Wessex Water Services Limited

Trowbridge Bioresources Centre (BC)

Application for Environmental Permit Variation

July 2021 Permit Reference: EPR/BB3934AG

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Project Name	Trowbridge BC - Environmental Permit Application
Project No	331101341.100.010104
Report Reference	V1.0

Revision	Date	Description	Author	Check	Review
0.1	5/7/21	DRAFT	JP	LG	PD

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Section I: Application Forms

Part A

Application for an environmental permit Part A – About you

You will need to fill in this part A if you are applying for a new permit, applying to change an existing permit or surrender your permit, or want to transfer an existing permit to yourself. Please check that this is the latest version of the form available from our website.

You can apply online for Waste standard rules environmental permits, bespoke waste permits and bespoke Medium combustion plant permits

Apply online for an environmental permit.

Please read through this form and the guidance notes that came with it.

The form can be:

1) **saved onto a computer and then filled in. Please note that the form follows a logic that means questions will open or stay closed depending on a previous answer. So you may not be able to enter text in some boxes.**
2) **printed off and filled in by hand. Please write clearly in the answer spaces.**

Note: if you believe including information on a public register would not be in the interests of national security you must enclose a letter telling us that you have told the Secretary of State. We will not include the information in the public register unless directed otherwise.

It will take less than one hour to fill in this part of the application form.

Where you see the term 'document reference' on the form, give the document references and send the documents with the application form when you've completed it.

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2 Applications from an individual
3 Applications from an organisation of individuals or charity
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6 Your address
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Appendix 1 – Date of birth information for installation and waste activities (applications for a new permit or transferring a permit) only

1 About you

Are you applying as an individual, an organisation of individuals (for example, a partnership), a company (this includes Limited Liability Partnerships) or a public body?

An individual	☐ Now go to section 2 and if you are applying for a new permit or transferring a permit for an installation or waste activity please also fill in Appendix 1
An organisation of individuals (for example, a partnership)	☐ Now go to section 3 and if you are applying for a new permit or transferring a permit for an installation or waste activity please also fill in Appendix 1
A public body	☐ Now go to section 4
A registered company or other corporate body	☑ Now go to section 5 and if you are applying for a new permit or transferring a permit for an installation or waste activity please also fill in Appendix 1

2 Applications from an individual

2a Please give us the following details

Name

Title (Mr, Mrs, Miss and so on) _____

First name _____

Last name _____

Now go to section 6

3 Applications from an organisation of individuals or charity

3a Type of organisation

For example, a charity, a partnership, a group of individuals or a club

3b Details of the organisation or charity

If you are an organisation of individuals, please give the details of the main representative below. If relevant, provide details of other members (please include their title Mr, Mrs and so on) on a separate sheet and tell us the document reference you have given this sheet

Contact name

Title (Mr, Mrs, Miss and so on)

First name

Last name

Now go to question 3c or section 6

3c Details of charity

Full name of charity

This should be the full name of the legal entity not any trading name.

3d Company registration number

If you are registered with Companies House please tell us your registration number

3e Charity Commission number

If you are registered with the Charity Commission please tell us your registration number

Now go to section 6

4 Applications from public bodies

4a Type of public body

For example, NHS trust, local authority, English county council

4b Name of the public body

4c Please give us the following details of the executive

An officer of the public body authorised to sign on your behalf

Name

Title (Mr, Mrs, Miss and so on)

First name

Last name

Position

Now go to section 6

5 Applications from companies or corporate bodies

5a Name of the company

Wessex Water Services Limited

5b Company registration number

02366648

Date of registration (DD/MM/YYYY)

01/04/1989

If you are applying as a corporate organisation that is not a limited company, please provide evidence of your status and tell us below the reference you have given the document containing this evidence.

Document reference

5 Applications from companies or corporate bodies, continued

5c Please give details of the directors

If relevant, provide details of other directors and company secretary, if there is one, on a separate sheet and tell us the reference you have given this sheet.

Document reference: See Non-Technical Summary

Details of company secretary (if relevant) and director/s

Title (Mr, Mrs, Miss and so on)

First name

Last name

Title (Mr, Mrs, Miss and so on)

First name

Last name

Now go to section 6

6 Your address

6a Your main (registered office) address

For companies this is the address on record at Companies House.

Contact name

Title (Mr, Mrs, Miss and so on): Mr

First name: Matt

Last name: Wheeldon

Address: Wessex Water Operations Centre,
Claverton Down Road,
Claverton Down,
Bath,

Postcode: BA2 7WW

Contact numbers, including the area code

Phone

Fax

Mobile: 07799581880

Email: WWreg@wessexwater.co.uk

For an organisation of individuals every partner needs to give us their details, including their title Mr, Mrs and so on. So, if necessary, continue on a separate sheet and tell us below the reference you have given the sheet.

Document reference

6b Main UK business address (if different from above)

Contact name

Title (Mr, Mrs, Miss and so on)

First name

Last name

Address

Postcode

6 Your address, continued

Contact numbers, including the area code

Phone

Fax

Mobile

Email

Now go to section 7

7 Contact details

7a Who can we contact about your application?

It will help us if there is someone we can contact if we have any questions about your application. The person you name should have the authority to act on your behalf.

Please add a second contact on a separate sheet if this person is not always available.

Document reference of this separate sheet

This can be someone acting as a consultant or an 'agent' for you.

Contact name

Title (Mr, Mrs, Miss and so on) Mr

First name Peter

Last name Duncan

Address Stantec House

Kelburn Court

Warrington

Postcode WA3 6UT

Contact numbers, including the area code

Phone 01925 845207

Fax

Mobile

Email peter.duncan@stantec.com

7b Who can we contact about your operation (if different from question 7a)?

Contact name

Title (Mr, Mrs, Miss and so on)

First name

Last name

Address

Postcode

Contact numbers, including the area code

Phone

Fax

Mobile

Email

7 Contact details, continued

7c Who can we contact about your billing or invoice?

Note: Please provide the name and address that all invoices should be sent to for your subsistence fees.

As in question 7a ☐

As in question 7b ☐

Please give details below if different from question 7a or 7b.

Contact name

Title (Mr, Mrs, Miss and so on)	Ms
First name	Carolyn
Last name	Dewhirst
Address	Wessex Water Operations Centre, Claverton Down Road, Claverton Down Bath,
Postcode	BA2 7WW

Contact numbers, including the area code

Phone	
Fax	
Mobile	07799581880
Email	Carolyn.dewhirst@wessexwater.co.uk

8 How to contact us

If you need help filling in this form, please contact the person who sent it to you or contact us as shown below.

General enquiries: 03708 506 506 (Monday to Friday, 8am to 6pm)

Textphone: 03702 422 549 (Monday to Friday, 8am to 6pm)

Email: enquiries@environment-agency.gov.uk

Website: www.gov.uk/government/organisations/environment-agency

If you are happy with our service, please tell us. It helps us to identify good practice and encourages our staff. If you're not happy with our service, please tell us how we can improve it. More information on how to do this is available at: www.gov.uk/government/organisations/environment-agency/about/complaints-procedure.

Please tell us if you need information in a different language or format (for example, in large print) so we can keep in touch with you more easily.

9 Where to send your application

For how many copies to send see the guidance note on part A.

For water discharges by email to PSC-WaterQuality@environment-agency.gov.uk

For waste and installations by email to PSC@environment-agency.gov.uk

For flood risk activity permits send 1 copy only to enquiries@environment-agency.gov.uk or to the local Environment Agency office for where the work is proposed to be carried out.

Or

Permitting Support, NPS Sheffield
Quadrant 2
99 Parkway Avenue
Parkway Business Park
Sheffield
S9 4WF

Feedback

(You don't have to answer this part of the form, but it will help us improve our forms if you do.)

We want to make our forms easy to fill in and our guidance notes easy to understand. Please use the space below to give us any comments you may have about this form or the guidance notes that came with it.

How long did it take you to fill in this form?

We will use your feedback to improve our forms and guidance notes, and to tell the Government how regulations could be made simpler.

Would you like a reply to your feedback?

Yes please ☐

No thank you ☐

Crystal Mark 19101
Clarity approved by Plain English Campaign

For Environment Agency use only

Date received (DD/MM/YYYY)

Our reference number

Payment received?

No ☐

Yes ☐ Amount received

£

Appendix 1 – Date of birth information for installation and waste activities (applications for a new permit or transferring a permit) only

Date of birth information in this appendix will not be put onto our Public Register

Are you applying as an individual, an organisation of individuals (for example, a partnership) or a company (this includes Limited Liability Partnerships)?

An individual	☐ Now go to 2
An organisation of individuals (for example, a partnership)	☐ Now go to 3
A registered company or other corporate body	☑ Now go to 4

2 Applications from an individual

Please give us the following details

Name

Date of birth (DD/MM/YY)

3 Applications from an organisation of individuals or charity

Details of the organisation or charity

If you are an organisation of individuals, please give the date of birth details of the main representative below. If relevant, provide details of other members on a separate sheet and tell us the document reference you have given this sheet.

Name

Date of birth (DD/MM/YY)

Document reference

4 Applications from companies or corporate bodies

Name of the company: Wessex Water Services Limited

Please give the date of birth details for all directors and company secretary if there is one. If relevant, provide those details of other directors on a separate sheet and tell us the document reference you have given this sheet.

Details of company secretary (if relevant) and director/s

Name: See Non-Technical Summary

Date of birth (DD/MM/YY)

Name

Date of birth (DD/MM/YY)

Name

Date of birth (DD/MM/YY)

Document reference

Part C2

Application for an environmental permit
Part C2 – General – varying a bespoke permit

Environment Agency

Fill in this part of the form, together with part A and the relevant parts of C3 to C7 and part F1 or F2, if you are applying to vary (change) the conditions or any other part of the permit. Please check that this is the latest version of the form available from our website.

You only need to give us details in this application for the parts of the permit that will be affected (for example, if you are adding a new facility or changing existing ones).

Waste operation changing to installation or vice versa?

If your changes mean that a waste operation becomes an installation (or vice versa) you also need to fill in either part C3 (waste to installation) or part C4 (installation to waste).

You do not need to resend any information from your original permit application if it is not affected by your proposed changes.

Please read through this form and the guidance notes that came with it.

The form can be:

1) saved onto a computer and then filled in. Please note that the form follows a logic that means questions will open or stay closed depending on a previous answer. So you may not be able to enter text in some boxes.
2) printed off and filled in by hand. Please write clearly in the answer spaces.

It will take less than two hours to fill in this part of the application form.

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1 About the permit
2 About your proposed changes
3 Your ability as an operator
4 Consultation
5 Supporting information
6 Environmental risk assessment
7 How to contact us
Appendix 1 – Low impact installation checklist
Appendix 2 – Date of birth information for Relevant offences and/or Technical ability questions only

1 About the permit

Note: If you are applying to convert your existing permit to a standard permit or add a standard facility you need to fill out form C1.

1a Discussions before your application

If you have had discussions with us before your application, give us the permit reference or details on a separate sheet. Tell us below the reference you have given this extra sheet.

Permit or document reference

1b Permit number

What is the permit number that this application relates to? EPR/BB3934AG

1c Site details

What is the name, address and postcode of the site?

Site name Trowbridge STW

Address Troiwbridge STW
Bradford Road
Trowbridge
Wiltshire

Postcode BA14 9BJ

2 About your proposed changes

2a Type of variation

What type of variation are you applying for?

Minor technical ☐

Normal variation ☐

Substantial ☑

2 About your proposed changes, continued

2b Changes or additions to existing activities

Please give us brief details in the box below. More detailed information can be given in Table 1 below.

Changes include variation of the EP to a Bespoke Installation EP for biological treatment activities. Further information is provided in Section III Supporting Information.

Fill in Table 1 with details of all the proposed changes to current activities. In the final column of the table, give us the document reference for the proposed changes and send them to us with your filled in application form.

Fill in a separate table for each activity you are applying to vary or add. Use a separate sheet if you have a long list and send it to us with your application form. Tell us below the reference you have given this document.

Document reference N/A

You only need to fill in one table for your mining waste operations.

2c Consolidating (combining) or updating existing permits

If your proposed change is to modernise (update) your permit, now answer 2c1; otherwise go to 2d.

If your proposed change is to consolidate (combine) a number of permits, now answer 2c2; otherwise go to 2d.

Note: In both cases we may require additional information from you about, for example, your management system. Therefore we would always advise you to talk to us before you submit any application to modernise or consolidate permits.

2c1 Do you want to have a modern style permit?

No ☐

Yes ☐

2c2 Identify all the permits you want to consolidate (combine) by listing the permit numbers in Table 2 below

Table 2 – Permit numbers

2d Treating batteries

2d Are you proposing to treat batteries?

No ☑

Yes ☐ Tell us how you will do this and send us a copy of your explanation and tell us below the reference you have given this explanation

Document reference for the explanation

2e Ship recycling

2e1 Is your activity covered by the Ship Recycling Regulations 2015? (See the guidance notes on part C2.)

No ☑

Yes ☐ Tell us how you will do this. Please send us a copy of your explanation and your facility recycling plan, and tell us below the reference numbers you have given these documents

Document reference for the explanation

Document reference for the facility recycling plan

2e2 Is this a renewal of an existing authorisation covered by the Ship Recycling Regulations 2015?

No ☑

Yes ☐ Tell us the expiry date of your existing authorisation (DD/MM/YYYY)

2 About your proposed changes, continued

Table 1 – Changes to existing activities

Fill in Table 1 with details of all the proposed changes to current activities. In the final column of the table, give us the document reference for the proposed changes and send them to us with your filled in application form.

Name	Installation schedule 1 references	Description of the installation activity	Description of waste operation	Description of the mining waste operations	Description of water discharge activity	Description of groundwater activity	Proposed changes document reference
i.e. name of installation, waste operation, mining waste operation, water discharge activity or groundwater activity							
Example – effluent unique name					Example – treated sewage effluent		
If you do not have enough room, go to the line below or send a separate document and give us the document reference here							
Trowbridge STW	Section 5.4 (b) (i)	Non-haz waste install.					See
		- Biological treatment					Supporting Information

2 About your proposed changes, continued

2f Low impact installations (installations only)

2f1 Will any changes mean that any of the regulated facilities will become low impact installations?

No ☑ Now go to section 3

Yes ☐ If yes, tell us how you meet the conditions for a low impact installation (see the guidance notes on part C2 – Appendix 1)

Document reference

Tick the box to confirm you have filled in the low impact installation checklist in appendix 1 for each regulated facility ☐

3 Your ability as an operator

If you are applying to add waste installations or waste operations to a permit that has not previously had them, you need to fill in all of section 3.

If you are applying to consolidate (combine) two or more permits or have an updated permit you must fill in question 3d.

This section does not apply for applications to surrender a permit.

3a Relevant offences

Installations and waste operations only (see the guidance notes on part C2).

3a1 Have you, or any other relevant person, been convicted of any relevant offence?

No ☐ Now go to question 3b

Yes ☑ Please give details below

Name of the relevant person

Title (Mr, Mrs, Miss and so on)

First name

Last name

Position held at the time of the offence

Name of the court where the case was dealt with

Date of the conviction (DD/MM/YY)

Offence and penalty set

Date any appeal against the conviction will be heard (DD/MM/YYYY)

If necessary, use a separate sheet to give us details of other relevant offences and tell us below the reference number you have given the extra sheet.

Document reference: Appendix 1 Relevant Offences

Now go to question 3b

Please also complete the details in Appendix 2.

3b Technical ability

Specified waste management activities and waste operations only (see the guidance notes on part C1).

Please indicate which of the two schemes you are using to demonstrate you are technically competent to operate your facility and the evidence you have enclosed to demonstrate this.

ESA/EU skills

I have enclosed a copy of the current Competence Management System certificate ☐

CIWM/WAMITAB scheme

Please select **one** of the following:

- I have enclosed a copy of:
  - the relevant qualification certificate/s ☑

  or
  - evidence of deemed competence ☐

  or

3 Your ability as an operator, continued

- Environment Agency assessment ☐

or

- evidence of nominated manager status under the transitional provisions for previously exempt activities ☐

and, if deemed competent or Agency-assessed, or if there is evidence of a nominated manager, or if the original qualification is over two years old:

I have enclosed a copy of the relevant current continuing competence certificate/s ☐

For each technically competent manager please give the following information. If necessary, use a separate sheet to give us these details and tell us below the document reference you have given the extra sheet.

Title (Mr, Mrs, Miss and so on) Mr

First name Dan

Last name Selby

Phone

Mobile

Email dan.selby@wessexwater.co.uk

Please provide the environmental permit number/s and site address for **all** other waste activities that the proposed technically competent manager provides technical competence for, including permits held by other operators. Continue on a separate sheet as required.

Permit number	Site address	Postcode
	None	

Document reference Section III Supporting Information

Now go to question 3c

Please also complete the details in Appendix 2.

3c Finances

Installations, waste operations and mining waste operations only (see the guidance notes on part C2).

Please note that if you knowingly or carelessly make a statement that is false or misleading to help you get an environmental permit (for yourself or anyone else), you may be committing an offence under the Environmental Permitting (England and Wales) Regulations 2016.

Do you or any relevant person or a company in which you were a relevant person have current or past bankruptcy or insolvency proceedings against you?

No ☑

Yes ☐ Please give details below, including the required set-up costs (including infrastructure), maintenance and clean up costs for the proposed facility against which a credit check may be assessed

We may want to contact a credit reference agency for a report about your business's finances.

3 Your ability as an operator, continued

Landfill, Category A mining waste facilities and mining waste facilities for hazardous waste only

How do you plan to make financial provision (to operate a landfill or a mining waste facility you need to show us that you are financially capable of meeting the obligations of closure and aftercare)?

Renewable bonds ☐

Cash deposits with the Environment Agency ☐

Other – provide comprehensive details ☐

Document reference

Provide a cost profile and expenditure plan of your estimated costs throughout the aftercare period of your site.

Document plan reference

Now go to question 3d

3d Management systems

You must have an effective, written management system in place that identifies and reduces the risk of pollution. You may show this by using a certified scheme or your own system.

Your permit requires you (as the operator) to ensure that you manage and operate your activities in accordance with a written management system.

You need to be able to explain what happens at each site and which parts of the overall management system apply. For example, at some sites you may need to show you are carrying out additional measures to prevent pollution because they are nearer to sensitive locations than others.

You can find guidance on management systems on our website at www.gov.uk/government/organisations/environment-agency.

Tick this box to confirm that you have read the guidance and that your management system will meet our requirements ☐

What management system will you provide for your regulated facility?

ISO 14001 ☐

BS 8555 (Phases 1–5) ☐

Acorn ☐

Green dragon ☐

Own management system ☑

Please make sure you send us a summary of your management system with your application.

Document reference/s EMS Summary

4 Consultation

Fill in 4a to 4c for installations and waste operations and 4d for installations only.

Could the waste operation or installation involve releasing any substance into any of the following?

4a A sewer managed by a sewerage undertaker?

No ☑

Yes ☐ Please name the sewerage undertaker

4b A harbour managed by a harbour authority?

No ☑

Yes ☐ Please name the harbour authority

4c Directly into relevant territorial waters or coastal waters within the sea fisheries district of a local fisheries committee?

No ☑

Yes ☐ Please name the fisheries committee

4 Consultation, continued

4d Is the installation on a site for which:

4d1 a nuclear site licence is needed under section 1 of the Nuclear Installations Act 1965?

No ☑

Yes ☐

4d2 a policy document for preventing major accidents is needed under regulation 5 of the Control of Major Accident Hazards Regulations 2015, or a safety report is needed under regulation 7 of those Regulations?

No ☑

Yes ☐

5 Supporting information

5a Provide a plan or plans for the site

See the guidance notes on part C2 for what needs to be marked on the plan.

Clearly mark the site boundary or discharge point, or both. Also include site drainage plans, site layout plans, and plant design drawings/process flow diagrams (as required). (See the guidance notes on part C2.)

Document reference/s of the plans: New Installation Boundary

5b Do any of the variations you plan to make need extra land to be included in the permit?

No ☐

Yes ☑ Please provide a site report for the extra land

Document report reference/s: Site Condition Report

5c Provide a non-technical summary of your application

Document reference of the summary: Non-Technical Summary

5d Risk of fire from sites storing combustible waste

Are you applying for an activity that includes the storage of combustible wastes?

(This applies to all activities excluding standalone water and groundwater discharges.)

No ☑ Go to question 5f

Yes ☐ Go to question 5e

5e Will your variation increase the risk of a fire occurring or increase the environmental risk if a fire occurs?

See the guidance notes on part C2.

No ☐

Yes ☐ Provide a fire prevention plan. You need to highlight any changes you have made since your pre-application discussions

Document reference of the plan:

5f Adding an installation

If you are applying to add an installation, tick the box to confirm that you have sent in a baseline report and provide a reference ☑

Document reference of the report: Site Condition Report

6 Environmental risk assessment

If you need one, see the guidance notes on part C2.

Provide an assessment of any additional risks the proposed changes or additions to your regulated facilities poses to the environment as part of your application to vary this permit. The risk assessment must follow the methodology set out in 'Risk assessments for your environmental permit' at https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit or an equivalent method.

Document reference for the assessment: Environmental Risk Assessment

7 How to contact us

If you need help filling in this form, please contact the person who sent it to you or contact us as shown below.

General enquiries: 03708 506 506 (Monday to Friday, 8am to 6pm)

Textphone: 03702 422 549 (Monday to Friday, 8am to 6pm)

Email: enquiries@environment-agency.gov.uk

Website: www.gov.uk/government/organisations/environment-agency

If you are happy with our service, please tell us. It helps us to identify good practice and encourages our staff. If you're not happy with our service, please tell us how we can improve it.

Please tell us if you need information in a different language or format (for example, in large print) so we can keep in touch with you more easily.

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How long did it take you to fill in this form?

We will use your feedback to improve our forms and guidance notes, and to tell the Government how regulations could be made simpler.

Would you like a reply to your feedback?

Yes please ☐

No thank you ☐

For Environment Agency use only

Date received (DD/MM/YYYY)

Our reference number

Payment received?

No ☐

Yes ☐ Amount received

£

Plain English Campaign's Crystal Mark does not apply to appendix 1.

Appendix 1 – Low impact installation checklist

Installation reference				
Condition	Response			Do you meet this?
A – Management techniques	Provide references to show how your application meets A			Yes ☐ No ☐
	References			
B – Aqueous waste	Effluent created		m^3/day	Yes ☐ No ☐
C – Abatement systems	Provide references to show how your application meets C			Yes ☐ No ☐
	References			
D – Groundwater	Do you plan to release any hazardous substances or non-hazardous pollutants into the ground?		Yes ☐ No ☐	Yes ☐ No ☐
E – Producing waste	Hazardous waste		Tonnes per year	Yes ☐ No ☐
	Non-hazardous waste		Tonnes per year	
F – Using energy	Peak energy consumption		MW	Yes ☐ No ☐
G – Preventing accidents	Do you have appropriate measures to prevent spills and major releases of liquids? (See 'How to comply'.)		Yes ☐ No ☐	Yes ☐ No ☐
	Provide references to show how your application meets G			
	References			
H – Noise	Provide references to show how your application meets H			Yes ☐ No ☐
	References			
I – Emissions of polluting substances	Provide references to show how your application meets I			Yes ☐ No ☐
	References			
J – Odours	Provide references to show how your application meets J			Yes ☐ No ☐
	References			
K – History of keeping to the regulations	Say here whether you have been involved in any enforcement action as described in Compliance History Appendix 1 explanatory notes		Yes ☐ No ☐	

Appendix 2 – Date of birth information for Relevant offences and/or Technical ability questions only

Date of birth information in this appendix will not be put onto our Public Register

Have you filled in the Relevant Offences question?

Yes ☑

No ☐

Have you filled in the Technical ability question?

Yes ☑

No ☐

2 Relevant Offences - date of birth information

Please give us the following details

Name	See Relevant Offences Appendix 1
Date of birth (DD/MM/YY)	

3 Technical ability - date of birth information

Name	Dan Selby
Date of birth (DD/MM/YY)	22/08/87

Part C3

Application for an environmental permit Part C3 – Variation to a bespoke installation permit

Environment Agency

Fill in this part of the form, together with part A, part C2 and part F1, if you are applying to vary (change) the conditions or any other part of the permit. Please check that this is the latest version of the form available from our website.

You only need to give us details in this application for the parts of the permit that will be affected (for example, if you are adding a new facility or making changes to existing ones).

You do not need to resend any information from your original permit application if it is not affected by your proposed changes.

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The form can be:

1) saved onto a computer and then filled in. Please note that the form follows a logic that means questions will open or stay closed depending on a previous answer. So you may not be able to enter text in some boxes.
2) printed off and filled in by hand. Please write clearly in the answer spaces.

It will take less than three hours to fill in this part of the application form.

Contents

1 What activities are you applying to vary?
2 Point source emissions to air, water and land
3 Operating techniques
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Appendix 1 – Specific questions for the combustion sector
Appendix 2 – Specific questions for the chemical sector
Appendix 3 – Specific questions for the waste incineration sector
Appendix 4 – Specific questions for the landfill sector

1 What activities are you applying to vary?

Fill in Table 1a below with details of all the activities listed in schedule 1 of the Environmental Permitting Regulations (EPR) and all directly associated activities (DAAs) (in separate rows), that you propose to carry out at the installation.

Note: if you want to add a Medium combustion plant or specified generator (MCP/SG) to your installation please use part C2.5 instead.

Fill in a separate table for each installation you are applying to vary. Use a separate sheet if you have a long list and send it to us with your application form. Tell us below the reference you have given the document.

Document reference

1 What activities are you applying to vary?, continued

Table 1a – Types of activities

Schedule 1 listed activities						
Installation name	Schedule 1 references (See note 1)	Description of the Activity (See note 2)	Activity capacity (See note 3)	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity (if this applies) (See note 3)	Non-hazardous waste treatment capacity (if this applies) (See note 3)
Add extra rows if you need them. If you do not have enough room, go to the line below or send a separate document and give us the document reference here	Put your main activity first			For installations that take waste only	For installations that take waste only	For installations that take waste only
See Section III						
Supporting Information						

Directly associated activities (See note 4)		
Name of DAA	Description of the DAA (please identify the schedule 1 activity it serves)	
Add extra rows if you need them		
For installations that take waste (See note 5 below)	Total storage capacity	
	Annual throughput (tonnes each year)	

1 What activities are you applying to vary?, continued

Notes

1 Quote the section number, part A1 or A2 or B, then paragraph and sub paragraph number as shown in part 2 of schedule 1 to the regulations.

2 Use the description from schedule 1 of the regulations. Include any extra detail that you think would help to accurately describe what you want to do.

3 By 'capacity', we mean:

- the total incineration capacity (tonnes every hour) for waste incinerators
- the total landfill capacity (cubic metres) for landfills
- the total treatment capacity (tonnes each day) for waste treatment operations
- the total storage capacity (tonnes) for waste storage operations
- the processing and production capacity for manufacturing operations, or
- the thermal input capacity for combustion activities

4 Fill this in as a separate line and give an accurate description of any other activities associated with your schedule 1 activities. You cannot have DAAs as part of a mobile plant application.

5 By 'total storage capacity', we mean the maximum amount of waste, in tonnes, you store on the site at any one time.

Types of waste accepted

For those installations that take waste, for each line in Table 1a (including DAAs), fill in a separate document to list those wastes you will accept on to the site for that activity. Give the List of Wastes catalogue code and description (search for 'Technical guidance on how to assess and classify waste' at www.gov.uk/government/organisations/environment-agency).

If you need to exclude waste from your activity or facility by restricting the description, quantity, physical nature, hazardous properties, composition or characteristic of the waste, include these in the document. Send it to us with your application form.

Please provide the reference for each document.

You can use Table 1b as a template.

If you want to accept any waste with a code ending in 99, you must provide more information and a full description of the waste in the document, (for example, detailing the source, nature and composition of the waste). Where you only want to receive specific wastes within a waste code you can provide further details of the waste you want to receive. Where a waste is dual coded you should use both codes for the waste.

Document reference of this extra information: See Section III Supporting Information

Table 1b – Template example – types of waste accepted and restrictions

Waste code	Description of the waste
Example	Example
02 01 08*	Agrochemical waste containing hazardous substances
18 01 03*	Infectious clinical waste, not contaminated with chemicals or medicines – human healthcare (may contain sharps) for alternative treatment
17 05 03*/17 06 05*	Non-hazardous soil from construction or demolition contaminated with fragments of asbestos cement sheet

2 Point source emissions to air, water and land

Fill in Table 2 below with details of the emissions that result from the operating techniques at each of your installations.

Fill in one table for each installation.

Table 2 – Emissions

Installation name	Trowbridge STW			
Point source emissions to air				
Emission point reference and location	Source	Parameter	Quantity	Unit
See Point Source Emissions to Air in				
Section III Supporting Information				
Point source emissions to water (other than sewers)				
Emission point reference and location	Source	Parameter	Quantity	Unit
See Section III Supporting Information				
Point source emissions to sewers, effluent treatment plants or other transfers off site				
Emission point reference and location	Source	Parameter	Quantity	Unit
See Section III Supporting Information				
Point source emissions to land				
Emission point reference and location	Source	Parameter	Quantity	Unit
None				

Supporting information

3 Operating techniques

3a Technical standards

Fill in Table 3a for each activity at the installation you refer to in Table 1a above and list the 'Best Available Techniques' you are planning to use. If you use the standards set out in the relevant BAT conclusion(s), BAT reference document(s) (BREF) and/or technical guidance(s) (TGN) there is no need to justify using them within your documents in Table 3a.

You must justify your decisions in a separate document if:

- there is no technical standard
- the technical guidance provides a choice of standards, or
- you plan to use another standard

This justification could include a reference to the Environmental Risk Assessment provided in part C2 (general bespoke permit) of the application form.

For each of the activities listed in Table 1a, the documents in Table 3a should summarise:

- the operations undertaken
- the measures you will use to control the emissions from your process, as identified in your risk assessment or the relevant BAT conclusions, BREF or technical guidance
- how you will meet other standards set out in the relevant BAT conclusions document, BREF or technical guidance

Table 3 – Technical standards

Fill in a separate table for each activity at the installation.

Installation name	Trowbridge STW	
Description of the schedule 1 activity or directly associated activity Add extra rows if you need them	Best available technique (BATC, BREF or TGN reference) (see footnote below)	Document reference (if appropriate)
Section 5.3 (b) (i) Biological Treatment	Sector Guidance Note 5.06	BAT Assessment
	2018/1147 BAT Conclusions	BAT Assessment

* Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

In all cases, describe the type of facility or operation you are applying for and provide site infrastructure plans, location plans and process flow diagrams or block diagrams to help describe the operations and processes undertaken. Give the document references you use for each plan, diagram and description.

Document reference: Non Technical Summary & Supporting Information

3a1 Does your permit (in Table 1.2 Operating Techniques or similar table in the permit) have references to any of your own documents or parts of documents submitted as part of a previous application for this site?

No ☑ Now go to 3b

Yes ☐ Please tell us in a separate document what document references are no longer valid or have been superseded and why

Please also tell us below the reference number you have given the document and send it in with your application

Document reference

3 Operating techniques, continued

3b General requirements

Fill in a separate Table 4 for each installation.

Table 4 – General requirements

Name of the installation	Trowbridge STW
If the technical guidance or your risk assessment shows that emissions of substances not controlled by emission limits are an important issue, send us your plan for managing them	Document reference or references Not an important issue, see ERA & Supp Info
Where the technical guidance or your risk assessment shows that odours are an important issue, send us your odour management plan	Document reference or references Odour Management Plan
If the technical guidance or your risk assessment shows that noise or vibration are important issues, send us your noise or vibration management plan (or both)	Document reference or references See Noise & Vibration Risk Assessment

Search for 'Risk assessment for your environmental permit' at www.gov.uk/government/organisations/environment-agency.

3c Types and amounts of raw materials

Fill in Table 5 for all schedule 1 activities. Fill in a separate table for each installation.

Table 5 – Types and amounts of raw materials

Name of the installation		Trowbridge STW		
Capacity (See note 1 below)				
Schedule 1 activity	Description of raw material and composition	Maximum amount (tonnes) (See note 2 below)	Annual throughput (tonnes each year)	Description of the use of the raw material including any main hazards (include safety data sheets)
Section III Supporting				
Information				

Notes

1 By 'capacity', we mean the total storage capacity (tonnes) or total treatment capacity (tonnes each day).

2 By 'maximum amount', we mean the maximum amount of raw materials on the site at any one time.

Use a separate sheet if you have a long list of raw materials, and send it to us with your application form. Please also provide the reference of this extra sheet.

Document reference: See Supporting Information

3d Information for specific sectors

For some of the sectors, we need more information to be able to set appropriate conditions in the permit. This is as well as the information you may provide in sections 5, 6 and 7. For those activities listed below, you must answer the questions in the related document.

Table 6 – Questions for specific sectors

Sector	Appendix
Combustion	See the questions in appendix 1
Chemicals	See the questions in appendix 2
Incinerating waste	See the questions in appendix 3
Landfill	See the questions in appendix 4

General information

4 Monitoring

4a Describe the measures you use for monitoring emissions by referring to each emission point in Table 2 above

You should also describe any environmental monitoring. Tell us:

- how often you use these measures
- the methods you use
- the procedures you follow to assess the measures

Document reference: See Section III Supporting Information

4b Point source emissions to air only

Provide an assessment of the sampling locations used to measure point source emissions to air. The assessment must use M1 (search for 'M1 sampling requirements for stack emission monitoring' at www.gov.uk/government/organisations/environment-agency).

Document reference of the assessment: Environmental Risk Assessment

5 Environmental impact assessment

5a Have your proposals been the subject of an environmental impact assessment under Council Directive 85/337/EEC of 27 June 1985 [Environmental Impact Assessment] (EIA)?

No ☑ Now go to section 6

Yes ☐ Please provide a copy of the environmental statement and, if the procedure has been completed:

- a copy of the planning permission
- the committee report and decision on the EIA

Document reference of the copy:

6 Resource efficiency and climate change

If the site is a landfill, you only need to fill in this section if the application includes landfill gas engines.

6a Describe the basic measures for improving how energy efficient your activities are

Document reference of the description: Energy Management Plan

6b Provide a breakdown of any changes to the energy your activities use up and create

Document reference of the breakdown: Energy Management Plan

6c Have you entered into, or will you enter into, a climate change levy agreement?

No ☑ Describe the specific measures you use for improving your energy efficiency

Document reference of the description:

Yes ☐ Please give the date you entered (or the date you expect to enter) into the agreement (DD/MM/YYYY):

Please also provide documents that prove you are taking part in the agreement.

Document reference of the proof:

6d Explain and justify the raw and other materials, other substances and water that you will use

Document reference of the justification: See Supporting Information

6e Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste

If you produce waste, describe how you recover it. If it is technically and financially impossible to recover the waste, describe how you dispose of it while avoiding or reducing any effect it has on the environment.

Document reference of the description: N/A

7 How to contact us

If you need help filling in this form, please contact the person who sent it to you or contact us as shown below.

General enquiries: 03708 506 506 (Monday to Friday, 8am to 6pm)

Textphone: 03702 422 549 (Monday to Friday, 8am to 6pm)

Email: enquiries@environment-agency.gov.uk

Website: www.gov.uk/government/organisations/environment-agency

If you are happy with our service, please tell us. It helps us to identify good practice and encourages our staff. If you're not happy with our service, please tell us how we can improve it.

Please tell us if you need information in a different language or format (for example, in large print) so we can keep in touch with you more easily.

Feedback

(You don't have to answer this part of the form, but it will help us improve our forms if you do.)

We want to make our forms easy to fill in and our guidance notes easy to understand. Please use the space below to give us any comments you may have about this form or the guidance notes that came with it.

How long did it take you to fill in this form?

We will use your feedback to improve our forms and guidance notes, and to tell the Government how regulations could be made simpler.

Would you like a reply to your feedback?

Yes please ☐

No thank you ☐

For Environment Agency use only

Date received (DD/MM/YYYY)

Our reference number

Payment received?

No ☐

Yes ☐ Amount received

£

Plain English Campaign's Crystal Mark does not apply to appendices 1 to 4.

Appendix 1 – Specific questions for the combustion sector

1 Identify the type of fuel burned in your combustion units (including when your units are started up, shut down and run as normal). If your units are dual fuelled (that is, use two types of fuel), list both the fuels you use

Fill in a separate table for each installation.

Installation reference	N/A - MCP covered under EPR/HB3602TR		
Type of fuel	When run as normal	When started up	When shut down
Coal			
Gas oil			
Heavy fuel oil			
Natural gas			
WID waste			
Biomass (see notes 1 and 2 below)			
Biomass (see notes 1 and 2 below)			
Biomass (see notes 1 and 2 below)			
Biomass (see notes 1 and 2 below)			
Biomass (see notes 1 and 2 below)			
Other			

Notes

1 Not covered by Industrial Emissions Directive 2010/75/EU.

2 'Biomass' is referred to in www.opsi.gov.uk/si/si2002/20020914.htm.

Give extra information if it helps to explain the fuel you use.

Document reference

2 Give the composition range of any fuels you are currently allowed to burn in your combustion plant

Fill in a separate table for each installation.

Fuel use and analysis					
Installation reference					
Parameter	Unit	Fuel 1	Fuel 2	Fuel 3	Fuel 4
Maximum percentage of gross thermal input	%				
Moisture	%				
Ash	% wt/wt dry				
Sulphur	% wt/wt dry				
Chlorine	% wt/wt dry				
Arsenic	% wt/wt dry				
Cadmium	% wt/wt dry				
Carbon	% wt/wt dry				
Chromium	% wt/wt dry				
Copper	% wt/wt dry				
Hydrogen	% wt/wt dry				
Lead	% wt/wt dry				
Mercury	% wt/wt dry				
Nickel	% wt/wt dry				
Nitrogen	% wt/wt dry				
Oxygen	% wt/wt dry				
Vanadium	mg/kg dry				
Zinc	mg/kg dry				
Net calorific value	MJ/kg				

Appendix 1 – Specific questions for the combustion sector, continued

3 If NOx factors are necessary for reporting purposes (that is, if you do not need to monitor emissions), please provide the factors associated with burning the relevant fuels

Fill in a separate table for each installation.

Installation reference	
Fuel	NOx factor (kgt^{-1})
Fuel 1	
Fuel 2	
Fuel 3	
Fuel 4	

Note: kgt^{-1} means kilograms of nitrogen oxides released for each tonne of fuel burned.

4 Will your combustion plant be subject to Chapter III of the Industrial Emissions Directive 2010/75/EU?

See Government Guidance.

No ☐ Now fill in part F

Yes ☐

5 What is your plant?

an existing one ☐ A plant licensed before 1 July 1987

a new one ☐ A plant licensed on or after 1 July 1987 but before 27 November 2002, or a plant for which an application was made before 27 November 2002 and which was put into operation before 27 November 2003

a new-new one ☐ A plant for which an application was made on or after 27 November 2002

6 If you run more than one type of plant or a number of the same type of plant on your installation, please list them in the table below

Fill in a separate table for each installation.

Installation reference	
Type of plant	Number within installation
Existing	
New	
New-new	
Gas turbine (group A)	
Gas turbine (group B)	

7 If you run an existing plant, have you submitted a declaration for the 'limited life derogation' set out in Article 33 of Chapter III of the Industrial Emissions Directive?

No ☐ Now go to section 9

Yes ☐

8 Have you subsequently withdrawn your declaration?

No ☐

Yes ☐

9 List the existing large combustion plants (LCPs) which have annual mass allowances under the National Emission Reduction Plan (NERP), and those with emission limit values (ELVs) under the LCPD

Installation reference	
LCPs under NERP	LCPs with ELVs

Appendix 1 – Specific questions for the combustion sector, continued

10 Do you meet the monitoring requirements of Chapter III of the Industrial Emissions Directive?

No ☐

Yes ☐ Document reference number

11a Are you substantially refurbishing an existing installation according to the meaning given in Article 14 of the Energy Efficiency Directive?

No ☐

Yes ☐ Now go to question 11b

11b Have you carried out a cost–benefit assessment (CBA) of opportunities for cogeneration (combined heat and power) or district heating under Article 14 of the Energy Efficiency Directive?

No ☐ Please provide supporting evidence of why a CBA is not required (for example, an agreement from us)

Document reference number of this evidence

Yes ☐ Please submit a copy of your CBA

Document reference number of the CBA

Appendix 2 – Specific questions for the chemical sector

1 Please provide a technical description of your activities

The description should be enough to allow us to understand:

- the process
- the main plant and equipment used for each process
- all reactions, including significant side reactions (that is, the chemistry of the process)
- the material mass flows (including by products and side streams) and the temperatures and pressures in major vessels
- the all emission control systems (both hardware and management systems), for situations which could involve releasing a significant amount of emissions – particularly the main reactions and how they are controlled
- a comparison of the indicative BATs and benchmark emission levels standards: technical guidance notes (TGNs); additional guidance 'The production of large volume organic chemicals' (EPR 4.01); 'Speciality organic chemicals sector' (EPR 4.02); 'Inorganic chemicals sector' (EPR 4.03); and best available techniques reference documents (BREFs) for the chemical sector

Document reference

2 If you are applying for a multi-purpose plant, do you have a multi-product protocol in place to control the changes?

No ☐

Yes ☐ Provide a copy of your protocol to accompany this application

Document reference

3 Does Chapter V of the Industrial Emissions Directive (IED) apply to your activities?

No ☐

Yes ☐ Fill in the following

3a List the activities which are controlled under the IED

Installation reference	
Activities	

3b Describe how the list of activities in question 3a above meets the requirements of the IED

Document reference

Appendix 3 – Specific questions for the waste incineration sector

If you are proposing to accept clinical waste please also fill in questions 1, 2 and 3 of appendix 4 above.

1a Do you run incineration plants as defined by Chapter IV of the Industrial Emissions Directive (IED)?

No ☐ You do not need to answer any other questions in this appendix

Yes ☐ IED applies

1b Are you subject to IED as

An incinerator? ☐

A co-incinerator? ☐

2 Do any of the installations contain more than one incineration line?

No ☐ Now go to question 4

Yes ☐

3 How many incineration lines are there within each installation?

Fill in a separate table for each installation.

Installation reference	
Number of incineration lines within the installation	
Reference identifiers for each line	

You must provide the information we ask for in questions 4, 5 and 6 below in separate documents. The information must at least include all the details set out in section 2 ('Key Issues') of S5.01 'Incineration of waste: additional guidance' (under the sub heading 'European legislation and your application for an EP Permit').

You must answer questions 7 to 13 on the form below.

4 Describe how the plant is designed, equipped and will be run to make sure it meets the requirements of IED, taking into account the categories of waste which will be incinerated

Document reference

5 Describe how the heat created during the incineration and co-incineration process is recovered as far as possible (for example, through combined heat and power, creating process steam or district heating)

Document reference

6 Describe how you will limit the amount and harmful effects of residues and describe how they will be recycled where this is appropriate

Document reference

For each line identified in question 3, answer questions 7 to 13 below

Question 3 identifier, if necessary

7 Do you want to take advantage of the Article 45 (1)(f) allowance (see below) if the particulates, CO or TOC continuous emission monitors (CEM) fail?

No ☐

Yes ☐ This allows 'abnormal operation' of the incineration plant under certain circumstances when the CEM for releases to air have failed. Annex VI, Part 3(2) sets maximum half hourly average release levels for particulates (150 mg/m^3), CO (normal ELV) and TOC (normal ELV) during abnormal operation

Describe the other system you use to show you keep to the requirements of Article 13(4) (for example, using another CEM, providing a portable CEM to insert if the main CEM fails, and so on)

Appendix 3 – Specific questions for the waste incineration sector, continued

8 Do you want to replace continuous HF emission monitoring with periodic hydrogen fluoride (HF) emission monitoring by relying on continuous hydrogen chloride (HCl) monitoring as allowed by IED Annex VI, Part 6 (2.3)?

Under this you do not have to continuously monitor emissions for hydrogen fluoride if you control hydrogen chloride and keep it to a level below the HCl ELVs.

No ☐

Yes ☐ Please give your reasons for doing this

9 Do you want to replace continuous water vapour monitoring with pre-analysis drying of exhaust gas samples, as allowed by IED Annex VI, Part 6 (2.4)?

Under this you do not have to continuously monitor the amount of water vapour in the air released if the sampled exhaust gas is dried before the emissions are analysed.

No ☐

Yes ☐ Please give your reasons for doing this

10 Do you want to replace continuous hydrogen chloride (HCl) emission monitoring with periodic HCl emission monitoring, as allowed by IED Annex VI, Part 6 (2.5), first paragraph?

Under this you do not have to continuously monitor emissions for hydrogen chloride if you can prove that the emissions from this pollutant will never be higher than the ELVs allowed.

No ☐

Yes ☐ Please give your reasons for doing this

Appendix 3 – Specific questions for the waste incineration sector, continued

11 Do you want to replace continuous HF emission monitoring with periodic HF emission monitoring, as allowed by IED Annex VI, Part 6 (2.5), first paragraph?

Under this you do not have to continuously monitor emissions for hydrogen fluoride if you can prove that the emissions from this pollutant will never be higher than the ELVs allowed.

No ☐

Yes ☐ Please give your reasons for doing this

12 Do you want to replace continuous SO_2 emission monitoring with periodic sulphur dioxide (SO_2) emission monitoring, as allowed by IED Annex VI, Part 6 (2.5), first paragraph?

Under this you do not have to continuously monitor emissions for sulphur dioxide if you can prove that the emissions from this pollutant will never be higher than the ELVs allowed.

No ☐

Yes ☐ Please give your reasons for doing this

13 If your plant uses fluidised bed technology, do you want to apply for a derogation of the CO WID ELV to a maximum of 100 mg/m^3 as an hourly average, as allowed by IED Annex VI, Part 3?

No ☐

Does not apply ☐

Yes ☐ Please give your reasons for doing this

Appendix 3 – Specific questions for the waste incineration sector, continued

14a Are you substantially refurbishing an existing installation according to the meaning given in Article 14 of the Energy Efficiency Directive?

No ☐

Yes ☐ Please go to question 14b

14b Have you carried out a cost–benefit assessment (CBA) of opportunities for cogeneration (combined heat and power) or district heating under Article 14 of the Energy Efficiency Directive?

No ☐ Please provide supporting evidence of why a CBA is not required (for example, an agreement from us)

Document reference number of this evidence

Yes ☐ Please submit a copy of your CBA

Document reference number of the CBA

Appendix 4 – Specific questions for the landfill sector

1 Provide your Environmental Setting and Installation Design (ESID) report

Document reference

2 Provide your hydrogeological risk assessment (HRA) for the site

Document reference

3 Provide your stability risk assessment (SRA) for the site

Document reference

4 Provide your landfill gas risk assessment (LFGRA) for the site

Document reference

We have developed templates for these four reports which can be found at www.gov.uk/government/collections/environmental-permitting-landfill-sector-technical-guidance.

5 Provide your proposed plan for closing the site and your procedures for looking after the site once it has closed

Document reference

Part F1 (including letter of authorisation)

Application for an environmental permit Part F1 – Charges and declarations

Environment Agency

Fill in this part for all applications for installations, waste operations, mining waste operations, water discharges, point source groundwater discharges and groundwater discharges onto land. Please check that this is the latest version of the form available from our website.

Please read through this form and the guidance notes that came with it.

The form can be:

1) **saved onto a computer and then filled in. Please note that the form follows a logic that means questions will open or stay closed depending on a previous answer. So you may not be able to enter text in some boxes.**
2) **printed off and filled in by hand. Please write clearly in the answer spaces.**

It will take less than two hours to fill in this part of the application form.

Contents

1 Working out charges
2 Payment
3 Privacy notice
4 Confidentiality and national security
5 Declaration
6 Application checklist
7 How to contact us
8 Where to send your application

Each individual who is applying for their name to appear on the permit must complete the declaration in section 5. You will have to print a separate copy of the declaration page for each additional individual to complete.

1 Working out charges

You must fill in this section.

You have to submit an application fee with your application. You can find out the charge by searching for 'Environment Agency charging scheme and guidance: environmental permits' at www.gov.uk/government/organisations/environment-agency.

Please remember that the charges are revised on 1 April each year and that there is an annual subsistence charge to cover the costs we incur in the ongoing regulation of the permit.

Table 1 – Type of application (fill number of activity being applied for in each column)

Installation	Waste	Mining waste	Medium Combustion Plant (MCP)/Specified Generator (SG)	Water discharge/point source discharge to groundwater	Groundwater spreading onto land
Biological Treatment					
(Section 5.4 (b) (i))					

Table 2 – Charge type (A)

Charge activity reference	Charge activity description	What are you applying to do? E.g. new, minor variation, normal variation, substantial variation, surrender, low risk surrender, transfer	Amount
e.g. 1.17.3	e.g. Sect 5.2 landfill for hazardous waste	e.g. transfer	e.g. £5,561
1.16.2.1	Section 5.3 (b) (i) Biological treatment	Substantial variation	£ 13,984.00
Total A			£ 13,984.00

1 Working out charges (you must fill in this section), continued

Table 3 – Additional assessment charges (B)

Part 1.19 Charges for plans and assessments			Tick appropriate
Reference	Plan or assessment	Charge	
1.19.1	Waste recovery plan	£1,231	☐
1.19.2	Habitats assessment (except where the application activity is a flood risk activity)	£779	☑
1.19.3	Fire prevention plan (except where the application activity is a farming installation)	£1,241	☐
1.19.4	Pests management plan (except where the application activity is a farming installation)	£1,241	☐
1.19.5	Emissions management plan (except where the application activity is a farming installation)	£1,241	☐
1.19.6	Odour management plan (except where the application activity is a farming installation)	£1,246	☑
1.19.7	Noise and vibration management plan (except where the application activity is a farming installation)	£1,246	☐
1.19.8	Ammonia emissions risk assessment (intensive farming applications only)	£620	☐
1.19.9	Dust and bio-aerosol management plan (intensive farming applications only)	£620	☐
	Advertising	£500	☐
Total B			£ 2,025.00

Total charges

Total A plus total B £ 16,009.00

2 Payment

Tick below to show how you have paid.

Cheque ☐

Postal order ☐

Cash ☐ Tick below to confirm you are enclosing cash with the application

Credit or debit card ☐

Electronic transfer (for example, BACS) ☑

Remittance number Payment ref. PSCAPPWESSEX027

Date paid (DD/MM/YYYY)

How to pay

Paying by cheque, postal order or cash

Cheque details

Cheque made payable to

Cheque number

Amount £

You should make cheques or postal orders payable to 'Environment Agency' and make sure they have 'A/c Payee' written across them if it is not already printed on.

Please write the name of your company and application reference number on the back of your cheque or postal order. **We will not** accept cheques with a future date on them.

We do not recommend sending cash through the post. If you cannot avoid this, please use a recorded delivery postal service and enclose your application reference details. Please tick the box below to confirm you are enclosing cash.

I have enclosed cash with my application ☐

2 Payment, continued

Paying by credit or debit card

If you are paying by credit or debit card we can call you. We will destroy your card details once we have processed your payment. We can accept payments by Visa, MasterCard or Maestro card only.

Please call me to arrange payment by debit or debit card ☐

Paying by electronic transfer BACS reference

If you choose to pay by electronic transfer you will need to use the following information to make your payment.

Company name	Environment Agency
Company address	SSCL (Environment Agency), PO Box 797, Newport Gwent, NP10 8FZ
Bank	RBS/NatWest
Address	London Corporate Service Centre, CPB Services, 2nd Floor, 280 Bishopsgate, London EC2M 4RB
Sort code	60-70-80
Account number	10014411
Account name	EA RECEIPTS
Payment reference number	PSCAPPXXXXXYYY

You need to create your own reference number. It should begin with PSCAPP (to reflect that the application is for a permitted activity) and it should include the first five letters of the company name (replacing the X's in the above reference number) and a unique numerical identifier (replacing the Y's in the above reference number). The reference number that you supply will appear on our bank statements.

If you are making your payment from outside the United Kingdom, it must be in sterling. Our IBAN number is GB23NWK60708010014411 and our SWIFTBIC number is NWBKGB2L.

If you do not quote your reference number, there may be a delay in processing your payment and application.

Provide a unique reference number for the application, i.e. do not only use the company name only: PSCAPPWESSEX027

State who is paying (full name and whether this is the agent/ applicant/other): Wessex Water Services Limited

Fee paid: £ 16,009.00

Date payment sent (DD/MM/YYYY):

Now read section 3 below

You should also email your payment details and reference number to ea_fsc_ar@gov.sscl.com.

3 Privacy notice

The Environment Agency runs the environmental permit application service.

We are the data controller for this service. A data controller determines how and why personal information is processed.

Our personal information charter explains:

- your rights
- what we do with your personal information

We're allowed to process your personal information because we have official authority as the environmental regulator. We need this information to carry out a task in the public interest that is set out in law. As the data controller, when you apply for an environmental permit, we have a legal obligation to process your personal data under the Environmental Permitting Regulations. The second lawful basis for processing your personal data is to comply with this legal obligation.

We need your personal information to process your environmental permit application. If you do not give us this information we cannot issue a permit to you. After we've issued a permit to you, we use your personal information:

- to check that you're complying with your permit
- during any potential enforcement action

What personal information we collect

If you're the individual applicant, director or company secretary of a company applying or a technically competent manager we need your:

- name
- date of birth

3 Privacy notice, continued

- address
- email address

If you're the agent, consultant, employee responsible for the activity or the employee responsible for billing and invoicing we need your:

- name
- address
- email address

If you're the applicant we need details of any:

- convictions
- bankruptcy

We also collect any questions or feedback you leave, including your email address if you contact us.

Your responsibility with other people's personal information

If you've included personal information about other people on your application, you must tell them. You must provide them with a copy of this privacy notice so that they know how their personal information will be used.

What we do with your personal information

We use your personal information to help us decide whether to issue you with a permit.

The information (except dates of birth) is available online on our consultation website during the consultation period. This website is available to everyone so your information may be seen outside the European Economic Area.

After consultation we put all the information (except dates of birth) you give us in your application on our public register.

If you can demonstrate that any information you send us is commercially or industrially confidential, we'll consider withholding that information from our public register.

If you think that the information you'll send us may be a threat to national security you must contact the Secretary Of State before you apply. You must still send us that information with your application. We will not include this information on our public register unless the Secretary of State decides it can be included.

See the environmental permitting guidance for guidance on national security.

We may use your email address to contact you for user research to improve our service. You don't have to take part in the research.

Where your personal information is processed and stored

We store and process your personal information on servers in the UK. We will not host your personal information outside the European Economic Area.

We do not use your personal information to make an automated decision or for automated profiling.

How long we keep your personal information

We keep your personal information while your permit is in use and for 7 years after you surrender your permit. If the permit is for a landfill site, we keep the data for 10 years after surrender.

Removing personal information from the public register

We will remove your personal information from the public register if:

- you withdraw your application
- we refuse your application and the time limit for appealing the decision has expired or an appeal is dismissed
- the information is no longer relevant for public participation purposes under the Environmental Permitting Regulations

Contact

Our Data Protection Team gives independent advice. They monitor how the Environment Agency uses your personal information.

If you have questions or concerns about how we process personal information, or to make a complaint or request relating to data protection, please contact:

Address: Data Protection Team
Environment Agency
Horizon House
Deanery Road
Bristol
BS1 5AH

3 Privacy notice, continued

Email: dataprotection@environment-agency.gov.uk

You can also make a complaint to the Information Commissioner's Office (ICO).

The ICO is the supervisory authority for data protection legislation. The ICO website has a full list of your rights under data protection legislation.

Now read section 4 below

4 Confidentiality and national security

Confidentiality

We will normally put all the information in your application on a public register of environmental information. However, we may not include certain information in the public register if this is in the interests of national security, or because the information is confidential.

You can ask for information to be made confidential by enclosing a letter with your application giving your reasons. If we agree with your request, we will tell you and not include the information in the public register. If we do not agree with your request, we will let you know how to appeal against our decision, or you can withdraw your application. You can find guidance on confidentiality in 'Environmental permitting guidance: core guidance', published by Defra and available via our website at www.gov.uk/government/organisations/environment-agency.

Only tick the box below if you wish to claim confidentiality for your application

Please treat the information in my application as confidential ☐

National security

You can tell the Secretary of State that you believe including information on a public register would not be in the interests of national security. You must enclose a letter with your application telling us that you have told the Secretary of State and you must still include the information in your application. We will not include the information in the public register unless the Secretary of State decides that it should be included.

You can find guidance on national security in 'Environmental permitting guidance: core guidance', published by Defra and available via our website at www.gov.uk/government/organisations/environment-agency.

You cannot apply for national security via this application.

Now fill in section 5

5 Declaration

If you knowingly or carelessly make a statement that is false or misleading to help you get an environmental permit (for yourself or anyone else), you may be committing an offence under the Environmental Permitting (England and Wales) Regulations 2016.

A relevant person should make the declaration (see the guidance notes on part F1). An agent acting on behalf of an applicant is NOT a relevant person.

Each individual (or individual trustee) who is applying for their name to appear on the permit must complete this declaration. You will have to print a separate copy of this page for each additional individual to complete.

If you are transferring all or part of your permit, both you and the person receiving the permit must make the declaration. You must fill in the declaration directly below; the person receiving the permit must fill in the declaration under the heading 'For transfers only'.

Note: we will issue a letter to both current and new holders to confirm the transfer. If you are changing address we will need to send this letter to your new address; therefore please tell us your new address in a separate letter.

If you are unable to trace one or more of the current permit holders please see below under the transfers declaration.

I declare that the information in this application is true to the best of my knowledge and belief. I understand that this application may be refused or approval withdrawn if I give false or incomplete information.

If you deliberately make a statement that is false or misleading in order to get approval you may be prosecuted.

I confirm that my standard facility will fully meet the rules that I have applied for (this only applies if the application includes standard facilities) ☐

Tick this box to confirm that you understand and agree with the declaration above, then fill in the details below (you do not have to provide a signature as well) ☑

Tick this box if you do not want us to use information from any ecological survey that you have supplied with your application (for further information please see the guidance notes on part F1) ☐

5 Declaration, continued

Name

Title (Mr, Mrs, Miss and so on)	Mr
First name	Matt
Last name	Wheeldon
on behalf of (if relevant; for example, a company or organisation and so on)	Wessex Water Services Limited
Position (if relevant; for example, in a company or organisation and so on)	Director
Today's date (DD/MM/YYYY)	

For transfers only – declaration for person receiving the permit

A relevant person should make the declaration (see the guidance notes on part F1). An agent acting on behalf of an applicant is NOT a relevant person.

I declare that the information in this application to transfer an environmental permit to me is true to the best of my knowledge and belief. I understand that this application may be refused or approval withdrawn if I give false or incomplete information.

Note: If you cannot trace a person or persons holding the permit you may be able to transfer the permit without their declaration as above. Please contact us to discuss this and supply evidence in your application to confirm you are unable to trace one or all of the permit holders.

If you deliberately make a statement that is false or misleading in order to get approval you may be prosecuted.

Tick this box to confirm that you understand and agree with the declaration above, then fill in the details below (you do not have to provide a signature as well)	☐

Name

Title (Mr, Mrs, Miss and so on)	
First name	
Last name	
on behalf of (if relevant; for example, a company or organisation and so on)	
Position (if relevant; for example, in a company or organisation and so on)	
Today's date (DD/MM/YYYY)	

Now go to section 6

6 Application checklist

You must fill in this section.

If your application is not complete we will return it to you. If you aren't sure about what you need to send, speak to us before you submit your application.

You must do the following:

Complete legibly all parts of this form that are relevant to you and your activities	☑
Identify relevant supporting information in the form and send it with the application	☑
List all the documents you are sending in the table below. If necessary, continue on a separate sheet. This separate sheet also needs to have a reference number and you should include it in the table below	☑
For new permits or any changes to the site plan, provide a plan that meets the standards given in the guidance note on part F1	☑
Provide a supporting letter for any claim that information is confidential	☐
Get the declaration completed by a relevant person (not an agent)	☑
Send the correct fee	☑

6 Application checklist, continued

Question reference	Document title	Document reference
Part A, Q5c	Director Details	Non-Technical Summary
Part C2, Tbl 1 & C2.5, Q4a	Non-Technical Summary	Non-Technical Summary
Part C2, Q3d	EMS Summary	Appendix 3
Part C2, Q5a	Installation Boundary Plan	
Part C2, Q5b	Site Condition Report	Appendix 4
Part C2, Q6	Environmental Risk Assessment	Appendix 7
Part C3, Q1	List of Waste codes	Supporting Information
Part C3, Q3a	BAT Assessment	Appendix 5
Part C2, Q3a	Relevant Offences	Appendix 1
Part C3, Q3b	Odour Management Plan	Appendix 9
Part C3, Q3a & b, 6a, 6b	Energy Management Plan	Appendix 11
Part C3, Q3b	Noise & Vibration Risk Assessment	Appendix 10
Part C3, Q4b & C2.5, Q2d	Air Quality Risk Assessment (H1 Tool)	Appendix 8
Part C2, Q3	Technical Competence	Appendix 2

7 How to contact us

If you need help filling in this form, please contact the person who sent it to you or contact us as shown below.

General enquiries: 03708 506 506 (Monday to Friday, 8am to 6pm)

Textphone: 03702 422549 (Monday to Friday, 8am to 6pm)

Email: enquiries@environment-agency.gov.uk

Website: www.gov.uk/government/organisations/environment-agency

If you are happy with our service, please tell us. It helps us to identify good practice and encourages our staff. If you're not happy with our service, or you would like us to review a decision we have made, please let us know. More information on how to do this is available at: https://www.gov.uk/government/organisations/environment-agency/about/complaints-procedure.

Please tell us if you need information in a different language or format (for example, in large print) so we can keep in touch with you more easily.

8 Where to send your application

For how many copies to send see the guidance note on part F1.

Please send your filled in application form to:

For water discharges by email to PSC-WaterQuality@environment-agency.gov.uk

For waste and installations by email to PSC@environment-agency.gov.uk

Or

Permitting Support, NPS Sheffield
Quadrant 2
99 Parkway Avenue
Parkway Business Park
Sheffield
S9 4WF

Do you want all information to be sent to you by email?

Please tick this box if you wish to have all communication about this application sent via email (we will use the details provided in part A) ☐

Feedback

(You don't have to answer this part of the form, but it will help us improve our forms if you do.)

We want to make our forms easy to fill in and our guidance notes easy to understand. Please use the space below to give us any comments you may have about this form or the guidance notes that came with it.

How long did it take you to fill in this form?

We will use your feedback to improve our forms and guidance notes, and to tell the Government how regulations could be made simpler.

Would you like a reply to your feedback?

Yes please ☐

No thank you ☐

For Environment Agency use only

Date received (DD/MM/YYYY)

Our reference number

Payment received?

No ☐

Yes ☐ Amount received

£

Wessex Water
YTL GROUP

Permitting Support
NPS Sheffield
Quadrant 2
99 Parkway Avenue
Parkway Business Park
Sheffield
S9 4WF

PSC@envrionment-agency.gov.uk

Direct line: 07799581880
(Carolyn Dewhirst)

Email:
wwreg@wessexwater.co.uk

Date: 20th July 2021

Dear Sir/Madam

Letter of Authorisation

This letter is authorising Stantec UK to submit this substantial variation permit application for EPR Permit BB3934AG at Trowbridge Bioresources Centre on behalf of Wessex Water Services Ltd.

Yours faithfully

Matt Wheeldon
Director of Assets and Compliance

Section II: Technical Description

The Information provided in this section should be viewed in parallel with:

- Section I: Application Forms
- Section III: Supporting Information

1. Introduction and overview

This application is being made due to changes to the Environment Agency (EA) interpretation of the environmental permitting exclusion for Urban Wastewater Activities (under Environmental Permitting (England and Wales) Regulations 2016 (EPR) Schedule 1, Part 2, Chapter 5, Section 5.4). The EA interpretation now requires that anaerobic digestion (AD) plants treating over 100 tonnes/day (t/d) are classified as installations for the purposes of EPR. Furthermore, it has been determined that, in calculating digester capacity, there shall be no distinction between imported or indigenous sludges. Therefore, the Trowbridge BC exceeds the 100t/d capacity threshold and it has been agreed that a variation to an existing permit is required to add Schedule 5.4 Part A(1)(b)(i) for AD treatment activities.

1.1 Permitting History

This application is to vary the current Environmental Permit Ref. EPR/BB3934AG. This Environmental Permit (EP) is a Standard Rules (SR 2008 No. 19) EP for non-hazardous sludge treatment. The EP was issued to Wessex Water Services Limited (WWSL) in November 2011.

It is acknowledged that the existing EP boundary was erroneously drawn and does not cover the appropriate assets associated with non-hazardous sludge treatment activities carried out on the Site, see Figure 1-5 EPR/BB3934AG Existing Permit Boundary. Furthermore, the EP boundary looks to intercept half of the Biogas and Combined Heat and Power (CHP) assets which are covered by a separate EP operated by Wessex Water Enterprises Limited (WWEL).

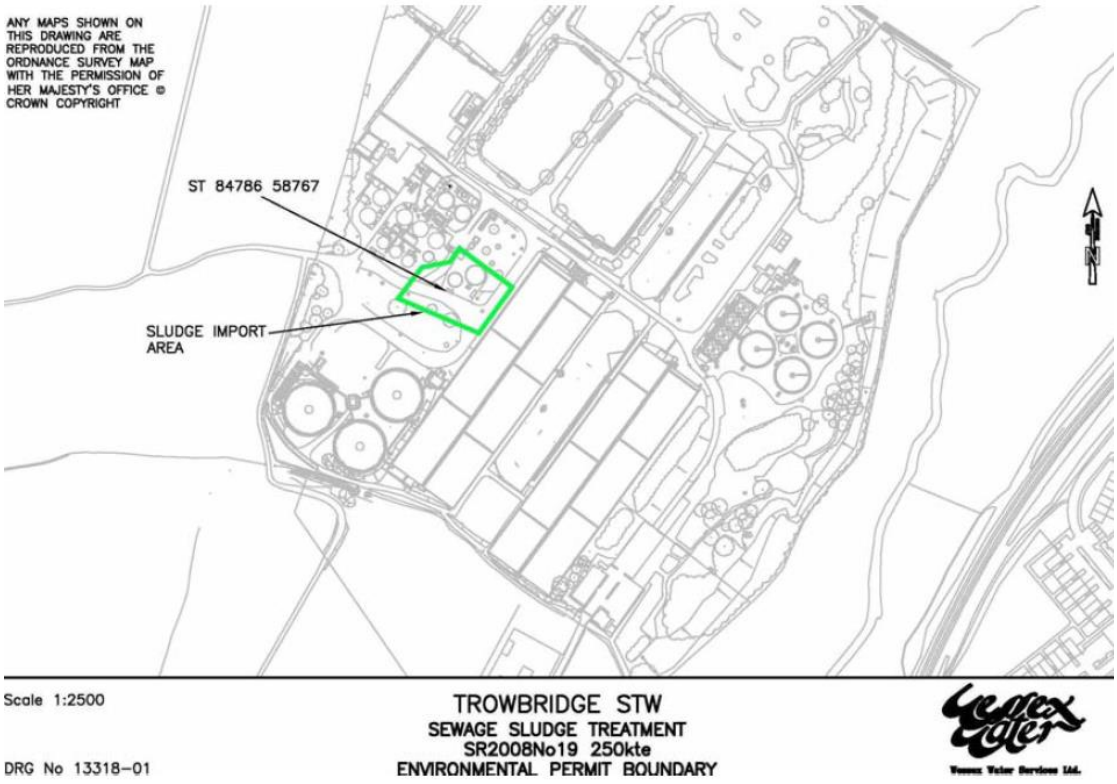


Figure 1-5 EPR/BB3934AG Existing Permit Boundary

In total, there are four Environmental Permits held on the Site. These Environmental Permits are outlined in Table 2 below. It is noted that two Environmental Permits are held by WWSL and two are held by WWEL. It is requested that the EA review the permitted area for the listed EP's present on Site as part of this variation, however for clarity no changes are proposed to other EP's and it is the intention that all EP's will remain following the variation of EPR/BB3934AG.

Table 2 Environmental Permits held on Site

EPR Ref.	Date	Operator	Description of Operations	Notes
EPR/BB3934AG	November 2011	WWSL	SR 2008 No.19 (250kte) Non-hazardous sludge treatment	Permit limit is 250,000 tonnes per year based on site plan. Permit boundary currently overlaps EPR/HB3602TR. It is considered this boundary is incorrect, as it cuts through half of the 'Gas Holder' which is currently

EPR Ref.	Date	Operator	Description of Operations	Notes
				associated with EPR/HB3602TR.
EPR/HB3602TR (previously EPR/CB3000TJ)	September 2014	WWEL	Biogas and Gas to Grid (including Combined Heat & Power / Medium Combustion Plant)	This Environmental Permit was transferred from WWSL to WWEL in July 2019. The Environmental Permit was varied to a Bespoke EP from a Standard Rules SR 2009 No. 4 EP in November 2019. The CHP and Gas to Grid activities are directly associated activities to the anaerobic digestion activity.
EPR/HB3205TW/T001 (previously WML – W940075WD)	March 2019 (original 1993)	WWEL	Biological treatment and discharge for disposal	This Permit was transferred from WWSL to WWEL in Mar 2019. The Permit is made up of a number of variations from 1993 through 2019.
102153	April 2019	WWSL	Discharge Permit	Discharge relating to the 'storm outflow' to surface water features. Discharge of secondary treated sewage effluent, storm sewage and sewage in an emergency.

1.2 Description of Site Activities

A summary description of all activities carried out within the Trowbridge BC is provided below.

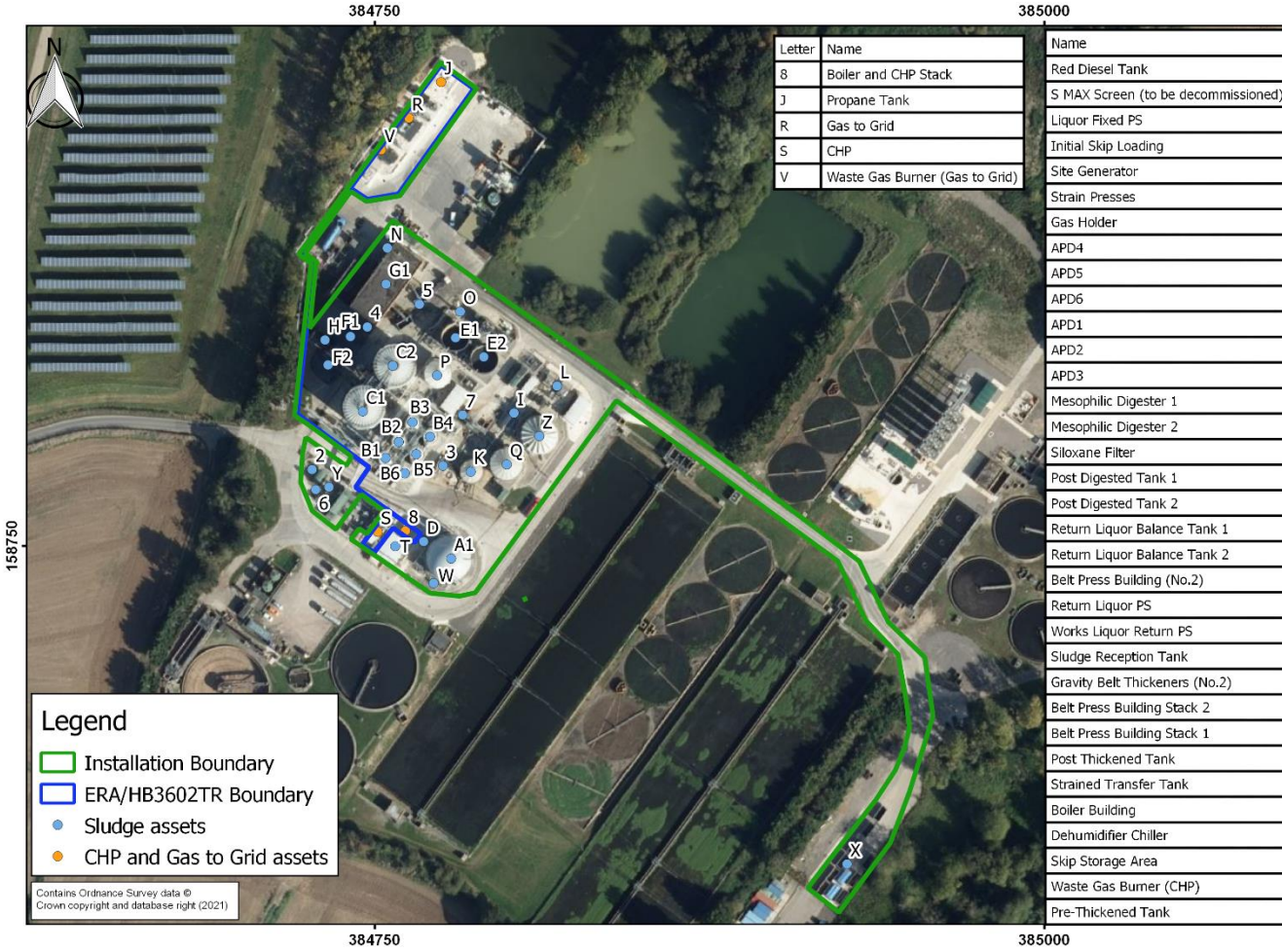
Stationary Technical Unit	Directly Associated Activities
Anaerobic digestion of indigenous and imported sludges >100te/day	**Sludge / cake import and storage** **Sludge screening** **Sludge thickening** **Liquor balancing** **Digester boilers** **Waste gas burner (flare)** **Dewatering and cake secondary treatment** **CHP (operated by Wessex Water Enterprises Ltd under permit reference EPR/HB3602TR)** **Gas to Grid (operated by Wessex Water Enterprises Ltd under permit reference EPR/HB3602TR)**

This section provides a summary of the sludge treatment process including the key assets and associated infrastructure at Trowbridge BC. The process is displayed pictorially in the Process Flow Diagram (PFD) as Figure 1-3 Installation: Process Flow Diagram. The location of the assets and infrastructure referred to are shown in Figure 1-7 Installation Boundary and Site Layout.

This information will be used to identify and assess the significance of the main sources of contamination (i.e., locations where sludges and liquors are stored / transferred) at the Trowbridge BC that would have the potential to cause pollution of the ground and / or the local water environment.

1.3 Sludge treatment process

The following provides a summary description of the sludge treatment process at the Trowbridge BC. Each asset in the summary description is provided with a corresponding reference (A,B etc.) which is referenced in Figure 1-4 Installation Boundary and Site Layout



in order to show its location within the installation.

- Imported sludge is transferred from tankers into a Sludge reception tank [K], as well as primary indigenous sludge. Previously a SMAX screen [3] screened the imported sludge before being discharged into the reception tank but the asset has failed and is now decommissioned. This Storage tank is also where the site's indigenous primary sludge is discharged.

- The sludge from the reception tank flow is pumped forward to the 2no. strain presses [7].

- Strained Sludge is transferred to 2no. Gravity Belt Thickeners (GBT) feed tanks via two holding tanks (strained transfer tank [Q] and pre-thickened tank [Z]). The 2no. GBTs [L] liquors are transferred to the head of the works via the return liquor PS [H].

- The thickened sludge is pumped to the Post Thickened Tank [P] before being forwarded for digestion.

- The digestion process is made up of two phases; the Acid Phase Digestion (APD) (B1 – B6) and Mesophillic Anaerobic Digestion (MAD) (C1 & C2) which make up the first phase, and Secondary Digesters making up the second phase. The 'Digester

Boiler' (T) supplies heat directly to the APD (B1), which is current operated around 30 ^{o}C. Residual heat is used in the MAD (C1 & C2) to facilitate biological activity.

- WWSL follow HACCP (Hazard Analysis and Critical Control Points) to ensure compliant sludge treatment; plus, digester process controls that set the key digester operating parameters that include:
    - pH and alkalinity of the digester feed;
    - digester operating temperature (HACCP);
    - hydraulic and organic loading rates of the digester feed (HACCP);
    - concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate;
    - Ultra-sonic detection of the liquid and foam levels are undertaken to automate anti-foam usage.
- Implementation of the above systems will:
    - ensure a stable digester operation;
    - minimise operational difficulties, such as foaming, which may lead to odour emissions;
    - provide sufficient early warning of system failures which may lead to a loss of containment and explosions.
- Digested sludge is pumped from the Secondary Digester (E1 & E2) to two Sludge Dewatering Belts. Filtrate generated by dewatering is forwarded to two Liquor Balancing Tanks (concentration tanks) (F1 & F2) before being pumped via Filtrate Return Pumps to the head of works for treatment at Trowbridge WRC. The digested cake ('sludge cake') from the dewatering activity is conveyed into skips in the Skip Storage Area [X] before being sent off Site for disposal.
- Biogas is collected from the APD tanks and the mesophilic digesters. This gas is diverted between the CHP and Gas to grid systems. The CHP system comprises of the gas holder [A1], dehumidifier [W], regenerative Siloxane filter [D], and the CHP waste gas burner [Y]. The Gas to Grid system comprises of a flare, biogas cleaning and propane addition. The CHP asset and the Gas to grid system is covered under EPR/HB3602TR.
- The biogas is primarily utilised by the gas to grid system. If the biogas does not meet the required standard or the gas to grid system has failed the biogas will be utilised by the CHP and the boilers. To ensure that no biogas is vented to atmosphere the site has two waste gas burners. The gas to grid waste gas burner is operated by WWEL and the CHP waste gas burner is operated by WWSL.

- The waste gas burner design includes the provision of a gas holder with sufficient capacity (4 hours of gas generation) and the use of high integrity relief valves. Plant management includes balancing the gas system and using advanced process control.

- The CHP process is designed to optimise the use of biogas and minimise the potential for releases to air. When biogas is available it is preferentially used to power the CHP engine and provide energy to be used by the site or resold to the National Grid with excess heat being used to maintain the optimum operational temperature of the primary digester. Note that the CHP and gas to grid activities are operated by WWEL.

- Under normal operating conditions, biogas is burned in either the CHP engine or dual fuel boilers. When biogas volumes are in excess of operational requirements and cannot be reduced sufficiently by operation of the engine and boilers, it is abated by the flare stack. The CHP flare stack is designed and operated in accordance with Landfill Technical Guidance Note (LFTGN) 05. Records for the past year show that the CHP flare [Y] has operated for 298 hours for 2020 (From July 2020 to June 2021 the run hours were 277) and is therefore below the requirements for emissions testing (operational for more than 10% of a year (876 hours)). In the unlikely event that there is still excess biogas in the gasholder it is vented to air via the pressure release valve (PRVs), however this situation is only anticipated in an emergency event when all planned combustion and abatement operations are unable to operate. There are, therefore, no planned emissions of biogas to the atmosphere under normal operations. The only potential for biogas releases to air could occur in an emergency situation, whereby emergency control and shutdown procedures would be put into action.

Figure 1-6 Installation Process Flow Diagram

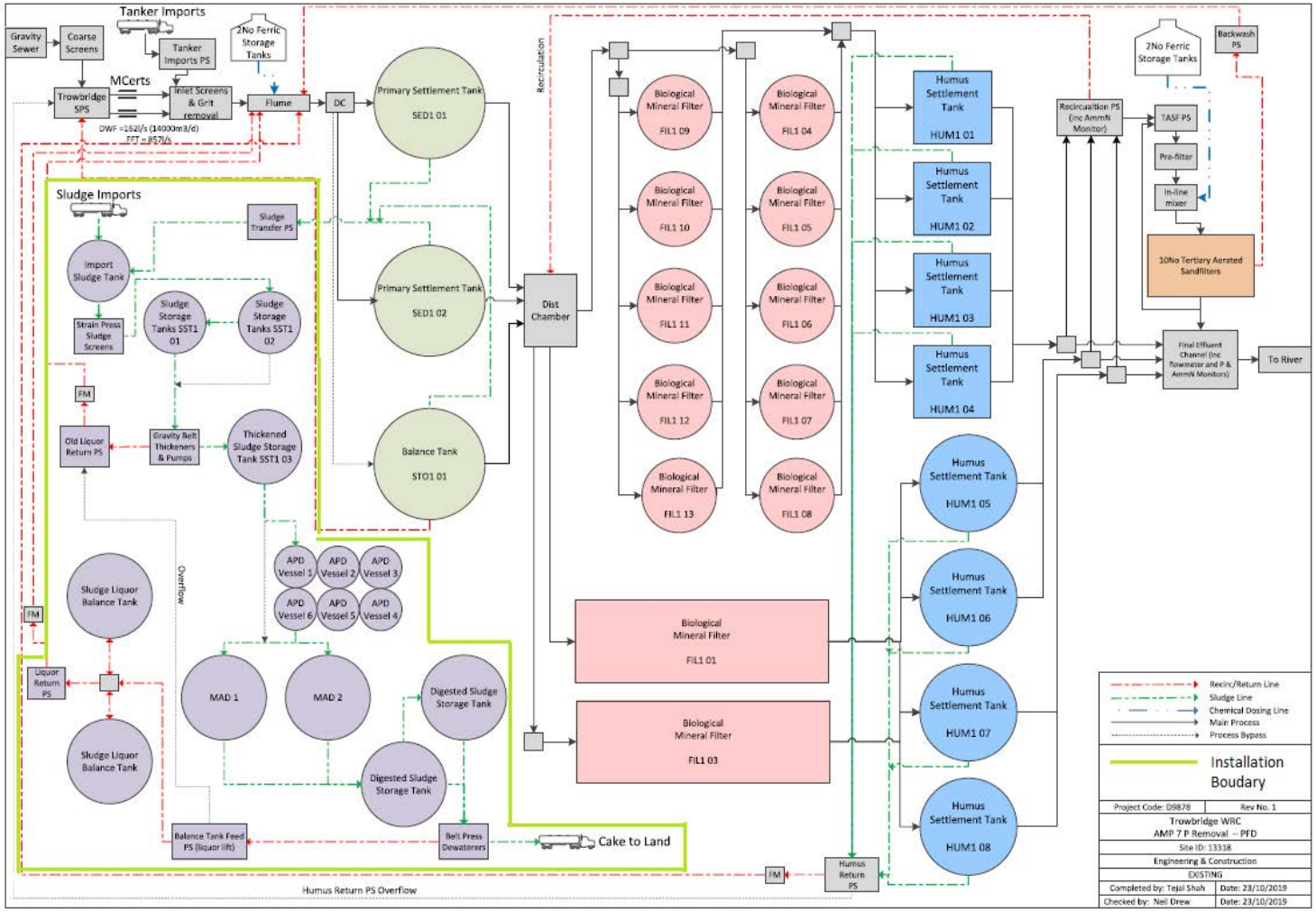
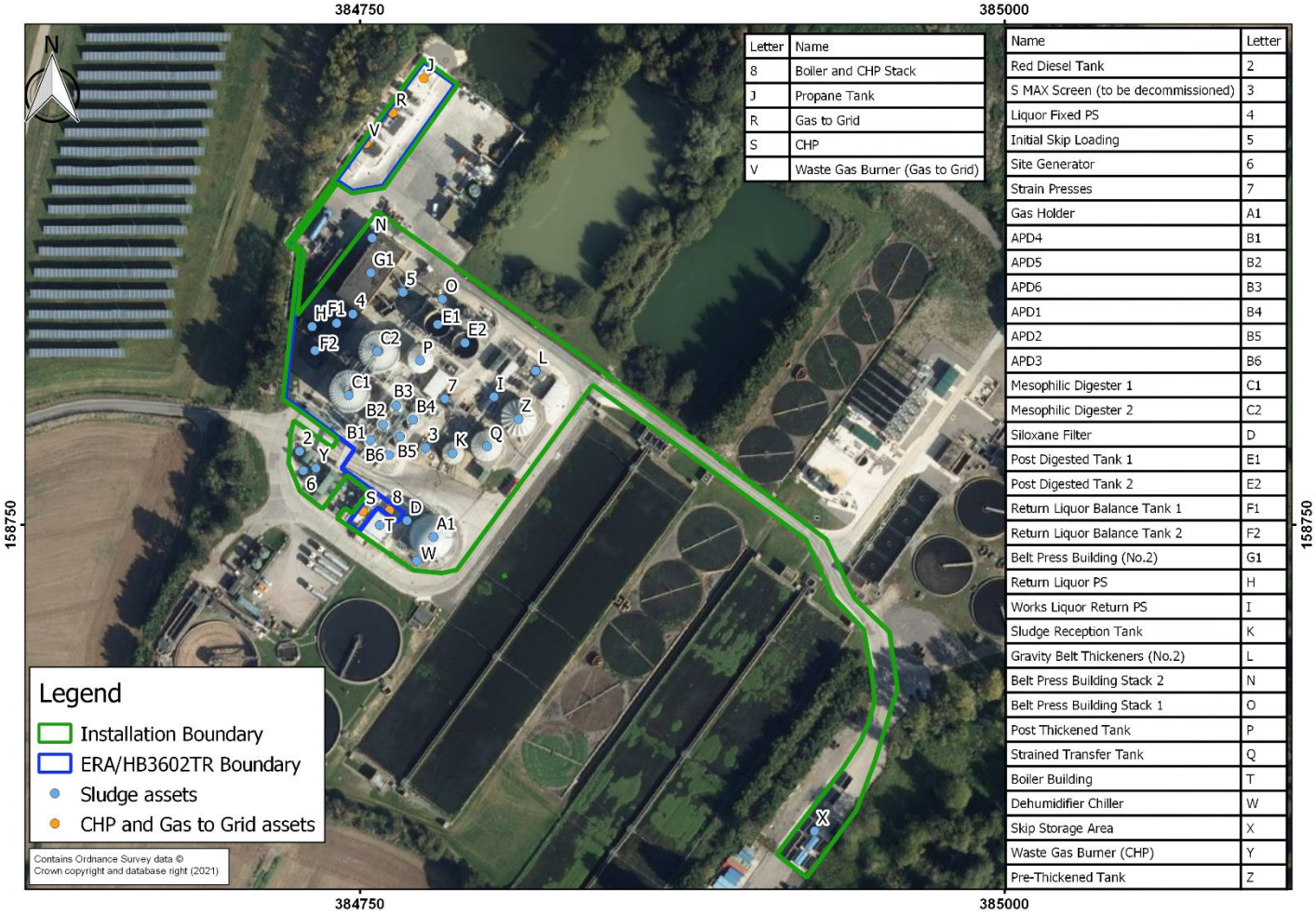


Figure 1-7 Installation Boundary and Site Layout



1.4 Best Available Techniques

The following BAT Tables (BAT 5, 15 and 38) reference applicable BAT compliance measures in place for the sludge treatment activities. In addition, the Environmental Quantitative Risk Assessment (EQRA) provides a detailed Source-Pathway-Receptor model in the evaluation of risks to controlled waters arising from storage, pipework and other assets with an associated determination of required BAT compliance; the EQRA is shown in **Appendix 6**. A further BAT assessment is provided in **Appendix 5**.

BAT 5. In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.
• Supervised unloading processes with tankers contracted via approved supplier(s). • Proprietary enclosed sludge screens reduce odour generation risk. • Trace heating reduces the risk of loss of containment from pipe fracture on freezing on relevant pipework. • The gravity belt thickeners have a control system installed to ensure they operate effectively, efficiently and are enclosed to reduce odour generation potential. • Sludge thickener bypass provision to avoid plant shutdown in the event of mechanical or other breakdown in the thickening process. • Final treated effluent is used for washdown waters reducing potable water demand. • In-line dosing of polymer ensures levels are controlled and raw materials used efficiently. • PLC controlled plant and largely automated. PLC includes level sensors to reduce risk of tank overtopping, resulting in contamination and potential odour generation. • WW Environmental Management Procedures are in place covering the import process.
BAT 15. BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques given below.
• Flame arrestors are fitted to the biogas flare system to reduce the risk of fire / explosion • Flow meters installed on gas utilisation under PLC control to maximise utilisation efficiency. • The plant operates under PLC and is largely automated. • WW procedures are in place covering biogas management.
BAT 38. In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.
• Sludge pumps are on inverters for energy efficiency, and typically operate around 75% speed. • Digested sludge transfer pumps adhere to DSEAR. • The plant operates under PLC and is largely automated. • WW procedures are in place covering the digestion process management. • Monitoring is undertaken to check that the digestion process is healthy and stable. This includes temperature, solids, volatiles, fatty acids and pH, as well as biogas quality. • Foam levels are actively monitored, and an anti-foam system is used as required. • Monitoring instrumentation including high level probes and pressure sensors linked to automatic PLC controlled pumps and other equipment to avoid potential loss of containment.

- An inspection and maintenance programme for above and below ground vessels, pipes and valves is in place.

Section III: Supporting Information

This part of the application provides detailed responses to questions in Section I: Application Forms, where further space is required to provide the necessary information.

Responses are provided only where further information is required, with the question numbers provided in italics and as stated in the application forms.

The information provided in this section should be viewed in parallel with:

- Section I: Application Forms
- Section II: Technical Description

Form C2 Supporting Information

2 About your proposed changes

The proposed changes are for the variation of existing Permit EPR/BB3934AG to include anaerobic digestion and directly associated activities as referenced in the table below.

SI Table 1 – Proposed Operations

Stationary Technical Unit	Directly Associated Activities
Anaerobic digestion of indigenous and imported sludges >100te/day	Sludge / cake import and storage Sludge screening Sludge thickening Liquor balancing Digester boilers Waste gas burner (flare stack) Dewatering and cake secondary treatment CHP (operated by Wessex Water Enterprises Ltd under permit reference EPR/HB3602TR) Gas to Grid (operated by Wessex Water Enterprises Ltd under permit reference EPR/HB3602TR)

3 Your ability as an operator

3a Relevant offences

Relevant offences are listed in **Appendix 1**.

3b Technical ability

WW have relevant technical competence to operate the activities at the site, including those included in this permit variation. Technical management will be provided by Dan Selby, who has a WAMITAB Level 4 Medium Risk Operator Competence qualification for Non-Hazardous Waste Treatment and Transfer, which was awarded in January 2020. A copy of Dan's certificate is provided in **Appendix 2.**

3d Management systems

A summary of the Environmental Management System (EMS) is provided in **Appendix 3**. In line with BAT 1, WW operate in accordance with environmental management plans and policies that align with BAT 1, however WW propose to develop an integrated EMS. As referenced in the BAT Assessment shown in **Appendix 5**, the following documents are provided as part of the EMS:

SI Table 2 – BAT 1 Environmental Management System

BAT 1. In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:	
Document	**Application Reference**
Fugitive Emissions Management Plan (including Leak Detection and Repair Programme)	Available on request
Waste Management Plan	Available on request
Site Condition Report.	Section V: Appendix 4
Point source emissions to air, water and land.	Section III: Supporting Information, Form C3, Question 2
Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste	Section III: Supporting Information, Form C3, Question 6e
Accident Management Plan	Section V: Appendix 11
Odour Management Plan.	Section V: Appendix 8
Noise impact assessment	Section V: Appendix 9

6 Environmental risk assessment

A review of environmental risks associated with activities covered by the scope of this variation application has been carried out. This review follows EA guidance on risk assessments for environmental permits[2]. It is noted that this guidance replaces previous EA H1 Guidance (Environment Agency, 2011), however, the H1 methodology is considered to remain appropriate. A copy of the Environmental Risk Assessment is shown in **Appendix 7**, to include a Qualitative Bioaerosols Risk Assessment. A precautionary approach has been taken within this application and consideration has been given to the potential for impact from bioaerosols as a result of activities at Trowbridge BC. This review follows a source-pathway-receptor model to evaluate risk, giving consideration to the characteristics of the waste material, plant design and the operational controls in place to mitigate the risks from bioaerosols. A copy of the Qualitative Bioaerosol Risk Assessment is shown in **Appendix 7**.

2 https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit (accessed February 2021)

Form C3 Supporting Information

1 What activities are you applying to vary?

Activities to be included within this installation are provided in Table C3: below. A summary of the activities to be removed from, and added to, the permit is provided above in Section Form C2: Table 1 above in response to Form C2, Question 2.

SI Table 3 - Types of Activities

Installation name	Schedule 1 references	Description of the Activity	Activity Capacity	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity	Non-hazardous waste treatment capacity
Trowbridge BC	Section 5.4 A(1) (b)(i)	**Anaerobic digestion** of indigenous and imported UWWT-derived sludges: Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving biological treatment	>100 tonnes per day	R 3: recycling/ reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)	N/A	Form C3 refers to note 3: By capacity we mean the total sludge treatment capacity (tonnes each day) for waste treatment operations. We have quoted total digester treatment capacity (of 525 tonnes/day (thickened import and indigenous sludge entering the digestion treatment process)

Directly Associated Activities (including description)	
CHP (operated by Wessex Water Enterprises Ltd under permit reference EPR/HB3602TR) Gas to Grid (operated by Wessex Water Enterprises Ltd under permit reference EPR/HB3602TR)	
Secondary treatment of digestate before being recycled to agriculture, including digestate produced on site or, as a contingency measure, from satellite sites.	R3: Recycling/reclamation of organic
Annual throughput (tonnes each year) [3]	**450,000 (this figure includes imports and indigenous sludge produced by the adjoining WRC). This is a maximum figure of unthickened sludge entering the IED permitted area.**

The List of Waste codes table below is provided in response to Environment Agency Form, Part C3, Question 1.

3 Data derived from an average of 2019 / 2020 figures

SI Table 4 – Changes to List of Waste Codes

Waste Code	Description
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF SITE WASTE WATER TREATMENT PLANTS AND PREPARATION OF WATER INTENDED FOR HUMANCONSUMPTION/INDUSTRIAL USE
19 02	Physio/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 02 06	sludges from physio/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)
19 06	Anaerobic treatment of waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste (sewage sludge only)
19 08	wastes from waste water treatment plants not otherwise specified
19 08 01	screenings
19 08 02	waste from desanding
19 08 05	sludges from treatment of urban waste water
19 08 09	grease and oil mixture from oil/water separation containing only edible oil and fats
19 09	wastes from the preparation of water intended for consumption or water for industrial use
19 09 02	sludges from water clarification
19 09 03	sludges from decarbonation
19 09 06	solutions and sludges from regeneration of ion exchangers
19 12	Mechanical treatment of waste not otherwise specified
19 12 12	wastes from mechanical treatment of wastes other than those mentioned in 19 12 11 (sewage sludge only)
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIALAND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS
20 03	other municipal wastes
20 03 04	septic tank sludge
20 03 06	waste from sewage cleaning
20 03 99	municipal wastes not otherwise specified (cesspool waste and other sewage sludge only)

The above List of Waste codes is derived from the Standard Rules set SR2008 No.19, with the addition of three List of Waste codes from RPS 231 (19 02 06, 19 06 06 and 19 12 12). These additional List of Waste codes are restricted in terms of their description to 'sewage sludge only'.

2 Point source emissions to air, water and land

The Point Source Emissions table is provided in answer to Environment Agency form Part C3, Q2, Table 2.

SI Table 5 - Point Source Emissions

Emission Point Reference and Location[1]	Source	Parameter	Quantity (Limit)	Unit
Point source emissions to air				
Digester Boilers [T]	Stack on boilers burning biogas	Oxides of nitrogen	No limit set	None specified
		Carbon monoxide	No Limit set	None specified
Siloxane Plant (PP Tek) [D]	Stack outside boiler Building	No Limit Set		
Site Generator [6]	Exhaust Stack	No Limit Set		
CHP Flare [Y]	CHP flare	No Limit Set		
Point source emissions to water (other than sewer)				
No point sources to emissions to water. All liquors returned to the head of the works for treatment.				
Point source emissions to sewers, effluent treatment plants or other transfers off site				
Return Liquor PS [H]	Process liquors and surface waters	No Limit Set. All liquors returned to the head of the works for treatment.		
Point source emissions to land				
No point source emissions to land.				

[1] The emission point reference and locations are shown in Figure 1-7 Installation Boundary and Site Layout.

The rated thermal input of the two Digester Boilers is 0.75 MW_{th} each. As the boilers are existing, having been put into operation before 20 December 2018, aggregation is not required. The boilers do not operate as a combined heat and power combustion plant and therefore are not generators. Therefore, the boilers are excluded from Medium Combustion Plant Directive and specified generator controls.

The diesel-powered backup generator is only used to provide power at the site during an emergency and doesn't operate for more than 50 hours a year, this includes the time spent under testing. The generator is therefore excluded from specified generator regulations.

Emissions to on-site drainage system

All process liquors and surface water runoff are collected and discharged via below ground drainage systems to Trowbridge WRC for full treatment prior to discharge under a separate EP (Permit No. 102153). Emission point from Trowbridge BC to the on-site drainage system is shown in **Figure 4**. A site drainage plan is provided as **Figure 6** (to be provided on completion).

Process liquor emissions comprise liquor from raw sludge thickening and digested sludge dewatering processes, condensate e.g. from biogas handling and cleaning effluent.

3 Operating techniques

3b General requirements

The Environmental Risk Assessment (**Appendix 7**) concludes that the risk from fugitive emissions is low, therefore a fugitive emissions management plan has not been provided as part of this application. However, Trowbridge BC does operate in accordance with the site Fugitive Emissions Management Plan and associated Leak Detection and Repair (LDAR) programme. These documents can be made available on request and are in accordance with BAT 14, as referenced below.

The majority of biogas pipework is within a secure area to reduce the risk of physical damage. A DSEAR review of the site has been completed and installed equipment is appropriate for the zone in which it is installed.

SI Table 7 – BAT 14 Fugitive Emissions

BAT 14. In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques.
The design and operation of Trowbridge BC ensures diffuse (fugitive) emissions to air are minimised. This includes the following measures:
• Raw sludge fully contained from waste reception through to sludge digestion. • The Primary Digesters are covered. The Secondary Digesters are uncovered; however, emissions of odour and organic compounds from digested sludge is very low. Refer to the odour management plan (Appendix 8) for more details. • All pipework design is subject to Water Industry Mechanical and Electrical Specifications (WIMES), which ensures correct material selection, corrosion prevention and valve type. • Regular inspections of tanks and pipework undertaken in line with the LDAR programme. • Biogas pipework largely above-ground, allowing easy inspection/leakage detection. • Sludge and sludge cake are wet at all times and therefore potential for generation of dust is very limited. This is not an issue of concern (see bioaerosol risk assessment, Appendix 7). • Traffic speed limits of 10mph are enforced on site

3c Types and amounts of raw materials

The raw materials table below is provided in answer to Environment Agency form Part C3, Q3c, Table 5.

Raw materials used in the installation include Polyelectrolyte, Diesel, Ferric Sulphate and Antifoam. Details for these raw materials, including maximum amount stored on the Site and annual throughput (both in cubic metres), are included in the table below. Where necessary, volumes and litres are used in place of tonnes as these raw materials are liquids and any conversion factor used would result in an inaccurate figure.

In the wider Site, potable water and final effluent are used. Details are not provided for these raw materials, as the amounts used vary.

SI Table 8 - Types and amounts of raw materials

Raw Material	Maximum amount stored at any one time	Annual throughput	Description of use of raw material
Polymer	Up to 15,000kg		Sludge thickener and sludge dewatering. To aid sludge thickening per digesters and in dewatering post digested sludge into digestate cake for recycling
Diesel	34468 L	Variable	Diesel for site generator
Antifoam	$3m^3$	Variable	Used for preventing digester foaming.

4 Monitoring

4a Describe the measures you use for monitoring emissions

The site is operated under PLC SCADA control with data logging and interrogation of key parameters to maintain safe, efficient and low emissions operation.

An odour monitoring programme is included in the Odour Management Plan (Appendix 8).

4b Point source emissions to air only – M1 Assessment

The proposed sampling locations and facilities will be fully assessed in compliance with M1 requirements, as applicable.

6d Explain and justify the raw and other materials, other substances and water that you will use

Water minimisation

Water use within the installation is not significant due to the nature of operations/activities undertaken within the installation. Water is used in small quantities for domestic use within control buildings and is also used as make up fluid for chemicals (polymer) used for sludge thickening/dewatering processes, as boiler feed water and for some cleaning activities i.e. sludge intake screens, thickener drums, washdown in some areas.

Measures are in place to ensure that water is used only where necessary and preference is given to the use of final treated effluent rather than mains water.

6e Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste

Waste Minimisation

Other than sludge cake, generation of waste is generally minimal and, largely limited to packaging or scrap materials associated with engineering projects. Where practical materials are transported to site and stored in bulk or containers are returned to the supplier.

A summary of waste generated as a result of activities undertaken within the Trowbridge BC is provided in Table SI-9 below. Reference to BAT 4 and 5 compliance measures in respect to waste are provided in Table SI-10.

SI - Table 9 – Waste Streams

Waste Type	Nature of Material	Storage and Disposal Method
Sludge screenings	Non-hazardous	Stored within a skip prior to collection by approved waste contractor
Waste oil	Hazardous	Stored within bunded container prior to collection by approved waste contractor
General waste	Non-hazardous	Stored within a dedicated container prior to collection by approved waste contractor
Metals	Non-hazardous	Stored within a skip prior to collection by approved waste contractor
Mixed recycling (including WEEE)	Non-hazardous	Stored within a dedicated container prior to collection by approved waste contractor
Wood	Non-hazardous	Stored within a skip prior to collection by approved waste contractor

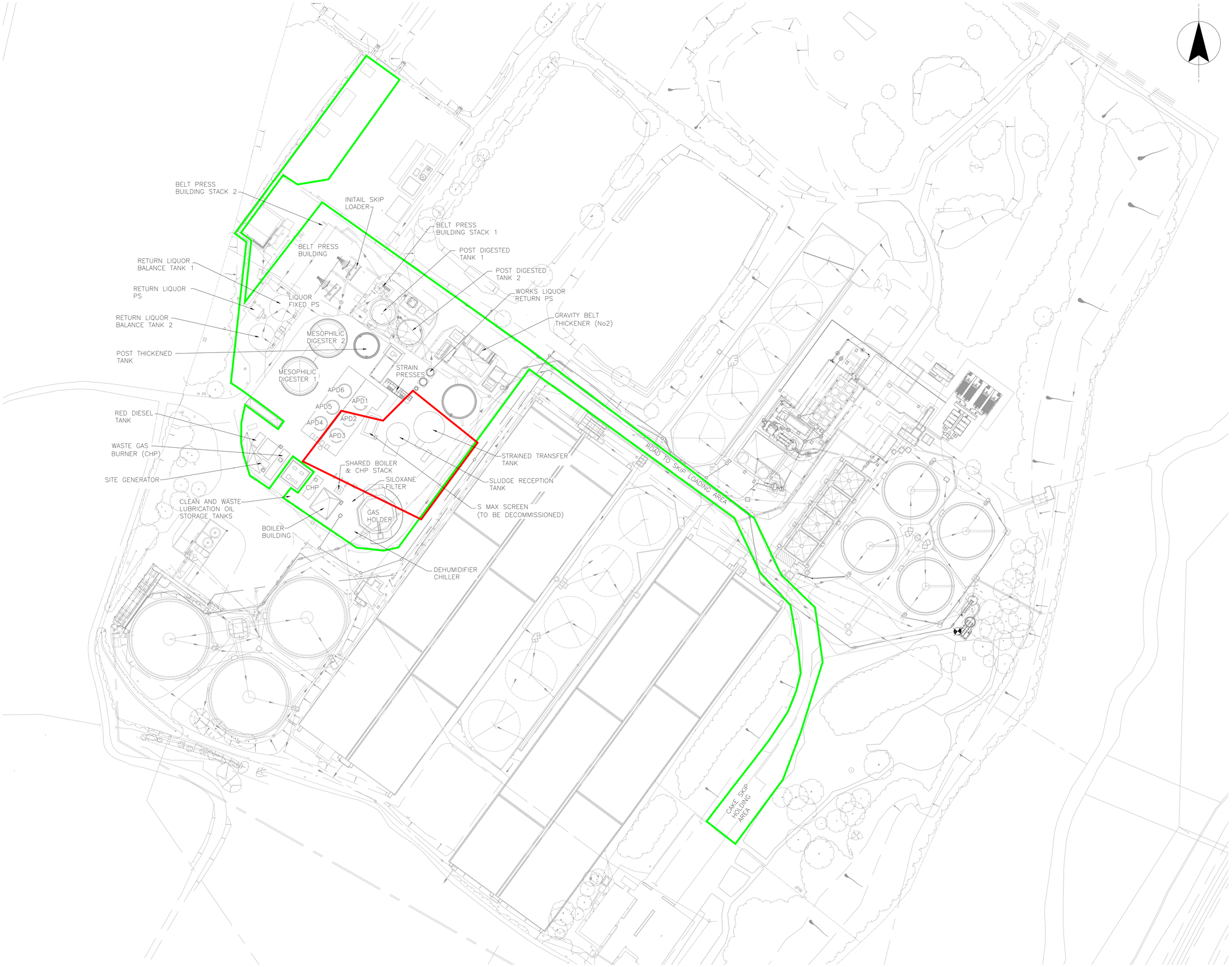
Waste Type	Nature of Material	Storage and Disposal Method
Empty IBCs	Hazardous	Stored within a dedicated area prior to collection by approved waste contractor
Oil contaminated absorbents	Hazardous	Stored outside of installation boundary within a dedicated container prior to collection by approved waste contractor
Antifreeze	Hazardous	Stored outside of installation boundary within a dedicated container prior to collection by approved waste contractor

SI Table 10 – BAT 4 & BAT 5 Waste

BAT 4. In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques. **BAT 5. In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.**
• Waste materials are stored on site for the minimum period of time, in suitable, fit for purpose containers located on areas of hardstanding and away from sensitive receptors. Waste containers are clearly labelled with their intended contents and container storage capacities are not permitted to be exceeded. Site housekeeping inspections are undertaken to ensure these standards are maintained. • Very limited quantities of hazardous waste are generated by site activities. This is limited to items such as batteries, aerosols, waste oil and fluorescent tubes. Hazardous waste is always stored in secure containers and segregated from other waste types. • Procedures are in place to ensure waste 'duty of care' requirements are met including ensuring that waste is only removed from site by contractors properly licenced and approved for use and accompanied by a fully completed waste transfer or hazardous waste consignment note. Waste transfer and consignment note records are retained electronically or as paper copies on site. Effective implementation of these procedures is supported by training for WW personnel as appropriate. • Controls are in place to prevent pollution as a result of sludge storage and handling. Following reception on site, sludge is fully contained within tanks and pipework until it is deposited, as digested sludge cake into the dedicated cake skips. • Sludge storage and handling areas are located away from sensitive receptors.

Figures

Figure 1: New Installation Boundary



SITE ID 13318

NGR ST 848 587

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KEY

NEW INSTALLATION BOUNDARY

EXISTING PERMIT BOUNDARY EPR/BB3934AG

MK	REVISIONS	DRN	CHK	APP	DATE

Stantec

TROWBRIDGE WRC

AMP 7

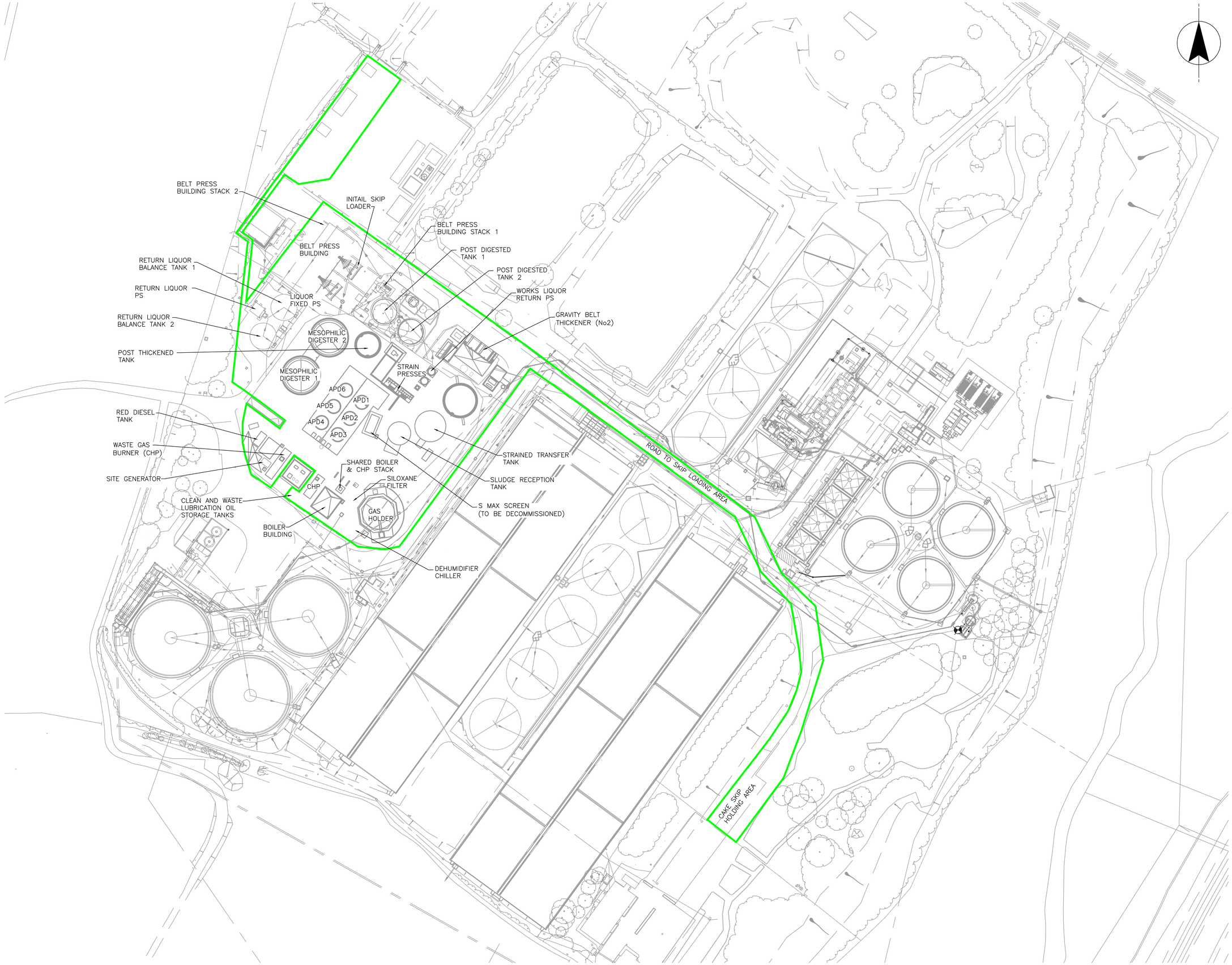
NEW INSTALLATION BOUNDARY

ORIGINAL DRAWING SIZE A1 | SCALE 1:500

DRAWING NUMBER FIGURE 1 | REV. A

Wessex Water YTL GROUP

Figure 2: Site Layout



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KEY

NEW INSTALLATION BOUNDARY

MK	REVISIONS	DRN	CHK	APP	DATE

Stantec

TROWBRIDGE WRC

AMP 7

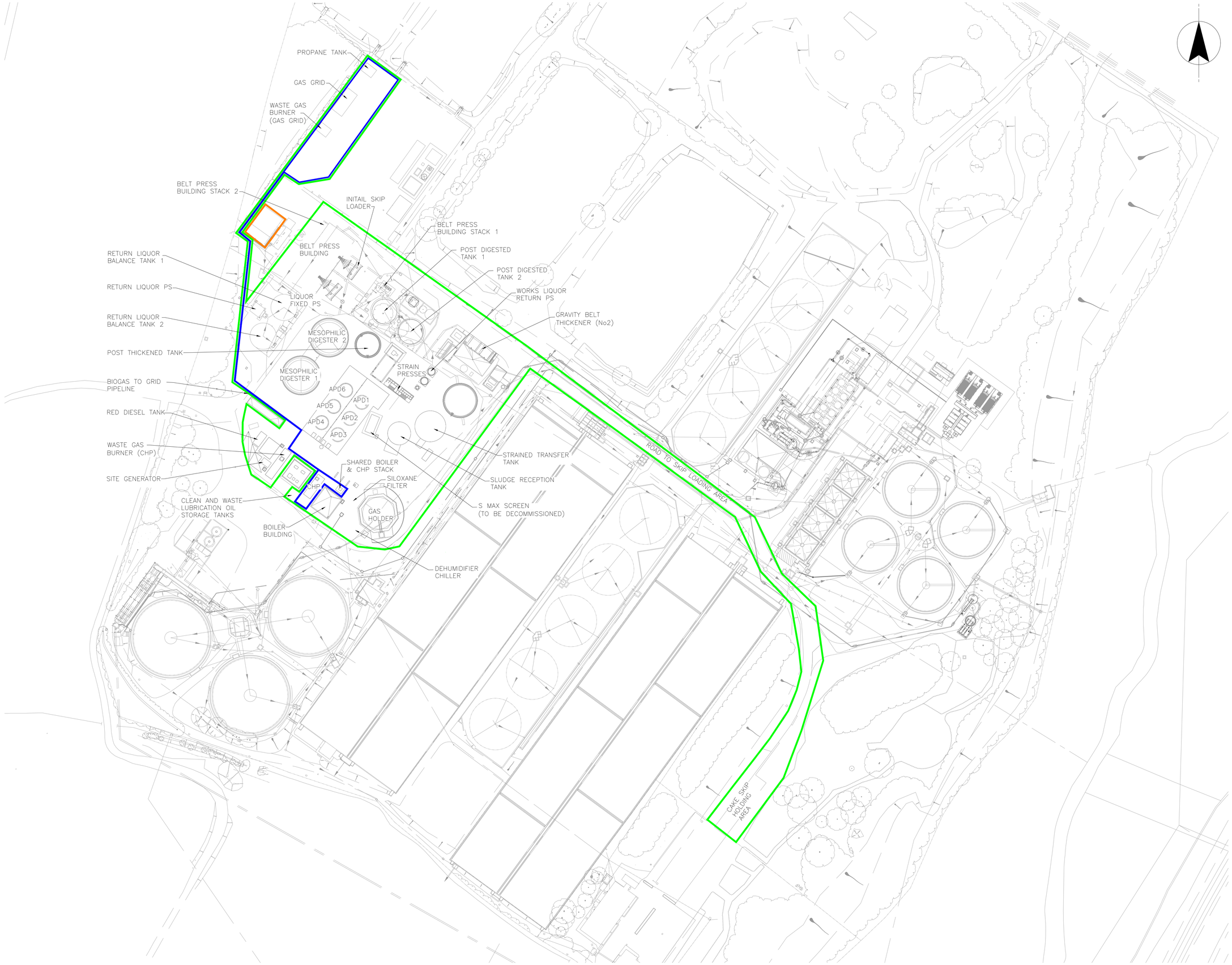
SITE LAYOUT

ORIGINAL DRAWING SIZE A1 | SCALE 1:700

DRAWING NUMBER	REV.
FIGURE 2	A

Wessex Water
YTL GROUP

Figure 3: EPR/HB3603TR/V002 Proposed WWEL CHP Permit Boundary



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KEY

- NEW INSTALLATION BOUNDARY
- EPR/HB3602TR/V002 – PROPOSED PERMIT BOUNDARY (WESSEX WATER ENTERPRISES LIMITED)
- HB3205TW TANKER WASTE IMPORTS PERMIT

MK	REVISIONS	DRN	CHK	APP	DATE

Stantec

TROWBRIDGE WRC

AMP 7

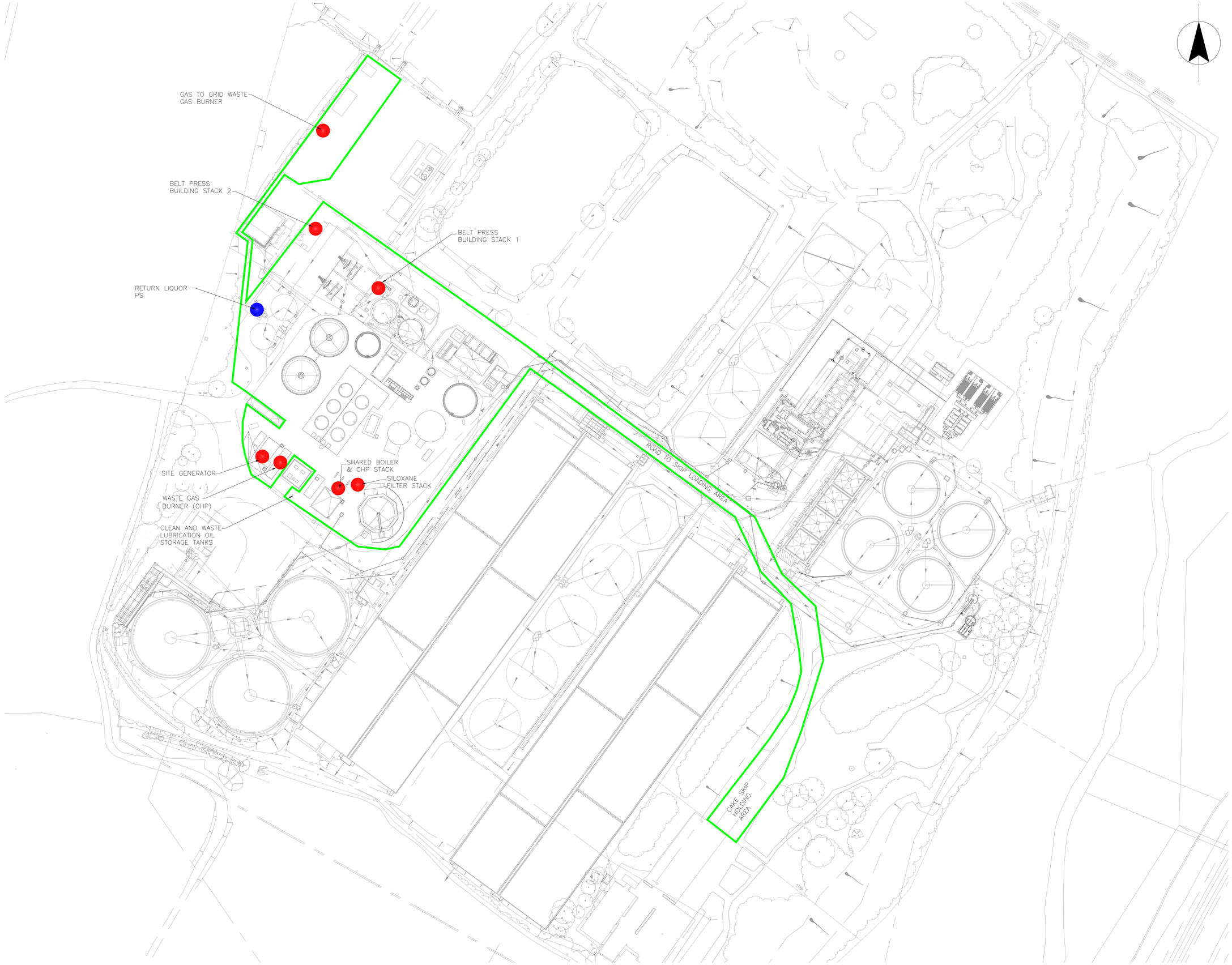
EPR/HB3602TR/V002
PROPOSED
PERMIT BOUNDARY

ORIGINAL DRAWING SIZE A1 | SCALE 1:1000

DRAWING NUMBER	REV.
FIGURE 3	A

Wessex Water
YTL GROUP

Figure 4: Point Source Emissions



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KEY

- NEW INSTALLATION BOUNDARY
- POINT SOURCE EMISSIONS TO AIR
- POINT SOURCE DISCHARGE TO PUMPING STATION TO HEAD OF WORKS

MK	REVISIONS	DRN	CHK	APP	DATE

Stantec

TROWBRIDGE WRC

AMP 7

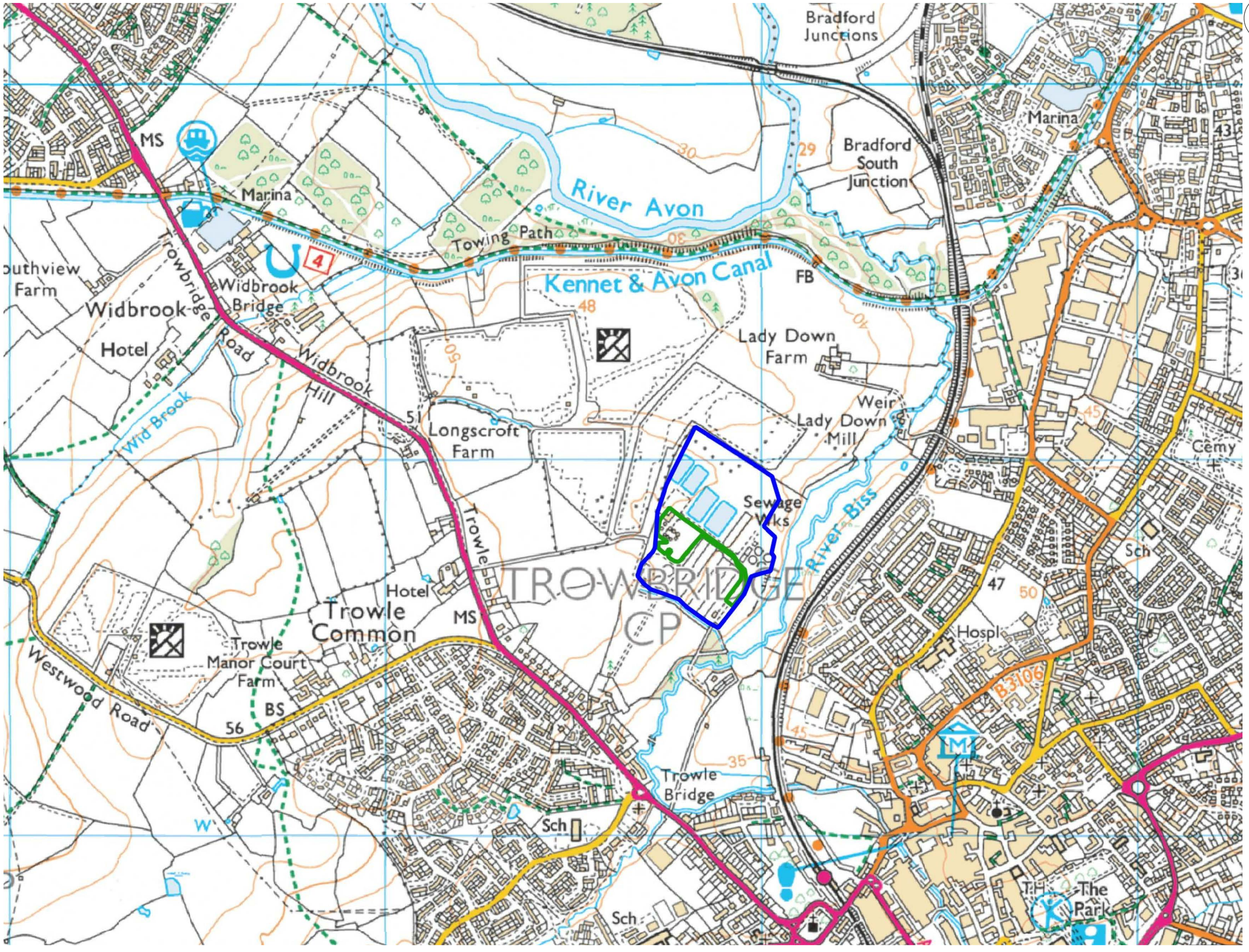
POINT SOURCE EMISSIONS

ORIGINAL DRAWING SIZE A1 | SCALE 1:700

DRAWING NUMBER	REV.
FIGURE 4	A

Wessex Water
YTL GROUP

Figure 5: Site Location Plan



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KEY

NEW INSTALLATION BOUNDARY

SITE OWNERSHIP BOUNDARY

MK	REVISIONS	DRN	CHK	APP	DATE
A					

Stantec

TROWBRIDGE WRC

AMP 7

SITE LOCATION PLAN

ORIGINAL DRAWING SIZE A1 | SCALE NTS

DRAWING NUMBER	REV.
FIGURE 5	A

Wessex Water
YTL GROUP

Figure 6: Site Drainage Plan (to be provided on completion)

Appendices

Appendix 1: Relevant Offences

Form C2 / Q3a1 Have you, or any other relevant person, been convicted of any relevant offence?

Relevant offences for Wessex Water Services Ltd are:

	Prosecutor	Court	Date	Hearing	Offence	Fine	Costs
1.	NRA	Dorchester	03/06/1990	12/11/1990	Toller Pocorum WRC and Lower Road Terminal PS S.107(1)(c) WA '89	£500.00	£435.16
2.	NRA	Bradford on Avon	03/08/1990	12/12/1990	The Green PS Broughton Gifford, Bradford on Avon S.107(6) WA '89 S.4(1) SFFA '75	£500.00 £350.00	£766.44
3.	NRA	Weymouth	30/07/1990	12/03/1991	S.107(6) WA '89 discharge from Langton Herring WRC	Case Dismissed	
4.	NRA	Dorchester	14/09/1990	24/04/1991	S.107(6) WA '89 sewage effluent from Evershot WRC	Case Withdrawn	
5.	NRA	Cricklade	06/12/1990	01/08/1991	S.107(6) WA '89 sewage effluent from Sherston WRC to Sherston, Avon	£1,000.00	£703.00
6.	NRA	Gillingham	07/01/1992	19/05/1992	S.85(6) WRA 1991 sewage effluent from Shaftesbury WRC	£1,500.00	£571.00
7.	NRA	Wareham	21/06/1991	14/08/1992	S.107(6) WA '89 sludge liquor from SW drain to Corfe stream	£2,500.00	£1,091.00

	Prosecutor	Court	Date	Hearing	Offence	Fine	Costs
8.	NRA	Bath	24/02/1992	22/09/1992	S.85(3) & (6) WRA 1991 Chew Stoke PS to Chew Stoke – air-locked pump	£2,000.00	£627.00
9.	NRA	Blandford	21/02/1992	28/10/1992	S.85(6) WRA 1991 sewage effluent from Tarrant Crawford WRC Look up table	Case Withdrawn	
10.	NRA	Blandford	24/02/1992	18/11/1992	S.85(6) WRA 1991 S.4(1) SFFA 1975 pump failure at Spetisbury PS	Case Withdrawn	
11.	NRA	North Avon	08/06/1992	23/03/1993	S.85(6) WRA 1991 sewage effluent from Hinton Blewitt WRC to Cam Brook	£1,750.00	£500.00
12.	NRA	Swanage	25/09/1992	02/07/1993	S.85(1) & (6) WRA 1991 Kings Road, E Swanage	Case Withdrawn	
13.	NRA	Chippenham	29/06/1992 & 31/07/1992	10/08/1993	S.85(6) WRA 1991 Stoppers Hill storm outfall	£1,500.00	£936.00
14.	NRA	Yeovil	18/02/1993	13/12/1993	S.85(3) WRA 1991 rising main at Chard	£1,200.00	£740.00
15.	NRA	Christchurch	21/04/1994	22/09/1994	S.85(6) WRA 1991 flow conditions Christchurch WRC	Absolute Discharge £370.00	

	Prosecutor	Court	Date	Hearing	Offence	Fine	Costs
16.	NRA	Dorchester	11/07/1994	01/08/1995	S.85(1) WRA 1991 sewage effluent from Evershot WRC storm outfall	£1,500.00	£1,010.00
17.	NRA	Bridport	09/08/1995	09/01/1996	S.85(6) WRA 1991 breach of telemetry condition at Newlands PS	£2,000.00	£280.00
18.	HSE	Swindon CC	12/01/1993	14/10/1996	S.3 HSWA 1974 injury at Codford WPS	£20,000.00	£36,829.00
19.	EA	Flax Bourton	20/11/1996	25/04/1997	S.85(1) WRA 1991 burst rising main at Kewstoke/Sand Bay	£2,500.00	£500.00
20.	EA	Flax Bourton	16/07/1997	16/01/1998	S.85(6) WRA 1991 unchlorinated effluent from Black Rock PS	£10,000.00	£250.00
21.	EA	Blandford	09/06/1997	08/04/1998	S.85(1) WRA 1991 sewer blockage at Milton Abbas	£500.00	£250.00
22.	EA	Trowbridge	03/06/1997	09/04/1998	S.85(1) WRA 1991 Trowbridge WRC Inlet PS	£15,000.00	£250.00
23.	EA	Weymouth	25/08/1997	07/05/1998	S.85(1) WRA 1991 Radipole PS	£5,000.00	£250.00
24.	EA	Frome	23/07/1997	03/07/1998	S.85(3) WRA 1991 Shepton Mallet WRC	£6,000.00	£250.00
25.	EA	Trowbridge	Nov 1997/1998	28/01/1999	S.85(1) & (6) WRA 1991 Westbury WRC	£3,000.00	£250.00

	Prosecutor	Court	Date	Hearing	Offence	Fine	Costs
26.	EA	Frome	04/08/1999 14/10/1999 21/10/1999 02/11/1999	26/05/2000	S.85(6) WRA 1991 – Breach of upper tier Condition for BOD at Shepton Mallet WRC	£4,000.00 £2,000.00 £2,000.00 £2,000.00	£300.00
27.	EA	Wimborne	Nov/Dec 1999	27/07/2000	S.85(6) WRA 1991 – Oil escape at Wimborne WRC	£5,000.00	£350.00
28.	EA	Chippenham	22/11/1998 08/07/1999 10/04/2000	19/12/2000	S85(3) WRA 1991 – Burst rising main at Minety	£3,000 £4,500 £4,500	£4,412.95
29.	EA	Bath	03/09/2000	09/01/2001	S85(3) WRA 1991 – CSO at Saltford	£1,500	£300
30.	EA	Chippenham	15/10/2000	01/05/2001	S85(1) + (6) WRA 1991 – CSO at Park Mead, Malmesbury	£2,000	£425
31.	EA	Trowbridge	15/10/2000	11/6/2001	S85(1) + (6) WRA 1991 – Magna Road PS	£6,000	£585
32.	EA	Bristol	03/05/2001	17/12/2001	S85(1) WRA 1991 – Glenwood Road CSO	£2,000	£1,450

	Prosecutor	Court	Date	Hearing	Offence	Fine	Costs
33.	EA	Wimborne	27/09/2001	19/04/2002	S85(6) WRA 1991 – Palmersford WRC	£5,000	£824
34.	EA	Wareham	29/08/2001	28/05/2002	S85(6) WRA 1991 – Trowbridge WRC	£5,000	£858
35.	EA	Bristol	29/05/2002	02/12/2002	S85(1) WRA 1991 – Fishponds Brook (CSO's)	£4,000	£1,170
36.	EA	Weymouth	23/06/2002	12/12/2002	S85(1) WRA 1991 – Gillingham SPS	£4,000	£564
37.	EA	Minehead	17/09/2002	28/03/2003	S85(1) + (6) WRA 1991 – Bye Farm CSO	£5,000	£1,000
38.	EA	Bournemouth	26/09/2002	20/05/2003	S85(1) + (6) WRA 1991 – Bourne Stream	£5,000	£1,043
39.	EA	Bournemouth	09/01/2003	22/07/2003	S85(1) + (6) WRA 1991 – Bure Brook	£5,000	£1,049
40.	WCC	Chippenham	10/02/2003 10/02/2003 03/06/2003	19/08/2003 19/08/2003 19/08/2003	S54 NRSWA 1991 S65 NRSWA 1991 S65 NRSWA 1991	£250 £250 £450	£624
41.	EA	Chippenham	21/03/2004	14/09/2004	S85(1) + (6) WRA 1991 – Westmead Depot	£6,500	£1,305
42.	EA	Bridgwater	24/05/2004	11/10/2004	S24(4)(b) WRA 1991 – Hawkridge	£750	

	Prosecutor	Court	Date	Hearing	Offence	Fine	Costs
			to 29/05/2004				
43.	EA	Bridgwater	19/10/2003 to 20/10/2003 23/10/2003 to 25/10/2003 26/10/2003 to 27/10/2003	11/10/2004	S24(4)(b) WRA 1991 – Luxhay S24(4)(b) WRA 1991 – Luxhay S24(4)(b) WRA 1991 – Luxhay	£250 £250 £250	£1,350
44.	EA	Bristol	30/06/2004	22/11/2004	S85(1) and (6) WRA 1991 – Fishponds Brook	£6,000	£1,000
45.	WCC	Chippenham	21/06/2004	30/11/2004	S65 NRSWA 1991	£700	£700
46.	WCC	Chippenham	29/07/2004	21/02/2005	S65 NRSWA 1991 S60 NRSWA 1991 (x2)	£700 £100 x 2	£450

	Prosecutor	Court	Date	Hearing	Offence	Fine	Costs
47.	BANES	Bath	02/12/2004	05/07/2005	S55 NRSWA 1991 S60 NRSWA 1991 S65 NRSWA 1991	£500 £1,000 £1,000	£532
48.	EA	Wimborne	25/02/2005 27/02/2005 28/02/2005 19/03/2005 28/02/2005	17/10/2005	S85(1) + (6) WRA 1991+ “ “ “ (Consent – auto pump) East Borough SPS	£1,500 £1,500 £1,500 £1,500 No penalty	£741
49.	EA	Wimborne	8-9/06/2005	27/03/2006	S85(3) WRA 1991	£7,500	£1,596
50.	EA	Blandford	27/9/2005 to 6/10/2005	30/03/2006	S85(3) WRA 1991 Abbotsbury WRC	£8,000	£1,056
51	EA	Bath	19/7/2005	8/8/2006	S85 (1) and (6) WRA 1991 Weston Lock Sewer	£2750	£1118

	Prosecutor	Court	Date	Hearing	Offence	Fine	Costs
52	EA	Wimborne	9/12/2005	11/9/2006	S85(1) and (6) WRA 1991 S85 (6) WRA 1991 – Aldridge Road SPS	£6,000 £2,000	£1,003
53	EA	Wimborne	13 & 14/2/2006	2/10/2006	S85 (1) and (6) WRA 1991 – Dugdell Close SPS	£8,000	£950
54	EA	Chippenham	13/04/2006	28/11/2006	S85(1) WRA 1991 S85(1) and (6) WRA 1991 – Springfield SPS	£7,000 £15,000	£1,663
55	EA	Salisbury	27/7/2006 to 2/8/2006	8/1/2007	S85 (1) WRA 1991 – Endless Road CSO	£4,000	£966
56.	EA	Lyndhurst	23/09/2006	05/03/2007	S85(1) and (6) WRA 1991 – Ringwood WRC	£6,000	£978
57.	EA	Bristol	30/07/2006	23/05/2007	S85(1) WRA 1991 – Henry Sleed Stream	£1,500	£1,589
58.	EA	Weymouth	30/03/2007	03/04/2008	S85(1) and (6) WRA 1991 – Shaftesbury WRC	£3,000	£1,960
59.	EA	Weymouth	04/03/2009	18/03/2010	S85(1) and (6) WRA 1991 – Shaftesbury WRC	£6,000	£2,235.41 + £15.00 victim surcharge

	Prosecutor	Court	Date	Hearing	Offence	Fine	Costs
60	MMO	Weymouth	On or before 17/07/2013	21/07/2014	S85(1)(a) Marine and Coastal Access Act 2009	£5,500	£2,340 costs £877 MMO investigation costs
61	SCC	Somerset	05/10/2017 06/10/2017	10/04/2018	S56(3) NRSWA 1991 S65(4) NRSWA 1991	£5,490	£1,687 + £170 victim surcharge
62	SCC	Somerset	07.05.2019	11.12.2019	S.65(4) NRSWA 1991		
63	SCC	Somerset	TBC	TBC		£TBC	

Appendix 2: Technical Competence

wamitab

Qualification Title:

WAMITAB Level 4 Medium Risk Operator Competence for Non-Hazardous Waste Treatment and Transfer

Qualification Accreditation Number:

601/8528/4

This Certificate is awarded to

Dan Selby

Verification date: 28/01/2020

Authorised:

Learner ID: 31230

Certificate No.: 5159135

Date of Issue: 28/01/2020

3C5E4930-C8D4-4C66-909A-1CD82DD38A37
AuthentiQual.com

Chris James
WAMITAB Chief Executive Officer

Regulated by Ofqual
For more information see http://register.ofqual.gov.uk

Corff dyfarnu cydnabyddedig
Cymwysterau Cymru Qualifications Wales
Recognised awarding body

CEA Regulation

The qualifications regulators logos on this certificate indicate that the qualification is accredited only for England, Wales and Northern Ireland. Qualifications Wales regulates this qualification where it is awarded to learners assessed wholly or mainly in Wales.

00129341

Operator Competence Certificate

Title:

Non-Hazardous Waste Treatment and Transfer

This Certificate is awarded to

Dan Selby

Verification date: 28/01/2020

Authorised:

WAMITAB Chief Executive Officer

Learner ID: 31230

Certificate No.: 5159135

Date of Issue: 28/01/2020

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

This certificate is jointly awarded by WAMITAB and the Chartered Institution of Wastes Management (CIWM) and provides evidence to meet the Operator Competence requirements of the Environmental Permitting (EP) Regulations, which came into force on 6 April 2008.

00129343

Credit certificate
This certificate determines credit awarded to:

Dan Selby

Units gained:

		Credit Value	Credit Level
A/508/0756	Maintain health and safety in the waste resource management industry	4	L4
F/508/0757	Manage the environmental impact of work activities	3	L4
F/508/0760	Manage the movement, sorting and storage of waste	5	L4
J/508/0887	Manage the reception of non-hazardous waste	6	L3
K/508/0980	Manage transfer and disposal from non-hazardous waste treatment and recovery operations	8	L4
M/508/0995	Manage site operations for the treatment of non-hazardous waste	8	L4

Verification date: 28/01/2020

Authorised:

Learner ID: 31230

Certificate No.: 5159135

Date of Issue: 28/01/2020

Chris James
WAMITAB Chief Executive Officer

Regulated by Ofqual

Corff dyfarnu cydnabyddedig
Cymwysterau Cymru Qualifications Wales
Recognised awarding body

The qualifications regulators logos on this certificate indicate that the qualification is accredited only for England, Wales and Northern Ireland. Qualifications Wales regulates this qualification where it is awarded to learners assessed wholly or mainly in Wales.

00129342

Appendix 3: EMS Summary

Wessex Water Services Ltd.

Trowbridge Bioresources Centre

Environmental Management System Summary

June 2021

Revision	Date	Description	Author	Checked by	Reviewed by
01	July 2021	EMS Summary	Josh Parsons	Peter Duncan	Peter Duncan

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Appendices

Appendix A Wessex Water Environmental Policy

Appendix B Waste Permit Procedure

1 INTRODUCTION

A summary of the EMS is required by Environment Agency (EA) application form Part C2, Question 3d. WW intend to operate their own EMS, which will meet the requirements outlined in EA Guidance, Develop a Management System: Environmental Permits[1] (EMS Guidance). The Wessex Water Services Ltd (WW) EMS will be kept on the WW cloud platform. A hard copy of the Environmental Permit (EP) will be kept on Site.

WW have an Environmental Policy which outlines how the company aims to protect and improve the environment and its commitment to becoming a truly sustainable company. A copy of the Wessex Water Environmental Policy is included as Appendix A.

In addition to the information provided in the following sections, WW have a Waste Permit Procedure which includes information on how WW will meet the conditions of the Environmental Permit, including regular internal reviews, notifying the Environment Agency and procedures for operations and monitoring / inspections. A copy of the Waste Permit Procedure is included as Appendix B.

Wessex Water Enterprises Limited (WWEL) also operate on the site, alongside Wessex Water Services Limited. WWEL will carry out operations associated with the Combined Heat and Power plant and Gas to Grid facility, under a separate EP Ref. EPR/HB3602TR. These activities will also be included as Directly Associated Activities (DAA's) to the biological treatment activities under the WWSL EP. Communications between the two organisations will be maintained to ensure activities carried out on the site are managed effectively.

The following section outlines the main documents which will make up the WW EMS. The following sections mirror the headings of prevailing EMS Guidance. WW will have associated procedures and records, which will aim to ensure compliance with Condition 1.1.1 of their EP.

The site has a management plan (EPRMP004) for the EP which covers site details, general management and gathers together relevant procedures and documents relevant for the site.

Risks identified during operation at the site, either from maintenance, changes, incidents will be recorded and rated within WARMS (Wastewater Asset Risk Management System). This system is used operationally to manage risks at sites.

2 EMS DOCUMENTS

2.1 Prepare your site infrastructure plan

The WW EMS will include an Installation EP Boundary Plan, Infrastructure, Drainage and Site Layout Plans. All site plans will be to scale and will highlight where activities are located. The WW EMS will also include a Sensitive Receptor Plan, which will be referenced in the ERA and other management plans.

The site infrastructure plan will show any:

- Buildings, and other main constructions, like treatment plants, incinerators/boilers, storage facilities and security fences;
- Storage facilities for hazardous materials like oil and fuel tanks, chemical stores, waste materials;

[1] https://www.gov.uk/guidance/develop-a-management-system-environmental-permits

- Location of items for use in accidents and emergencies e.g. spill kits;
- Entrances and exits that can be used by emergency services;
- Points designed to control pollution, for example inspection or monitoring points;
- Trade effluent or sewage effluent treatment plants;
- Effluent discharge points;
- Mains water stop tap and isolating valves, switches and cut-offs for gas and electricity;
- Routes for gas, electricity and water supplies on the site;
- Any land that is considered or known to be contaminated, for example areas that have previously been used for industrial purposes.

2.2 Site Operations

An Environmental Risk Assessment (ERA) has been produced as part of this EP application. This ERA has been prepared in accordance with EA H1 Environmental Risk Assessment for Permits Guidance[2] and assesses the mitigation measures WW will take to reduce impact to the environment. This ERA will form the basis for procedures outlining the following:

- Procedures will include waste acceptance, waste classification, waste rejection, waste storage, handling and labelling. These procedures will include the following information:
    - The longest amount of time that each type of waste will be stored on site;
    - Controls in place to ensure these time limits are not exceeded;
    - The maximum amount of each type of waste stored in terms of volume;
    - Controls to identify the specific types of waste stored on site; and
    - Waste acceptance criteria and rejection procedures to ensure only permitted waste types are accepted on to the site.

The WW EMS will include an overview of site operations, including a process flowchart showing the operations and resulting waste streams.

2.3 Site and equipment maintenance plan

The WW EMS will include a system for maintaining plant & infrastructure on the site. This system will include preventative maintenance schedules and routine checks. Machinery will be maintained in accordance with manufacturers specifications. Records will be kept and made available on request to demonstrate compliance. The site has a maintenance task sheets which details the task and frequency (i.e. daily, weekly). These are completed on site and available both in paper format for reference and electronically. They are available for recording and reporting for maintenance performance assessment.

[2] https://www.gov.uk/government/publications/h1-environmental-risk-assessment-for-permits-overview

WW also operate a continuous monitoring system which monitors key plant on the site and is remotely viewable by key staff. This system enables the operator to remotely view key metrics with regard to the functioning of plant and will alert the operator in the event of malfunction. Any malfunctions are dealt with and recorded.

2.4 Contingency plans

The WW EMS will include a series of contingency plans which minimise the impacts to the environment in the event of any unforeseen and foreseen circumstances e.g. breakdowns, enforced shutdowns and any other changes in normal operations (flooding, extreme weather etc.). These are called Consequence Management plans and more site specific Local Emergency Plans.

2.5 Accident prevention and management plan

The WW EMS will include an Environmental Accident Management Plan (EAMP), which will contain information on how WW will deal with any incidents or events that could cause pollution. The EAMP is centred around a risk assessment for potential incidents (likelihood, consequence and mitigation measures to avoid and/or minimise the impact of an incident). The WW EAMP will include a list of emergency contacts, contact details for a site sign (for the public), substances stored on site and forms to record accidents or incidents. The EAMP will also consider the risks posed by online security.

The WW EAMP will also include how accidents and incidents (including near misses) are recorded, investigated and responded to. The review of incident records will inform any amendments that may be required to the WW EAMP. The WW EAMP will also include a document review table, including dates for next review.

2.6 A Changing Climate

The WW EAMP and Contingency Plans will include risks posed by climate change and actions to be taken in an event influenced by climate change e.g. flooding or extreme weather (higher temperatures, storms etc.). In addition, WW have a climate change adaption plan which sets out how WW will adapt to climate related hazards; looks at what level of risk each poses and details what adaptation options are in place or are proposed.

2.7 Complaints Procedure

A site notice board will be present on site, which includes contact details and relevant information to allow the public to make a complaint. The WW EMS will include details on how WW will deal with complaints, how each complaint will be investigated, tracked and the recording of any actions taken as a result of complaints. WW have a website which allows the public to lodge complaints, with WW aiming to respond to all complaints within 10 working days.

2.8 Managing Staff Competence and Training Records

WW staff will be trained to ensure they are aware of the requirements of the WW EMS and their responsibilities under the EMS. Staff will also be trained in relation to site operations and management, to ensure that the site is run effectively.

The WW EMS will include a register of job roles, associated training requirements and dates when training was last received i.e. a ‘training matrix’. The training matrix will include all relevant training, including qualifications or informal training. Training records for staff will be kept alongside relevant certificates.

The Site will require an active Technically Competent Manager (TCM) to be present on the Site. An appropriate TCM, Dan Selby, will be present and will sign into the Site to provide a record for EA Audit. Dan WAMITAB reference is 601/8528/4 (certificate number 5159135). Dan is aware of the additional modules required to meet the requirements for 601/8515/6. This change was detailed in EA

communications in February 2021. An additional staff member Mallory Revollon is also being trained to provide TCM cover.

2.9 Keeping records

Record keeping is essential for demonstrating compliance with Condition 1.1.1. of the Environmental Permit. The WW EMS will include records associated with procedures and management plans that make up the EMS. A list of records to be kept is including below, but is not deemed exhaustive:

- Permits issued to the site;
- Other legal requirements;
- Environmental Risk Assessment;
- Management system plans;
- Management plans required by the application or permit e.g. odour management plan, noise & vibration management plan, fugitive emissions management plan;
- All operating procedures;
- Duty of Care records, including waste details for waste imported to and exported from the site (quantity, LoW code, origin, producer of the waste, dates that waste was produced and received on site and quarantined waste);
- Documents relating to staff competence and training (for example qualifications, courses attended);
- Emissions and any other monitoring undertaken (for example water samples);
- Compliance checks, findings of investigation and actions taken;
- Complaints made, findings of investigation and actions taken;
- Audits of management system, findings (reports) and actions taken; and
- EMS reviews and changes made to the EMS.

Records are kept in a wide variety of locations and systems.

Site Condition Report

The Environmental Management System will include Part 1 of a Site Condition Report, that will be completed as part of this EP application in accordance with EA H5 Site Condition Report Guidance[3]. The SCR will be updated through the life of the EP, when required. Records will be kept alongside the SCR, including details of pollution incidents e.g. spills and evidence of effectiveness of pollution prevention control measures. A Surrender SCR will be completed at the time of surrender.

[3] https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report

2.10 Review your Management System

The WW EMS, including management plans and procedures, will be reviewed on a regular basis. The WW EMS will also be reviewed when:

- Changes are made to the site, operations or equipment that affect the activities covered by the Permit;
- When the Permit is varied;
- In the event of any accident, complaint or breach of the Permit conditions; and
- If a new environmental issue is encountered and new mitigation or control measures are implemented.

2.11 Site Closure

As mentioned above, a Surrender SCR will be prepared in the event the Permit is surrendered. This Surrender SCR will draw upon the information from Part 1 of the SCR and Part 2 (during the life of the Permit).

2.12 Make Sure People Understand What to do

A copy of the WW EMS will be available on site and will be available for staff to consult during the operational life of the Permit. Staff will be trained on relevant sections of the EMS as part of their training program. A copy of the WW EMS will be available and will be provided to the EA or other bodies if required.

WESSEX WATER ENVIRONMENTAL POLICY

Purpose

Wessex Water Services (WWSL) Environmental Policy supports the company's aims to protect and improve the environment and its commitment to becoming a truly sustainable company, whilst meeting the requirements set out in GRP007, WWL Group Environmental Policy. We do this by delivering the highest possible quality of water and wastewater services that safeguards the environment and complies with, or betters, regulation/legislation, and in the innovative ways in which we:

- Solve problems
- Build and manage our assets
- Interact with stakeholders
- Carry out our role as a good employer.

Scope

This policy covers Wessex Water Services Limited (WWSL) activities, specifically Environmental Management in the following areas:

- Water Resources Management
- Environmental Protection
- Wastewater Compliance
- Sustainability & Innovation

Regulation & Legislation

The company is an appointed water and sewerage undertaker by the Secretary of State for the Environment under Sections of the Water Industry Act 1991). A copy of the full operating licence describing the conditions of the appointment can be found on the economic regulators (Ofwat) website: http://www.ofwat.gov.uk/industrystructure/licences/

The key regulators /stakeholders are:

Organisation	Responsibilities
Ofwat	Sets regulation and policy
DEFRA	Strategic Environmental Regulation & Policy
Consumer Council for Water	Representing customers
Environment Agency (EA)	Environmental monitoring, permitting, legislation & regulation
Natural England (NE)	Environmental monitoring, consenting, legislation & regulation

The main Environmental legislation that the company complies with is:

Water Industry Act 1991: This consolidates previous legislation on water supply and sewerage services (including trade effluent consents). It requires licenses for abstraction, impoundment, established flood defence committees, and provides for works notices and water protection zones.

Water Act 2003: This sets out the framework for water abstraction licensing, regulation of impoundments, and measures for drought management and flood defence.

In addition to these, the company complies with specific environmental legislation and these are listed in the relevant strategies in the Environmental Management Framework.

Policy Objectives

To achieve the company's environmental aims and commitments, objectives have been established, including those set out in the company's Strategic Direction Statement and Business Plan, which are:

- Comply with and, where possible better European, national, and local codes, consents and directives
- Operate in a socially responsible manner
- Consult with environmental regulators and other stakeholders on the development of proposed legislation
- Engage with and involve the public and local groups in our work where it may affect them
- Design assets and implement working practices that are resilient and continue to deliver high quality reliable services, even in the face of unusual events
- Be fully prepared to cope with operational emergencies that might affect the environment and continually improve the environmental management of our activities
- Communicate the impact of changes in environmental legislation to the relevant company departments and management teams enabling us to continuously improve and promote best practice
- Reduce emissions to levels at which adverse impacts on the environment are avoided
- Conserve and enhance the environment, and where appropriate, improve it through the services we provide

In addition to these there are the specific objectives for each of the areas of the environment, and these are listed in the relevant strategic Framework.

Framework

This framework is one element of the overall Structured Management System Framework (refer to Source Intranet) for the company that operate to meet our objectives. To ensure the successful implementation of this policy an Environmental Management Framework has been developed which is shown in Figure 1.

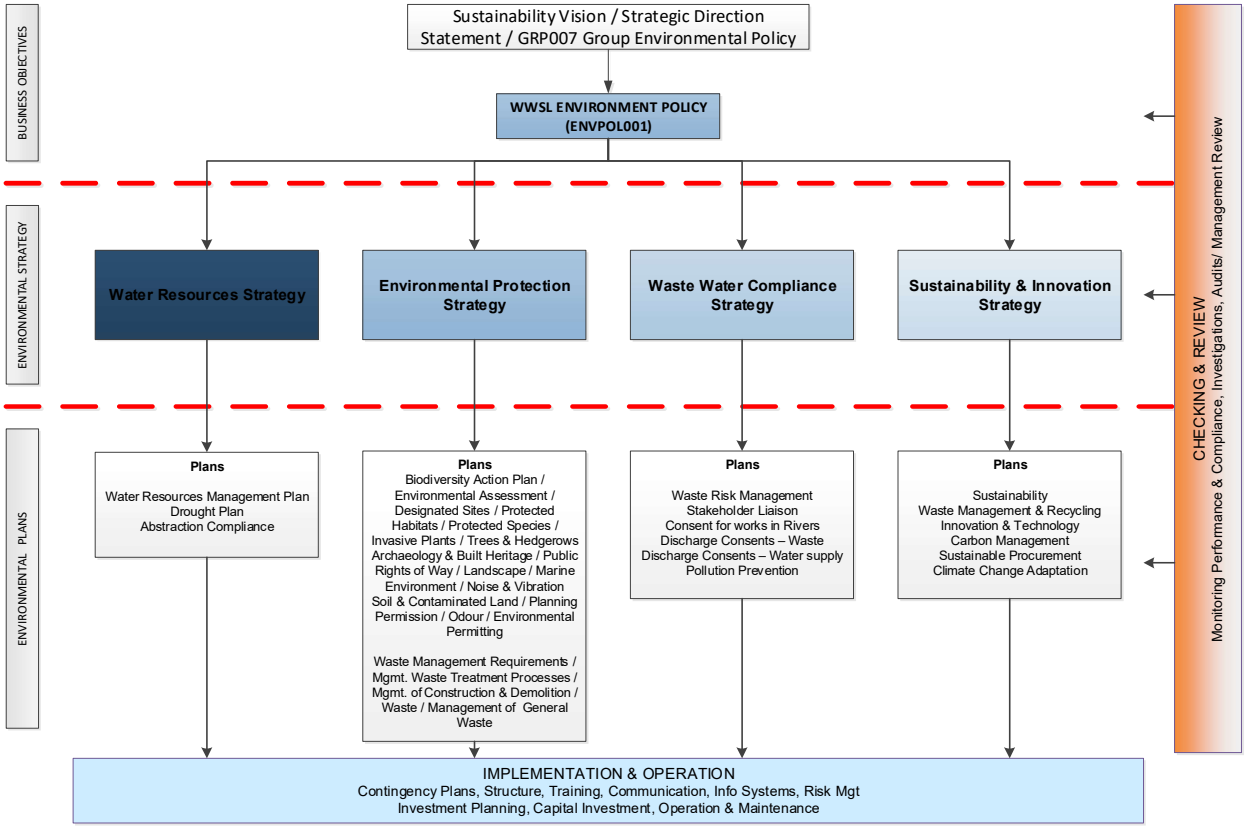

Figure 1: Environmental Management Framework

This Framework includes:

- The company's strategic objectives, legal obligations and wider social and environmental goals
- Environmental service levels and performance indicators
- Integrated policy strategies and plans for the areas of Water Resources; Environmental Protection; Wastewater compliance and Sustainability & Innovation
- Operational quality controls to define requirements for:

  - Organisational roles, communication & information needs
  - Design, operation and maintenance of equipment to meet required standards
  - Installation of plant/works that blends sympathetically with the local landscape

- Monitoring and publicly reporting of environmental performance/compliance
- Investigations of performance issues to identify lessons learned and the need improvement
- Corporate governance to ensure that decisions are made wisely transparently and approved by the relevant business management teams

The strategies for each of the areas of Environmental Management are as follows:

- Water Resources Management Strategy (ENVS001)
- Environmental Protection Strategy (ENVS002)

- Wastewater Compliance Strategy (ENVS004)
- Sustainability & Innovation Strategy (ENVS005)

Responsibility

The Group Chief Innovation Officer has overall responsibility for Environmental Management, with approval for this policy sitting with the Corporate Social Responsibility Committee. The operation of the Environmental Management Framework is the responsibility of the Environment & Technology directorate supported by the Environmental Leaders Group and all Wessex Water employees and external contractors/suppliers.

The company's Operational & Enterprises (Supply, Wastewater, Geneco) and Capital Investment (Engineering & Construction) business units are responsible for ensuring that the environment is protected and improved as part of their management systems. The Assets & Compliance Directorate is responsible for ensuring that our Business Plan and strategic investment is in line with current and future legislative requirements and that we meet required compliance standards. Environmental management activities are supported by business units/teams that provide: Legal; Financial; Training & Development; Information Technology; Procurement; Customer; and Health & Safety services.

Revision History

Issue	Revision Description	Date
1	First issue	
2	Revised Format	May 10
3	Redrafted to include a framework which incorporates all aspects of Environmental & Public health management	Jan 13
4	Revised to remove Public Health element and updated to reflect structure changes	September 2019

Waste Permit Procedure

Wessex Water Services Limited has an agreed management system to achieve the requirements of Environmental Permits on sites that hold Environmental Permitting Regulations (EPR) waste environmental permits.

The approach is designed to satisfy the requirements of many stakeholders of which are detailed in this procedure.

Associated Documents:

EPF001 – Environmental Monthly Internal Review Form
EPF002 – EA Notification Form
OPSP001 – Procedure for working on operational sites
MSMAN001 – Operations Quality Manual
OPSP227 – Procedure for procuring Environmental Monitoring services and receiving their reports

Abbreviations

EMP – Environmental Management Plan
TCM - Technically Competent Manager
EA – Environment Agency

Permits

The requirements of achieving compliance with permitted activities will be managed by standard rules/bespoke permits: EMPs to be produced showing applicable procedures and reporting required.

Clarity of roles and responsibilities

Roles and responsibilities – Environmental permits			
	Completed by	Used by	Action
EMP document	TCM	Key operations staff*	• EMP added to Site Information File • Environmental folder • Forward to Management Systems team for publishing
TCM monthly review	TCM	Key operations staff*	• Copy saved to Sharepoint • Copy to key operations staff* • Non-compliance raised at waste risk meeting.
6 Monthly review	TCM	Key operations staff*	• Copy saved to Sharepoint • Summary of results to be discussed at waste risk meeting (reported annually)
Audit program – 8-year cycle	TCM	N/A	• Copy saved to Sharepoint • Summary of results to be discussed at waste risk meeting (reported annually)

* Key operations staff: Operator / Scientists / Assistant treatment manager / Treatment manager / Geneco regional manager / Geneco area operations manager.

The agenda and minutes will comprise of:

- a programme of monitoring requirements for all sites, e.g., air quality
- a programme of environmental improvements as required by the permit, e.g., energy efficiency, raw materials and waste minimisation
- confirmation/review that quarterly waste records are adequately generated from the sites
- discussions around regulatory interest in any/all of the Permitted Sites, e.g., EA audits or Improvement Conditions
- changes in legislation
- share best practice, learning points from events and resultant actions
- raised resource and training issues
- review (and action for revision where necessary) the currency of documents (emergency management plans, procedures, Site Environmental Management plans, Risk Assessments etc).

Environmental Management Plan

Each permitted site will have an Environmental Management Plan (EMP) which will be produced and overseen by the Technically Competent Manager (TCM) for the site or permitted activity. The EMP plan will consist of the elements required by the Permit, including those detailed in the document management and control section below. Reference to the EA's environmental permits management system guidance will also be needed.

TCM role

Competent personnel who are WAMITAB trained are deemed to understand the activities operating with an Environmental Permit; can

- identify and assess environmental pollution impacts;
- can work within Wessex Water's management systems;
- can work without prejudice and have the authority to raise any issues identified to the appropriate level of management to enable change.

Competent personnel will produce, and revise where necessary, the Environmental Management Plan (EMP) for the site or permitted activities. The EMP will be used to identify the necessary site-specific management techniques

Competent personnel will attend the Permitted site or activity for the number of hours per week as stipulated out by the EMP. The EMP will detail the calculation for attendance hours. Due to the waste activities undertaken attendance hours are based on sites or permitted activities operating 24/7 365 days a year.

When visiting the site, Competent Staff will sign in and out the visitor book to demonstrate their attendance. During the visits, they will ensure via a monthly internal audit that the necessary inspections, maintenance, reporting, communications etc have taken place and report this via Environmental Monthly Internal Review Form (EPF001). Should deficiencies be found, these will be recorded onto Sharepoint and escalated to the monthly Waste risk meetings.

Key Operational staff will be given a copy of the report (EPF001) as soon as practicable following the visit and a copy saved electronically in the Permit folder (see

'Document Control' for locations). Should a management issue be observed by a TCM during any other site visit, they should be recorded in the site diary and reported immediately to the Treatment Manager.

TCMs, Odour Management Coordinator and Treatment Managers will meet every 6 months to review management plans, procedures, share best practice and learning points from any incidents, identify and organise any actions arising and minute these meetings. An annual meeting will take place to be attended by all TCMs, Odour Management Coordinator and a representative of Treatment Managers, heads of Water Recycling, Geneco Operations/Services and Assets and Compliance.

Environmental incidents/events and malfunctions

Any environmental events and malfunctions should be reported to the TCM/Area Manager/Wastewater Regulation and where appropriate, report these to the EA (immediately by telephone (0800-807060) followed up in writing within 24 hours using the Environment Agency Notification Form EPF002 available on source).

Permitted Sites' Managers

Will discuss matters relating to their Environmental Permits during their monthly team briefs/compliance meetings. A review of recent incidents applicable to the permitted activities will be required to enable this.

Raise relevant Environmental Permit matters for discussion in the 6 monthly Waste Managers Meeting and if necessary, raise with the EA.

TCM/Line Managers

Their line managers will coordinate any leave and any other duties so as to ensure there is always a competent person available to visit sites for the regular programme and as required under exceptional circumstances, e.g., incidents.

Document Management and Control

Each Permitted site will have a white, ring binder Site Environmental File, prepared by the TCMs. This file will contain:

Document	Electronic location
A copy of the Environmental Permit and a plan showing the extent of the Permitted area.	SIF
Any other permits for the site	SIF
An Environmental Permit Management Plan showing the location and management of particular documents. Appended will be the site risk assessments.	Source
Emissions, monitoring and modelling results (Sharepoint)	Sharepoint
Accident prevention Management Plan (if applicable)	Source
Fire prevention plan (if applicable)	Source
Site infrastructure and drainage plan	Source
Site and equipment maintenance plan	Source
Contingency plans	Source
Complaints procedure	Source
Staff competence and training records	Source

Records of any compliance checks, investigations, complaints, audits and management reviews	Sharepoint
Any other documents required by the permit	

Electronic information, such as meeting minutes, correspondence, Permit application documents will be stored on Sharepoint

Control of Contractors

TCMs must ensure all internal or external designers or contractors (including E&C) working in the Permitted area or undertaking work that may affect the Permitted activity are made aware of the Permit and its requirements and given sufficient instruction to ensure that they act in a way that will comply with the Permit. This may include, reporting requirements environmental events, pollution prevention practices, etc.The TCM should assign responsibilities for these actions as relevant.

Information and Reporting to the Environment Agency

Information

All reportable monitoring results shall be correlated by the TCM and given to Wastewater Regulation for checking, collation and final presentation to the EA.
This will include quarterly waste returns, stack emissions and other relevant permitted permit requirements.

Notifications

Changes in the business administration will be advised to the EA by the Legal and Estates team.

Environmental incidents/events and malfunctions

Any environmental events and malfunctions should be reported the TCM/Area Manager/Wastewater Regulation and where appropriate, report these to the EA (immediately by telephone (0800-807060) followed up in writing within 24 hours using the Environment Agency Notification Form EPF002 available on source).
The Environment Agency shall be notified as soon as reasonably practicable following detection, within the site of the regulated facility of:

(a) any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution; and
(b) any breach of a limit specified in schedule 3 table S3.1 (including individual exceedances of limits which are covered by condition 3.1.2).

Any other significant adverse environmental effects, which may have been caused by the activity, shall also be notified to the Environment Agency as soon as reasonably practicable following detection.

Wastewater Regulation must be advised of any such communication as soon as appropriate.

Revision History

Issue	Date	Description	Prepared By
1	22nd July 2010	First Issue	Alex Urie
2	30th June 2011	Major changes	Alex Urie
3	17 December 2020	Major rewrite and change of owner to Jack Crassweller	Ed Taylor / Carolyn Dewhirst / Dave Jones / Jim Humphries / Jack Crassweller

Appendix 4: Site Condition Report

Stantec

Trowbridge Bioresources Centre

Site ID: 11799

SITE CONDITION REPORT – H5

July 2021

Revision	Date	Description	Author	Checked by	Reviewed by
01	July 2021	H5 SCR	E.Wilson	Rob Gordon	Rob Gordon

1.0 SITE DETAILS	
Name of the applicant	Wessex Water Services Limited
Activity address	Trowbridge Water Recycling Centre Off Bradford Road Trowbridge Wiltshire BA14 9BJ United Kingdom
National grid reference	Approximate Bioresources Centre: ST848587 (coordinates: 384760, 158790)

Document reference and dates for Site Condition Report at permit application and surrender	Reference: Site Condition Report H5 July 2021 Application Date: July 2021

Document references for site plans (including location and boundaries)	Stantec Industrial Emissions Directive Compliance Action Plan, Environmental Qualitative Risk Assessment, Trowbridge Bioresources Centre, Report Reference: EQRA 331101341, version 0.1, June 2021. Figure 2.1 Site Setting – Regional Figure 2.2 Site Setting – Local Figure 3.1 Sludge Treatment Process Flow Diagram Figure 3.2 Plan of Current Water Recycling Assets (& shows site surfacing) Figure 4.1 Site investigation borehole locations Figure 4.2 Surface Water Features

2.0 Condition of the land at permit issue	
Environmental setting including: • geology • hydrogeology • surface waters	The environmental setting of the WRC has been detailed in the Environmental Quantitative Risk Assessment (EQRA) completed for the site (Stantec, 2021). The Trowbridge site is located at the north-westerly extent of Trowbridge town and is approximately 12 km to the south-east of central Bath (NGR: 384760, 158790). The Bioresources Centre covers an area of approximately 1.28 ha which includes the main sludge assets at the WRC and the road to the south-eastern area where the skip storage is located. The Bioresources Centre is comprised of both the anaerobic digestion and associated activities (as operated by Wessex Water Services Limited (WWSL) and which are within the 'installation boundary') and the Combined Heat Plant (CHP) and Gas to Grid activities as operated by Wessex Water Enterprises Limited (WWEL) (and which are

	within the 'EPA/HB3602TR boundary') as shown on Figure 3.2. Geological, hydrogeological and hydrological information detailed within the EQRA is based upon previous Site Investigation (SI) reports completed for various developments across the WRC. Locations of the previous SI and available British Geological Survey (BGS) borehole logs are presented on Figure 4.1. Site Investigation Locations are as follows: Structural soils (2004) - Two boreholes (BH1 and BH2) - Three trial pits (TP101 – TP103) Located adjacent to the post digested tanks [E1 and E2]. CJ Associates (2008) - Three boreholes (BH1, BH1R BH2) - One trial pit (TP1) Located beneath the APD3 [B6], sludge reception tank [K] and strained transfer tank [Q]. Geotechnics (2008) - 16 boreholes (BH1 to BH16) Located to the south of the Bioresources Centre and the majority along the eastern / south-eastern boundary of the Site. BWB (2012) - Two boreholes (BH1 and BH2) - Six trial pits (TP1 to TP6) Located to the south-west of Mesophilic Digester 1 [C1], east of the waste gas burner (CHP) [Y] and around the sludge reception tank [K] and pre-thickened tank [Z]. ESG (2016) - Four boreholes (BH01 – BH04 including BH02A, BH04A and BH04B) Located by the filter beds. ESG (2017) - One borehole (BH101) - Three trial pits (HDP01 to HDP03) Located in the liming plant area. BWB (2020) - Three boreholes (BH01 to BH03) - Seven trial pits (HP01 to HP07) Located to the east of the filter beds.

	BGS Borehole Logs - One borehole (ST85NW10) Located within the WRC along the road between the sludge assets and cake skips. **Geology** *Made Ground* Mapping indicates no Made Ground is present at the Site. However, Made Ground was recorded during site investigations. The Made Ground is described as sandy silty gravel and sandy slightly gravelly clay and is generally present at a thickness of between 0.65 m to 3 m across the Site (including in the main part of the Bioresources Centre in the north-west part of the Site). However, significantly thicker Made Ground (up to 7 m) was recorded along the east / south-east boundary of the Site adjacent to the valley containing the River Biss. This is where an earthworks / former refuse tip were identified on historical mapping and reflects how this area has been built up above the original ground levels. *Superficial Quaternary Deposits: Alluvium* The available mapping / site investigation data indicate that no superficial deposits are present at the Site, however alluvium follows the River Biss 30m to the east of the Site. *Kellaways Formation / Oxford Clay Formation* Bedrock at the Site is the Kellaways Formation / Oxford Clay Formation. This is described as sandy clay with occasional laminated mudstone layers at depth and is recorded at between 10 and 20 m thick beneath the Site. However, a 2 m thick sandstone unit within the Kellaways Formation was recorded by BWB (2020) at BH01 and BH02 at around 18.5 mbgl (c. 17.5 m AOD). *Cornbrash Formation / Forest Marble Formation* The Cornbrash Formation was recorded in the ESG (2017) boreholes to the east of the lagoons at depths of 17.65 mbgl (BH01) and 17.77 mbgl (BH02A) and is identified as weak thickly bedded grey fine to medium grained clayey limestone. Weathering and discontinuities are present within this unit. Only one BGS borehole (ST85NW10) is available to a depth of 61 m located in the centre of the Site. This borehole recorded 30 m of blue/green/grey clay immediately beneath the ground (Kellaways Formation / Oxford Clay Formation). Beneath this lies 2 m of ‘very hard stone and clay’ which is potentially identified as the Cornbrash

	Formation. Underlying this is 19 m of 'stone and clay with harder seams of clay' which is potentially identified as the Forest Marble Formation. **Hydrogeology** *Aquifer Designations* The alluvium to the east of the Site is classified as a Secondary A aquifer. This is due to permeable layers they contain being capable of supporting water supplies at a local scale. The Kellaways Formation / Oxford Clay Formation is classified as unproductive strata due to the low permeability of the layers that are considered to have negligible significance for water supply. However, the underlying Cornbrash Formation and Forest Marble Formation are classified as Secondary A Aquifers. This is due to permeable layers they contain being capable of supporting water supplies at a local scale. Aquifer Testing It is noted that the site investigation undertaken by BWB in 2012 (BWB, 2012) included a rising and falling head permeability test within BH03 where a piezometer was installed within the Made Ground unit. The rising head test calculated permeability values of 0.018 - 0.021 m/d and the falling head test values of 0.031 - 0.042 m/d, which indicative of low permeability materials. *Source Protection Zones* There are no Source Protection Zones within 500 m of the Site; the nearest is over 2 km to the north-east. *Licenced Groundwater Abstractions* The EQRA reports no licenced groundwater abstractions within 4 km of the Site. Further information is provided within the EQRA (Stantec, 2021). *Groundwater Observations* There are four boreholes that include dual installations (one shallow installation that monitors within the Made Ground; and one deep that monitors within the Kellaways / Oxford Clay). The data suggests that groundwater levels in these units tend to be very similar (several may indicate a small downwards hydraulic gradient from the Made Ground to the Kellaways / Oxford Clay).

	There is one borehole that includes a dual installation with a shallower installation that monitors within the Kellaways / Oxford Clay and a deeper installation that monitors in the Cornbrash. The data suggests that there is downwards hydraulic gradient from the Kellaways / Oxford Clay to the Cornbrash. Groundwater levels measured in the Kellaways / Oxford Clay in the main part of the Biosresources area to the west of the Site are typically around 38 to 42 m AOD. Groundwater levels measured in the Made Ground and Kellaways / Oxford Clay in the north east of the Site are typically 34 to 36 m AOD. Groundwater levels measured in the Made Ground and Kellaways / Oxford Clay along the eastern / south-eastern boundary are typically around 32 to 34 m AOD. The groundwater strike and level data would appear to suggest that there is no Site wide shallow groundwater present within the Made Ground. It is considered likely that the groundwater levels that have been measured within the Made Ground and Kellaways / Oxford Clay reflect the general low permeability nature of these units. Isolated areas of groundwater may be present associated with more permeable areas of Made Ground. Groundwater levels along the eastern / south-eastern boundary of the Site are several metres lower than in the main part of the Bioresources area to the west of the Site. This is where the presence of thicker Made Ground has been identified; the lower groundwater levels are to a degree assumed to reflect the lower elevation of the underlying Kellaways / Oxford Clay. Further information on groundwater is included in the EQRA (Stantec, 2021). **Surface Waters (Hydrology)** Surface water in the area is expected to generally drain to the south-east from the higher ground where the Site is located towards the River Biss (i.e. following the local topography). The River Biss lies approximately 100 m east of the Site and flows northwards towards the River Avon where they meet approximately 900 m north of the Site. As outlined above, drains lie along the southern and eastern boundaries of

	the Site. The southern boundary flows to the east towards the eastern drain / River Biss, however, during the site visit the confluence area by the Site's entry road to the south-east was too overgrown to confirm whether the southern drain converges with the eastern drain or River Biss. The eastern drain lies runs along the base of the valley (at the break in slope) parallel with the River Biss and flows towards the north-east where is discharges into the River Biss downstream of the Site. Four surface water lagoons lie immediately to the north of the Site. The most eastern two are surrounded by an embankment (approximately 1-2m high) and hence lie at a greater elevation than the sludge assets within the Bioresources Centre. These ponds are currently not in use. The western two lagoons lie immediately adjacent to the liming area (as shown on Figure 4.1) and are used for fishing/wildlife.
Pollution history including: • pollution incidents that may have affected land • historical land-uses and associated contaminants • any visual/olfactory evidence of existing contamination • evidence of damage to pollution prevention measures	**Pollution Incidents** There are two historic pollution incidents recorded with the EA within 500 m of the Site. Both are associated with WW operations at the Site and relate to sewage materials impacting the River Biss to the south-east of the Site). WW and EA records for both incidents indicate sewage was discharged to the river following equipment failure in 2001 (which led to a minor impact on water) and after a lightning strike causing loss of power in 2003 (which led to a significant impact on water).. Records of pollution incidents are provided within the Groundsure Environmental Data Report included in the EQRA (Stantec, 2021) Appendix A. **Historical land-uses & associated contaminants** Historical mapping is provided in Appendix B and Appendix C of the EQRA (Stantec, 2021). Potentially contaminative activities / features are listed in the Groundsure Environmental Data Report provided in Appendix A of the EQRA. *Sewage Works* Sewage Works was constructed at the Site some point between 1901 and 1922 in what is currently the eastern part of the Site only. Tanks are listed as potentially contaminative land-use on site from 1922-1939. Following this, the land along the eastern edge of the Site (i.e. along the side of the valley containing the River Biss) was built up

	between 1924 and 1956-1960 as displayed by earthwork markings on the maps. This was extended further south along the south-east edge of the Site between 1956-1960 and 1985-1987. During this time the sewage works were extended to the west between 1968-1971 and 1974-1977 in the south-west corner of the Site and again between 1979 and 1985-1987 to cover the entire current Site area with the initial eastern area remaining as filter beds. Prior to this time the area appears to have been predominately agricultural. *Drainage Network* The drain that lies along the eastern boundary of the Site is identified in 1924 (and may have been constructed as part of the work that raised the land along the eastern edge of the Site at this time); there is an outfall (this is now the final effluent outfall) from the Site to this drain. This was first detailed on mapping from 1968 – 1971. The drain along the southern boundary of the Site is first identified in 1979; prior to this an area of vegetation was in this location. The four lagoons that are currently located to the north of the Site were initially constructed between 1979 and 1985-87 as five ponds, however between 2010 and 2020 the three western ponds were altered into two ponds. *Waste Management Licences/Landfills* There are four historical landfill sites within 500 m of the Site and the closest is 185 m to the north-east of the Site. There are a further two refuse tips within 500m of the Site. There are five licensed waste management facilities located within 500 m of the WRC. The three closest are located on site for the combustion of biogas, liquid treatment and sewage sludge treatment. These are operated by Wessex Water Enterprises Limited. A refuse tip was located in the north-east corner of the Site from between 1936-1939 to 1974-1977, to the north of the filter beds. A further refuse tip was also present (to the north of where the current lagoons are) from between 1956-1960 to 1968-1971. *Potential Contaminants* Potential contaminants associated with the identified potential sources of contamination on site and in the surrounding area include: Metals, petroleum hydrocarbons - associated with fuel tank(s) and pumping stations; PAHs, polychlorinated biphenyls (PCBs) (associated with generators and electricity substations),

	Metals, asbestos and ground gas (carbon dioxide, carbon monoxide) - from areas of infilling and sewage treatment. Further detail on the potential sources of contamination (PSC) and contaminants associated with current and historical use of the site and other potential sources of contamination (PSC) identified within 50m of the site (250m for infilled ground/ landfill) with an accompanying PSC Plan is included in the memorandum titled, *Potential Sources of Contamination Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report* (Stantec, 2021) presented as Appendix A of this document. **Visual / Olfactory Evidence of Contamination** No olfactory evidence of contamination was identified during the January 2021 site visit. As detailed within the EQRA, visual evidence of contamination included spillages from the return liquor pumping station and leaks from the return liquor balance tanks. Made Ground including ash was identified in BH02, HP05 and HP06 during the BWB 2020 ground investigation (GI) between 0 and 3.0m below ground level (bgl); however, this is located northeast of the current Bioresources Centre. Ash was not recorded in any other GI however macadam and clinker were noted in BH01 and BH02A/BH04 respectively in ESG 2016 boreholes which are located in the same area as BH02 mentioned above recording the ash. **Evidence of Damage to Pollution Prevention Measures** Within the EQRA, Table 3.1 Main Assets Associated with Sludge Treatment (collected during site visit) indicates that some failure has occurred at the BC. This included: (1) corrosion holes near the top of the Post Digested Tank [E1 and E2], Sludge Reception Tank [K], Post Thickened Tank [P] and Strained Transfer Tank [Q] limiting their use.
Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)	Out of the 7 previous GI reports existing for the Site, the following include geo-environmental chemical testing: - Geotechnics (2008). - ESG (2017). - BWB (2020). - BWB (2012).

	Detectable concentrations of metals, asbestos, Aliphatic and Aromatic fraction Total Petroleum Hydrocarbons (including some BTEX), PCBs and polycyclic aromatic hydrocarbons (PAH) were observed in these investigations. For detail on contamination encountered during previous GI at the site see the *Potential Sources of Contamination Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report (Stantec, 2021)* presented in Appendix A of this document.
Baseline soil and groundwater reference data	For detail of the soil and groundwater reference data at the Site see the *Potential Sources of Contamination Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report (Stantec, 2021)* presented in Appendix A of this document. As presented in Table 1.9 of the report in Appendix A there are potential contaminants (predominantly metals and PAHs and TPHs) associated with both the Bioresources Centre activities, at the Site and the wider WRC. There is sufficient data for soil and groundwater within the wider WRC to determine baseline data of the Site even though this is limited data for the Bioresources Centre.
Supporting information	• Source information identifying environmental setting and pollution incidents • Historical Ordnance Survey plans • Site reconnaissance • Historical investigation / assessment / remediation / verification reports • Baseline soil and groundwater reference data

3.0 Permitted activities

Permitted activities	WRC comprising Sludge Treatment Process outlined in the EQRA Section 3.1 Figure 3.1 Sludge Treatment Process Flow Diagram (Stantec, 2021).
Non-permitted activities undertaken	Not Applicable
Document references for: • plan showing activity layout; and • environmental risk assessment.	Stantec Industrial Emissions Directive Compliance Action Plan Environmental Qualitative Risk Assessment, Trowbridge Sludge Treatment Centre, Report Reference: EQRA 331101341, version 0.1, July 2021. Figure 2.1 Site Setting – Regional Figure 2.2 Site Setting – Local Figure 3.1 Sludge Treatment Process Flow Diagram

	Figure 3.2 Plan of Current Water Recycling Centre Assets Table 3.1 Main assets associated with Sludge Treatment Section 6.0 EQRA.

Note:

In Part B of the application form you must tell us about the activities that you will undertake at the site. You must also give us an environmental risk assessment. This risk assessment must be based on our guidance (*Environmental Risk Assessment - EPR H1*) or use an equivalent approach.

It is essential that you identify in your environmental risk assessment all the substances used and produced that could pollute the soil or groundwater if there were an accident, or if measures to protect land fail.

These include substances that would be classified as 'dangerous' under the Control of Major Accident Hazards (COMAH) regulations and also raw materials, fuels, intermediates, products, wastes and effluents.

If your submitted environmental risk assessment does not adequately address the risks to soil and groundwater we may need to request further information from you or even refuse your permit application.

4.0 Changes to the activity	
Have there been any changes to the activity boundary?	This application is for a new installation comprising existing activities.
Have there been any changes to the permitted activities?	If yes, provide a description of the changes to the permitted activities
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	If yes, list of them
Checklist of supporting information	• Plan showing any changes to the boundary (where relevant) • Description of the changes to the permitted activities (where relevant) • List of 'dangerous substances' used/produced by the permitted activities that were not identified in the Application Site Condition Report (where relevant)

5.0 Measures taken to protect land	
Use records that you collected during the life of the permit to summarise whether pollution prevention measures worked. If you can't, you need to collect land and/or groundwater data to assess whether the land has deteriorated.	
Checklist of supporting information	• Inspection records and summary of findings of inspections for all pollution prevention measures • Records of maintenance, repair and replacement of pollution prevention measures

6.0 Pollution incidents that may have had an impact on land, and their remediation	
Summarise any pollution incidents that may have damaged the land. Describe how you investigated and remedied each one. If you can't, you need to collect land and /or groundwater reference data to assess whether the land has deteriorated while you've been there.	
Checklist of supporting information	• Records of pollution incidents that may have impacted on land • Records of their investigation and remediation

7.0 Soil gas and water quality monitoring (where undertaken)	
Provide details of any soil gas and/or water monitoring you did. Include a summary of the findings. Say whether it shows that the land deteriorated as a result of the permitted activities. If it did, outline how you investigated and remedied this.	
Checklist of supporting information	• Description of soil gas and/or water monitoring undertaken • Monitoring results (including graphs)

8.0 Decommissioning and removal of pollution risk	
Describe how the site was decommissioned. Demonstrate that all sources of pollution risk have been removed. Describe whether the decommissioning had any impact on the land. Outline how you investigated and remedied this.	
Checklist of supporting information	• Site closure plan • List of potential sources of pollution risk • Investigation and remediation reports (where relevant)

9.0 Reference data and remediation (where relevant)	
Say whether you had to collect land and/or groundwater data. Or say that you didn't need to because the information from sections 3, 4, 5 and 6 of the Surrender Site Condition Report shows that the land has not deteriorated. If you did collect land and/or groundwater reference data, summarise what this entailed, and what your data found. Say whether the data shows that the condition of the land has deteriorated, or whether the land at the site is in a "satisfactory state". If it isn't, summarise what you did to remedy this. Confirm that the land is now in a "satisfactory state" at surrender.	
Checklist of supporting information	• Land and/or groundwater data collected at application (if collected) • Land and/or groundwater data collected at surrender (where needed) • Assessment of satisfactory state • Remediation and verification reports (where undertaken)

10.0 Statement of site condition
Using the information from sections 3 to 7, give a statement about the condition of the land at the site. This should confirm that: • the permitted activities have stopped • decommissioning is complete, and the pollution risk has been removed • the land is in a satisfactory condition.

Appendix A

Potential Sources of Contamination – Supporting Information

Stantec

Memo

To:	Wessex Water	From:	Stantec
File:	330201558 Wessex Water IED HRAs	Date:	July 5, 2021

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

BACKGROUND

Wessex Water Services is required to meet conditions under the Industrial Emissions Directive (IED). An Environmental Permit is required for the Bioresources Centre (the Site) located within Trowbridge Water Recycling Centre (WRC).

As part of the environmental permit application an Environmental Quantitative Risk Assessment (EQRA) (Stantec, 2021), has been undertaken for the Trowbridge Bioresources Centre. The EQRA provides a Compliance Action Plan (CAP) detailing the site specific actions required at the Trowbridge Bioresources Centre to ensure IED compliance. The EQRA will be used to identify the mitigation measures that are required to reduce the risk of pollution to ground or local water environment to comply with the IED. To support the EQRA process, a desk-top preliminary hydrogeological study for the Trowbridge Bioresources Centre has been undertaken and is presented within the EQRA.

In addition to the EQRA, an H5 Site Condition Report (SCR) (Stantec, 2021) has been completed for the Trowbridge Bioresources Centre. The purpose of the SCR is to describe and record the baseline conditions of the land and groundwater at the Site at the point of application/ start of operations.

To support the SCR, this memo documents a review of environmental data to identify potential sources of contamination at the Site and within the surroundings, resulting from historical and/ or current land uses/ activities.

This memo should be read in conjunction with the SCR and EQRA.

SITE SETTING

The Site is located at:

Trowbridge Bioresources Centre
Off Bradford Road
Trowbridge
BA14 9BJ
United Kingdom.

National Grid Reference: (approximate WRC centre): ST848587; Coordinates: 384760, 158790.

The Site is in a rural area but close to the suburbs of Trowbridge and Trowle Common. A solar farm lies adjacent to the western boundary and extends to the north beyond four lagoons which lie adjacent to the northern boundary of the Site. Drains lie adjacent to the eastern and southern boundary of the Site. To the east lies the River Biss at approximately 100 m away and flows in a northerly direction. A railway line lies to the east of the river at approximately 160 m east of the Site. The Kennet and Avon canal (Canal) lies 660 m north of the Site (at the closest point). The River Avon lies just north of the Canal at 720 m north of the Site.

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

The Site is on the southern edge of a fairly flat area of higher ground. This is defined by a south-west to north-east orientated valley to the south-east of the Site (that contains the River Biss) and an east to west orientated valley to the north of the Site which contains the Canal and River Avon. The high ground is at approximately 50 m AOD with the Site at 42 m AOD and the ground dropping steeply to the south-east down the side of the valley to approximately 30 m AOD at the River Biss.

Further information on site setting, including geology, hydrogeology and hydrology is provided in the EQRA.

HISTORICAL GROUND INVESTIGATION

Reports for 7 Site Investigations (SI) have been provided for the Trowbridge WRC.

- According to BWB (2012), Structural Soils drilled two boreholes (BH1 and BH2) and excavated three trial pits (TP101 – TP103) adjacent to the post digested tanks [E1 and E2] in 2004. However, borehole / trial pit logs are not available.
- According to BWB (2012), CJ Associates drilled three boreholes (BH1, BHR1 and BH2) and excavated one trial pit (TP1) beneath the APD3 [B6], sludge reception tank [K] and strained transfer tank [Q] in 2008. However, borehole / trial pit logs are not available for BH1R or TP1.
- Geotechnics Ltd (2008) drilled 16 boreholes (BH1 to BH16) across the Site in 2008 with four located to the south of the Bioresources Centre and the majority along the eastern / south-eastern boundary of the Site.
- BWB (2012) drilled two boreholes (BH1 and BH2) and excavated six trial pits (TP1 to TP6) to the south-west of Mesophilic Digester 1 [C1], east of the waster gas burner (CHP) [Y] and around the sludge reception tank [K] and pre-thickened tank [Z] in 2012.
- ESG (2017) drilled four boreholes (BH01 – BH04 including BH02A, BH04A and BH04B) by the filter beds in 2016.
- According to Sweco (2019), ESG also drilled one borehole (BH101) and excavated three trial pits (HDP01 to HDP03) in the hardstanding area to the north of the site in 2017.
- BWB (2020) drilled three boreholes (BH01 to BH03) and seven trial pits (HP01 to HP07) to the east of the filter beds in 2020.

Figure 4.1 extracted from the EQRA shows the locations of the exploratory holes completed as part of the SIs, in addition to British Geological Survey (BGS) boreholes available (BGS, 2021).

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

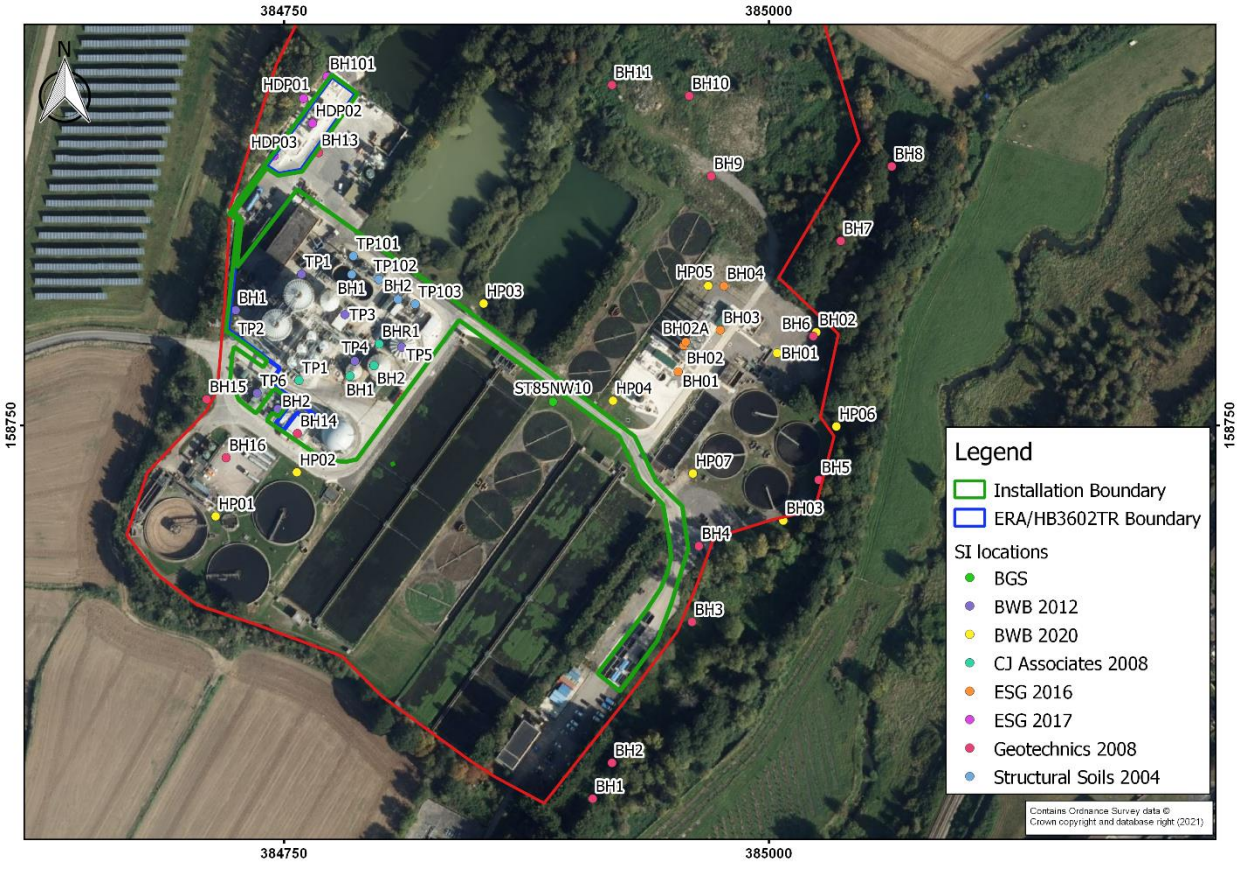

Figure 4.1 Previous Ground Investigations Exploratory Hole Location Plan (current Bioresources Centre boundary)

Strata Encountered

A review of the strata encountered as reported on the exploratory hole logs is detailed within the EQRA Section 4, but is also summarised as follows:

Made Ground

Mapping indicates no Made Ground is present at the Site. However, Made Ground was recorded during site investigations. The Made Ground is described as sandy silty gravel and sandy slightly gravelly clay and is generally present at a thickness of between 0.65 m to 3 m across the Site (including in the main part of the Bioresources Centre in the north-west part of the Site). However, significantly thicker Made Ground (up to 7 m) was recorded along the east / south-east boundary of the Site adjacent to the valley containing the River

Biss. This is where the earthworks / former refuse tip were identified on the historical mapping and reflects how this has been built up above the original ground levels.

No visual/olfactory evidence of contamination was noted in the exploratory hole records.

Superficial Quaternary Deposits: Alluvium

The available mapping indicates that no superficial deposits are present at the Site, however a 125 m wide strip of alluvium follows the River Biss 30m to the east of the Site.

Bedrock

Mapping shows that bedrock at the Site is the Kellaways Formation and Oxford Clay Formation (undifferentiated). The two formations are identified as 'undifferentiated' by the BGS as they are comprised of similar geology (i.e. predominately mudstone) and so available descriptions are not always sufficient to distinguish between the two or not enough information is available to tell them apart.

The Kellaways Formation comprises mudstone which is locally sandy. According to BGS (2000) the Kellaways Formation is up to 27m and is typically around 20m in the Wessex Basin. BGS (2000) shows the Oxford Clay Formation overlying the Kellaways Formation. The Kellaways Formation is underlain by a thin layer (3 – 6 m) of Cornbrash Formation which is comprised of limestone. The Forest Marble Formation further underlies this unit which is predominantly mudstone. These two units mainly outcrop to the north-west of the Site (c. 600 m), however an isolated outcrop to the south-east of the Site (c. 400 m) is also present.

The Kellaways Formation / Oxford Clay Formation is described as sandy clay with occasional laminated mudstone layers at depth and is recorded at between 10 and 20 m thick beneath the Site. However, a 2 m thick sandstone unit within the Kellaways Formation was recorded by BWB (2020) at BH01 and BH02 at around 18.5 mbgl (c. 17.5 m AOD).

The Cornbrash Formation was recorded in the ESG (2017) boreholes to the east of the lagoons at depths of 17.65 mbgl (BH01) and 17.77 mbgl (BH02A) and is identified as weak thickly bedded grey fine to medium grained clayey limestone. Weathering and discontinuities are present within this unit.

Further information on the geology encountered during these GI at the Bioresources Centre and wider WRC is provided in the EQRA.

Geo-Environmental Analysis

Out of the 7 SI reports existing for the Site, the following include geo-environmental chemical testing:

- Geotechnics (2008)
- BWB Consulting (2012)
- ESG Ltd (2017)
- BWB Consulting (2020)

Table A1 presented in Appendix A summarises the geo-environmental soil samples available for review.

Soil Analysis

Laboratory analysis results from Geotechnics (2008) reported that BTEX (benzene, toluene, ethylbenzene and xylene) were only identified in BH2 and BH8. A range of Polyaromatic hydrocarbons (PAHs) were identified in all boreholes with the greatest concentration of PAH 16 Total recorded at BH4 (85,000 µg/kg) and the smallest at BH13 (27 µg/kg). Other than the BTEX detected in BH2 and BH8 no other volatile organic compounds were detected. No asbestos was detected.

Detected maximum and minimum concentrations identified during the 2008 SI are summarised in Table 1.1.

Table 1.1 Summary of Detected Contaminant Concentrations, Geotechnics 2008

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Total Sulphate	510 mg/kg	BH4 at 1.0m	17000 mg/kg	BH13 at 1.0m
Boron Water Soluble	<3.5 mg/kg	BH2 at 1.0m, BH4 at 1.0m, BH8 at 1.0m, BH10 at 0.5m, BH13 at 1.0m and BH16 at 1.0m	14 mg/kg	BH6 at 4.0m
Arsenic	9 mg/kg	BH8 at 1.0m	54 mg/kg	BH2 at 1.0m
Barium	59 mg/kg	BH16 at 1.0m	1500 mg/kg	BH2 at 1.0m
Beryllium	<0.4 mg/kg	BH13 at 1.0m	5.8 mg/kg	BH2 at 1.0m
Cadmium	<0.3 mg/kg	BH10 at 0.5m, BH13 at 1.0m and BH16 at 1.0m	3.3 mg/kg	BH2 at 1.0m
Chromium	21 mg/kg	BH13 at 1.0m	150 mg/kg	BH5 at 3.5m
Copper	<0.6 mg/kg	BH16 at 1.0m	290 mg/kg	BH6 at 4.0m
Lead	9 mg/kg	BH16 at 1.0m	590 mg/kg	BH6 at 4.0m
Mercury	<0.6 mg/kg	BH4 at 1.0m, BH10 at 0.5m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	1.7 mg/kg	BH5 at 3.5m
Nickel	<0.9 mg/kg	BH13 at 1.0m	71 mg/kg	BH2 at 1.0m
Vanadium	25 mg/kg	BH13 at 1.0m	51 mg/kg	BH2 at 1.0m
Zinc	22 mg/kg	BH13 at 1.0m	1300 mg/kg	BH2 at 1.0m
Nitrate (soluble) as NO3	<1 mg/kg	BH13 at 1.0m	440 mg/kg	BH5 at 3.5m
Easily Liberated Sulphide	<15 mg/kg	BH2 at 1.0m, BH4 at 1.0m, BH5 at 3.5m, BH6 at 4.0m, BH8 at 1.0m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	27 mg/kg	BH10 at 0.5m
Elemental Sulphur	<70 mg/kg	BH2 at 1.0m, BH6 at 4.0m, BH8 at 1.0m, BH10 at 0.5m, BH11 at	350 mg/kg	BH5 at 3.5m

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
		8.0m, BH13 at 1.0m and BH16 at 1.0m		
pH Value	6.61 pH	BH13 at 1.0m	8.26 pH	BH10 at 0.5m
EPH (DRO) (C10-C40)	38 mg/kg	BH13 at 1.0m	3300 mg/kg	BH5 at 3.5m
GRO (C4-C10)	17 µg/kg	BH4 at 1.0m, BH5 at 3.5m, BH6 at 4.0m, BH10 at 0.5m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	84 µg/kg	BH2 at 1.0m
Sum of BTEX	<10 µg/kg	BH4 at 1.0m, BH5 at 3.5m, BH6 at 4.0m, BH10 at 0.5m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	84 µg/kg (including benzene, toluene and m and p-xylene)	BH2 at 1.0m
PAH 16 Total	27 µg/kg	BH13 at 1.0m	85,000 µg/kg	BH4 at 1.0m
VOC Toluene	<5 µg/kg	BH4 at 1.0m, BH5 at 3.5m, BH6 at 4.0m, BH8 at 1.0m, BH10 at 0.5m, BH11 at 8.0m, BH13 at 1.0m and BH16 at 1.0m	9 µg/kg	BH2 at 1.0m

Analytical results from the recovered trial pit soil samples by BWB (2012) were found below the Limit of Detection (LoD) for PCBs and PAHs at TP2 (0.4m depth), TP3 (1.2m depth) and TP5 (1.1m depth). However, TPH>C6-C40 was detected at TP3 (0.9m depth). Chloride and sulphate were both detected at TP2, TP4 and TP5 at depths of 1.9m, 0.6m and 1.2m respectively. MTBE and BTEX at TP2, TP3 and TP5 were all below the LoD. At TP5, Total PAHs was below the LoD, however TP3 recorded a concentration of 204 µg/kg due to detection of 8 PAHs (pyrene recorded maximum of 32.2 µg/kg). Asbestos was not identified at TP3 or TP5. WAC testing has been carried out at TP2, TP3 and TP5.

The maximum and minimum concentrations detected are summarised in Table 1.2.

Table 1.2 Summary of Detected Contaminant Concentrations, BWB 2012

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Asbestos	None Detected	TP3 at 0.9m, TP5 at 0.4m	None Detected	TP3 at 0.9m, TP5 at 0.4m
pH	4.84	TP2 at 1.9m	8.22	TP5 at 1.1m
Mineral oil >C10-C40	32.7 mg/kg	TP2 at 0.4m	52 mg/kg	TP3 at 1.2m
Organic Carbon, Total	0.357 %	TP5 at 1.1m	0.568 %	TP3 at 1.2m
TPH >C6-C40	<10 mg/kg	TP5 at 0.4m	164 mg/kg	TP3 at 0.9m
Sulphate, Total	1120 mg/kg	TP2 at 1.9m	1200 mg/kg	TP4 at 0.6m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Water Soluble Sulphate as SO4 2:1 Extract	0.0423 g/l	TP2 at 1.9m	0.625 g/l	TP4 at 0.6m
Chloride (soluble)	6.46 mg/kg	TP2 at 1.9m	21.9 mg/kg	TP4 at 0.6m
Naphthalene	<9 µg/kg	TP5 at 0.4m	12.5 µg/kg	TP3 at 0.9m
Phenanthrene	<15 µg/kg	TP5 at 0.4m	25.2 µg/kg	TP3 at 0.9m
Fluoranthene	<17 µg/kg	TP5 at 0.4m	38 µg/kg	TP3 at 0.9m
Pyrene	<15 µg/kg	TP5 at 0.4m	32.2 µg/kg	TP3 at 0.9m
Benz(a)anthracene	<14 µg/kg	TP5 at 0.4m	27.7 µg/kg	TP3 at 0.9m
Chrysene	<10 µg/kg	TP5 at 0.4m	19 µg/kg	TP3 at 0.9m
Benzo(b)fluoranthene	<15 µg/kg	TP5 at 0.4m	29.1 µg/kg	TP3 at 0.9m
Benzo(a)pyrene	<15 µg/kg	TP5 at 0.4m	20.8 µg/kg	TP3 at 0.9m
PAH, Total Detected USEPA 16	<118 µg/kg	TP5 at 0.4m	204 µg/kg	TP3 at 0.9m

Laboratory analysis results from BWB 2020 boreholes reported that asbestos was detected at BH02 at 1.0m depth, BH03 at 3.5m depth and HP07 at 1.02m and 0.4m depth. This was chrysotile at <0.001% at all locations. A range of speciated PAHs were detected in 12 out of 20 samples with the greatest concentrations recorded at BH03 at a depth of 3.5m (Total PAH at 115 mg/kg). This included a measurement of 20mg/kg of fluoranthene. No BTEX or MTBE were detected in any soil samples. Total Petroleum Hydrocarbons (TPH) for Aliphatic (EC5 - EC35) were present above the laboratory LoD (<10 mg/kg) at BH02 (1.0m depth), BH03 (3.5m depth), BH01 (0.7m depth), HP06 (0.6m depth) and HP07 (0.2m and 0.4m depth). The same locations, except for BH01, recorded concentrations above the LoD for Aromatic TPHs (EC5 – EC35) also, with the addition of HP01 (0.1m depth), HP04 (0.1m depth), HP05 (0.2m and 0.5m depth) and HP06 (0.1m depth). Most heavy metals were detected in all samples, except for chromium, mercury and selenium which were predominantly below the LoD or at very low concentrations.

The maximum and minimum concentrations detected are summarised in Table 1.3.

Table 1.3 Summary of Detected Contaminant Concentrations, BWB 2020

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Asbestos	Not Detected	BH02 at 4.0m, BH03 at 7.5m, BH01 at 0.7m and 3.0m, HP01 – HP06 at all depths	<0.001% (Chrysotile)	BH02 at 1.0m, BH03 at 3.5m, HP07 at 0.2m and 0.4m
pH	7.4	HP05 at 0.5m	9.6	BH02 at 1.0m
Total Organic Carbon	0.4%	HP04 at 0.5m	3.8%	BH01 at 0.7m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Speciated Total EPA-16 PAHs	<0.8 mg/kg	BH01 at 3.0m, BH02 at 4.0m, HP01, HP03, HP04 at 0.5m, HP05 at 0.5m	115 mg/kg	BH03 at 3.5m
TPH-CWG - Aliphatic (EC5 - EC35)	<10 mg/kg	BH02 at 4.0m and BH03 at 7.5m, BH01 at 3.0m, HP01 – HP05, HP06 at 0.1m	700 mg/kg	HP06 at 0.6m
TPH-CWG - Aromatic (EC5 - EC35)	<10 mg/kg	BH02 at 4.0m and BH03 at 7.5m, BH01, HP01, HP03, HP04 at 0.5m and HP05 at 0.5m	430 mg/kg	HP06 at 0.6m
Antimony (aqua regia extractable)	<1.0 mg/kg	BH03 at 7.5m, HP01 at 0.1m and 0.6m, HP03 at 0.5m, HP04 at 0.1m,	27 mg/kg	BH03 at 3.5m
Arsenic (aqua regia extractable)	9 mg/kg	HP03 at 0.5m	64 mg/kg	BH01 at 0.7m
Barium (aqua regia extractable)	36 mg/kg	HP03 at 0.5m	940 mg/kg	BH03 at 3.5m
Cadmium (aqua regia extractable)	<0.2 mg/kg	BH02 at 4.0m, BH03 at 7.5m, BH01 at 3.0m, HP01 at 0.6m, HP03 at 0.5m, HP04 at 0.5m, HP05 at 0.5m	4.3 mg/kg	BH01 at 0.7m
Chromium (aqua regia extractable)	19 mg/kg	HP01 at 0.3m	200 mg/kg	BH02 at 1.0m
Copper (aqua regia extractable)	13 mg/kg	HP01 at 0.3m and 0.6m	1100 mg/kg	BH01 at 0.7m
Lead (aqua regia extractable)	17 mg/kg	HP04 at 0.5m	910 mg/kg	BH01 at 0.7m
Mercury (aqua regia extractable)	<0.3 mg/kg	BH02 at 4.0m, BH03 at 7.5m, HP01 at 0.1m and 0.6m, HP03, HP04, HP05 at 0.5m, HP06 at 0.1m, HP07 at 0.2m	5 mg/kg	BH01 at 0.7m
Molybdenum (aqua regia extractable)	0.55 mg/kg	HP03 at 0.5m	9.7 mg/kg	BH01 at 0.7m
Nickel (aqua regia extractable)	10 mg/kg	HP01 at 0.3m	87 mg/kg	BH02 at 1.0m
Vanadium (aqua regia extractable)	22 mg/kg	HP06 at 0.1m	87 mg/kg	BH02 at 1.0m
Zinc (aqua regia extractable)	57 mg/kg	HP01 at 0.6m	1900 mg/kg	BH03 at 3.5m

Laboratory analysis results from ESG 2017 boreholes reported that asbestos was detected at BH02A at 1.2m depth and BH03 at 1.0m depth. PCBs were detected at BH03 and BH04B with PCB52 detected at BH04B and PCB153, PCB138 and PCB180 detected at BH03. WAC testing has been carried out at BH02A, BH03 and BH04B. A range of speciated PAHs were detected in four of the samples at BH02A at 1.2m depth, BH03 at 0.1m and 1.0m depth and BH04B at 1.2m depth. The greatest concentrations were recorded at BH03 at a depth of 1.0m. All monoaromatics and oxygenates (i.e., BTEX and MTBE) were recorded below their respective LoD's. Most heavy metals were detected in all samples, except for chromium III, chromium VI, phenol, GRO (C6-C10) and cyanide (complex and total) which were below their LoD.

The maximum and minimum concentrations detected are summarised in Table 1.4.

Table 1.4 Summary of Detected Contaminant Concentrations, ESG 2017

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Asbestos	Not Detected	BH03 at 0.1m and BH04B at 1.2m	Amosite and Chrysotile	BH02A at 1.2m and BH03 at 1.0m
PCB52	<5.8 and <6.4 µg/kg	BH02A at 1.2m and BH03 at 1.0m	190 µg/kg	BH04B at 1.2m
PCB153	<5.7 and <6.4 µg/kg	BH02A at 1.2m and BH04B at 1.2m	9.4 µg/kg	BH03 at 1.0m
PCB138	<5.7 and <6.4 µg/kg	BH02A at 1.2m and BH04B at 1.2m	10.6 µg/kg	BH03 at 1.0m
PCB180	<5.7 and <6.4 µg/kg	BH02A at 1.2m and BH04B at 1.2m	8.4 µg/kg	BH03 at 1.0m
Naphthalene	< 0.09 mg/kg	BH04B at 1.2m and BH03 at 0.1m	0.14 mg/kg	BH03 at 1.0m
Acenaphthylene	< 0.09 mg/kg	BH04B at 1.2m	0.88 mg/kg	BH03 at 1.0m
Acenaphthene	< 0.09 mg/kg	BH04B at 1.2m and BH03 at 0.1m	0.21 mg/kg	BH03 at 1.0m
Fluorene	< 0.09 mg/kg	BH04B at 1.2m and BH03 at 0.1m	0.22 mg/kg	BH03 at 1.0m
Phenanthrene	0.10 mg/kg	BH04B at 1.2m	3.08 mg/kg	BH03 at 1.0m
Anthracene	< 0.09 mg/kg	BH04B at 1.2m	1.36 mg/kg	BH03 at 1.0m
Fluoranthene	0.28 mg/kg	BH04B at 1.2m	11.70 mg/kg	BH03 at 1.0m
Pyrene	0.25 mg/kg	BH04B at 1.2m	9.75 mg/kg	BH03 at 1.0m
Benzo[a]anthracene	0.22 mg/kg	BH04B at 1.2m	8.14 mg/kg	BH03 at 1.0m
Chrysene	0.17 mg/kg	BH04B at 1.2m	5.82 mg/kg	BH03 at 1.0m
Benzo[b]fluoranthene	0.26 mg/kg	BH04B at 1.2m	10.42 mg/kg	BH03 at 1.0m
Benzo[k]fluoranthene	0.10 mg/kg	BH04B at 1.2m	3.60 mg/kg	BH03 at 1.0m

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Benzo[a]pyrene	0.20 mg/kg	BH04B at 1.2m	8.22 mg/kg	BH03 at 1.0m
Indeno[1,2,3-cd]pyrene	0.20 mg/kg	BH04B at 1.2m	9.03 mg/kg	BH03 at 1.0m
Dibenzo[a,h]anthracene	< 0.09 mg/kg	BH04B at 1.2m	2.02 mg/kg	BH03 at 1.0m
Benzo[g,h,i]perylene	0.16 mg/kg	BH04B at 1.2m	6.82 mg/kg	BH03 at 1.0m
Coronene	< 0.09 mg/kg	BH04B at 1.2m	1.81 mg/kg	BH03 at 1.0m
Total (USEPA16) PAHs	< 2.49 mg/kg	BH04B at 1.2m	81.35 mg/kg	BH03 at 1.0m
SO4-- (H2O sol) mg/l	39 mg/l	BH03 at 2.0m	332 mg/kg	BH03 at 3.8m
Total Sulphur.	0.031 %	BH01 at 2.1m	1.01 mg/kg	BH03 at 3.8m
SO4-- (acid sol)	312 mg/kg	BH03 at 2.0m	2070 mg/kg	BH03 at 3.8m
Boron (H20 Soluble)	1.2 mg/kg	BH04B at 1.2m	8.1 mg/kg	BH04B at 3.4m
Arsenic (MS)	5.9 mg/kg	BH01 at 2.1m	20.4 mg/kg	BH03 at 0.1m
Cadmium (MS)	<0.2 mg/kg	BH01 at 2.1m and BH03 at 2.0m	1.62 mg/kg	BH03 at 1.0m
Chromium (MS)	28 mg/kg	BH01 at 2.1m	63.8 mg/kg	BH04B at 1.2m
Copper (MS)	12.3 mg/kg	BH01 at 2.1m	673.4 mg/kg	BH04B at 3.4m
Lead (MS)	8.7 mg/kg	BH01 at 2.1m	286.6 mg/kg	BH03 at 1.0m
Mercury (MS)	<0.5 mg/kg	BH01 at 2.1m and BH03 at 2.0m	0.6 mg/kg	BH03 at 1.0m
Nickel (MS)	18.5 mg/kg	BH03 at 2.0m	38.4 mg/kg	BH03 at 0.1m
Selenium (MS)	<0.5 mg/kg	BH01 at 2.1m, BH03 at 2.0m and BH04B at 1.2m	0.9 mg/kg	BH02A at 11.2m and BH03 at 0.1m
Zinc (MS)	78.9 mg/kg	BH01 at 2.1m	404.3 mg/kg	BH03 at 0.1m
pH units (AR)	7.3	BH01 at 2.1m	10.2	BH04B at 1.2m
Cyanide (Free) (AR)	<0.6 mg/kg	BH01 at 2.1m, BH02A at 11.2m, BH03 at 1.0m and BH04B at 1.2m and 3.4m	0.7 mg/kg	BH03 at 2.0m
Tot.Moisture @ 105C	13 %	BH04B at 1.2m	23.2%	BH03 at 2.0m
TPH Band (>C10-C16)	<11 mg/kg	BH04B at 1.2m	15 mg/kg	BH03 at 1.0m
TPH Band (>C10-C40)	81 mg/kg	BH02A at 11.2m	973 mg/kg	BH03 at 1.0m
TPH Band (>C16-C21)	<13 mg/kg	BH02A at 11.2m, BH03 at 2.0m and BH04B at 3.4m	97 mg/kg	BH03 at 1.0m
TPH Band (>C21-C35)	<12 mg/kg	BH01 at 2.1m	766 mg/kg	BH03 at 1.0m

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
TPH by GCFID (AR)	13 mg/kg	BH01 at 2.1m	975 mg/kg	BH03 at 1.0m
Acid Neut. Capacity	4.45 Mol/kg	BH02A at 11.2m	9.13 Mol/kg	BH04B at 1.2m
Chloride:(2:1)	5 mg/l	BH03 at 2.0m	29 mg/l	BH01 at 2.1m
L.O.I. % @ 450C	1.6%	BH04B at 1.2m	6.8%	BH03 at 1.0m
Total Organic Carbon	0.27 %M/M	BH01 at 2.1m	6.02 %M/M	BH03 at 0.1m

No data was provided by Wessex Water on the composition of the sludge and cake at the Bioresources Centre so no comparison can be undertaken between the concentrations recorded during the site investigations to provide a baseline.

Leachability Samples

Leachability analysis was undertaken on samples taken by BWB (2020) at BH01, BH02, HP01 and HP03 – HP07 in November 2011. The results showed that all petroleum hydrocarbons, speciated and Total PAHs and monoaromatics and oxygenates (i.e., BTEX and MTBE) were recorded below their respective LoDs. Cyanide (total and free) was not detected in any sample. Total phenols were only detected at its LoD in HP06 at 0.6m and HP07 at 0.4m. Most heavy metals were detected excluding hexavalent chromium, mercury and selenium which were below their LoD in all samples. A range of concentrations are reported for the metals and general inorganics as displayed in Table 1.5. pH was recorded as pH 7.6 – 8.1.

Table 1.5 Summary of Detected Contaminant Concentrations in Leachate, BWB 2020

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
pH	7.6	HP07 at 0.4m	8.1	BH01 at 0.7m
Sulphate as SO4	2.6 mg/l	HP03 at 0.1m	426 mg/l	HP07 at 0.4m
Ammoniacal Nitrogen as N	<15 µg/l	HP01 at 0.6m	3100 µg/l	BH01 at 3.0m
Total Phenols (monohydric)	<10 µg/l	All depths at BH01, BH02, HP01, HP03 – HP05 and HP06 at 0.1m	19 µg/l	HP06 at 0.6m
Arsenic (dissolved)	<1.0 µg/l	HP03 at 0.1m, BH02 at 4.0m, HP04 at 0.5m HP05 at 0.1m and 0.5m, and HP07 at 0.4m	9.7 µg/l	HP06 at 0.6m
Boron (dissolved)	20 µg/l	HP06 at 0.1m	710 µg/l	BH01 at 3.0m
Cadmium (dissolved)	<0.08 µg/l	All depths at BH01, BH02, HP01, HP03 – HP06	0.09 µg/l	HP07 at 0.4m

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Chromium (III)	<1.0 µg/l	BH01 at 3.0m, BH02 at 4.0m and HP04 at 0.5m	5.1 µg/l	BH01 at 0.7m
Chromium (dissolved)	<0.4 µg/l	BH01 at 3.0m	5.1 µg/l	BH01 at 0.7m
Copper (dissolved)	6.8 µg/l	HP04 at 0.5m	17 µg/l	HP05 at 0.1m and HP06 at 0.1m
Lead (dissolved)	<1.0 µg/l	HP01 at 0.6m	9.7 µg/l	HP06 at 0.6m
Nickel (dissolved)	0.8 µg/l	HP06 at 0.1m	4.0 µg/l	BH02 at 4.0m
Zinc (dissolved)	8.4 µg/l	BH01 at 3.0m	70 µg/l	HP07 at 0.4m

Leachability analysis was undertaken on samples taken by ESG (2017) at BH03 and BH04B and recorded few determinands greater than their LoDs. BTEX, MTBE, cadmium, mercury, selenium, ammoniacal nitrogen as N, cyanide (free and total), phenol, TPH Band >C10-C16 and GRO >C6->C10 were all recorded below their LoD. However, multiple PAHs and metals were detected as shown in Table 1.6 with the majority of maximum concentrations recorded at BH03.

Table 1.6 Summary of Detected Contaminant Concentrations in Leachate, ESG 2017

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
pH units	7.5	BH03 at 0.1m	7.8	BH04B at 1.2m
Total Sulphur as SO4 (Dissolved)	6.1 mg/l	BH03 at 0.1m	8.8 mg/l	BH04B at 1.2m
Nickel as Ni (Dissolved)	<0.001 mg/l	BH04B at 1.2m	0.002 mg/l	BH03 at 0.1m
Chromium as Cr (Dissolved)	<0.001 mg/l	BH03 at 0.1m	0.002 mg/l	BH04B at 1.2m
Copper as Cu (Dissolved)	0.004 mg/l	BH04B at 1.2m	0.024 mg/l	BH03 at 0.1m
Lead as Pb (Dissolved)	0.002 mg/l	BH04B at 1.2m	0.006 mg/l	BH03 at 0.1m
Zinc as Zn (Dissolved)	0.016 mg/l	BH04B at 1.2m	0.05 mg/l	BH03 at 0.1m
Arsenic as As (Dissolved)	0.004 mg/l	BH03 at 0.1m and BH04B at 1.2m	0.004 mg/l	BH03 at 0.1m and BH04B at 1.2m
Boron as B (Dissolved)	0.03 mg/l	BH04B at 1.2m	0.04 mg/l	BH03 at 0.1m
Ammoniacal Nitrogen as NH4	<0.01 mg/l	BH03 at 0.1m	0.01 mg/l	BH04B at 1.2m
TPH Band >C16-C21	<0.01 mg/l	BH04B at 1.2m	0.01 mg/l	BH03 at 0.1m
TPH Band (>C21-C35)	0.02 mg/l	BH04B at 1.2m	0.03 mg/l	BH03 at 0.1m
TPH GC	0.03 mg/l	BH04B at 1.2m	0.06 mg/l	BH03 at 0.1m
Naphthalene	0.096 µg/l	BH04B at 1.2m	0.236 µg/l	BH03 at 0.1m
Acenaphthylene	<0.010 µg/l	BH04B at 1.2m	0.026 µg/l	BH03 at 0.1m

Contaminant	Minimum	Exploratory Hole Location & Depth (m bgl)	Maximum	Exploratory Hole Location & Depth (m bgl)
Acenaphthene	0.021 µg/l	BH04B at 1.2m	0.765 µg/l	BH03 at 0.1m
Fluorene	0.015 µg/l	BH04B at 1.2m	0.368 µg/l	BH03 at 0.1m
Phenanthrene	0.070 µg/l	BH04B at 1.2m	0.738 µg/l	BH03 at 0.1m
Anthracene	0.014 µg/l	BH04B at 1.2m	0.161 µg/l	BH03 at 0.1m
Fluoranthene	0.052 µg/l	BH04B at 1.2m	0.228 µg/l	BH03 at 0.1m
Pyrene	0.043 µg/l	BH04B at 1.2m	0.161 µg/l	BH03 at 0.1m
Benzo[a]anthracene	0.030 µg/l	BH04B at 1.2m	0.050 µg/l	BH03 at 0.1m
Chrysene	0.018 µg/l	BH04B at 1.2m	0.046 µg/l	BH03 at 0.1m
Benzo[b]fluoranthene	0.022 µg/l	BH04B at 1.2m	0.043 µg/l	BH03 at 0.1m
Benzo[k]fluoranthene	<0.010 µg/l	BH04B at 1.2m	0.019 µg/l	BH03 at 0.1m
Benzo[a]pyrene	0.013 µg/l	BH04B at 1.2m	0.032 µg/l	BH03 at 0.1m
Indeno[1,2,3-cd]pyrene	<0.010 µg/l	BH04B at 1.2m	0.026 µg/l	BH03 at 0.1m
Dibenzo[a,h]anthracene	<0.010 µg/l	BH04B at 1.2m	<0.010 µg/l	BH03 at 0.1m
Benzo[g,h,i]perylene	<0.010 µg/l	BH04B at 1.2m	0.024 µg/l	BH03 at 0.1m
Total (USEPA16) PAHs	<0.444 µg/l	BH04B at 1.2m	<2.933 µg/l	BH03 at 0.1m

Groundwater Samples

Groundwater samples were taken by BWB (2020) at BH02 (deep) and BH03 (shallow and deep) in November 2011. The results showed that phenols and volatile free fatty acids were below the LoD in all three samples. BTEX and MTBE were below the LoD at BH03 (S) which was the only sample analysed for these. PAHs were only detected at BH03 (S) with a Total PAH concentration of 318 µg/l (with all 16 PAHs being detected). Petroleum hydrocarbons were only analysed for at BH03 (S) and recorded detections of both aliphatic (C5 – C35) and aromatic (C5 – C35) at concentrations of 390 µg/l and 1400 µg/l. All metals were detected in all three locations except for hexavalent chromium, beryllium, cadmium and mercury (excluding BH02 (D) for mercury). A range of concentrations are reported for major anions and cations as displayed in Table 1.7. pH was recorded as pH 7.3 – 7.7.

Table 1.7 Summary of Detected Contaminant Concentrations, BWB 2020

Contaminant	Minimum	Exploratory Hole Location	Maximum	Exploratory Hole Location
pH	7.3	BH03 (S)	7.7	BH02 (D)
Total EPA-16 PAHs	<0.16 µg/l	BH02 (D) and BH03 (D)	318 µg/l	BH03 (S)
TPH-CWG - Aliphatic (C5 - C35)	390 µg/l	BH03 (S)	390 µg/l	BH03 (S)

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Contaminant	Minimum	Exploratory Hole Location	Maximum	Exploratory Hole Location
TPH-CWG - Aromatic (C5 - C35)	1400 µg/l	BH03 (S)	1400 µg/l	BH03 (S)
Thiocyanate as SCN	240 µg/l	BH02 (D)	330 µg/l	BH03 (D)
Sulphate as SO4	104 mg/l	BH03 (S)	803 mg/l	BH02 (D)
Sulphide	<5.0 µg/l	BH02 (D) and BH03 (D)	120 µg/l	BH03 (S)
Chloride	22 mg/l	BH03 (S)	840 mg/l	BH02 (D)
Ammoniacal Nitrogen as N	190 µg/l	BH03 (D)	4800 µg/l	BH03 (S)
Total Nitrogen (Kjeldahl)	6.6 mg/l	BH03 (S)	6.6 mg/l	BH03 (S)
Total Organic Carbon (TOC)	11.3 mg/l	BH02 (D)	33.7 mg/l	BH03 (S)
Nitrate as N	0.05 mg/l	BH02 (D)	0.09 mg/l	BH03 (S)
Nitrate as NO3	0.41 mg/l	BH03 (S)	0.41 mg/l	BH03 (S)
Chemical Oxygen Demand (Total)	120 mg/l	BH02 (D)	1900 mg/l	BH03 (S)
BOD (Biochemical Oxygen Demand) (Total) - PL	7.1 mg/l	BH03 (S)	56 mg/l	BH02 (D)
Boron (dissolved)	420 µg/l	BH03 (S)	3900 µg/l	BH02 (D)
Calcium (dissolved)	78 mg/l	BH02 (D)	130 mg/l	BH03 (D)
Iron (dissolved)	0.038 mg/l	BH03 (S)	0.17 mg/l	BH02 (D)
Magnesium (dissolved)	7.3 mg/l	BH03 (S)	21 mg/l	BH02 (D)
Potassium (dissolved)	12 mg/l	BH03 (S)	23 mg/l	BH02 (D)
Sodium (dissolved)	100 mg/l	BH03 (S)	920 mg/l	BH02 (D)
Chromium (total)	6.8 µg/l	BH03 (S)	8.4 µg/l	BH03 (D)
Lead (total)	7 µg/l	BH03 (S)	43 µg/l	BH02 (D)
Mercury (total)	<0.05 µg/l	BH03 (S)	0.15 µg/l	BH02 (D)
Nickel (total)	27 µg/l	BH02 (D)	80 µg/l	BH03 (S)
Selenium (total)	4 µg/l	BH03 (S)	8.7 µg/l	BH02 (D)
Zinc (total)	220 µg/l	BH02 (D)	6800 µg/l	BH03 (S)
Antimony (dissolved)	1.3 µg/l	BH02 (D)	4 µg/l	BH03 (S)
Arsenic (dissolved)	2.98 µg/l	BH03 (S)	5.56 µg/l	BH02 (D)
Barium (dissolved)	37 µg/l	BH02 (D)	68 µg/l	BH03 (S)
Manganese (dissolved)	120 µg/l	BH02 (D)	1800 µg/l	BH03 (S)
Vanadium (dissolved)	1.2 µg/l	BH03 (D)	5.5 µg/l	BH02 (D)
Copper (total)	11 µg/l	BH03 (S)	63 µg/l	BH02 (D)

Groundwater was sampled by ESG (2017) at four boreholes on 6 February 2017. PAHs were only detected at BH04B where pyrene was recorded at 0.012 µg/l, all others were below the LoD. Phenol, sulphide and cyanide were not detected in any samples. TPH Bands (>C21 – C35) was detected at BH01, BH02A and BH04B at 0.04 mg/l and TPH GC was detected in all four samples with a maximum concentration of 0.06 mg/l at BH02A and BH04B. Major cations and anions and metals were detected in most samples with the maximum and minimums displayed in Table 1.8.

Table 1.8 Summary of Detected Contaminant Concentrations, ESG 2017

Contaminant	Minimum	Exploratory Hole Location	Maximum	Exploratory Hole Location
pH units	7.4 pH	BH04B	7.8 pH	BH02A
Conductivity uS/cm @ 25C	4000 µS/cm	BH03 and BH04B	5200 µS/cm	BH01
Chloride as Cl	490 mg/l	BH04B	1070 mg/l	BH01
Total Sulphur as SO4 (Total)	625 mg/l	BH02A	1310 mg/l	BH03 and BH04B
Total Sulphur as SO4 (Dissolved)	694 mg/l	BH02A	1490 mg/l	BH04B
Magnesium as Mg (Dissolved)	14 mg/l	BH02A	72 mg/l	BH04B
Nickel as Ni (Dissolved)	0.004 mg/l	BH01 and BH02A	0.008 mg/l	BH04B
Chromium as Cr (Total)	0.002 mg/l	BH01 and BH02A	0.037 mg/l	BH03
Cadmium as Cd (Dissolved)	<0.0001 mg/l	BH04B	0.0004 mg/l	BH01
Copper as Cu (Dissolved)	0.002 mg/l	BH02A and BH04B	0.003 mg/l	BH01 and BH03
Lead as Pb (Dissolved)	<0.001 mg/l	BH01, BH03 and BH04B	0.002 mg/l	BH02A
Zinc as Zn (Dissolved)	0.009 mg/l	BH04B	0.105 mg/l	BH01 and BH03
Arsenic as As (Dissolved)	0.001 mg/l	BH04B	0.005 mg/l	BH02A
Boron as B (Dissolved)	2.54 mg/l	BH02A	4.0 mg/l	BH03
Mercury as Hg (Dissolved)	<0.0001 mg/l	BH03 and BH04B	0.0001 mg/l	BH01 and BH02A
Selenium as Se (Dissolved)	0.001 mg/l	BH04B	0.099 mg/l	BH02A
Ammoniacal Nitrogen as N	0.16 mg/l	BH04B	1.0 mg/l	BH02A
Nitrate as NO3 (Kone Calc)	<0.9 mg/l	BH04B	47.4 mg/l	BH02A
Nitrate as N	<0.2 mg/l	BH04B	10.7 mg/l	BH02A
TPH Band (>C21-C35)	<0.01 mg/l	BH03	0.04 mg/l	BH01, BH02A and BH04B
TPH GC	0.02 mg/l	BH03	0.06 mg/l	BH02A and BH04B

A prior groundwater sample was taken at BH01 on 8 December 2016. The following was recorded:

- Selenium (0.006 mg/l), ammoniacal nitrogen as NH4 (0.03 mg/l), ammoniacal nitrogen N (0.02 mg/l), nitrate as NO3 (50.5 mg/l) and nitrate as N (11.4 mg/l) were all detected.
- Phenol was detected at a concentration of 0.0029 mg/l.
- Only two PAHs were detected which were acenaphthene (0.012 µg/l) and benzo[a]anthracene (0.011 µg/l)
- TPH: >C16 – C21 and >C21 – C35 were detected at concentrations of 0.01 mg/l and 0.013 mg/l respectively.

It should be noted that a great deal of emphasis may be placed on the limited chemical data that is available and the reported data should not be assumed to represent groundwater quality at the Site. The chemical data is for samples collected by third parties; sample collection and storage procedures are not known and could affect the validity of the results. Furthermore, chemical concentrations vary spatially and with time.

The laboratory analysis reports are appended to the individual SI Reports, presented as Appendix B to E of this memo (Stantec, 2021).

POTENTIAL SOURCES OF CONTAMINATION (PSCs)

PSCs identified on site and within 50m of the Trowbridge Bioresources Centre (250m for potentially infilled ground) are summarised in Table 1.9 and illustrated in Figure 1. This has been completed by reviewing the site history presented in the EQRA and using information, including historical mapping included in the Environmental Data Report (Groundsure, 2021) and online sources (Data.gov.uk, 2021).

Table 1.9 Potential Sources of Contamination (PSCs)

PSC Plan ID	PSC on site or within 50m radius, 250m radius for potentially infilled land	Distance to site	Status / Year	Potential Contaminants
1	Trowbridge Bioresources Centre. Infrastructure includes digesters, APDs, strain presses and boiler including fuel oil storage tank. Potential for infilling of former tanks and infrastructure bases during development of bioresources centre (see EQRA Figure 3.3 For Current Bioresources Centre Assets).	On-Site	Present	Metals, petroleum hydrocarbons, VOCs including BTEX, MTBE - associated with fuel tank(s) and pumping stations Phenols, PAHs, pathogens, polychlorinated biphenyls (PCBs) (associated with generators and electricity substations), Asbestos and ground gas (carbon dioxide, carbon monoxide, methane, hydrogen sulphide) - from areas of infilling and sewage treatment, Volatile organic vapours – from storage tanks
1a	Wider Trowbridge WRC Sewage works and unspecified tanks (PSC 1b) (c.1922) in the east. WRC expands slightly to the southwest in c.1968-1971 and 1974-1977 and again between 1979 and 1985-1987 to cover the entire Site area. Potential for infilling of former tanks and infrastructure bases over various phases of redevelopment. Made Ground including ash was identified in BH02, HP05 and HP06 during the BWB 2020 GI between 0 and 3 mbgl; however, this is located northeast of the current Bioresources Centre. Ash was not recorded in any other GI however macadam and clinker were noted in BH01 and BH02A/BH04 respectively in ESG 2016 boreholes which are located in the same area as BH02 mentioned above recording the ash (see Figure 4.1 for locations.	Adjacent	1901 - 1922 to present	
1b	Unspecified Tanks	On-site	1974 to 1985	Metals, petroleum hydrocarbons, VOCs, including BTEX, MTBE - associated with fuel tank(s) and pumping stations Phenols, PAHs, pathogens, PCBs, ground gas (carbon dioxide, carbon monoxide, methane, hydrogen sulphide) – associated with sludge beds
	Sewage Works		1922 – 1939, 1973 - 1974 to 1985 - 1987	
1c	Filter Tanks	On site. 77m south.	1939	
1d	Electricity Substation	On-site	Present	Petroleum Hydrocarbons (heavy fractions) and PCBs
2	Refuse Heap	138m northeast	1956	BTEX, PAHs, Volatile Organic Compound - Toluene.
Landfills within 250m; pollution incidents within 50m (Groundsure, 2020) (Data.gov.uk, 2021)				

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

2	BGS Recorded Historical Landfill approximately 185m northeast of Site at Bradford Road, Trowbridge. No other information is supplied.
2	Environment Agency Recorded Historical Landfill approximately 135m northeast of Site at Bradford Road received industrial and commercial waste and was operated by Trowbridge Urban District Council. No dates of issue or surrender are supplied.
2	Local Authority Recorded 2 Historical Landfills approximately 119m north and 196m east of Site and from historic mapping. No other information is supplied.
N/A	Pollution incidents – none recorded within 50m
British Geological Survey (BGS) Online Records (artificial ground within 250m)	
N/A	None recorded in published mapping.
Environmental Permitting / Exemptions (50m radius) (Groundsure, 2020)	
N/A	Environmental Permits held at the Site for Biological Treatment (issued 1993), Combustion of Biogas (issued 2014) and Sewage Sludge Treatment (issued 2011) for 250,000 tonnes.
N/A	One storage of waste exemption (S1 & S2) is held for the storage of waste in secure containers at Trowbridge WRC.

Reference: Potential Sources of Contamination – Trowbridge Water Recycling Centre, Bioresources Centre – Supporting Information for H5 Site Condition Report, Version 1.

Figure 1 Potential Sources of Contamination (PSC) Plan

Stantec

Memo

RECOMMENDATIONS FOR BASELINE DATA

A number of potential sources of contamination (PSCs) have been identified on Site. As presented in Table 1.9, there are potential contaminants (predominantly metals, PAHs and TPHs) associated with both the Bioresources Centre activities at the Site and the wider WRC. There is sufficient data for soil and groundwater within the wider STW to determine baseline data of the Site even though this is limited data for the Bioresources Centre.

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QUALITY ASSURANCE

Version 1 Author: Elizabeth Wilson Checker: Rob Gordon Reviewer:	

Appendix A – Data Tables

Table A1 Historical GI Geo-Environmental Analysis

Exploratory Hole ID	Sample Depth	Strata	Suites of Analysis					
			Metals	Asbestos	BTEX, GRO, DRO	PAHs	VOCs	
Geotechnics 2008								
BH2	1.0 m	MG	X	X	X	X	X	
BH4	1.0 m	MG	X	X	X	X	X	
BH5	3.5 m	KF/OC	X	X	X	X	X	
BH6	4.0 m	MG	X	X	X	X	X	
BH8	1.0 m	MG	X	X	X	X	X	
BH10	0.5 m	MG	X	X	X	X	X	
BH11	8.0 m	KF/OC	X	X	X	X	X	
BH13	1.0 m	KF/OC	X	X	X	X	X	
BH16	1.0 m	KF/OC	X	X	X	X	X	
BWB 2012								
Exploratory Hole ID	**Sample Depth**	**Strata**	**LOI, Mineral Oil, TOC, PCBs, Total PAHs**	**pH**	**Sulphate, chloride**	**TPHs, PAHs, asbestos**	**BTEX**	**WAC**
TP2	0.4 m	MG	X	X			X	X
	1.9 m	KF/OC		X	X			
TP3	0.9 m	MG				X		
	1.2 m	MG	X	X			X	X
TP4	0.6 m	MG		X	X			
	2.5 m	MG						
TP5	0.4 m	MG				X		
	1.1 m	MG	X				X	X
TP6	1.20 m	KF/OC		X	X			
ESG 2017								
Exploratory Hole ID	**Sample Depth**	**Strata**	**pH**	**Sulphate, Sulphur**	**Metals, Cyanides, Sulphate, GRO, Phenol, TPHs, BTEX, MTBE, PAHs**	**Asbestos**	**TOC, PCBs**	**WAC**
BH01	2.1 m	KF/OC	X	X	X			

BH02A	1.2 m	MG	X	X	X	X	X	X
BH03	0.1 m	Topsoil	X		X	X		
BH03	1.0 m	MG	X		X	X	X	X
BH03	2.0 m	MG – KF/OC boundary	X	X	X			
BH03	3.8 m	KF/OC	X	X				
BH04B	1.2 m	MG	X		X	X	X	X
BH04B	3.4 m	KF/OC	X		X			
BWB 2020								
Exploratory Hole ID	**Sample Depth**	**Strata**	**Metals, TOC Cyanide**	**Asbestos**	**PAHs**	**BTEX, TPHs**		
BH02	1.0 m	MG	X	X	X	X		
BH02	2.0 m	MG	X	X	X	X		
BH03	3.5 m	MG	X	X	X	X		
BH03	7.5 m	MG – KF/OC boundary	X	X	X	X		
BH01	0.7 m	MG	X	X	X	X		
BH01	3.0 m	KF/OC	X	X	X	X		
HP01	0.1 m	MG	X	X	X	X		
HP01	0.3 m	MG	X	X	X	X		
HP01	0.6 m	KF/OC	X	X	X	X		
HP03	0.1 m	MG	X	X	X	X		
HP03	0.5 m	KF/OC	X	X	X	X		
HP04	0.1 m	MG	X	X	X	X		
HP04	0.5 m	MG	X	X	X	X		
HP05	0.2 m	MG	X	X	X	X		
HP05	0.5 m	MG	X	X	X	X		
HP06	0.1 m	MG	X	X	X	X		
HP06	0.6 m	MG	X	X	X	X		
HP07	0.2 m	MG	X	X	X	X		
HP07	0.4 m	MG	X	X	X	X		

TPH CWG - Total Petroleum Hydrocarbons Criteria Working Group; PAHs - polycyclic aromatic hydrocarbons, TOC - Total Organic Carbon, BTEX - Benzene Toluene Ethylbenzene and Xylene.

KF = Kellaways Formation, OC = Oxford Clay Formation.

Table A2 Historical Groundwater Quality Analysis

ESG 2017								
Exploratory Hole ID	**Sample Depth**	**Strata**	**Metals,**	**Phenol**	**PAHs**	**TPHs**	**Nitrate, Ammoniacal**	**Conductivity, pH**

			Cyanide, Sulphide				nitrogen, sulphur	
BH01	-	-	x	x	x	x	x	x
BH02A	-	-	x	x	x	x	x	x
BH03	-	-	x	x	x	x	x	x
BH04B	-	-	x	x	x	x	x	x
BWB 2020								
Exploratory Hole ID	**Sample Depth**	**Strata**	**General Inorganics**	**Metals**	**PAHs**	**Phenols**	**Volatile free fatty acids**	**Petroleum hydrocarbons, monoaromatics % oxygenates**
BH02 (D)	-	-	x	x	x	x	x	
BH03 (D)	-	-	x	x	x	x	x	
BH03 (S)	-	-	x	x	x	x	x	x

Table A3 Historical Leachability Quality Analysis

BWB 2020								
Exploratory Hole ID	**Sample Depth**	**Strata**	**General Inorganics**	**Metals**	**PAHs**	**Phenols**	**Volatile free fatty acids**	**Petroleum hydrocarbons, monoaromatics % oxygenates**
BH01	0.7	MG	x	x	x	x	x	x
BH01	3.0	KF/OC	x	x	x	x	x	x
HP01	0.6	KF/OC	x	x	x	x	x	x
HP03	0.1	MG	x	x	x	x	x	x
HP04	0.5	MG	x	x	x	x	x	x
HP05	0.1	MG	x	x	x	x	x	x
HP05	0.5	MG	x	x	x	x	x	x
HP06	0.1	MG	x	x	x	x	x	x
HP06	0.6	MG	x	x	x	x	x	x
HP07	0.4	MG	x	x	x	x	x	x

Appendix B – Geotechnics, 2008

Attachment

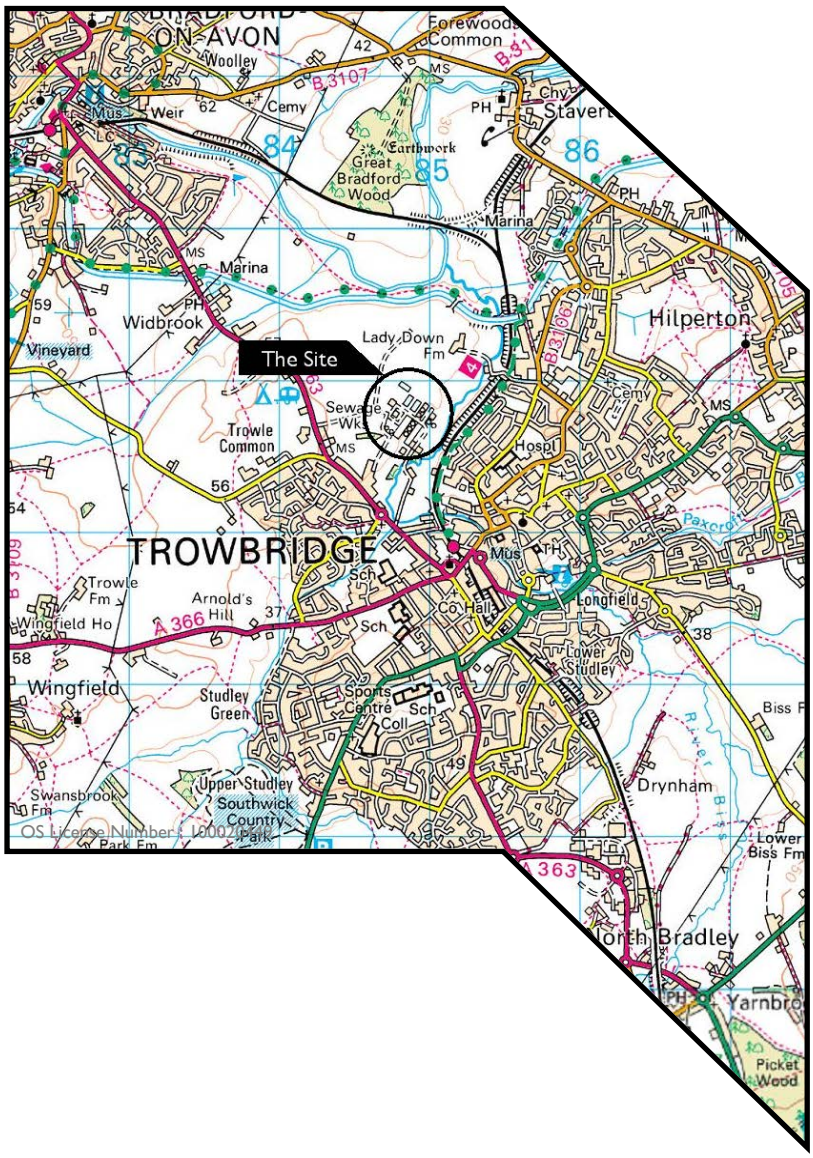
Appendix C – ESG Ltd, 2017

Attachment

Appendix D – BWB Consulting, 2012

Attachment

Appendix E – BWB Consulting, 2020



Contaminated Land Improvement Review

Trowbridge STW

Factual Report

for

Wessex Water Services Limited

Project Number : PE080558

June 2008

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Contaminated Land Improvement Review Factual Report

TROWBRIDGE STW

for
Wessex Water Services Limited

Project No:
PE080558
June 2008

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APPENDICES

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1.0 INTRODUCTION

A geoenvironmental investigation was undertaken by Geotechnics Ltd at the site of an operational Sewage Treatment Works (STW) in Trowbridge, Wiltshire. The investigation was carried out to the instructions of the Client, Wessex Water Services Ltd. This report describes the work undertaken and presents the data obtained.

2.0 OBJECT AND SCOPE OF THE INVESTIGATION

The object of the investigation was to obtain information on the ground and groundwater conditions relating to potential contamination, and migration of contaminants, across the site within the limitations posed by exploratory hole numbers, locations, depths, methods adopted and the scope of approved in situ and laboratory testing. The Client's Brief for the project and Geotechnics Limited's response is included in Appendix 1. The investigation comprised Rotary Boreholes, in situ and laboratory testing and reporting. A geoenvironmental interpretation and evaluation of the data obtained was not commissioned.

3.0 PRESENTATION

A description of the site and a summary of the procedures followed during the investigation process are presented in Sections 4 to 6. The factual data so obtained are presented in Appendices 2 to 6 of this report.

In addition, data in electronic PDF format is presented separately on disk.

Attention is drawn to the General Notes and Investigation Procedures presented in Appendix 7 to aid an understanding of the procedures followed and the context in which the report should be read.

4.0 THE SITE

4.1 Location

The site is located approximately 1km north west of Trowbridge town centre, Wiltshire. It lies approximately 500m east of the A363 between Trowbridge and Bradford-on-avon, Wiltshire. The approximate Ordnance Survey National Grid Reference for the centre of the site is ST 848 587 and an extract from the relevant 1:50,000 Scale O.S. Map (Sheet No. 173) is included as Appendix 2.

4.2 Description

The site is approximately rectangular in shape covering an area of around 250m by 400m. The site generally slopes gently down toward the south east, with local undulations.

The site comprises many STW structures and lagoons and an historic landfill to the north east and south east edges of the site. The site is surrounded by a chain link perimeter fence, with many hedges, trees and drainage ditches.

Agricultural pasture land surrounds the site on all sides, with the River Biss and associated flood plain approximately 50m to the south east. Access to the site is via a track from the west leading from the A363.

Some areas are inaccessible by heavy plant due to soft ground or the presence of structures.

5.0 PROCEDURE

5.1 Commissioning

The work was awarded following submission of a proposal for ground investigation of the site in accordance with the Client's requirements (see Appendix 1).

5.2 General

The procedures followed in this site investigation are based on *BS 5930 (1999) - Code of Practice for Site Investigations*. The borehole records are included in Appendix 3 and their approximate positions are shown on the Exploratory Hole Location Plan in Appendix 4.

The Exploratory Hole locations were selected by Geotechnics Ltd and the client to provide general coverage of the site perimeter to identify whether there is subsurface contamination present and to determine whether its source is on or off site. Levels shown on the Exploratory Hole Records were estimated from the Survey Drawing provided by the Client and the depths quoted are in metres below ground level.

A walkover visual search of the site for a Victorian culvert was carried out within the site boundary. However, no evidence of the culvert was found during the visit.

5.3 Rotary Boreholes

Fifteen (15 No.) 140mm diameter boreholes (numbered BH1 to BHR11, and BH13 to BH16) were sunk utilising open hole rotary with ODEX casing techniques to a depth of 8.00m below ground level. The work was carried out between the 19th March and 25th March. An inspection pit was excavated at each borehole location using hand tools to a depth not exceeding 1.20m below ground level to check for the presence of underground services.

The drilling equipment on this particular contract utilised compressed air as the flushing medium. Some strata descriptions in the open hole sections of the borehole records are the Drilling Foreman's estimate based on sediment and chipping returns in the flushing medium. The rate of penetration is also used as an indicator of the type of material being drilled, particularly where there is loss of flush returns. Definitive classification in terms of geology or degree of disturbance is not usually possible from these sources.

In some boreholes the ground was particularly soft and the material was pushed aside by the air flush rather than collected and flushed to the ground surface. As a result some boreholes had little return material to sample, and the description is based on drillers' observations.

Groundwater observations are included on the borehole records where appropriate.

On completion standpipes were installed in boreholes BH2, BH4, BH5, BH6, BH8, BH9, BH10 and BH13 to BH16 (See section 5.4). The boreholes BH1, BH3, BH7, and BH11 were backfilled with bentonite on completion.

Borehole BH12 was cancelled due to inaccessibility as a result of localised flooding.

Borehole records are presented in Appendix 3.

5.4 Instrumentation and Monitoring

Long term monitoring of the gas and groundwater levels was made possible by the installation of standpipes as follows:

Exploratory Hole	Standpipe Slotted pipe & Filter Zone (m)
BH2	1.00 to 8.00
BH4	1.00 to 8.00
BH5	1.00 to 8.00
BH6	1.00 to 8.00
BH8	1.00 to 8.00
BH9	1.00 to 8.00
BH10	1.00 to 8.00
BH13	1.00 to 8.00
BH14	1.00 to 8.00
BH15	1.00 to 8.00
BH16	1.00 to 8.00

Monitoring of the gas and groundwater levels at the site commenced on April 3rd 2008 and comprised 5 further visits on the 10th, 16th, and 23rd April, and the 1st and 9th May 2008.

At each position a record of the groundwater level in each instrument was taken

In addition to the groundwater levels the following parameters were measured and recorded in each standpipe using a GA2000 and Gas Data LSmxi Gas Analysers:

- Concentrations (% Vol) of CH_4, O_2, CO_2, along with (% LEL) CH_4.
- Flow Rate
- Differential Pressure
- Barometric Pressure

The results of the monitoring are presented in Appendix 5.

6.0 LABORATORY TESTING

6.1 Contamination

Selected samples of soil and groundwater were tested at the laboratories of ALcontrol Geochem for a number of determinands in order to check on potential site contamination. The determinands were specified by the Client.

The results are presented in Appendix 6.

Ben Tucker
BSc (Hons)
Graduate Engineer

Matthew Yates
BSc(Hons), CGeol, FGS
Principal Engineer

APPENDIX I
The Brief

1. *EXECUTIVE SUMMARY*

Wessex Water conducted a Preliminary Environmental Site Assessment (ESA) at Trowbridge Sewage Treatment Works (STW) located at off Bradford Road, Trowbridge (Site Id.13318). The Preliminary Environmental Site Assessment (ESA) was completed as part of an internal environmental due diligence audit of selected WW facilities.

Purpose

To evaluate the environmental condition of the site under Part IIA of the Environmental Protection Act (1990) and determine the potential for risk to the environment or human health associated with the continued use of the site as a STW facility.

Identified Sources of Site Contamination

Onsite sources of potential contamination were identified to include the following:

- Fuel storage facilities – there is one diesel above ground fuel tank and one tank used to store waste oil.
- The old landfill site;
- Areas used for old sludge beds;
- Substations on site;
- Waste/flytipping on the site;
- Site operations associated with STW facility.

No potential off-site sources of contamination were identified.

Preliminary Risk Assessment

With respect to the findings of the Preliminary ESA, the following areas of potential environmental or human health risk are discussed.

- Landfill site – the material within the landfill site is largely unknown. There is a risk of leachate generated from the decomposition of the material entering the groundwater and possibly the surface water. There is also the potential for the generation and migration of landfill gases.

- Fuel tanks - there are 2 above ground storage tanks on site. One is used to collect waste oil and the other is for the storage of diesel for use on site. There is a potential risk of localised soil contamination and the diesel mixing with surface water run off.

- STW Facility – the presence of likely contaminants in soils underlying the STW are considered to pose a minimal risk to human health, given the low sensitivity of land use and reduced potential for human exposure due to restricted site access to trained personnel.

Conclusion & Recommendations

In summary, the findings of the Preliminary ESA indicate that the site is considered as suitable for the continued land use as a STW facility. If however the surrounding land were to be redeveloped for a more sensitive use then more detailed investigation should be undertaken to confirm whether any further remediation would be required.

To ensure that human health risks and environmental impacts associated with future site operations are minimised, the following recommendations are made:

- All waste on site should be removed in the appropriate manner.

- Filter bed media should be analysed prior to disposal to ensure that it is not contaminated. Disposal on site may then be an option.

- The diesel tank has a double skin but should be bunded. This should also include the dispensing pump. This will reduce spillages to the area and localised contamination. Checks should be made to ensure complaince with The Control of Pollution (Oil Storage) (England) Regulations 2001.

- The landfill site should be sampled both for landfill gases and leachate to establish whether they are still being generated from the decomposition of materials.

Your Ref :
Our Ref : MY/QE070004
Date : 01 February 2008

Wessex Water
Claverton Down Road
Claverton Down
Bath
BA2 7WW

FAO: Paul Slade
Email: Paul.slade@wessexwater.co.uk

Dear Sirs

Geotechnical Investigation Quotes: Contaminated Land Improvement Review

Further to your email dated 23rd January 2008 and following a meeting with yourself, we have pleasure in enclosing our revised quotes for carrying out the works as discussed. The works have been based on the following:

- Bowerhill: Provide a crew to obtain shallow soil samples from around the perimeter of the pond and water samples taken within the pond for metals testing. Letter report allowed for.
- Wells STW: Cable percussion boreholes to be located around the hillock towards the middle of the site. Window samples within the sludge dumping area towards the south-west part of the site. This area may be accessible using a man-handleable wheeled rig. Alternative equipment (jack-hammer window sampling kit) would be mobilised as an alternative should ground conditions require. Parts of this area of the site have not been visited and additional plant may be required to gain access.
- Trowbridge: Based on providing a tractor mounted rotary drilling rig to carry out open-hole (with ODEX casing to keep boreholes open to allow standpipe installation) drilling. Engineer supervision includes for walkover search of Victorian culvert.
- Westbury: Three days worth of window sampling, some boreholes to be installed with standpipes.
- Paulton: Provide a crew to obtain soil samples from the south-eastern end of the site. Letter report allowed for.
- Yeovil: Cable percussion boreholes to be located across the site to investigate potential contamination from off-site and on-site sources. Geoenvironmental input from our environmental department has been allowed for.
- Glastonbury: Hand pitting around suspected hydrocarbon leak 0 based on excavating through grass areas. Cable percussion and window sample boreholes through the site, some with standpipe installations.

All installations would be dual purpose gas and water monitoring standpipes. Geotechnics Ltd would need to be informed of the exact requirements from Wessex Water regarding proposed exploratory hole locations and borehole requirements.

We assume that access is available for the various rigs, together with unlimited headroom. Most sites should be readily accessible for the rigs we have quoted for. However, some areas of some sites may be boggy, in particular the Yeovil site. We have allowed for using floatation tyres on the cable percussion rig, however it is possible that an excavator/tractor may need to assist in moving around the site.

At Wells, we understand that vegetation clearance and access would be made available for drilling between the small river and the sludge landfill.

As detailed on the enclosed Conditions of Offer, the Employer, or his appointed representative, will be responsible for notifying Geotechnics Ltd of the location of any services, utilities or buried structures present on the site. No work can be started on site until such information is made available. In the absence of such information we would be pleased to undertake enquiries with the statutory undertakers or, in the case of private sites, organise an on-site services search by a specialist company. The costs for undertaking these services can be provided if required. It should be recognised that the information from a specialist company can be provided in CAD format to become a permanent record for inclusion in the site H&S File for the project.

We ask you to note that it is company policy to excavate service inspection pits to 1.2m at all borehole locations unless instructed in writing by the Client/Engineer not to do so. Any such written instruction would relieve Geotechnics Ltd of any liability for damage to underground apparatus.

Mobilisation to site can currently take place within around two weeks following receipt of a written instruction to proceed. Some of the activities such as providing a pitting crew can be mobilised more quickly, usually within 1 week.

We hope you find our offer of interest, however, should you have any queries or require further information, please do not hesitate to contact us.

Yours faithfully

Matthew Yates
for GEOTECHNICS LIMITED – South West Office
email: myates@geotechnics.co.uk
Enc

APPENDIX 2
Site Location Plan

SITE LOCATION PLAN

Contaminated Land Improvement Review
Trowbridge STW
for
Wessex Water Services Limited

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APPENDIX 3
Borehole Records

DATA SHEET - Symbols and Abbreviations used on Records

Samples

B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
P	Piston sample (PF - failed piston sample)
TW	Thin walled push in sample
U -	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
V	Vial sample
W	Water sample

Insitu Testing / Properties

S	Standard Penetration Test (SPT)
C	SPT with cone
VN	Strength from Insitu Vane
HV	Strength from Hand Vane
PP	Strength from Pocket Penetrometer
	(All other strengths from undrained triaxial testing)
w%	Water content
N	SPT Result
-/-	Blows/penetration (mm) after 150mm seating.
-*/-	Total blows/penetration (mm)
( )	Extrapolated value

Rotary Core

RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (mm)	Maximum Minimum
NI	Non-intact core
NR	No core recovery

(where core recovery is unknown it is assumed to be at the base of the run)

Groundwater

Water Strike ▽

Depth Water Rose To ▼

Instrumentation

Seal

Filter

Seal

Strata

Made Ground — Type 1

Type 2

Topsoil

Cobbles and Boulders

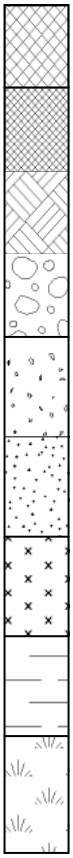
Gravel

Sand

Silt

Clay

Peat



Note: Composite soil types shown by combined symbols

Chalk

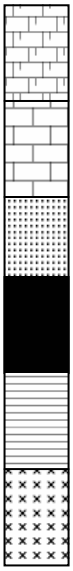
Limestone

Sandstone

Coal

Mudstone

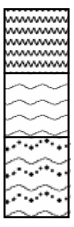
Siltstone



Metamorphic Rock — Fine Grained

Medium Grained

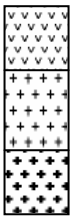
Coarse Grained



Igneous Rock — Fine Grained

Medium Grained

Coarse Grained



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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** **Borehole** **BH1** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **34.45** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
					Black and dark brown very clayey gravelly sand of ash. Gravel is angular to subrounded fine to coarse of pottery, glass, brick and clinker. [MADE GROUND]		**G.L.**		**34.45**
0.50	**E**								
1.00	**E**								
					Black soil and black clay ** [MADE GROUND]		**1.20**		**33.25**
3.00	**3.00**								
					Yellow and grey CLAY **		**3.90**		**30.55**
					Grey CLAY and limestone bands **		**4.90**		**29.55**
					End of Drillhole		**8.00**		**26.45**

Drilling

Depth	Dia	Technique	Crew
1.20	**0.30**	**Inspection Pit**	**AB-OVO**
3.00	**0.14**	**ODEX Rotary**	**AB-OVO**
8.00	**0.11**	**Rotary Open Hole**	**AB-OVO**

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			**25/03/08**	**08:00**
8.00	**3.00**	**DRY**	**25/03/08**	**18:00**

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered during boring.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
Borehole backfilled with arisings and bentonite on completion.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
**** = Drillers' description**

Logged by **NS**

Figure **1 of 1**

02/07/2008

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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** Borehole **BH2** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **35.30** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
							G.L.		35.30
0.50	E				Black and dark brown clayey very gravelly sand of ash. Gravel is angular to subrounded fine to coarse of clinker, brick, charcoal and glass with rare rootlets. [MADE GROUND]				
1.00	E						1.00		34.30
					Brown to yellow clay ** [MADE GROUND]				
							3.40		31.90
					Dark soil fill glass and plastic ** [MADE GROUND]				
4.50	4.50								
					Grey CLAY with limestone bands **		5.20		30.10
							8.00		27.30
					End of Drillhole				

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
4.50	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			25/03/08	08:00
8.00	4.50	Dry	25/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered during boring.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** **Borehole** **BH3** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **35.50** m AOD

Drilling | Properties/Sampling | Strata | Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
					Black soil and fill ** [MADE GROUND]		**G.L.**		**35.50**
0.50	**E**								
1.00	**E**								
					Black and dark brown clayey very gravelly sand of ash. Gravel is angular to subrounded fine to coarse of brick, clinker, glass and pottery with rare rootlets. [MADE GROUND]		**1.20**		**34.30**
2.00	**D**								
3.00	**3.00**								
4.00	**D**								
					Grey and yellow CLAY with limestone bands **		**5.40**		**30.10**
5.40	**D**								
					End of Drillhole		**8.00**		**27.50**

Drilling

Depth	Dia	Technique	Crew
1.20	**0.30**	**Inspection Pit**	**AB-OVO**
3.00	**0.14**	**ODEX Rotary**	**AB-OVO**
8.00	**0.11**	**Rotary Open Hole**	**AB-OVO**

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			**20/03/08**	**08:00**
8.00	**3.00**		**20/03/08**	**18:00**

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered during boring.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
Borehole backfilled with arisings and bentonite on completion.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
**** = Drillers' description**

Figure **1 of 1**
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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**
Engineer **WESSEX WATER SERVICES LIMITED**
Borehole **BH4**
Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED**
Ground Level **36.40** m AOD

Scale 1:50

Drilling: Core Run/Depth	Drilling: Depth Cased & (to Water)	Properties/Sampling: Type TCR/SCR%	Properties/Sampling: Length Max/Min	Properties/Sampling: RQD %	Strata: Description General	Strata: Description Detail	Depth	Legend	Level m AOD
							G.L.		36.40
0.50	E				Black and dark brown clayey very gravelly sand of ash. Gravel is angular to subrounded fine to coarse of brick, clinker, glass and concrete with occasional up to cobble sized pockets of sandy clay. [MADE GROUND]				
1.00	E						1.00		35.40
					Dark soil and fill ** [MADE GROUND]				
							2.40		34.00
					Yellow and brown clay fill ** [MADE GROUND]				
							2.90		33.50
3.00	3.00				Black fill and glass ** [MADE GROUND]				
							3.40		33.00
					Grey CLAY with limestone bands **				
							8.00		28.40
					End of Drillhole				

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
3.00	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			20/03/08	08:00
8.00	3.00		20/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
6.00	3.00				

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** **Borehole** **BH5** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **35.75** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
							G.L.		35.75
0.50	E				Soft dark brown and black slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick, clinker, ash and glass with rare rootlets. [MADE GROUND]		0.40		35.35
1.00	D								
1.50	D				Firm orange brown and dark grey slightly sandy slightly gravelly clay. Gravel is subangular fine and medium of chalk, brick and glass with occasional gravel sized pockets of ash. [MADE GROUND]		1.40		34.35
2.50	D				Soft brown and grey slightly sandy slightly gravelly clay. Gravel is subangular to subrounded fine to coarse of clinker, brick and glass. Many gravel sized pockets of ash. [MADE GROUND]		3.30		32.45
3.00	3.00								
3.50	D				Grey CLAY and yellow limestone bands **				
					End of Drillhole		8.00		27.75

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
3.00	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			20/03/08	08:00
8.00	3.00		20/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered during drilling.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
02/07/2008

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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** Borehole **BH6** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **36.30** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
							G.L.		36.30
0.50	E				Soft dark brown and black slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick, glass and clinker with many pockets of ash with occasional rootlets. [MADE GROUND]				
1.00	E					Between 1.00-1.10m: firm orange brown	1.10		35.20
					Black fill ** [MADE GROUND]				
2.00	D								
3.00	D								
					Dark brown clay ** [MADE GROUND]		3.60		32.70
4.00	D								
4.50	4.50								
							5.10		31.20
5.50	D				Black to dark brown very clayey very gravelly sand of ash. Gravel is angular to subrounded fine to coarse of brick, glass, clinker and charcoal with occasional pockets of grey slightly sandy clay with rare rootlets. [MADE GROUND]		5.50		30.80
							6.20		30.10
					Grey CLAY **				
					Grey CLAY and limestone **				
							8.00		28.30
					End of Drillhole				

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
4.50	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			20/03/08	08:00
8.00	4.50		20/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
3.00					

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
**** = Drillers' description**
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
02/07/2008

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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** **Borehole** **BH7** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **38.30** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
					Firm orange brown slightly sandy slightly gravelly clay. Gravel is subangular fine of brick and glass with occasional rootlets [MADE GROUND]		G.L.		38.30
0.50	E								
1.00	E					Below 1.00m: with pockets of black ash and rare cobbles of meta lithorelicts.	1.30		37.00
					Black clay and fill ** [MADE GROUND]				
2.00	D						2.10		36.20
					Black and brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick, clinker and ash. [MADE GROUND]				
4.00	D								
5.50	D				Grey and yellow CLAY **		5.30		33.00
6.00	6.00								
					End of Drillhole		8.00		30.30

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
6.00	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			19/03/08	08:00
8.00	6.00		19/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					Damp at around 4.00m depth.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
Borehole backfilled with arisings and bentonite on completion.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
**** = Drillers' description**

Figure **1 of 1**
02/07/2008

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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** **Borehole** **BH8** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **38.70** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
							G.L.		38.70
0.50	E				Firm orange brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of glass and brick with occasional rootlets.				
1.00	E				[MADE GROUND]	Below 1.00m: with many pockets of brown clayey sand of ash.			
1.50	D						1.50		37.20
					Black clayey very gravelly sand of ash. Gravel is angular to subrounded fine and medium of glass, brick and clinker with rare roots and rootlets. [MADE GROUND]				
3.00	D								
5.00	D								
6.00	6.00								
7.00	D						7.00		31.70
					Grey and yellow CLAY **				
							8.00		30.70
					End of Drillhole				

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
6.00	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			19/03/08	08:00
8.00	6.00		19/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered during boring.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation. Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
02/07/2008

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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** Borehole **BH9** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **40.35** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
							G.L.		40.35
0.50	E				Firm to stiff orange brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to medium of brick, flint and meta - lithorelicts with occasional pockets of black ash and rare rootlets. [MADE GROUND]				
1.00	E								
1.50	D						1.40		38.95
2.00	D				Soft black and dark brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick, glass and ash with rare rootlets. [MADE GROUND]				
3.00	D							▽	
4.00	D								
5.00	D								
6.00	6.00								
6.00	D				Brown and grey CLAY **		6.70		33.65
					End of Drillhole		8.00		32.35

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
6.00	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			19/03/08	08:00
8.00	6.00		19/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
3.00					

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
02/07/2008

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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** **Borehole** **BH10** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **41.30** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
							G.L.		41.30
0.50	E				Firm to stiff orange brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse of brick and meta - lithorelicts with rare rootlets. [MADE GROUND]				
1.00	D								
							1.40		39.90
2.00	D				Soft brown and black slightly sandy gravelly clay. Gravel is angular to subrounded fine to coarse of brick, glass, ash and clinker. [MADE GROUND]				
4.00	D								
6.00	6.00								
6.00	D								
					Grey and yellow CLAY **		6.70		34.60
					End of Drillhole		8.00		33.30

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
6.00	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			19/03/08	08:00
8.00	6.00		19/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					Damp at around 3.00m depth.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** Borehole **BH11** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **42.95** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
							G.L.		42.95
					Dark soil ** [MADE GROUND]		0.20		42.75
0.50	E				Firm to stiff orange brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse brick, flint and clinker with rare rootlets. [MADE GROUND]				
1.00	E						1.00		41.95
1.30	D				Black and brown very clayey very gravelly sand of ash. Gravel is subangular to subrounded fine to coarse of clinker, brick, glass and fragments of decomposing organic material. [MADE GROUND]				
4.00	D								
6.00	6.00								
					Grey and yellow CLAY **		6.30		36.65
8.00	D				End of Drillhole		8.00		34.95

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
6.00	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			19/03/08	08:00
8.00	6.00		19/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					Damp at around 4.00m depth.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
Borehole backfilled with arisings and bentonite on completion.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
**** = Drillers' description**

Figure **1 of 1**
02/07/2008

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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** **Borehole** **BH13** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **42.50** m AOD

Drilling		Properties/Sampling			Strata				
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
					Concrete ** [MADE GROUND]		**G.L.**		**42.50**
							0.15		**42.35**
0.50	**E**				**Hardcore ** [MADE GROUND]**		**0.25**		**42.25**
1.00	**E**				**Stiff orange brown and grey indistinctly structured slightly sandy CLAY.**				
1.50	**1.50**								
3.00	**D**				**Soft grey slightly sandy CLAY.**		**3.10**		**39.40**
					Grey CLAY limestone bands **	**Below 5.60m: with rare subangular fine to coarse gravel of limestone.**	**5.60**		**36.90**
7.00	**D**								
					End of Drillhole		**8.00**		**34.50**

Drilling				Progress					Groundwater					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	**0.30**	**Inspection Pit**	**AB-OVO**	**G.L.**			**25/03/08**	**08:00**	**5.90**	**1.50**				
1.50	**0.14**	**ODEX Rotary**	**AB-OVO**	**8.00**	**1.50**		**25/03/08**	**18:00**						
8.00	**0.11**	**Rotary Open Hole**	**AB-OVO**											

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation. Inspection pit hand excavated to 1.20m depth to check for presence of buried services. E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial. ** = Drillers' description A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**

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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** **Borehole** **BH14** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **42.20** m AOD

Drilling		Properties/Sampling			Strata				
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
					Soil ** [TOPSOIL]		**G.L.**		**42.20**
							0.20		**42.00**
0.50	**E**				**Firm to stiff orange mottled blue - grey slightly sandy CLAY with rare rootlet traces.**				
1.00	**E**								
1.50	**1.50**								
							1.90		**40.30**
					Grey CLAY with yellow bands **				
							3.40		**38.80**
					Grey CLAY with limestone bands **				
							8.00		**34.20**
					End of Drillhole				

Drilling				Progress					Groundwater					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	**0.30**	**Inspection Pit**	**AB-OVO**	**G.L.**			**25/03/08**	**08:00**						**None encountered during boring.**
1.50	**0.14**	**ODEX Rotary**	**AB-OVO**	**8.00**	**1.50**		**25/03/08**	**18:00**						
8.00	**0.11**	**Rotary Open Hole**	**AB-OVO**											

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
**** = Drillers' description**
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**
Engineer **WESSEX WATER SERVICES LIMITED**
Borehole **BH15**
Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED**
Ground Level **43.20** m AOD

Scale 1:50

Drilling: Core Run/Depth	Drilling: Depth Cased & (to Water)	Properties/Sampling: Type TCR/SCR%	Properties/Sampling: Length Max/Min	Properties/Sampling: ROD %	Strata: Description General	Strata: Description Detail	Depth	Legend	Level m AOD
					Firm to stiff orange mottled blue - grey slightly sandy CLAY with rare rootlet traces.		**G.L.**		**43.20**
0.50	**E**								
1.00	**E**								
1.50	**1.50**								
					Grey CLAY with limestone bands **		**3.30**		**39.90**
					End of Drillhole		**8.00**		**35.20**

Drilling: Depth	Dia	Technique	Crew	Progress: Depth of Hole	Depth Cased	Depth to Water	Date	Time	Groundwater: Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	**0.30**	**Inspection Pit**	**AB-OVO**	**G.L.**			**20/03/08**	**08:00**						**None encountered during boring.**
1.50	**0.14**	**ODEX Rotary**	**AB-OVO**	**8.00**	**1.50**		**20/03/08**	**18:00**						
8.00	**0.11**	**Rotary Open Hole**	**AB-OVO**											

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of; 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
**** = Drillers' description**
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
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BOREHOLE RECORD - Rotary

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW** Engineer **WESSEX WATER SERVICES LIMITED** **Borehole** **BH16** Project No **PE080558**

Client **WESSEX WATER SERVICES LIMITED** Ground Level **42.20** m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
					Hardcore gravel ** [MADE GROUND]		**G.L.**		**42.20**
0.50	**E**				**Firm to stiff orange mottled blue grey slightly sandy CLAY with rare rootlet traces.**		**0.30**		**41.90**
1.00	**E**								
					Grey and yellow CLAY **		**1.40**		**40.80**
1.50	**1.50**								
					Grey CLAY with limestone bands **		**2.90**		**39.30**
					End of Drillhole		**8.00**		**34.20**

Drilling

Depth	Dia	Technique	Crew
1.20	**0.30**	**Inspection Pit**	**AB-OVO**
1.50	**0.14**	**ODEX Rotary**	**AB-OVO**
8.00	**0.11**	**Rotary Open Hole**	**AB-OVO**

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			**25/03/08**	**08:00**
8.00	**1.50**		**25/03/08**	**18:00**

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered during boring.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
**** = Drillers' description**
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure **1 of 1**
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APPENDIX 4
Exploratory Hole Location Plan

KEY:

BH1 Borehole Location

WS1 Water Sample Location

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The Geotechnical Centre,
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Devon, EX2 7LL

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www.geotechnics.co.uk

Client:
Wessex Water Services Limited

Project:

Contaminated Land Improvement Review

Trowbridge STW

Drawing Title:
Exploratory Hole Location Plan
Taken from a drawing supplied by the client

Not To Scale	Date: June 2008
Project No: PE080558	File Name: PE080558_EXP

APPENDIX 5
Monitoring Results

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH2**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **25 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		2.93	7.90	0	0	2.3	19.1	78.5	
10-Apr-2008			7.58	0	0	1.9	19.2	78.9	
16-Apr-2008		2.53	7.52	0	0	1.9	19.2	78.9	
23-Apr-2008		2.52	7.48	0	0	3.5	17.5	79.00	
1-May-2008			7.50	0	0	4.0	17.1	78.9	
9-May-2008			7.35	0	0	0.0	20.5	79.5	

Remarks

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FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH2**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**8.00m**	Cover Type	**Upright lockable protective cover**
Filter Zone	**1.00 - 8.00m**	Ground Level	
Date Installed	**25 March 2008**		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		**1028**	**-**	**+0.01**	
10-Apr-2008		**994**	**+000.25**	**-0.0**	
16-Apr-2008		**1014**	**+000.07**	**-0.0**	
23-Apr-2008		**1013**	**+0.00**	**-0.00**	
1-May-2008		**1001**	**-000.10**	**+0.0**	
9-May-2008		**1007**	**+000.11**	**-0.0**	

Remarks

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FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH4**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **20 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		3.15	7.80	0	0	1.3	19.5	79.0	Tap left open.
10-Apr-2008			7.70	0	0	7.6	12.8	79.6	
16-Apr-2008		2.84	7.46	0	0	0.9	19.8	79.3	
23-Apr-2008		2.88	7.49	0	0	8.4	12.4	79.2	
1-May-2008			7.43	0	0	8.6	11.3	80.1	
9-May-2008			7.41	0	0	0.3	20.2	79.5	

Remarks

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FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH4**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**8.00m**	Cover Type	**Upright lockable protective cover**
Filter Zone	**1.00 - 8.00m**	Ground Level	
Date Installed	**20 March 2008**		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		**1028**			
10-Apr-2008		**993**	**+000.21**		
16-Apr-2008		**1015**	**+000.32**	**-0.0**	
23-Apr-2008		**1013**	**-.000.12**	**-0.0**	
1-May-2008		**1001**	**-000.04**	**+0.0**	
9-May-2008		**1006**	**+000.21**	**-0.0**	

Remarks

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Form 003/1

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH5**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **20 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008			7.90	0	0	0.8	19.8	79.3	
10-Apr-2008			7.60	0	0	4.1	14.3	81.6	
16-Apr-2008		2.90	7.63	0	0	4.1	14.1	81.8	
23-Apr-2008		2.95	7.59	0	0	4.0	14.6	81.4	
1-May-2008			7.50	0	0	0.9	19.0	80.1	
9-May-2008			7.52	0	0	0.0	20.5	79.5	

Remarks

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FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH5**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type	**Standpipe**	Diameter	**50mm**
Depth to Base	**8.00m**	Cover Type	**Upright lockable protective cover**
Filter Zone	**1.00 - 8.00m**	Ground Level	
Date Installed	**20 March 2008**		

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		**1028**		**+0.1**	
10-Apr-2008		**993**	**+000.17**	**-0.0**	
16-Apr-2008		**1015**	**+000.27**	**+0.0**	
23-Apr-2008		**1013**	**+000.01**	**-0.0**	
1-May-2008		**1001**	**+000.03**	**+0.0**	
9-May-2008		**1007**	**+000.22**	**-0.0**	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH6**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **20 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		3.55	7.90	0	0	3.7	19.0	77.1	
10-Apr-2008			7.48	0	0	9.6	7.3	83.1	
16-Apr-2008		3.31	7.36	0	0	0	20.5	79.5	
23-Apr-2008		3.31	7.29		0	13.5	0.7	85.8	
1-May-2008			7.23	0	0	7.7	10.1	82.2	
9-May-2008			7.04	0	0	0.0	20.5	79.5	

Remarks

geotechnics

Form 003/1

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH6**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **20 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1028		-0.01	
10-Apr-2008		993	+000.10	-0.0	
16-Apr-2008		1015	+000.10	-0.0	
23-Apr-2008		1013	-000.07	-0.0	
1-May-2008		1001	-000.02	+0.0	
9-May-2008		1007	+000.13	-0.0	

Remarks

geotechnics

Form 003/1

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH8**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **19 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		7.15	7.99	0	0	1.4	20.4	78.1	
10-Apr-2008			7.64	0	0	5.9	11.3	82.8	
16-Apr-2008		6.81	7.65	0	0	0.4	19.6	80	
23-Apr-2008		6.80	7.65	0	0	0.7	19.7	79.6	
1-May-2008			7.65	0	0	0.7	20.1	79.2	
9-May-2008			7.62	0	0	1.5	19.6	78.9	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH8**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **19 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1028		-0.1	
10-Apr-2008		994	+000.12	-0.0	
16-Apr-2008		1015	+000.07	+0.0	
23-Apr-2008		1012	+000.05	-0.0	
1-May-2008		1001	+000.00	+0.0	
9-May-2008		1007	+000.10	-0.0	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH9**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **19 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		4.03	7.80	0	0	0.4	21.0	78.5	
10-Apr-2008			7.45	0.1	0.2	3.3	11.1	85.6	
16-Apr-2008			7.47	0.2	3.0	5.4	3.0	91.6	
23-Apr-2008		3.85	7.38	0	0	0.3	19.8	79.9	
1-May-2008			7.37	0	0	0.1	20.3	79.6	
9-May-2008			7.38	0	0	0.0	20.5	79.50	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH9**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **19 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		-0.01	
10-Apr-2008		993	+000.20	-0.0	
16-Apr-2008		993	+000.20	-0.0	
23-Apr-2008		1011	-000.04	-0.0	
1-May-2008		1001	+000.06	+0.0	
9-May-2008		1006	+000.19	-0.0	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH10**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **19 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		5.57			9.7	1.8	18.2	19.4	
10-Apr-2008			7.56	10.7	>99.9	6.9	0.8	92.3	
16-Apr-2008		5.20	7.45	10.0	5.4	4.4	7.1	88.5	
23-Apr-2008		5.18	7.41	0.1	1.0	0.8	19.9	79.3	
1-May-2008			7.27	0.3	6.0	0.2	20	79.8	
9-May-2008			7.29	2.6	52	1.6	17.2	81.2	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH10**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **19 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		+0.0	
10-Apr-2008		993	+000.14	-0.0	
16-Apr-2008		1016	+000.14	-0.0	
23-Apr-2008		1011	+000.05	-0.0	
1-May-2008		1000	+000.08	+0.0	
9-May-2008		1007	+000.00	-0.0	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH13**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **25 March 2008**

Diameter **50mm**
Cover Type **Flush lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		1.05		0	0	2.6	14.0	83.3	
10-Apr-2008			7.66	0.3	5.0	5.0	6.6	88.4	
16-Apr-2008		0.50	7.19						Bung not sealed.
23-Apr-2008		0.46	7.13						Flooded.
1-May-2008			7.06	0	0	0.0	20.4	79.6	
9-May-2008			7.02	0	0	0.0	20.5	79.5	

Remarks

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FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH13**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **25 March 2008**

Diameter **50mm**
Cover Type **Flush lockable protective cover**
Ground Level

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		-2.81	
10-Apr-2008		993	+002.17	-0.0	
16-Apr-2008		1018	+000.03	-0.0	
23-Apr-2008					
1-May-2008		1001	-000.32	+0.0	
9-May-2008		1007	+000.04	-0.0	

Remarks

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FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH14**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **25 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		6.03		0	0	1.8	18.2	19.4	
10-Apr-2008			7.50	0	0	3.2	16.5	80.3	
16-Apr-2008		4.24	7.50	0	0	0.5	19.4	80.1	
23-Apr-2008		3.54	7.55	0	0	0.0	20.4	79.6	
1-May-2008			7.54	0	0	0.2	20.1	79.7	
9-May-2008			7.51	0	0	0.0	20.5	79.5	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH14**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **25 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		+0.01	
10-Apr-2008		993	+000.09	-0.0	
16-Apr-2008		1017	+000.06	+0.0	
23-Apr-2008		1012	-000.06	-0.0	
1-May-2008		1000	+000.00	+0.0	
9-May-2008		1006	+000.04	+0.0	

Remarks

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Form 003/1

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH15**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **20 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		4.81		0	0	1.7	13.6	84.6	
10-Apr-2008			7.61	0	0	2.2	14.4	83.4	
16-Apr-2008		2.48	7.63	0	0	0.4	19.3	80.3	
23-Apr-2008		2.09	7.62	0	0	2.4	17.4	80.2	
1-May-2008			7.61	0	0	0.1	20.3	79.6	
9-May-2008			7.62	0	0	0.0	20.5	79.5	

Remarks

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FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH15**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **20 March 2008**

Diameter **50mm**
Cover Type **Upright lockable protective cover**
Ground Level

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		-0.0	
10-Apr-2008		993	-000.15	-0.0	
16-Apr-2008		1017	-000.00	-0.0	
23-Apr-2008		1011	-000.06	-0.0	
1-May-2008		1000	+000.09	+0.0	
9-May-2008		1006	+000.02	-0.0	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH16**

Sheet No. **1 (1 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **25 March 2008**

Diameter **50mm**
Cover Type **Flush lockable protective cover**
Ground Level

Date	Time	Depth to Water (m bgl)	Current Hole Depth (m)	Explosive Gas CH4 (% VOL)	Explosive Gas CH4 (% LEL)	Carbon Dioxide CO2 (% VOL)	Oxygen O2 (% VOL)	Nitrogen N2 (% VOL)	Remarks
3-Apr-2008		4.49		0.8	14.8	4.2	15.9	78.9	
10-Apr-2008			7.58	0.2	3.0	6	13.5	80.5	
16-Apr-2008		Flooded							Flooded over cover.
23-Apr-2008		1.39	7.53	0	0.0	0.0	20.3	79.7	
1-May-2008			7.53	0.1	3.0	0.4	20.2	79.4	
9-May-2008			7.54	0	0.0	0.0	20.4	79.6	

Remarks

geotechnics

FIELDWORK - *Insitu Gas Monitoring - Instrument Record*

Project **CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW**

Client **WESSEX WATER SERVICES LIMITED**

Project No **PE080558**

Borehole **BH16**

Sheet No. **1 (2 of 2)**

Installation Details

Installation Type **Standpipe**
Depth to Base **8.00m**
Filter Zone **1.00 - 8.00m**
Date Installed **25 March 2008**

Diameter **50mm**
Cover Type **Flush lockable protective cover**
Ground Level

Date	Time	Barometric Pressure (mBars)	Diff. Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
3-Apr-2008		1027		+0.0	
10-Apr-2008		993	+000.17	-0.0	
16-Apr-2008					
23-Apr-2008		1011	-000.05	-0.0	
1-May-2008		1000	+000.03	+0.0	
9-May-2008		1007	+000.04	-0.0	

Remarks

geotechnics

APPENDIX 6
Laboratory Test Results - Contamination

ALcontrol Laboratories

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: mkt@alcontrol.co.uk
website: www.alcontrol.co.uk

Geotechnics Ltd
The Geotechnical Centre
8 Orchard Court
Heron Road
Sowton Industrial State
Exeter, Devon
EX2 7LL ATTN: Cathy Smith

CERTIFICATE OF ANALYSIS

Date: 15 May, 2008

Our Reference: 08/08299/02/01

Your Reference: PEO80558

Location: TROWBRIDGE STW

A total of 24 samples was received for analysis on Friday, 02 May 2008 and completed on Wednesday, 14 May 2008. Accredited laboratory tests are defined in the log sheet, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation. We are pleased to enclose our final report, it was a pleasure to be of service to you, and we look forward to our continuing association.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials- whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Signed

Diane Whittlestone
Tech. Support Manager

David O'Hare
Project Manager

Caroline Suttie
Project Coordinator
Team Leader

Valid if signed by any of the above signatories.

Compiled By

Briony Johnson

MCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING 1291

ALcontrol Laboratories
TEST SCHEDULE

JOB NUMBER : 08/8299/02
CLIENT : Geotechnics Ltd
CONTACT : Cathy Smith
DATE OF RECEIPT : 02/05/08
LOCATION : TROWBRIDGE STW

BATCH NUMBER : 1
CLIENT REF/CODE : PEO80558
ORDER NUMBER : OE4778
TURNAROUND : 6 days

Numeric values indicate additional scheduling

* indicates test subcontracted

					UKAS Accredited ?	✓	✓		✓	✓	✓	✓		✓	✓	✓		✓		✓	✓	✓	✓							
Sample Number	Sample Identity	P / V	Depth	Sample Type		Metals ICP. 9 (S)	Boron Water Soluble (S)	Beryllium (S)	Barium (S)	Vanadium (S)	Sulphur Elemental (S)	Cyanide Total (S)	Cyanide Free (S)	Nitrate as NO3 Kone (S)	Sulphate Total (S)	Sulphide Easily Liberated (S)	Asbestos Screen (ID)	pH (S)	Acetone (S)	EPH (DRO) (S)	GRO BTEX MTBE GC (S)	PAH Spec MS (S)	VOC MS (S)							
1	BH2	1KGTub	1.00	SOLID								X	X			X	X	X											
2	BH2	JAR 250g	1.00	SOLID		X	X	X	X	X	X			X	X				X	X	X	X								
3	BH2	Vial	1.00	SOLID																			X							
4	BH4	1KGTub	1.00	SOLID								X	X			X	X	X											
5	BH4	JAR 250g	1.00	SOLID		X	X	X	X	X	X			X	X				X	X	X	X								
6	BH4	Vial	1.00	SOLID																			X							
7	BH5	1KGTub	3.50	SOLID		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
8	BH5	Vial	3.50	SOLID																			X							
9	BH6	1KGTub	4.00	SOLID		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
10	BH6	Vial	4.00	SOLID																			X							
11	BH8	1KGTub	1.00	SOLID								X	X			X	X	X											
12	BH8	JAR 250g	1.00	SOLID		X	X	X	X	X	X			X	X				X	X	X	X								
13	BH8	Vial	1.00	SOLID																			X							
14	BH10	1KGTub	0.50	SOLID								X	X			X	X	X											
15	BH10	JAR 250g	0.50	SOLID		X	X	X	X	X	X			X	X				X	X	X	X								
16	BH10	Vial	0.50	SOLID																			X							
17	BH11	1KGTub	8.00	SOLID		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
18	BH11	Vial	8.00	SOLID																			X							
19	BH13	1KGTub	1.00	SOLID								X	X			X	X	X											
20	BH13	JAR 250g	1.00	SOLID		X	X	X	X	X	X			X	X				X	X	X	X								
21	BH13	Vial	1.00	SOLID																			X							
22	BH16	1KGTub	1.00	SOLID								X	X			X	X	X											

Printed : 15/05/08 16:03:24

ALcontrol Laboratories
TEST SCHEDULE

JOB NUMBER : 08/8299/02
CLIENT : Geotechnics Ltd
CONTACT : Cathy Smith
DATE OF RECEIPT : 02/05/08
LOCATION : TROWBRIDGE STW

BATCH NUMBER : 1
CLIENT REF/CODE : PEO80558
ORDER NUMBER : OE4778
TURNAROUND : 6 days

Numeric values indicate additional scheduling

* indicates test subcontracted

Sample Number	Sample Identity	P / V	Depth	Sample Type	Metals ICP. 9 (S)	Boron Water Soluble (S)	Beryllium (S)	Barium (S)	Vanadium (S)	Sulphur Elemental (S)	Cyanide Total (S)	Cyanide Free (S)	Nitrate as NO3 Kone (S)	Sulphate Total (S)	Sulphide Easily Liberated (S)	Asbestos Screen (ID)	pH (S)	Acetone (S)	EPH (DRO) (S)	GRO BTEX MTBE GC (S)	PAH Spec MS (S)	VOC MS (S)						
	UKAS Accredited ?				✓	✓		✓	✓	✓	✓		✓	✓	✓		✓		✓	✓	✓	✓						
23	BH16	JAR 250g	1.00	SOLID	X	X	X	X	X	X			X	X				X	X	X	X							
24	BH16	Vial	1.00	SOLID																		X						
	Total Number of Tests				9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9						

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ALcontrol Laboratories

Extractable Petroleum Hydrocarbons (EPH) By GC-FID

Carbon Range C10-C40

Job Number : 08/08299/02/01
Client : Geotechnics Ltd
Client Ref : PEO80558
Matrix [Units] : SOLID [mg/kg]

All results expressed on a dry weight basis.

Sample No	Sample Identity	Depth	EPH	Interpretation
2	BH2	1.0	680	PAHs/Bitumen/Tar/Humic acids
5	BH4	1.0	570	PAHs/Bitumen/Tar
7	BH5	3.5	3300	biodegraded diesel/bitumen/tar/pahs/carboxylic acids
9	BH6	4.0	820	biodegraded diesel/bitumen/tar/humics
12	BH8	1.0	390	Bitumen/Tar/humic acids
15	BH10	0.5	100	Bitumen/Tar/humic acids
17	BH11	8.0	1100	PAHs/Bitumen/Tar/Humic acids
20	BH13	1.0	38	biodegraded diesel
23	BH16	1.0	53	humic acids

Extractable Petroleum Hydrocarbons (formally Diesel Range Organics) :- Any compound extractable in n-hexane within the carbon range C10-C40, includes Aliphatic (Min Oil), Aromatic (PAHs) and naturally occurring compounds.

ALcontrol Laboratories Analytical Services
Sample Descriptions

Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref : PEO80558

Grain sizes

<0.063mm	Very Fine
0.1mm - 0.063mm	Fine
0.1mm - 2mm	Medium
2mm - 10mm	Coarse
>10mm	Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
BH2	1.0	Brown	0.1mm - 2mm	Loam (topsoil) with some Stones	1
BH4	1.0	Brown	0.1mm - 0.063mm	Silty Clay Loam with some Stones	1
BH5	3.5	Brown	0.1mm - 0.063mm	Silty Clay Loam with some Stones	1
BH6	4.0	Brown	0.1mm - 2mm	Loam (topsoil) with some Glass & Stones	1
BH8	1.0	Brown	0.1mm - 2mm	Sandy Silt Loam with some Stones	1
BH10	0.5	Beige	0.1mm - 0.063mm	Silty Clay with some Stones	1
BH11	8.0	Brown	0.1mm - 0.063mm	Silty Clay Loam with some Glass & Stones	1
BH13	1.0	Beige	<0.063mm	Clay	1
BH16	1.0	Beige	<0.063mm	Clay	1

* These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.
Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.
[1] Sample Description supplied by client

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ALcontrol Laboratories Analytical Services
Table Of Results

[#] ISO 17025 accredited
[M] MCERTS accredited
* Subcontracted test
» Shown on prev. report

Job Number: 08/08299/02/01 **Matrix:** SOLID
Client: Geotechnics Ltd **Location:** TROWBRIDGE STW
Client Ref. No.: PEO80558 **Client Contact:** Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	1-3	4-6	7-8	9-10	11-13	14-16	17-18	19-21	22-24		
Total Sulphate	2200	510	5500	14000	2400	610	2400	17000	580	TM129[#M]	<100 mg/kg
Boron Water Soluble	<3.5	<3.5	9.8	14	<3.5	<3.5	5.8	<3.5	<3.5	TM129[#M]	<3.5 mg/kg
Arsenic	54	18	30	47	9	10	13	13	9	TM129[#M]	<3.0 mg/kg
Barium	1500	460	530	450	150	120	240	110	59	TM129[#M]	<6.0 mg/kg
Beryllium	5.8	0.8	1.9	4.2	0.7	0.8	0.8	<0.4	0.5	TM129	<0.4 mg/kg
Cadmium	3.3	0.8	2.1	2.5	0.8	<0.3	1.0	<0.3	<0.3	TM129	<0.3 mg/kg
Chromium	62	73	150	58	33	32	33	21	28	TM129[#M]	<4.5 mg/kg
Copper	200	73	240	290	63	19	120	7	<6	TM129[#M]	<6 mg/kg
Lead	310	190	310	590	96	58	130	21	9	TM129[#M]	<2 mg/kg
Mercury	1.1	<0.6	1.7	0.9	0.9	<0.6	<0.6	<0.6	<0.6	TM129[#M]	<0.6 mg/kg
Nickel	71	23	49	56	21	16	30	<0.9	4.0	TM129[#M]	<0.9 mg/kg
Selenium	<3	<3	<3	<3	<3	<3	<3	<3	<3	TM129[#M]	<3 mg/kg
Vanadium	51	37	42	40	25	32	32	25	40	TM129[#M]	<1.5 mg/kg
Zinc	1300	400	890	940	200	110	300	22	43	TM129[#M]	<2.5 mg/kg
Nitrate (soluble) as NO3	230	30	440	52	60	2	81	<1	34	TM102[#]	<1 mg/kg
Easily Liberated Sulphide	<15	<15	<15	<15	<15	27	<15	<15	<15	TM180[#]	<15 mg/kg
Total Cyanide	<1	<1	<1	<1	<1	<1	<1	<1	<1	TM153[#M]	<1 mg/kg
Free Cyanide	<1	<1	<1	<1	<1	<1	<1	<1	<1	TM153	<1 mg/kg
Asbestos Presence Screen	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	TM001	NONE
Elemental Sulphur	<70	250	350	<70	<70	<70	<140	<70	<70	TM136[#]	<70 mg/kg
pH Value	7.68	7.83	7.31	7.55	7.77	8.26	7.46	6.61	8.02	TM133[#M]	<1.00 pH Units
EPH (DRO) (C10-C40)	680	570	3300	820	390	100	1100	38	53	TM061[#M]	<35 mg/kg
EPH (DRO) (C10-C40) % Surrogate Recovery	96	95	98	96	98	98	96	100	100	TM061[#M]	%
GRO (C4-C10)	84	<10	<10	<10	17	<10	<10	<10	<10	TM089	<10 ug/kg
GRO (C10-C12)	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM089	<10 ug/kg
Benzene	14	<10	<10	<10	<10	<10	<10	<10	<10	TM089[#M]	<10 ug/kg
Toluene	41	<10	<10	<10	17	<10	<10	<10	<10	TM089[#M]	<10 ug/kg
Ethyl benzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM089[#M]	<10 ug/kg
m & p Xylene	29	<10	<10	<10	<10	<10	<10	<10	<10	TM089[#M]	<10 ug/kg
o Xylene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM089[#M]	<10 ug/kg
Sum m&p and o Xylene	29	<10	<10	<10	<10	<10	<10	<10	<10	TM089	<10 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

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ALcontrol Laboratories Analytical Services
Table Of Results

[#] ISO 17025 accredited
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* Subcontracted test
» Shown on prev. report

Job Number: 08/08299/02/01 **Matrix:** SOLID
Client: Geotechnics Ltd **Location:** TROWBRIDGE STW
Client Ref. No.: PEO80558 **Client Contact:** Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	**1-3**	**4-6**	**7-8**	**9-10**	**11-13**	**14-16**	**17-18**	**19-21**	**22-24**		
Sum of BTEX	84	<10	<10	<10	17	<10	<10	<10	<10	TM089	<10 ug/kg
MTBE	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM089[#]	<10 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

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ALcontrol Laboratories Analytical Services
Table Of Results

[#] ISO 17025 accredited
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Job Number: 08/08299/02/01 **Matrix:** SOLID
Client: Geotechnics Ltd **Location:** TROWBRIDGE STW
Client Ref. No.: PEO80558 **Client Contact:** Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	**1-3**	**4-6**	**7-8**	**9-10**	**11-13**	**14-16**	**17-18**	**19-21**	**22-24**		
PAH by GCMS											
Naphthalene	270	200	260	420	23	22	150	<10	<10	TM074[#M]	<10 ug/kg
Acenaphthylene	390	830	510	170	38	22	170	<5	<5	TM074[#M]	<5 ug/kg
Acenaphthene	23	69	140	26	<14	<14	170	<14	<14	TM074[#M]	<14 ug/kg
Fluorene	64	420	210	65	14	<12	360	<12	<12	TM074[#M]	<12 ug/kg
Phenanthrene	1300	7000	1700	790	140	92	4300	<21	56	TM074[#M]	<21 ug/kg
Anthracene	610	2700	710	240	78	58	1800	<9	17	TM074[#M]	<9 ug/kg
Fluoranthene	3700	17000	4100	1000	470	320	11000	<25	120	TM074[#M]	<25 ug/kg
Pyrene	3100	13000	3500	820	420	280	7300	<22	76	TM074[#M]	<22 ug/kg
Benz(a)anthracene	2500	7700	2400	730	290	200	6200	17	91	TM074[#M]	<12 ug/kg
Chrysene	2500	6000	2200	680	290	240	6300	10	92	TM074[#M]	<10 ug/kg
Benzo(b)fluoranthene	4400	10000	4200	1000	550	440	10000	<16	97	TM074[#M]	<16 ug/kg
Benzo(k)fluoranthene	2100	3500	1400	430	180	180	3300	<25	58	TM074[#M]	<25 ug/kg
Benzo(a)pyrene	2600	6600	2800	600	350	250	6000	<12	75	TM074[#M]	<12 ug/kg
Indeno(123cd)pyrene	1900	4000	2100	470	250	160	4000	<11	42	TM074[#M]	<11 ug/kg
Dibenzo(ah)anthracene	500	1200	500	180	70	51	1300	<8	11	TM074[#M]	<8 ug/kg
Benzo(ghi)perylene	2000	4600	2500	620	290	200	4500	<10	60	TM074[#M]	<10 ug/kg
PAH 16 Total	28000	85000	29000	8300	3500	2500	67000	27	790	TM074[#M]	<25 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

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ALcontrol Laboratories Analytical Services
Table Of Results

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* Subcontracted test
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Job Number: 08/08299/02/01 **Matrix:** SOLID
Client: Geotechnics Ltd **Location:** TROWBRIDGE STW
Client Ref. No.: PEO80558 **Client Contact:** Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	1-3	4-6	7-8	9-10	11-13	14-16	17-18	19-21	22-24		
Volatile Organic Compounds											
Dichlorodifluoromethane	<4	<4	<4	<4	<4	<4	<4	<4	<4	TM116[#]	<4 ug/kg
Chloromethane	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116[#]	<7 ug/kg
Vinyl Chloride	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#][M]	<10 ug/kg
Bromomethane	<13	<13	<13	<13	<13	<13	<13	<13	<13	TM116	<13 ug/kg
Chloroethane	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116[#]	<14 ug/kg
Trichlorofluoromethane	<6	<6	<6	<6	<6	<6	<6	<6	<6	TM116[#][M]	<6 ug/kg
trans-1-2-Dichloroethene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116[#]	<11 ug/kg
Dichloromethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#]	<10 ug/kg
Carbon Disulphide	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116[#][M]	<7 ug/kg
1.1-Dichloroethene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#][M]	<10 ug/kg
1.1-Dichloroethane	<8	<8	<8	<8	<8	<8	<8	<8	<8	TM116[#][M]	<8 ug/kg
Methyl Tertiary Butyl Ether	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116	<11 ug/kg
cis-1-2-Dichloroethene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116[#][M]	<5 ug/kg
Bromochloromethane	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116[#]	<14 ug/kg
Chloroform	<8	<8	<8	<8	<8	<8	<8	<8	<8	TM116[#][M]	<8 ug/kg
2.2-Dichloropropane	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116	<12 ug/kg
1.2-Dichloroethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116[#]	<5 ug/kg
1.1.1-Trichloroethane	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116[#][M]	<7 ug/kg
1.1-Dichloropropene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116[#][M]	<11 ug/kg
Benzene	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116[#][M]	<9 ug/kg
Carbontetrachloride	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116[#][M]	<14 ug/kg
Dibromomethane	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116[#]	<9 ug/kg
1.2-Dichloropropane	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116[#][M]	<12 ug/kg
Bromodichloromethane	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116[#][M]	<7 ug/kg
Trichloroethene	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116[#][M]	<9 ug/kg
cis-1-3-Dichloropropene	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116[#][M]	<14 ug/kg
trans-1-3-Dichloropropene	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116[#][M]	<14 ug/kg
1.1.2-Trichloroethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#]	<10 ug/kg
Toluene	9	<5	<5	<5	<5	<5	<5	<5	<5	TM116[#][M]	<5 ug/kg
1.3-Dichloropropane	<7	<7	<7	<7	<7	<7	<7	<7	<7	TM116[#]	<7 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

Validated ☑
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ALcontrol Laboratories Analytical Services
Table Of Results

[#] ISO 17025 accredited
[M] MCERTS accredited
* Subcontracted test
» Shown on prev. report

Job Number: 08/08299/02/01 **Matrix:** SOLID
Client: Geotechnics Ltd **Location:** TROWBRIDGE STW
Client Ref. No.: PEO80558 **Client Contact:** Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	1-3	4-6	7-8	9-10	11-13	14-16	17-18	19-21	22-24		
Volatile Organic Compounds (cont)											
Dibromochloromethane	<13	<13	<13	<13	<13	<13	<13	<13	<13	TM116[#]	<13 ug/kg
1.2-Dibromoethane	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116[#]	<12 ug/kg
Tetrachloroethene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116[#]	<5 ug/kg
1.1.1.2-Tetrachloroethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#M]	<10 ug/kg
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116[#M]	<5 ug/kg
Ethylbenzene	<4	<4	<4	<4	<4	<4	<4	<4	<4	TM116[#]	<4 ug/kg
p/m-Xylene	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116[#]	<14 ug/kg
Bromoform	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#]	<10 ug/kg
Styrene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#]	<10 ug/kg
1.1.2.2-Tetrachloroethane	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#]	<10 ug/kg
o-Xylene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#]	<10 ug/kg
1.2.3-Trichloropropane	<17	<17	<17	<17	<17	<17	<17	<17	<17	TM116[#]	<17 ug/kg
Isopropylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116[#]	<5 ug/kg
Bromobenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#M]	<10 ug/kg
2-Chlorotoluene	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116[#]	<9 ug/kg
Propylbenzene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116[#]	<11 ug/kg
4-Chlorotoluene	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116[#]	<12 ug/kg
1.2.4-Trimethylbenzene	<9	<9	<9	<9	<9	<9	<9	<9	<9	TM116[#]	<9 ug/kg
4-Isopropyltoluene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116[#]	<11 ug/kg
1.3.5-Trimethylbenzene	<8	<8	<8	<8	<8	<8	<8	<8	<8	TM116[#]	<8 ug/kg
1.2-Dichlorobenzene	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116[#M]	<12 ug/kg
1.4-Dichlorobenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	TM116[#M]	<5 ug/kg
sec-Butylbenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#]	<10 ug/kg
tert-Butylbenzene	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116[#]	<12 ug/kg
1.3-Dichlorobenzene	<6	<6	<6	<6	<6	<6	<6	<6	<6	TM116[#]	<6 ug/kg
n-Butylbenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	TM116[#]	<10 ug/kg
1.2-Dibromo-3-chloropropane	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM116[#]	<14 ug/kg
1.2.4-Trichlorobenzene	<6	<6	<6	<6	<6	<6	<6	<6	<6	TM116[#]	<6 ug/kg
Naphthalene	<13	<13	<13	<13	<13	<13	<13	<13	<13	TM116[#]	<13 ug/kg
1.2.3-Trichlorobenzene	<11	<11	<11	<11	<11	<11	<11	<11	<11	TM116[#]	<11 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

Validated ☑
Preliminary ☐

ALcontrol Laboratories Analytical Services
Table Of Results

[#] ISO 17025 accredited
[M] MCERTS accredited
* Subcontracted test
» Shown on prev. report

Job Number: 08/08299/02/01 **Matrix:** SOLID
Client: Geotechnics Ltd **Location:** TROWBRIDGE STW
Client Ref. No.: PEO80558 **Client Contact:** Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	**1-3**	**4-6**	**7-8**	**9-10**	**11-13**	**14-16**	**17-18**	**19-21**	**22-24**		
Volatile Organic Compounds (cont)											
Hexachlorobutadiene	<12	<12	<12	<12	<12	<12	<12	<12	<12	TM116[#]	<12 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

Validated ☑
Preliminary ☐

ALcontrol Laboratories Analytical Services
Table Of Results

[#] ISO 17025 accredited
[M] MCERTS accredited
[*] Subcontracted test
[»] Shown on prev. report

Job Number: 08/08299/02/01 **Matrix:** SOLID
Client: Geotechnics Ltd **Location:** TROWBRIDGE STW
Client Ref. No.: PEO80558 **Client Contact:** Cathy Smith

Sample Identity	BH2	BH4	BH5	BH6	BH8	BH10	BH11	BH13	BH16	Method Code	LoD/Units
Depth (m)	1.0	1.0	3.5	4.0	1.0	0.5	8.0	1.0	1.0		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date											
Sample Received Date	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08	02.05.08		
Batch	1	1	1	1	1	1	1	1	1		
Sample Number(s)	**1-3**	**4-6**	**7-8**	**9-10**	**11-13**	**14-16**	**17-18**	**19-21**	**22-24**		
Miscellaneous VOCs											
Acetone	<50	<50	<50	<50	<50	<50	<50	<50	<50	PENDING	<50 ug/kg

All results expressed on a dry weight basis.

Date 15.05.2008

ALcontrol Laboratories Analytical Services
Table Of Results - Appendix

Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref. No.: PEO80558

Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03×10^{-7}

NDP	No Determination Possible	*	Subcontracted test
NFD	No Fibres Detected	»	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
PFD	Possible Fibres Detected	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample [1]	Surrogate Corrected
PENDING		method details are pending			WET	
TM001	In - house Method	Screening of Soils for Fibres			WET	
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)	✓	✓	DRY	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS. MCERTS Accreditation on Soils for Naphthalene except when Kerosene present.	✓		DRY	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS. MCERTS Accreditation on Soils for Naphthalene except when Kerosene present.	✓	✓	DRY	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)			WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓		WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓	✓	WET	
TM102	Method 4500H, AWWA/APHA, 20th Ed., 1999	Determination of Total Oxidised Nitrogen using the Kone Analyser	✓		DRY	
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS			WET	
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS	✓		WET	
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS	✓	✓	WET	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	

[1] Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

ALcontrol Laboratories Analytical Services
Table Of Results - Appendix

Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref. No.: PEO80558

Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03×10^{-7}

NDP	No Determination Possible	*	Subcontracted test
NFD	No Fibres Detected	»	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
PFD	Possible Fibres Detected	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample [1]	Surrogate Corrected
TM133	BS 1377: Part 3 1990	Determination of pH in Soil and Water using the GLpH pH Meter	✓	✓	WET	
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC	✓		DRY	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser			WET	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser	✓	✓	WET	
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)'	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique	✓		WET	

[1] Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

ALcontrol Laboratories Analytical Services
Table Of Results - Appendix

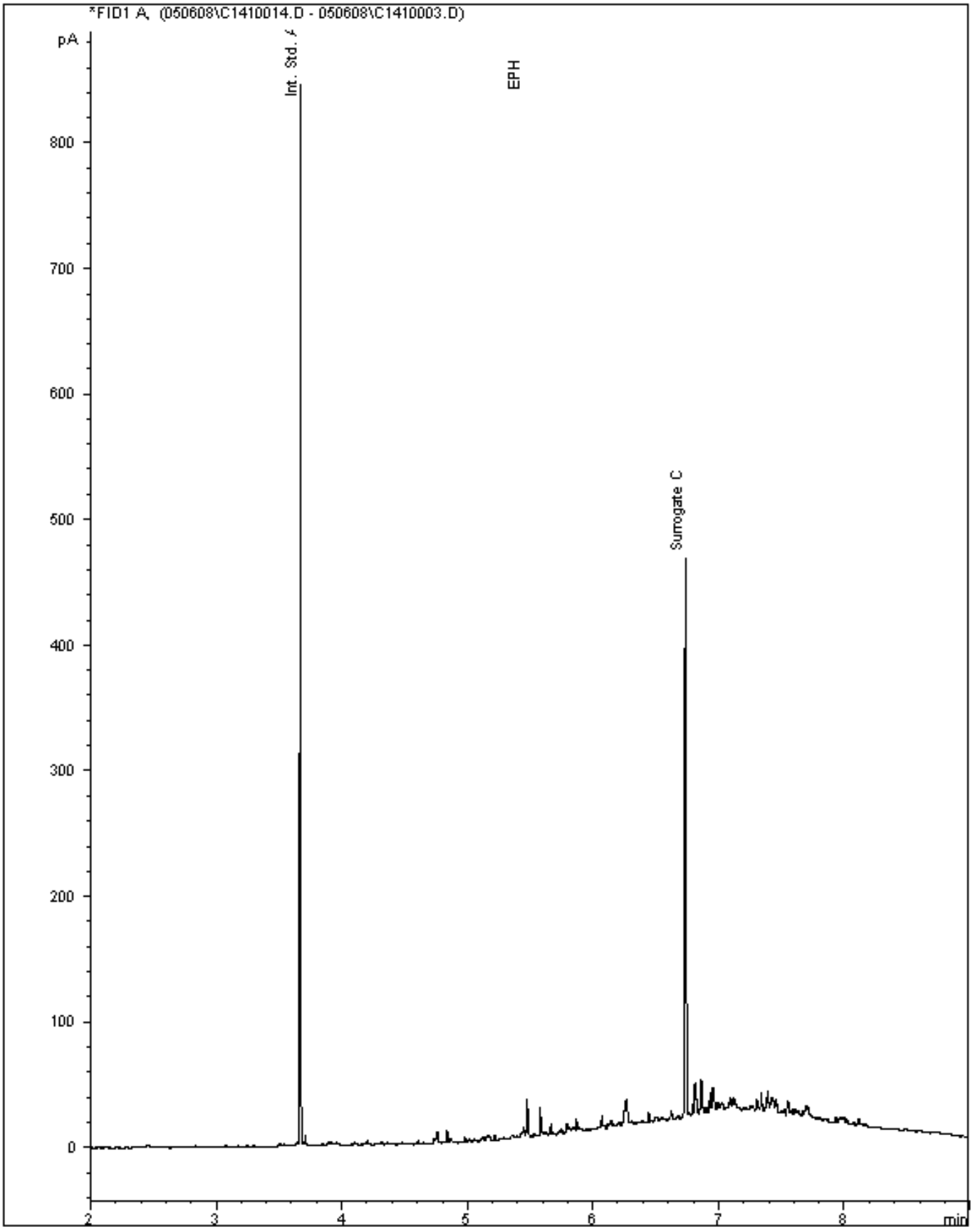
Job Number: 08/08299/02/01
Client: Geotechnics Ltd
Client Ref. No.: PEO80558

Summary of Coolbox temperatures

Batch No.	Coolbox Temperature (°C)
1	5.2

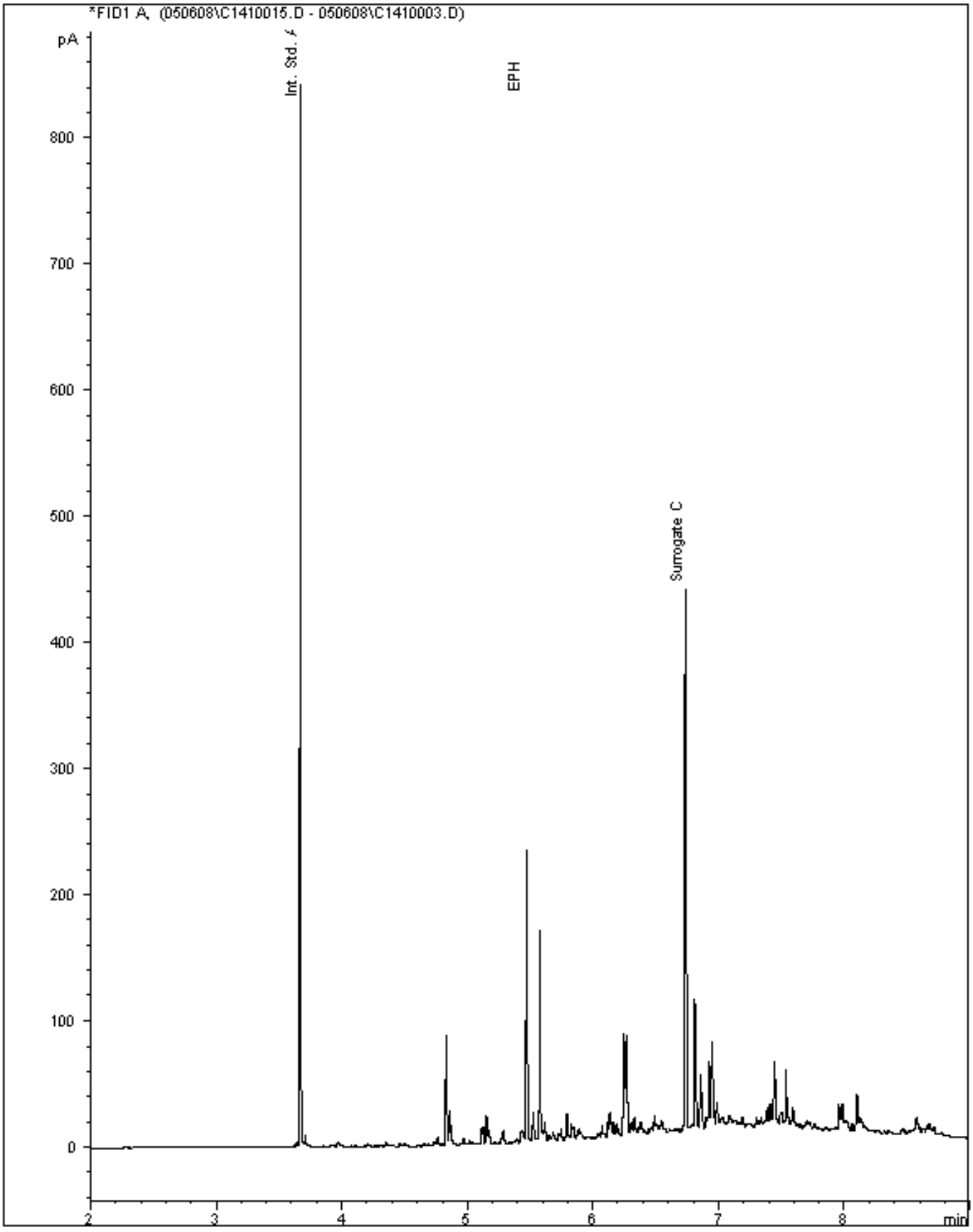
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity	:	200808299-2/S
Date Acquired	:	06/05/08 21:28:56 PM
Units	:	mg/kg
Sample Multiplier	:	1.005
Dilution	:	



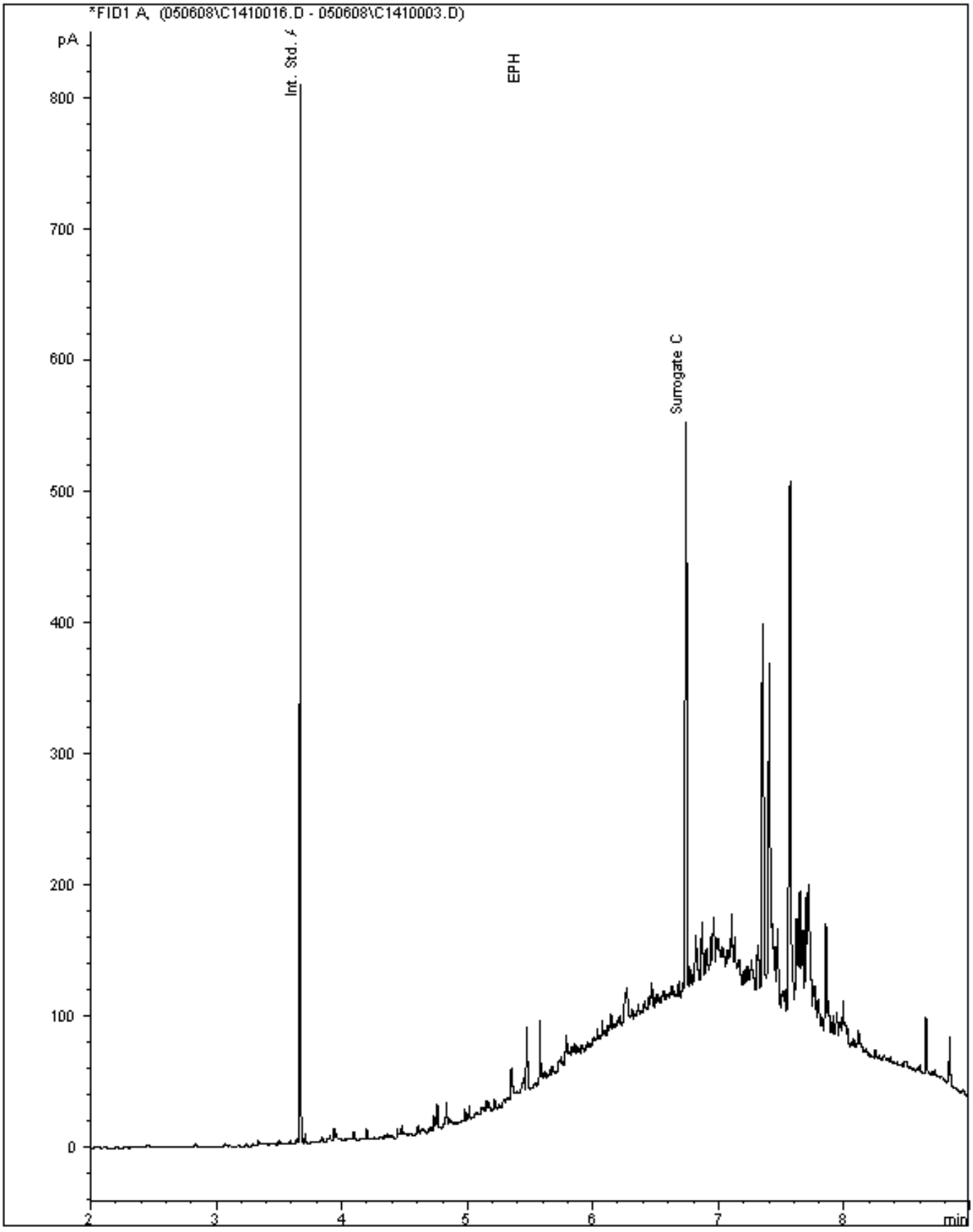
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity	:	200808299-5/S
Date Acquired	:	06/05/08 21:50:36 PM
Units	:	mg/kg
Sample Multiplier	:	1.000
Dilution	:	



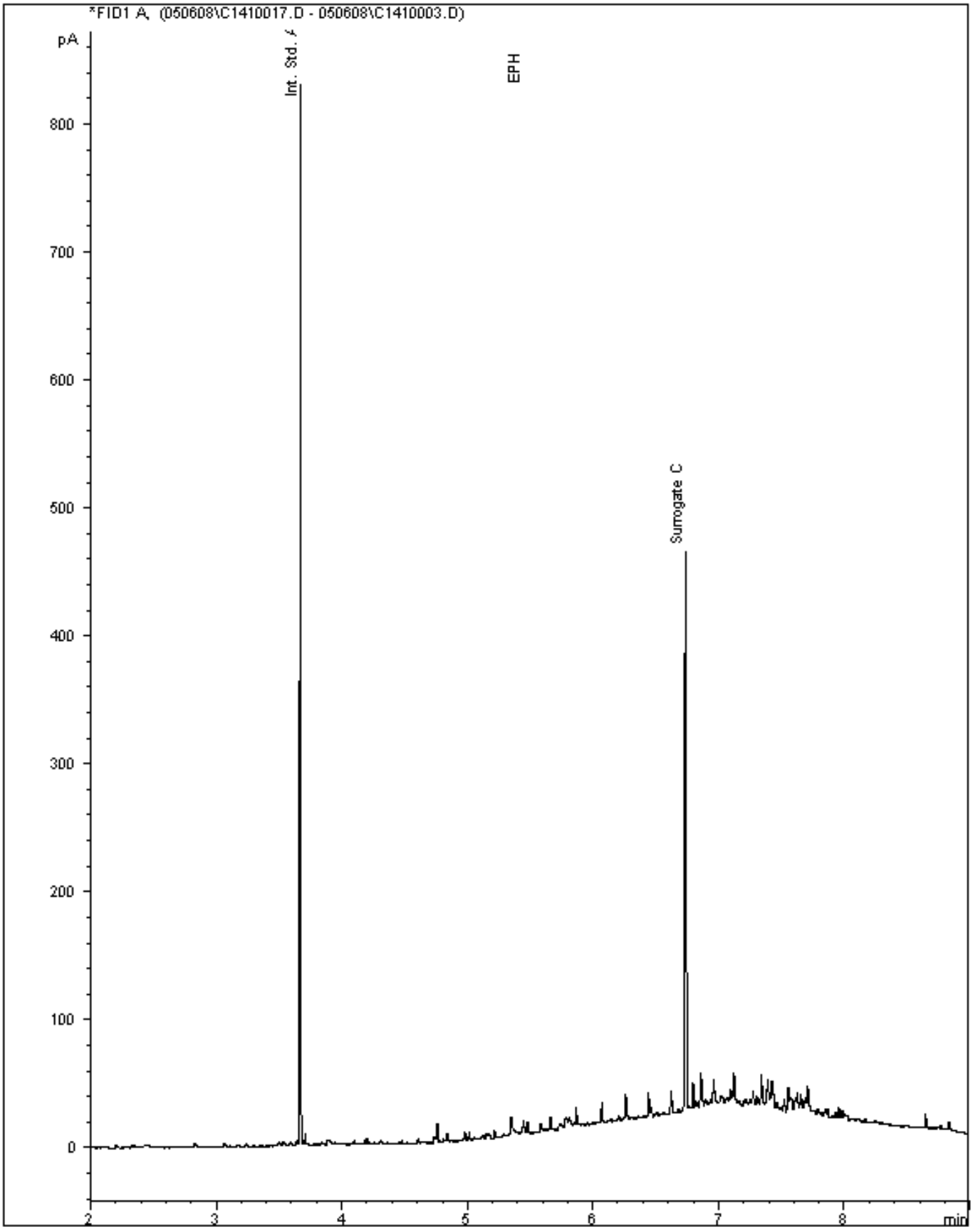
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity	:	200808299-7/S
Date Acquired	:	06/05/08 22:12:16 PM
Units	:	mg/kg
Sample Multiplier	:	1.004
Dilution	:	



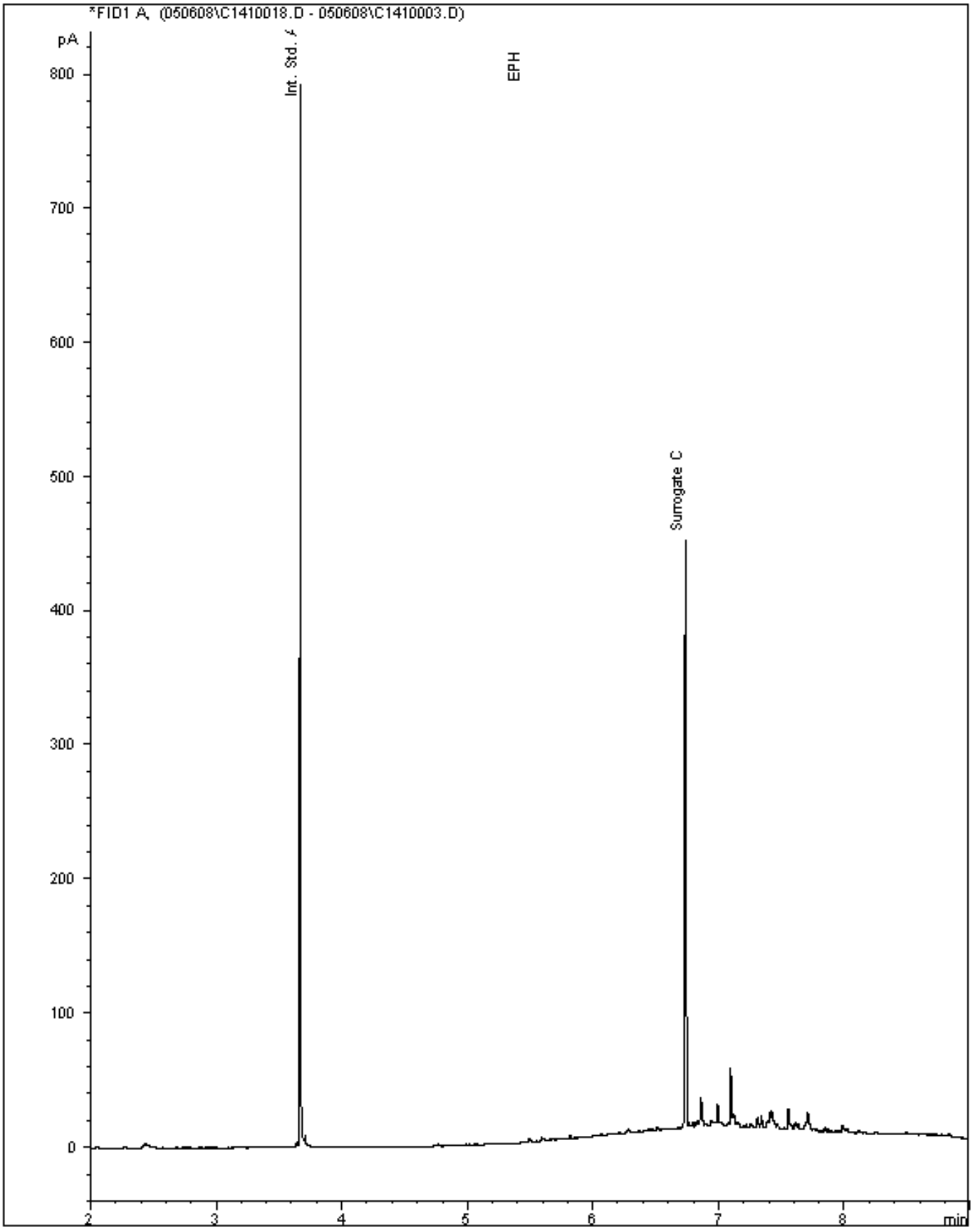
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity	:	200808299-9/S
Date Acquired	:	06/05/08 22:33:37 PM
Units	:	mg/kg
Sample Multiplier	:	1.001
Dilution	:	



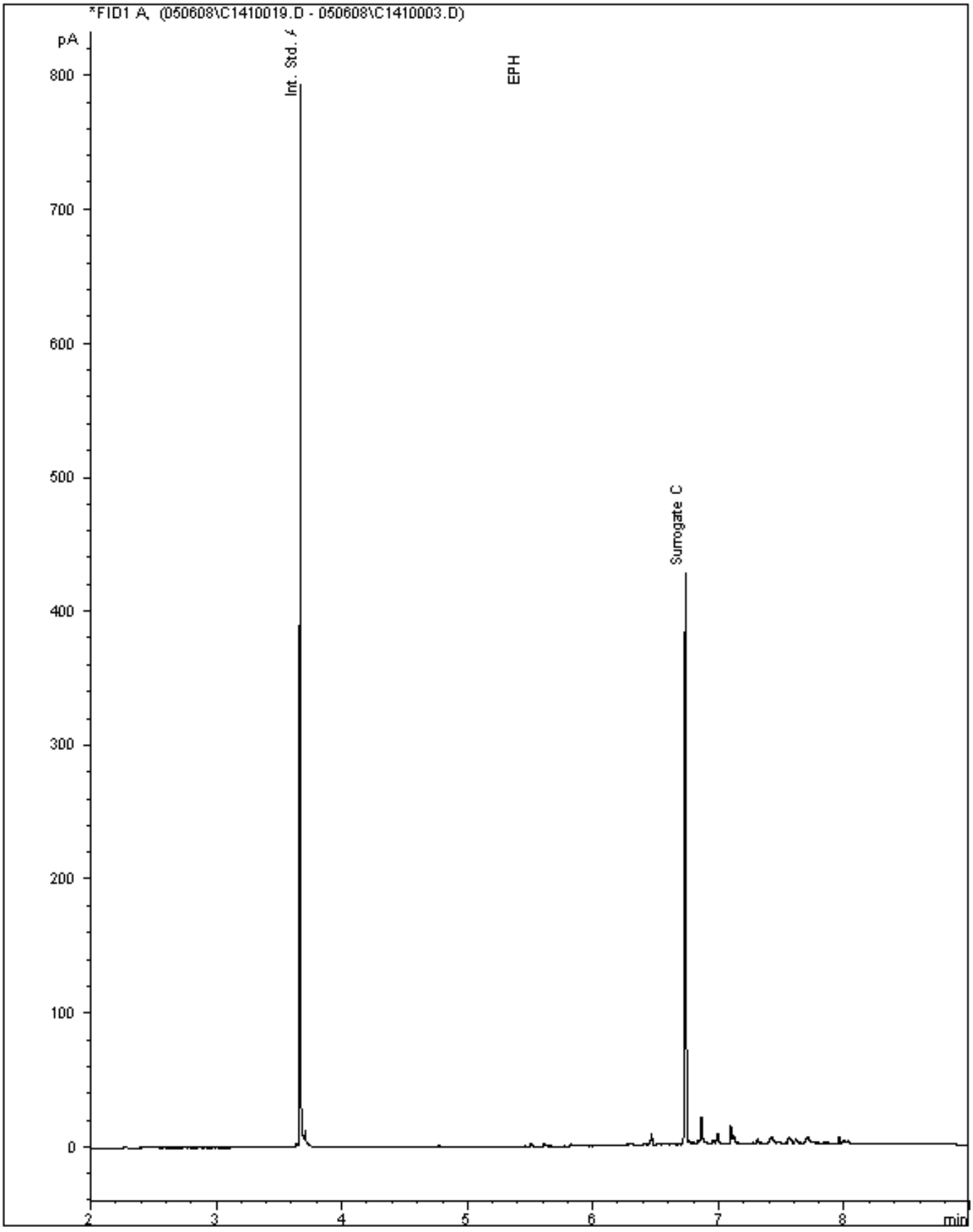
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity	:	200808299-12/S
Date Acquired	:	06/05/08 22:54:58 PM
Units	:	mg/kg
Sample Multiplier	:	0.998
Dilution	:	



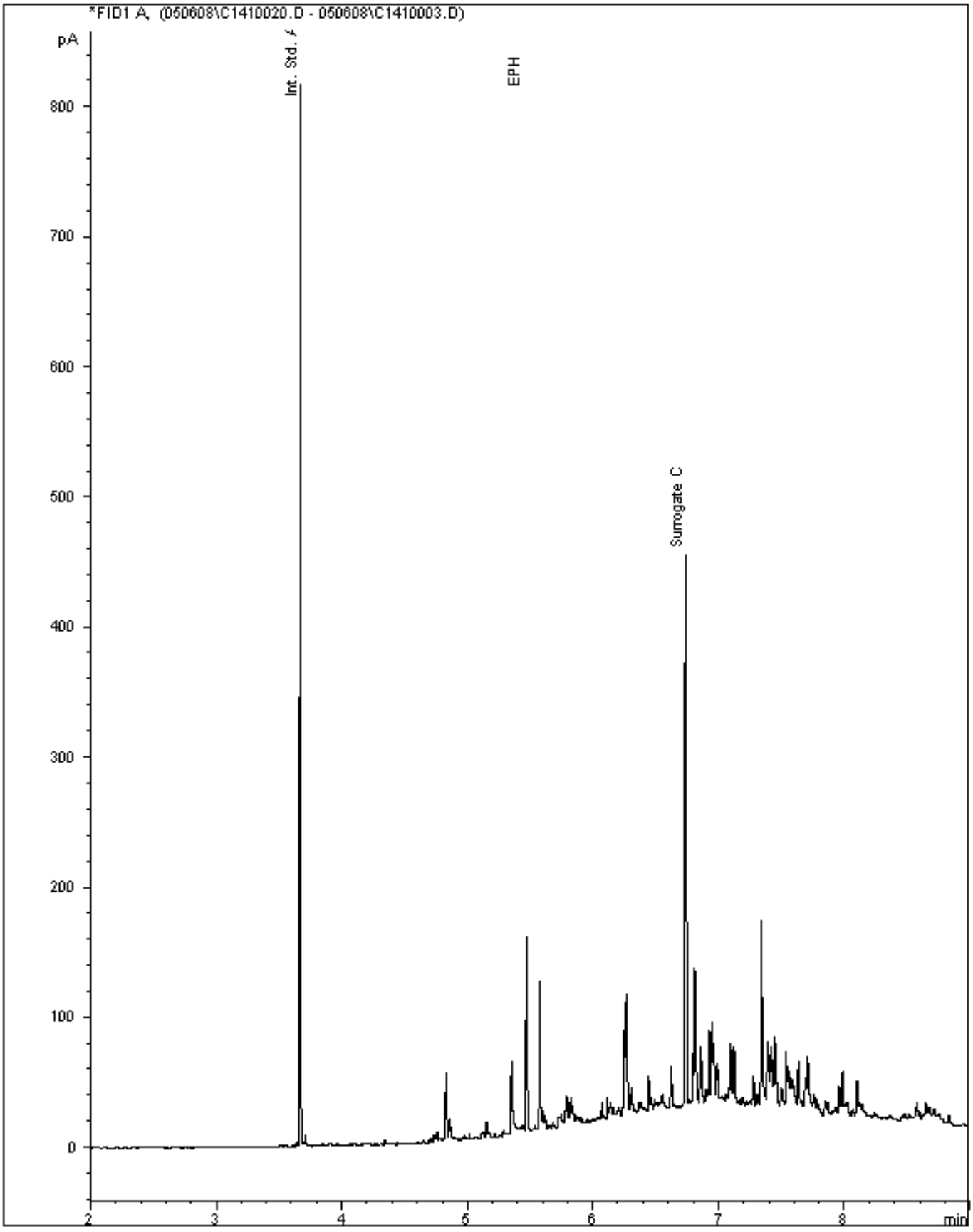
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity	:	200808299-15/S
Date Acquired	:	06/05/08 23:16:28 PM
Units	:	mg/kg
Sample Multiplier	:	0.997
Dilution	:	



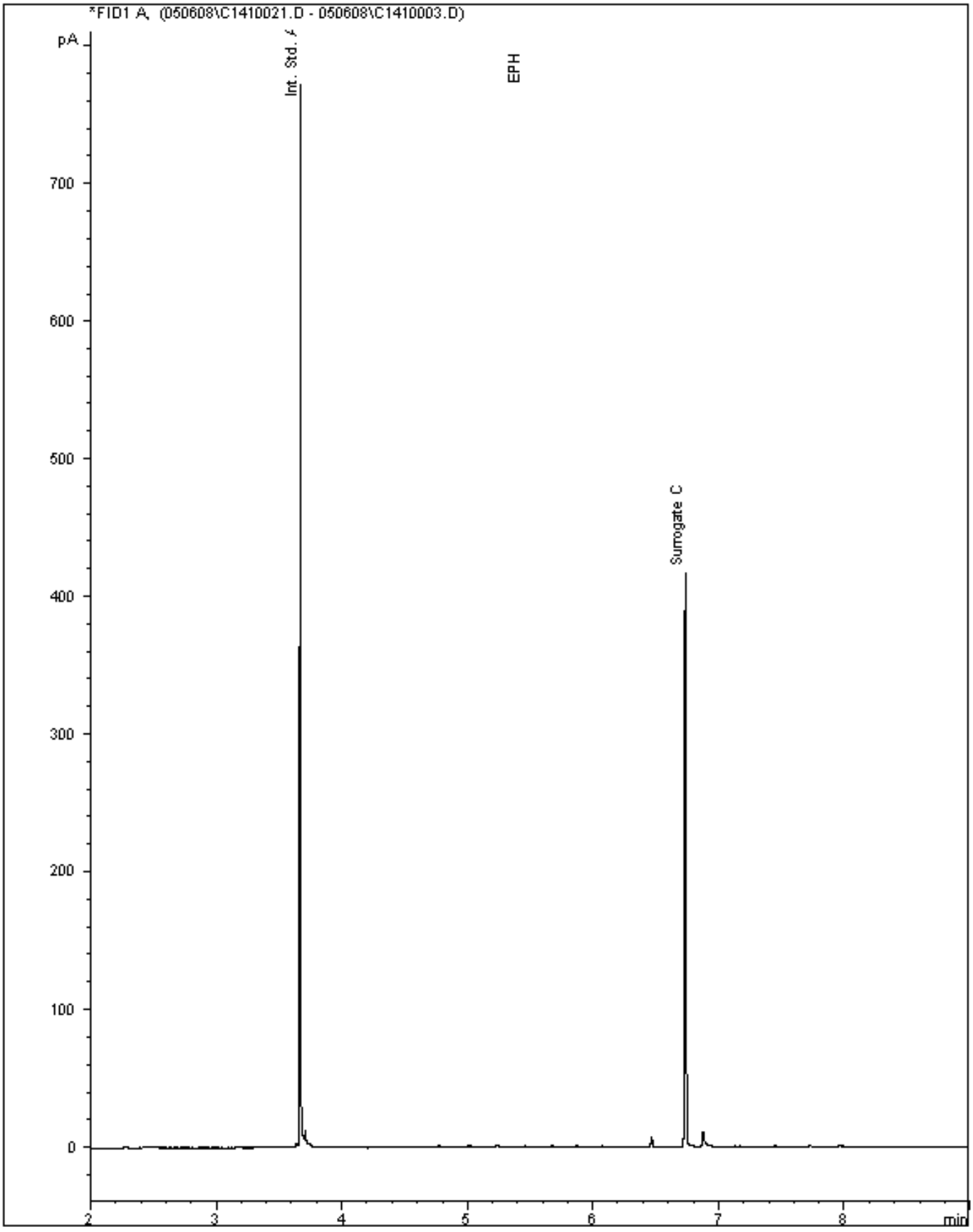
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity	:	200808299-17/S
Date Acquired	:	06/05/08 23:37:42 PM
Units	:	mg/kg
Sample Multiplier	:	0.995
Dilution	:	



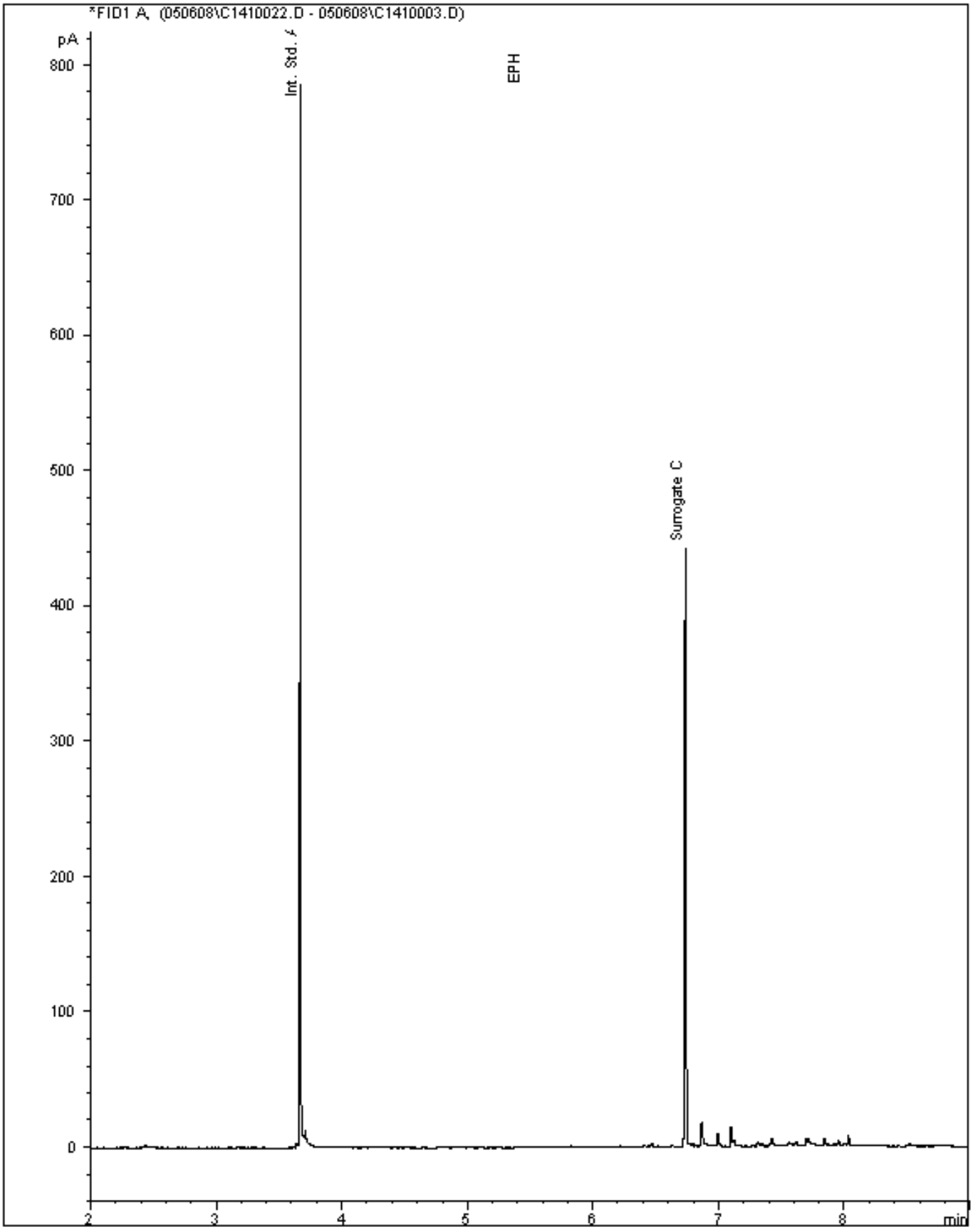
Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

Sample Identity	:	200808299-20/S
Date Acquired	:	06/05/08 23:58:49 PM
Units	:	mg/kg
Sample Multiplier	:	1.004
Dilution	:	



Alcontrol/Geochem Analytical Services
EPH Range Organics (C10 - C40)

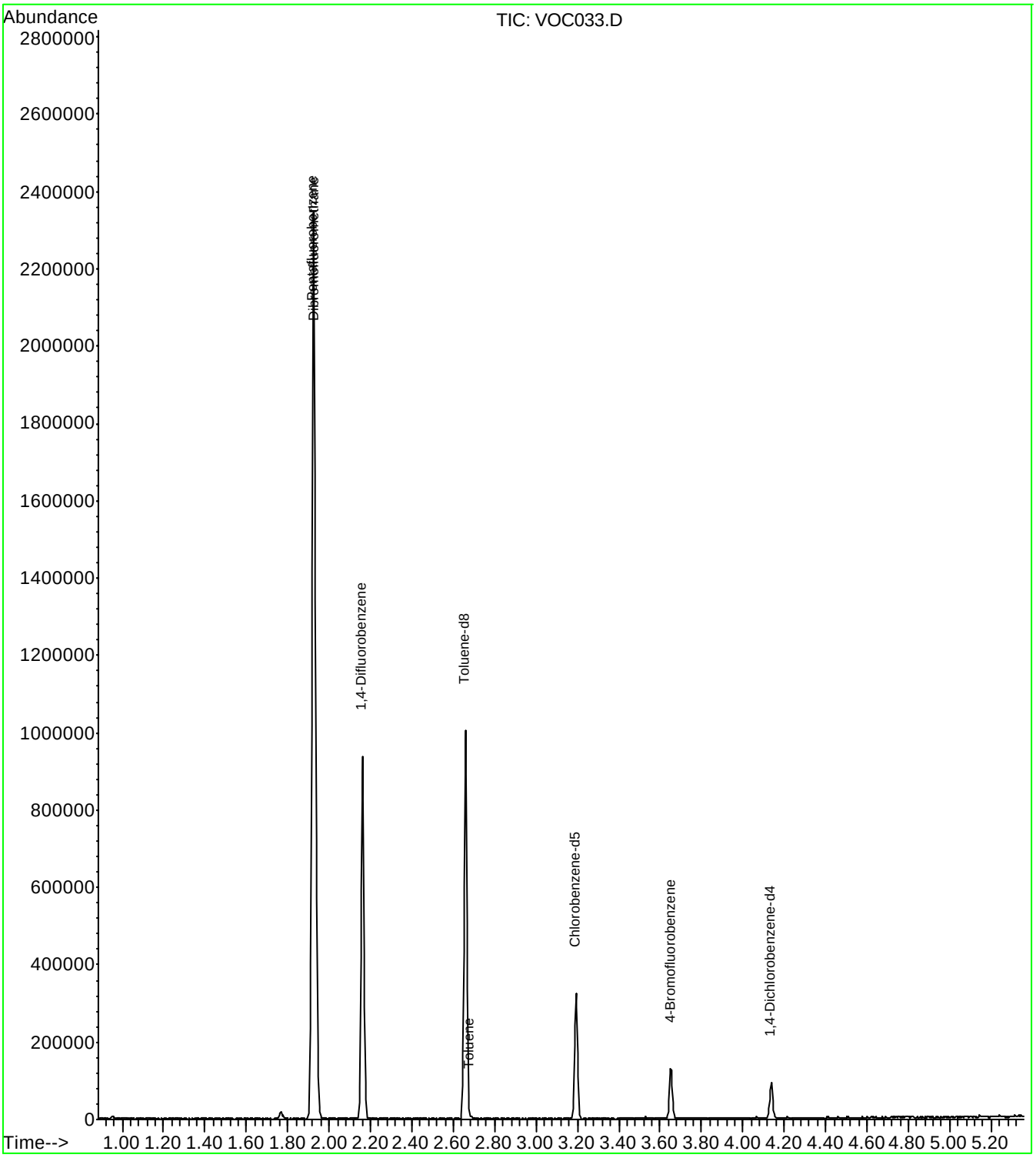
Sample Identity	:	200808299-23/S
Date Acquired	:	07/05/08 00:20:15 PM
Units	:	mg/kg
Sample Multiplier	:	1.001
Dilution	:	



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008
Data File : VOC033.D
Acq On : 10 May 2008 15:18
Operator : Alcontrol Labs
Sample : 200808299-003
Misc : /soil
ALS Vial : 33 Sample Multiplier: 2

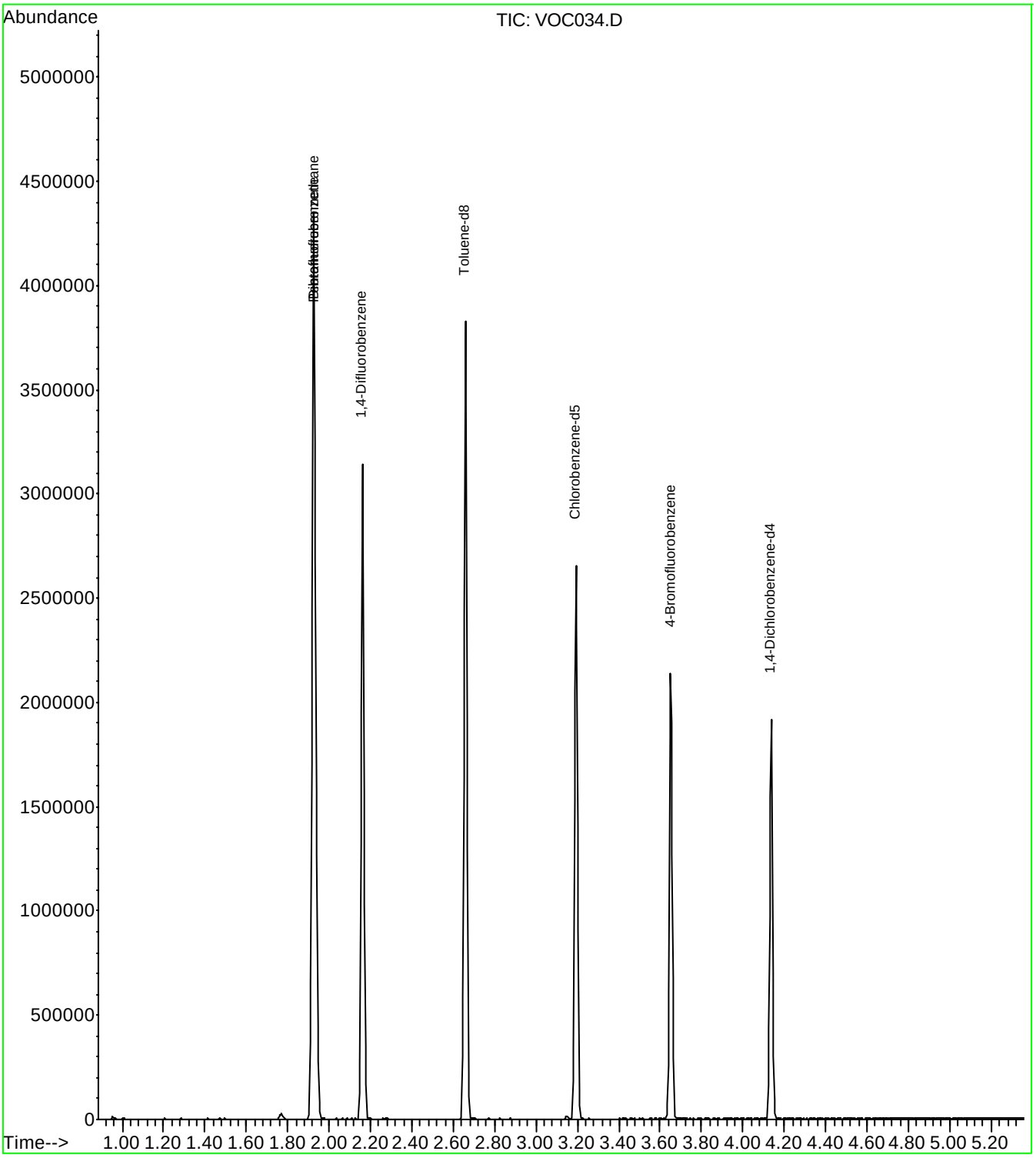
Quant Time: May 12 11:29:28 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008
Data File : VOC034.D
Acq On : 10 May 2008 15:29
Operator : Alcontrol Labs
Sample : 200808299-006
Misc : /soil
ALS Vial : 34 Sample Multiplier: 2

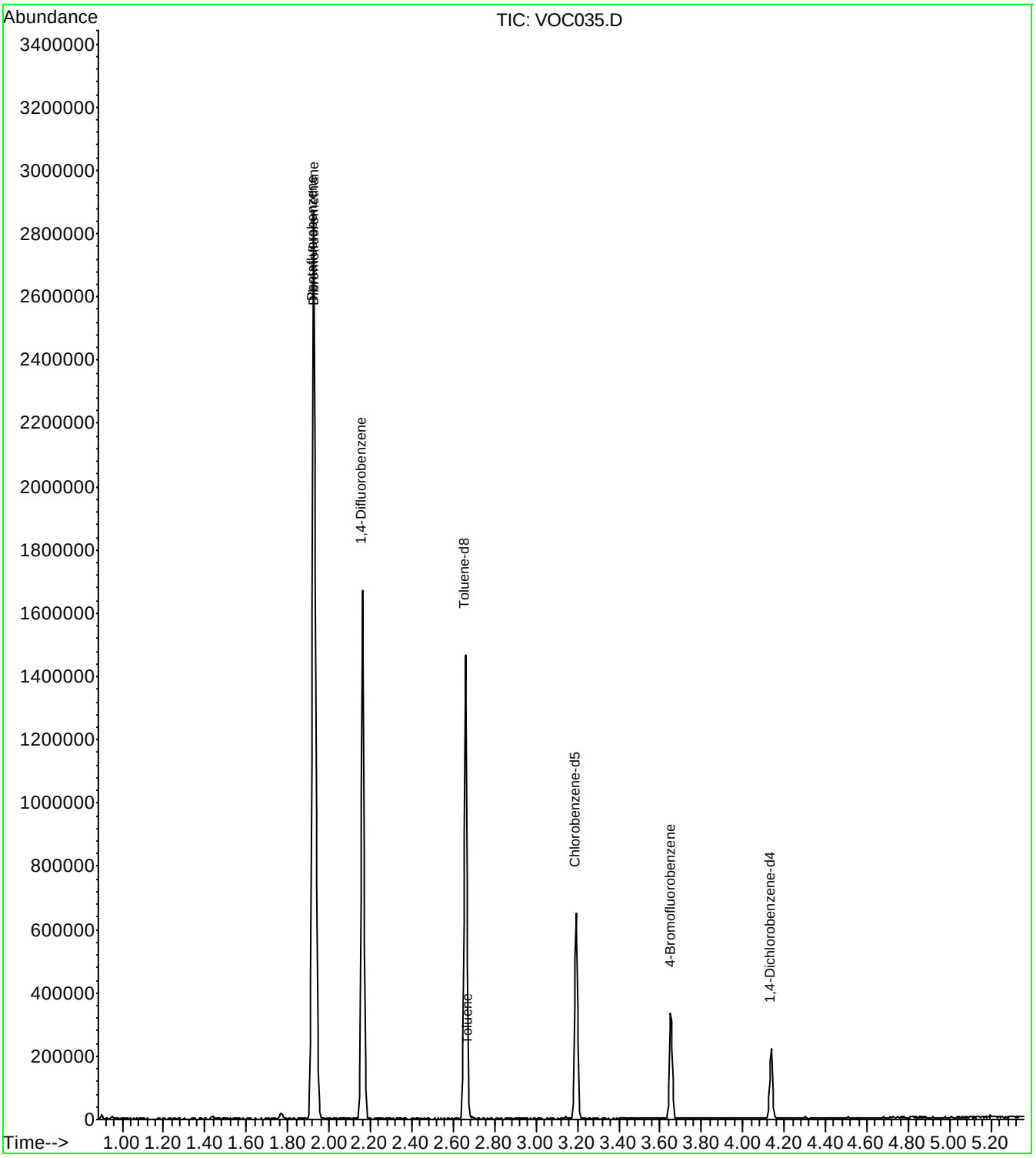
Quant Time: May 12 11:29:30 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008
Data File : VOC035.D
Acq On : 10 May 2008 15:40
Operator : Alcontrol Labs
Sample : 200808299-008
Misc : /soil
ALS Vial : 35 Sample Multiplier: 2

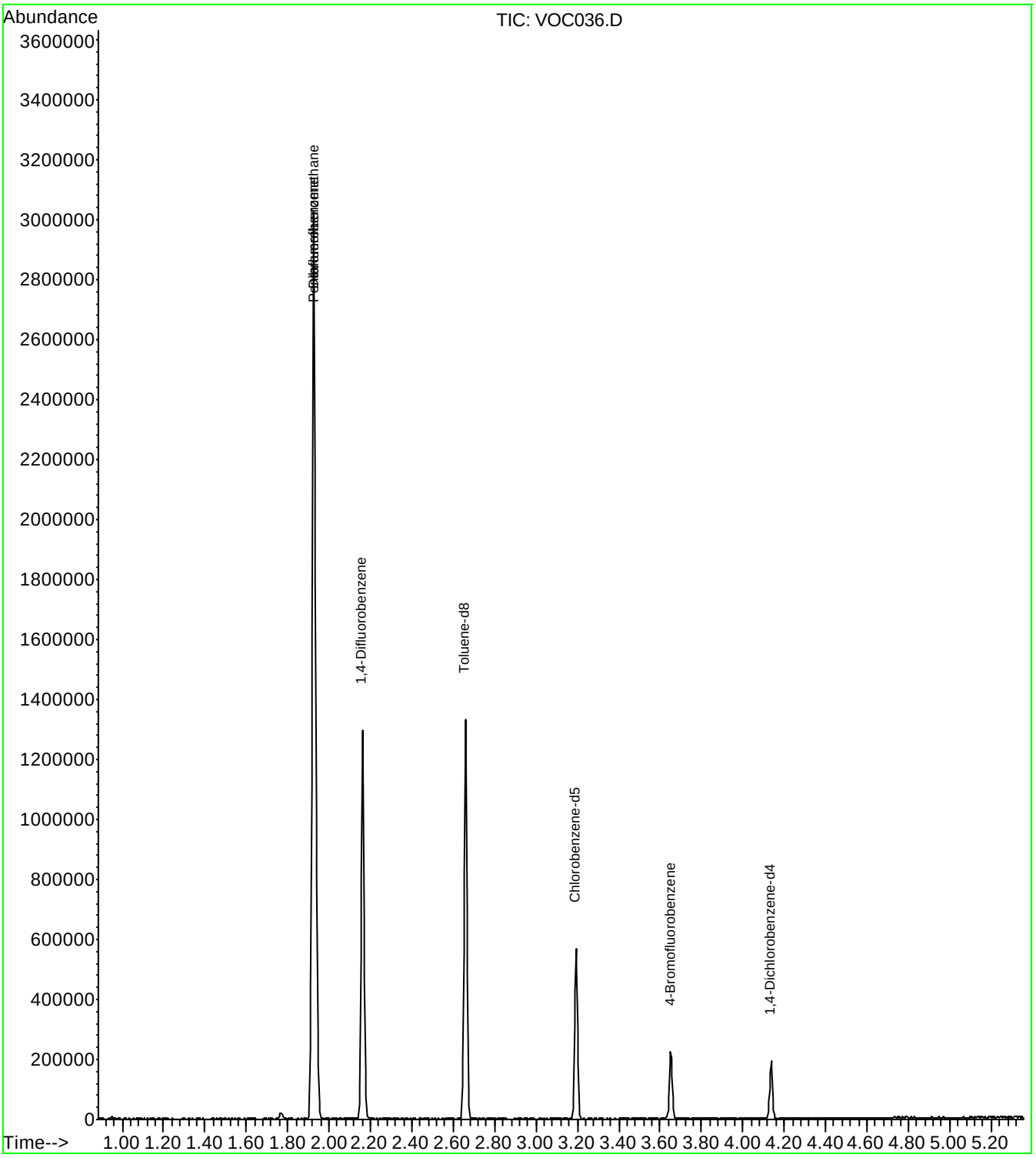
Quant Time: May 12 11:45:25 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008
Data File : VOC036.D
Acq On : 10 May 2008 15:50
Operator : Alcontrol Labs
Sample : 200808299-010
Misc : /soil
ALS Vial : 36 Sample Multiplier: 2

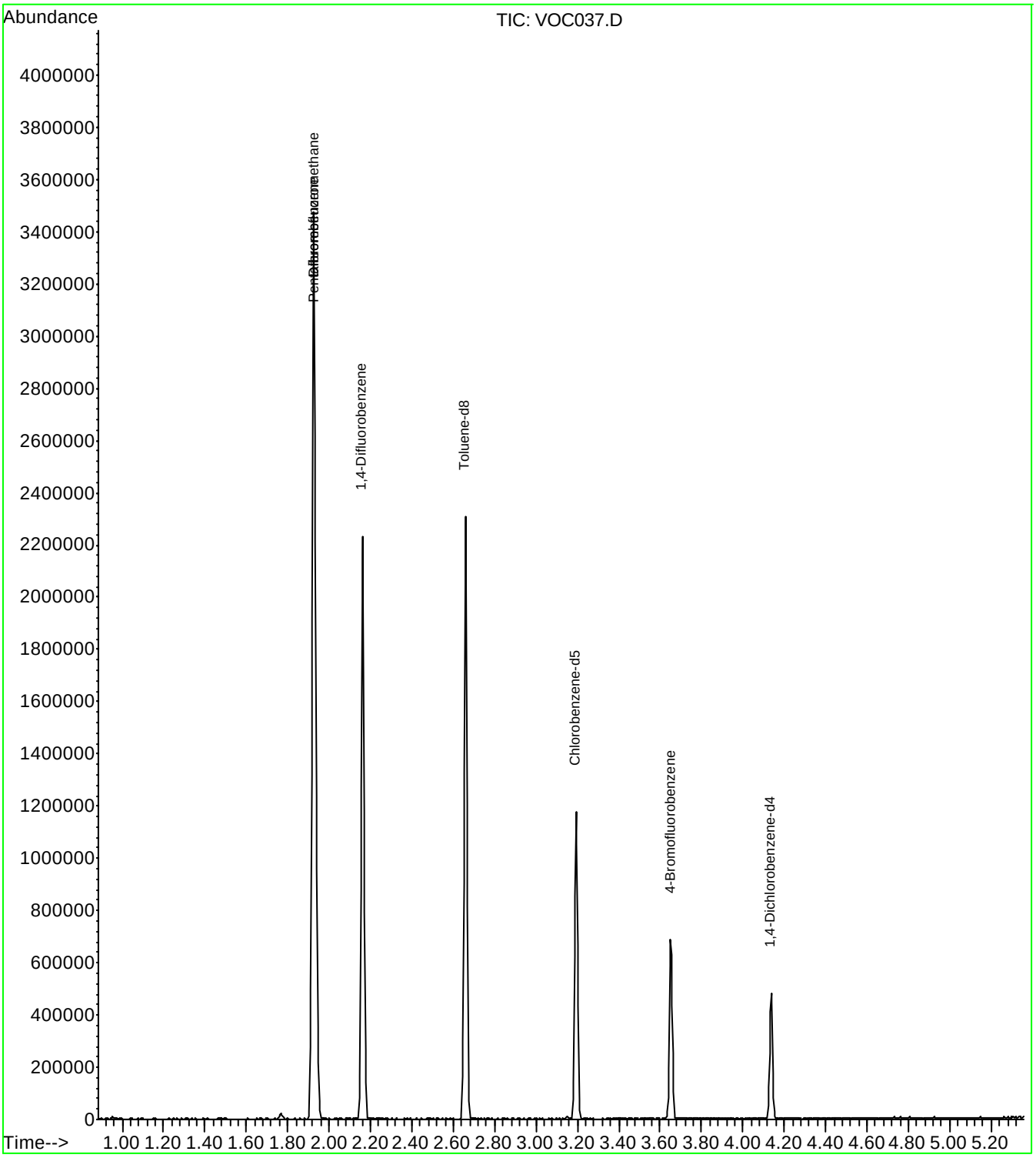
Quant Time: May 12 11:29:34 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

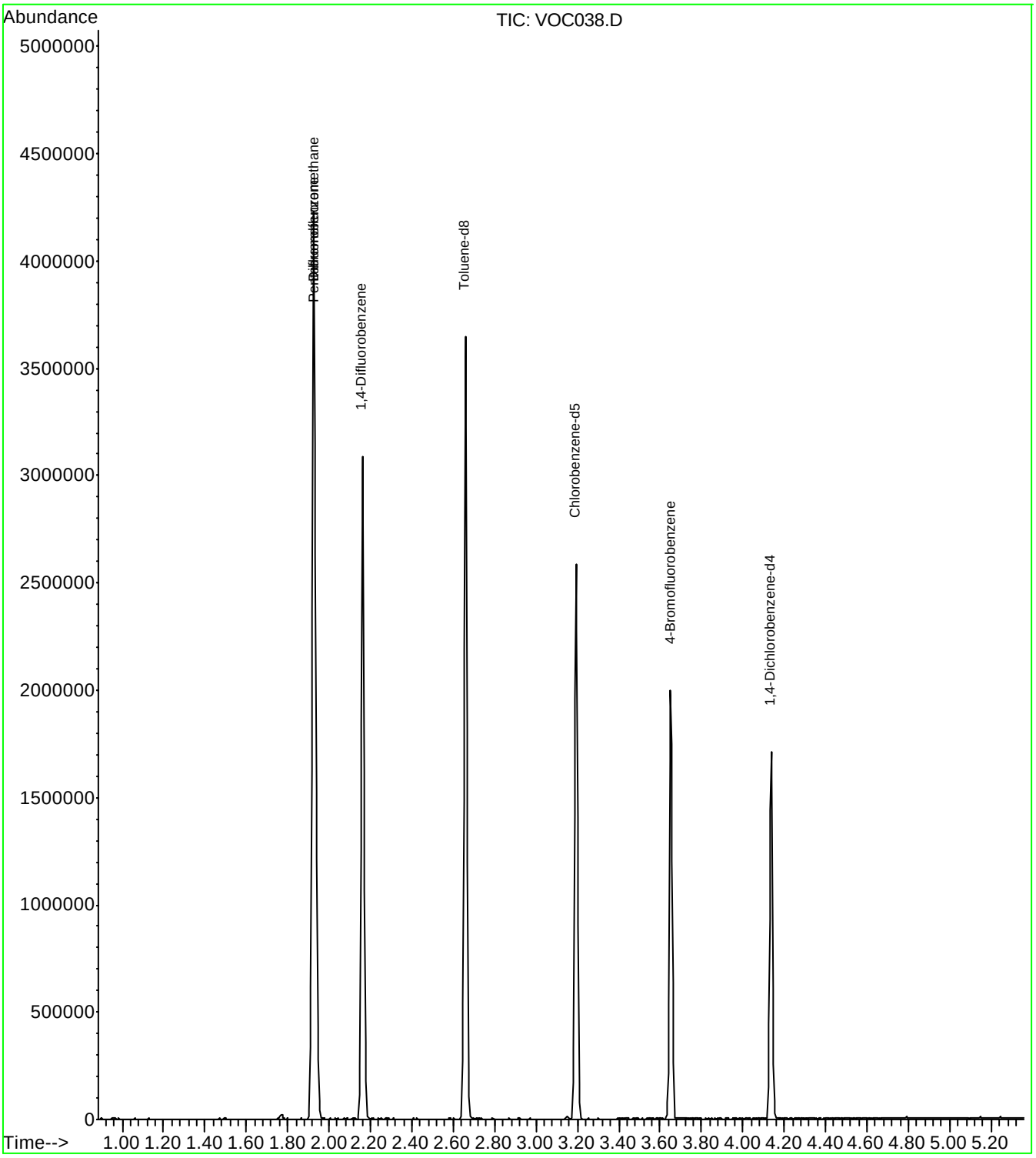
Data Path : C:\MSDCHEM\1\DATA\051008
Data File : VOC037.D
Acq On : 10 May 2008 16:01
Operator : Alcontrol Labs
Sample : 200808299-013
Misc : /soil
ALS Vial : 37 Sample Multiplier: 2

Quant Time: May 12 11:29:36 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Data Path : C:\MSDCHEM\1\DATA\051008\
Data File : VOC038.D
Acq On : 10 May 2008 16:12
Operator : Alcontrol Labs
Sample : 200808299-016
Misc : /soil
ALS Vial : 38 Sample Multiplier: 2

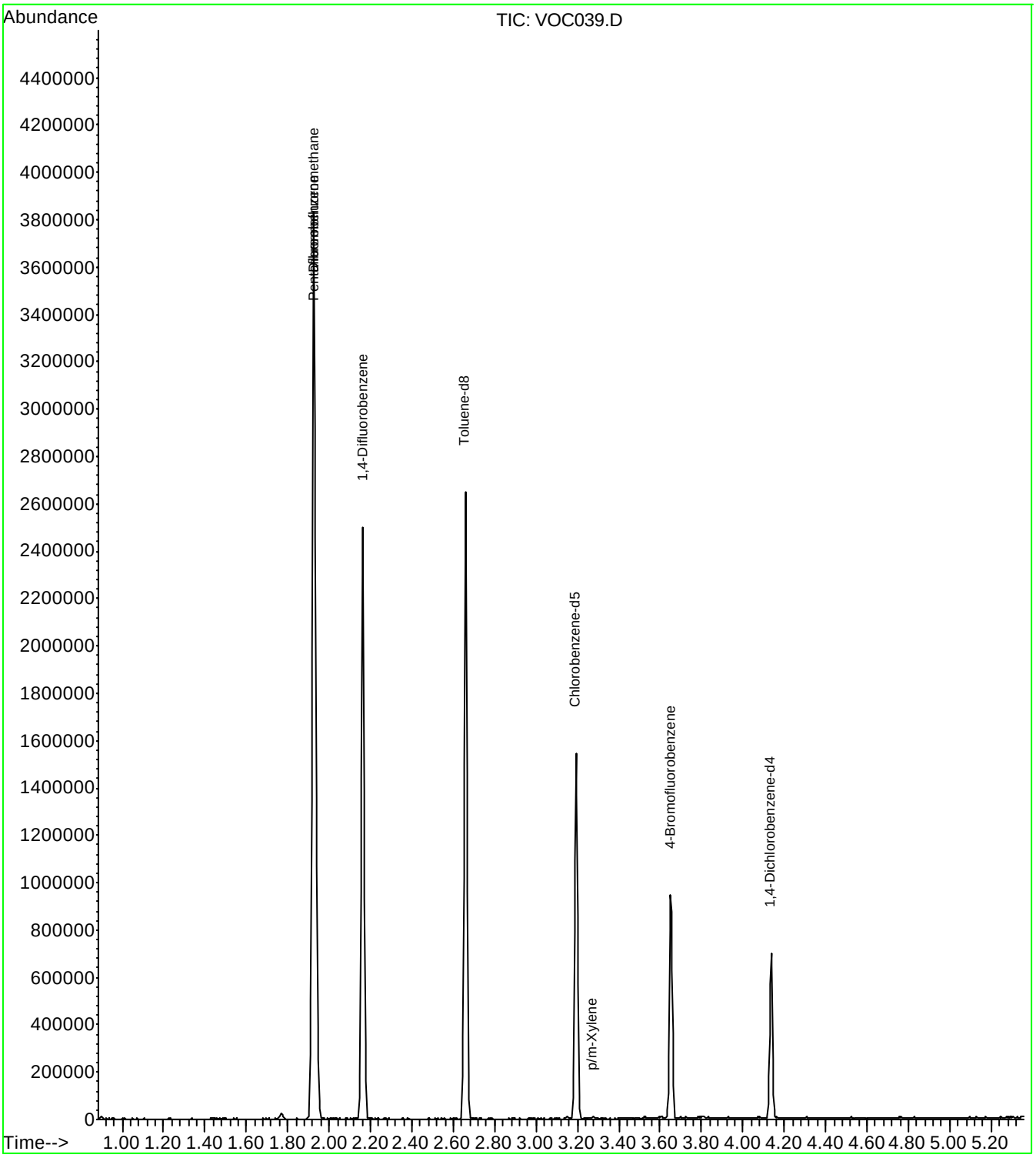
Quant Time: May 12 11:29:38 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008
Data File : VOC039.D
Acq On : 10 May 2008 16:23
Operator : Alcontrol Labs
Sample : 200808299-018
Misc : /soil
ALS Vial : 39 Sample Multiplier: 2

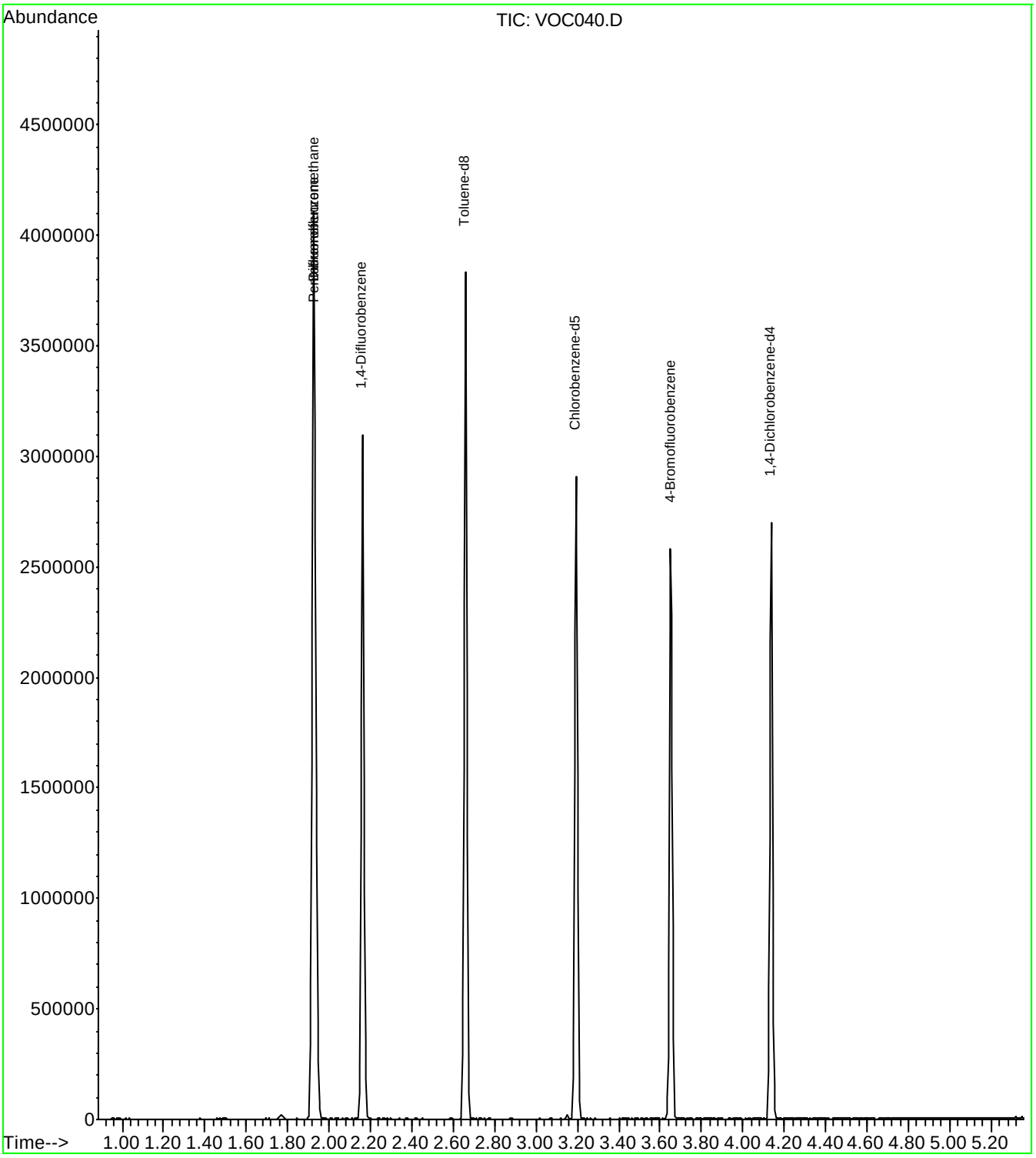
Quant Time: May 12 11:46:20 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008
Data File : VOC040.D
Acq On : 10 May 2008 16:34
Operator : Alcontrol Labs
Sample : 200808299-021
Misc : /soil
ALS Vial : 40 Sample Multiplier: 2

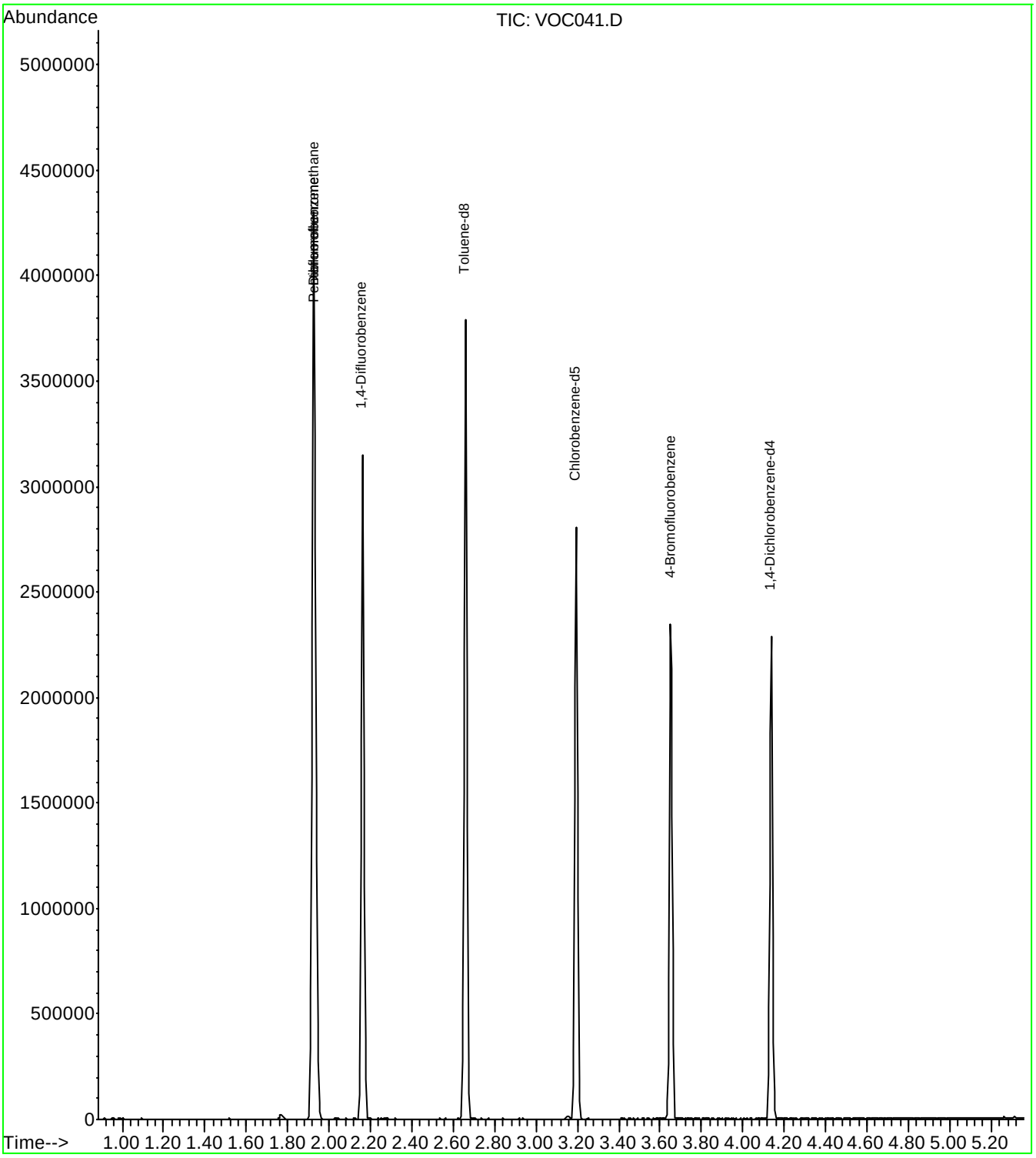
Quant Time: May 12 11:29:42 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\MSDCHEM\1\DATA\051008
Data File : VOC041.D
Acq On : 10 May 2008 16:45
Operator : Alcontrol Labs
Sample : 200808299-024
Misc : /soil
ALS Vial : 41 Sample Multiplier: 2

Quant Time: May 12 11:46:55 2008
Quant Method : C:\MSDCHEM\1\METHODS\FASTVOC2.M
Quant Title : Volatile Organic Compounds (EPA 624/8260)
QLast Update : Mon May 12 11:27:21 2008
Response via : Initial Calibration



APPENDIX

APPENDIX

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH_4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.
2. Samples will be run in duplicate upon request, but an additional charge may be incurred.
3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All samples received and not scheduled will be disposed of one month after the date o receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Geochem reserve the right to charge for samples received and stored but not analysed.
4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.
5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.
6. When requested, an asbestos screen is done in-house on soils and if no fibres are found will be reported as NFD – no fibres detected. If asbestos is detected, then identification is carried out by ALcontrol Shutler. If a sample is suspected of containing asbestos, then further preparation and analysis will be suspended on that sample until the asbestos result is known. If asbestos is present, then no further analysis will be undertaken.
7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample – similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.
8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.
9. NDP – No determination possible due to insufficient/unsuitable sample.
10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals – total metals must be requested separately.
11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.
12. **Surrogate recoveries** – Currently the only analysis, which is surrogate corrected, is PAHs on soils. For EPH on soils the result is not surrogate corrected, but a percentage recovery is quoted.
13. **Product analyses** – Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.
14. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).
15. Total of 8 speciated phenols by HPLC includes Resorcinol, Catechol, Phenol, Napthol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).
16. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
17. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.
18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.
19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.
20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.
22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials – whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

.Last Updated March 2008

APPENDIX 7
Investigation Techniques and General Notes

INVESTIGATION TECHNIQUES

INTRODUCTION

The following brief review of Ground Investigation techniques, generally used as part of most Site Investigations in the UK, summarises their methodology, advantages and limitations. Detailed descriptions of the techniques are available and can be provided on request. This review should be read in conjunction with the accompanying General Notes.

TRIAL PITS

The trial pit is amongst the most simple yet effective means of identifying shallow ground conditions on a site. Its advantages include simplicity, speed, potential accuracy and cost-effectiveness. The trial pit is most commonly formed using a backacting excavator which can typically determine ground conditions to some 4 metres below ground level. Hand excavation is often used to locate, expose and detail existing foundations, features or services. In general, it is difficult to extend pits significantly below the water table in predominantly granular soils, where flows can cause instability. Unless otherwise stated, the trial pits will not have been provided with temporary side support during their construction. Under such circumstances ground conditions to some 1.20 metres can be closely inspected, subject to stability assessment, but below this depth, entrance into the pit is not permitted in the absence of shoring and hence observations will have been made from ground surface and samples taken from the excavator bucket.

Trends in strata type, level and thickness can be determined, shear surfaces identified and the behaviour of plant, excavation sides and excavated materials can be related to the construction process. They are particularly valuable in land slip investigations. Some types of insitu test can be undertaken in such pits and large disturbed or block samples obtained.

CABLE PERCUSSION BORING

The light Cable Percussion technique of soft ground boring, typically at a diameter of 150mm, is a well established simple and flexible method of boring vertical holes and generally allows data to be obtained in respect of strata conditions other than rock. A tubular cutter (for cohesive soils) or shell with a flap valve (for granular soils) is repeatedly lifted and dropped using a winch and rope operating from an "A" frame. Soil which enters these tools is regularly removed and either sampled for subsequent examination or test, or laid to one side for backfilling. Steel casing will have been used to prevent collapse of the borehole sides where necessary. A degree of disturbance of soil and mixing of layers is inevitable and the presence of very thin layers of different soils within a particular stratum may not be identified. Changes in strata type can only be detected on recognition of a change in soil samples at surface, after the interface has been passed. For the foregoing reasons, depth measurements should not be considered to be more accurate than 0.10 metre.

In cohesive soils cylindrical samples are retrieved by driving or pushing in 100mm nominal diameter tubes. In soft soils, piston sampling or vane testing may be undertaken. In granular soils and often in cohesive materials, insitu Standard Penetration Tests (SPT's) are performed. The SPT records the number of standard blows required to drive a 50mm diameter open or cone ended probe for 300mm after an initial 150mm penetration. A modified method of recording is used in more dense strata. Small disturbed samples are obtained throughout.

The technique can determine ground conditions to depths in excess of 30 metres under suitable circumstances and usually causes less surface disturbance than trial pitting.

ROTARY DRILLING

Rotary Drilling to produce cores by rotating an annular diamond-impregnated tube or barrel into the ground is the technique most appropriate to the forming of site investigation boreholes through rock or other hard strata. It has the advantage of being able to be used vertically or at an angle. Core diameters of less than 100mm are most common for site investigation purposes. Core is normally retrieved in plastic lining tubes. A flushing fluid such as air, water or foam is used to cool the bit and carry cuttings to the surface.

Examination of cores allows detailed rock description and generally enables angled discontinuity surfaces to be observed. However, vertical holes do not necessarily reveal the presence of vertical or near-vertical fissures or joint discontinuities. The core type and/or techniques used. Where open hole rotary drilling is employed, descriptions of strata result from examination at surface of small particles ejected from the borehole in the flushing medium. In consequence, no indication of fissuring, bedding, consistency or degree of weathering can be obtained. Small scale plant can be used for auger drilling to limited depths where access is constrained.

Depths in excess of 60 metres can be achieved under suitable circumstances using rotary techniques, with minimal surface disturbance.

WINDOW SAMPLING

This technique involves the driving of an open-ended tube into the ground and retrieval of the soil which enters the tube. The term "window sample" arose from the original device which had a "window" or slot cut into the side of the tube through which samples were taken. This has now been superseded by the use of a thin-walled plastic liner within a sampler which has a solid wall. Diameters range from 36 to 86mm. Such samples can be used for qualitative logging, selection of samples for classification and chemical analysis and for obtaining a rudimentary assessment of strength.

Driving devices can be hand-held or machine mounted and the drive tubes are typically in 1m lengths. The hole formed is not cased, however, and hence the success of this technique is limited when soils and groundwater conditions are such that the sides of the hole collapse on withdrawal of the sampler. Obstructions within the ground, the density of the material or its strength can also limit the depth and rate of penetration of this light-weight investigation technique. Nevertheless, it is a valuable tool where access is constrained such as within buildings or on embankments. Depths of up to 8m can be achieved in suitable circumstances but depths of 4m to 6m are more common.

EXPLORATORY HOLE RECORDS

The data obtained by these techniques are generally presented on Trial Pit, Borehole, Drillhole or Window Sample Records. The descriptions of strata result from information gathered from a number of sources which may include published geological data, preliminary field observations and descriptions, insitu test results, laboratory test results and specimen descriptions. A key to the symbols and abbreviations used accompanies the records. The descriptions on the exploratory hole records accommodate but may not necessarily be identical to those on any preliminary records or the laboratory summaries.

The records show ground conditions at the exploratory hole locations. The degree to which they can be used to represent conditions between or beyond such holes, however, is a matter for geological interpretation rather than factual reporting and the associated uncertainties must be recognised.

DYNAMIC PROBING

This technique typically measures the number of blows of a standard weight falling over a standard height to advance a cone-ended rod over sequential standard distances (typically 100mm). Some devices measure the penetration of the probe per standard blow. It is essentially a profiling tool and is best used in conjunction with other investigation techniques where site-specific correlation can be used to delineate the distribution of soft or loose soils or the upper horizon of a dense or strong layer such as rock.

Both machine-driven and hand-driven equipment is available, the selection depending upon access restrictions and the depth of penetration required. It is particularly useful where access for larger equipment is not available, disturbance is to be minimised or where there are cost constraints. No samples are recovered and some techniques leave a sacrificial cone head in the ground. As with other lightweight techniques, progress is limited in strong or dense soils. The results are presented both numerically and graphically. Depths of up to 10m are commonly achieved in suitable circumstances.

The hand-driven DCP probing device has been calibrated by the TRL to provide a profile of CBR values over a range of depths of up to 1.50m.

INSTRUMENTATION

The most common form of instrument used in site investigation is either the standpipe or else the standpipe piezometer which can be installed in investigation holes. They are used to facilitate monitoring of groundwater levels and water sampling over a period of time following site work. Normally a standpipe would be formed using rigid plastic tubing which has been perforated or slotted over much of its length whilst a standpipe piezometer would have a filter tip which would be placed at a selected level and the hole sealed above and sometimes below to isolate the zone of interest. Groundwater levels are determined using an electronic "dipmeter" to measure the depth to the water surface from ground level. Piezometers can also be used to measure permeability. They are simple and inexpensive instruments for long term monitoring but response times can limit their use in tidal areas and access to the ground surface at each instrument is necessary. Remote reading requires more sophisticated hydraulic, electronic or pneumatic equipment.

Settlement can be monitored using surface or buried target plates whilst lateral movement over a range of depths is monitored using slip indicator or inclinometer equipment.

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GENERAL NOTES

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4. *The assessment of the significance of the factual data, where called for, is provided to assist the Client and his Engineer and/or Advisers in the preparation of their designs.*

5. *The report is based on the ground conditions encountered in the exploratory holes together with the results of field and laboratory testing in the context of the proposed development. The data from any commissioned desk study and site reconnaissance are also drawn upon. There may be special conditions appertaining to the site, however, which are not revealed by the investigation and which may not be taken into account in the report.*

6. *Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical and any geoenvironmental data would be required to provide discussion and evaluations appropriate to these methods.*

7. *The accuracy of results reported depends upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristics of the strata as a whole (see accompanying notes on Investigation Techniques). Where such measurements are critical, the technique of investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the Company where necessary.*

8. *The samples selected for laboratory test are prepared and tested in accordance with the relevant Clauses of BS 1377 Parts 1 to 8, where appropriate, in Geotechnics Limited's UKAS accredited Laboratory, where possible. A list of tests is given.*

9. *Tests requiring the use of another laboratory having UKAS accreditation where possible are identified.*

10. *Any unavoidable variations from specified procedures are identified in the report.*

11. *Specimens are cut vertically, where this is relevant and can be identified, unless otherwise stated.*

12. *All the data required by the test procedures are recorded on individual test sheets but the results in the report are presented in summary form to aid understanding and assimilation for design purposes. Where all details are required, these can be made available.*

13. *Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on either visual, verbal, written, cartographical, photographic or published evidence, this is for guidance only and no liability can be accepted for its accuracy.*

14. *Classification of materials as Made Ground is based on the inspection of retrieved samples or exposed excavations. Where it is obvious that foreign matter such as paper, plastic or metal is present, classification is clear. Frequently, however, for fill materials that arise from the adjacent ground or from the backfilling of excavations, their visual characteristics can closely resemble those of undisturbed ground. Other evidence such as site history, exploratory hole location or other tests may need to be drawn upon to provide clarification. For these reasons, classification of soils on the exploratory hole records as either Made Ground or naturally occurring strata, the boundary between them and any interpretation that this gives rise to should be regarded as provisional and subject to re-evaluation in the light of further data.*

15. *The classification of materials as Topsoil is generally based on visual description and should not be interpreted to mean that the material so described complies with the criteria for Topsoil used in BS 3882 (1994). Specific testing would be necessary where such definition is a requirement.*

16. *Ground conditions should be monitored during the construction of the works and the report should be re-evaluated in the light of these data by the supervising geotechnical engineers.*

17. *Any comments on groundwater conditions are based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.*

18. *Any bearing capacities for conventional spread foundations which are given in the report and interpreted from the investigation are for bases at a minimum depth of 1m below finished ground level in naturally occurring strata and at broadly similar levels throughout individual structures, unless otherwise stated. The foundations should be designed in accordance with the good practice embodied in BS 8004:1986 - Foundations, supplemented for housing by NHBC Standards. Foundation design is an iterative process and bearing pressures may need adjustment or other measures may need to be taken in the context of final layouts and levels prior to finalisation of proposals.*

19. *Unless specifically stated, the investigation does not take account of the possible effects of mineral extraction or of gases from fill or natural sources within, below or outside the site.*

20. *The costs or economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical or geoenvironmental considerations and hence their evaluation is outside the scope of the report.*

TROWBRIDGE STW, WILTSHIRE

FACTUAL REPORT ON GROUND INVESTIGATION

Report No H6100-16

February 2017

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February 2017

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1 INTRODUCTION

In August 2016 ESG was commissioned by SWECO, on behalf of Wessex Water Services Limited (WW) to carry out a ground investigation at Trowbridge Sewage Treatment Works (STW), Wiltshire. The investigation was required to obtain geotechnical and geoenvironmental information for a proposed upgrade to existing infrastructure.

The scope of the investigation was specified by SWECO and comprised dynamically sampled with rotary follow on cored boreholes, in situ testing and laboratory testing. The investigation was performed in accordance with the contract specification, and the general requirements of BS 5930 (2015), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and other relevant related standards identified below. The fieldwork took place between 30 September and 19 October 2016.

This report presents the factual records of the fieldwork and laboratory testing.

2 SITE SETTING

2.1 Location and Description

Trowbridge STW is located approximately 1.00 km northwest, at National Grid reference ST 848587, see Site Location Plan in Appendix A.

The site comprises a currently operational sewage treatment works. The site is approximately rectangular and measures approximately 320 m by 340 m. The site is dominated by a series of filter beds and lagoons around which lie several buildings and access roads associated with the sewage treatment works.

The site is bound to the north, south and west by open agricultural land. The River Biss lies approximately 70 m east of the site, beyond which lie residential dwellings.

2.2 Published Geology

The published geological map for the area, BGS Sheet 381 (1994) and the BGS Geology of Britain Viewer (2016) show the site located on Kellaway Mudstone Formation of Jurassic age. This is indicate to comprise mudstone and occasional sandstone.

3 FIELDWORK

The fieldwork was carried out in general accordance with BS 5930 (2015), BS EN 1997-2 (2007) and BS EN ISO 22475-1 (2006).

The exploratory hole locations were selected by SWECO. The locations were set out from local features. The co-ordinates and reduced levels were surveyed by JV Survey Limited to National Grid and Ordnance Datum. The exploratory hole locations are shown on the Site Plan in Appendix A.

3.1 Exploratory Holes

The exploratory holes are listed in the following table.

TABLE 1: SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	MAXIMUM DEPTH (m)	REMARKS
Dynamically Sampled with Rotary Follow on Coring	7	25.72	BH01 to BH04 (including BH02A, BH04A ad BH04B)

Exploratory hole location BH02 was terminated at 1.73 m depth due to an obstruction. The borehole was relocated 2.00 m north east and renamed BH02A.

Exploratory hole BH04 was terminated at 1.84 m depth due to an obstruction. The borehole was relocated 2.00 m north east and renamed BH04A.

Exploratory hole BH04A was terminated at 1.84 m depth due to an obstruction. The borehole was relocated 2.00 m south east and renamed BH04B.

The exploratory hole logs are presented in Appendix B. These provide information including the equipment and methods used, samples taken, tests carried out, water observations and descriptions of the strata encountered. Explanation of the terms and abbreviations used on the logs is given in the Key to Exploratory Hole Records in Appendix B, together with other explanatory information. The logging of soil and rock materials is in accordance with BS EN ISO 14688-1+A1 (2013) for soils and BS EN ISO 14689-1 (2003) for rocks, as amplified by BS 5930 (2015).On completion of the fieldwork geotechnical samples were transported to the Bridgend office of ESG for temporary retention, with those required for testing being transferred to the ESG

laboratories. Geoenvironmental samples were transported from site directly to the laboratory at ESG.

3.2 Groundwater Monitoring

Instrumentation installed in the exploratory holes for groundwater monitoring are shown on the logs and summarised in Appendix C. Records of monitoring carried out by ESG during and after the fieldwork period are presented in Appendix C.

3.3 In Situ Testing

In situ testing was carried out in accordance with the relevant standards as tabulated below. The testing is summarised in the following table and the results are presented in Appendix D unless noted otherwise.

Calibration certificates where appropriate are included with the results in the appendix.

TABLE 2: SUMMARY OF IN SITU TESTING

TYPE	QUANTITY	REMARKS
Standard Penetration Test	54	BS EN ISO 22476-3 (2011). Results presented on logs in Enclosure A
California Bearing Ratio Tests	3	BS 1377 (1990)

4 LABORATORY TESTING

4.1 Geotechnical Testing

Geotechnical laboratory testing was scheduled by SWECO and was carried out in accordance with BS 1377 (1990), BS EN ISO 17892 (2014) Part 1 and ISRM (2007) unless otherwise stated. The testing is summarised below and the results are presented in Appendix E.

- Water Content Determination
- Atterberg Limit Determination
- Particle Size Distribution Analysis

- pH, Acid and Water Soluble Sulphate and Total Sulphur Content of Soils. Test methods are BS 1377 or others recognised in BRE Special Digest 1 (2005); they are indicated on the results report sheets in Appendix E.
- Unconsolidated Undrained Triaxial Compression Testing
- One Dimensional Oedometer Consolidation Testing
- Index Properties of Rock
- Point Load Index Test
- Shear Strength by Hand Vane

4.2 Geoenvironmental Testing

Geoenvironmental laboratory testing was scheduled by SWECO on the soil and water samples recovered during the fieldwork. The testing was carried out by the laboratory at Burton on Trent. The results are presented in Appendix F.

REFERENCES

BGS England and Wales Sheet 381 : 1994 : Frome. 1:50000 geological map (solid and drift). British Geological Survey.

BGS Geology of Britain Viewer : 2016. www.bgs.ac.uk. British Geological Survey.

BRE Special Digest 1 : 2005 : Concrete in aggressive ground. Building Research Establishment.

BS 1377 : 1990 : Methods of test for soils for civil engineering purposes. British Standards Institution.

BS 5930 : 2015 : Code of practice for ground investigations. British Standards Institution.

BS EN 1997-2 : 2007 : Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. British Standards Institution.

BS EN ISO 14688-1:2002+A1 : 2013 : Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description. British Standards Institution.

BS EN ISO 14688-2:2004+A1 : 2013 : Geotechnical investigation and testing - Identification and classification of soil - Part 2 Principles for a classification. British Standards Institution.

BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description. British Standards Institution.

BS EN ISO 17892-1, Geotechnical investigation and testing – Laboratory Testing of soil – Determination of water content.

BS EN ISO 22475-1 : 2006 : Geotechnical investigation and testing – Sampling methods and groundwater measurements - Part 1 Technical principles for execution. British Standards Institution.

BS EN ISO 22476-3:2005+A1 : 2011 : Geotechnical investigation and testing - Field testing - Part 3 Standard penetration test. British Standards Institution.

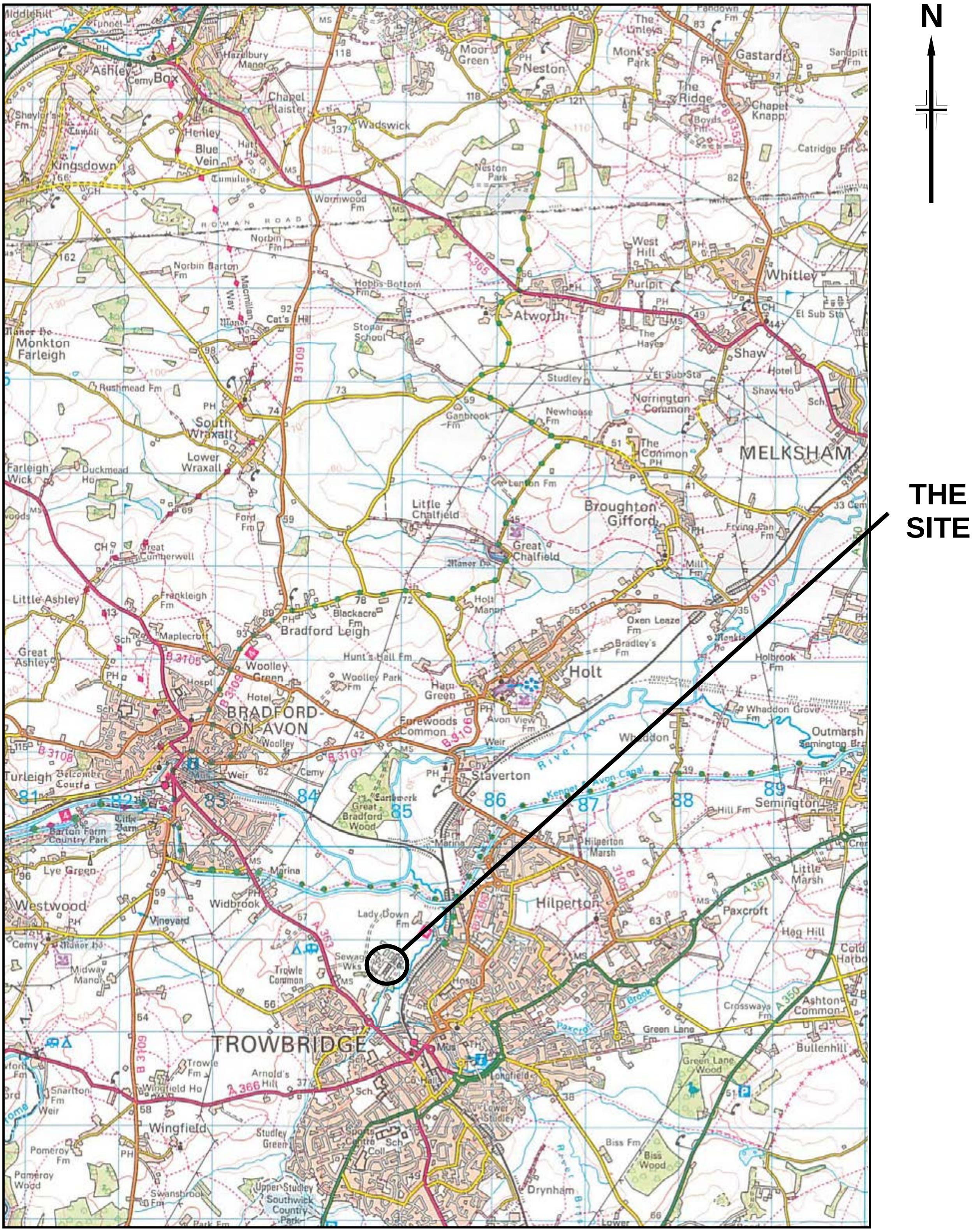
ISRM : 2007 : The Complete ISRM Suggested Methods for Rock Characterisation, Testing and Monitoring (1974-2006). Commission on Testing Methods, International Society for Rock Mechanics (Editors Ulusay R & Hudson JA).

APPENDIX A

FIGURES AND DRAWINGS

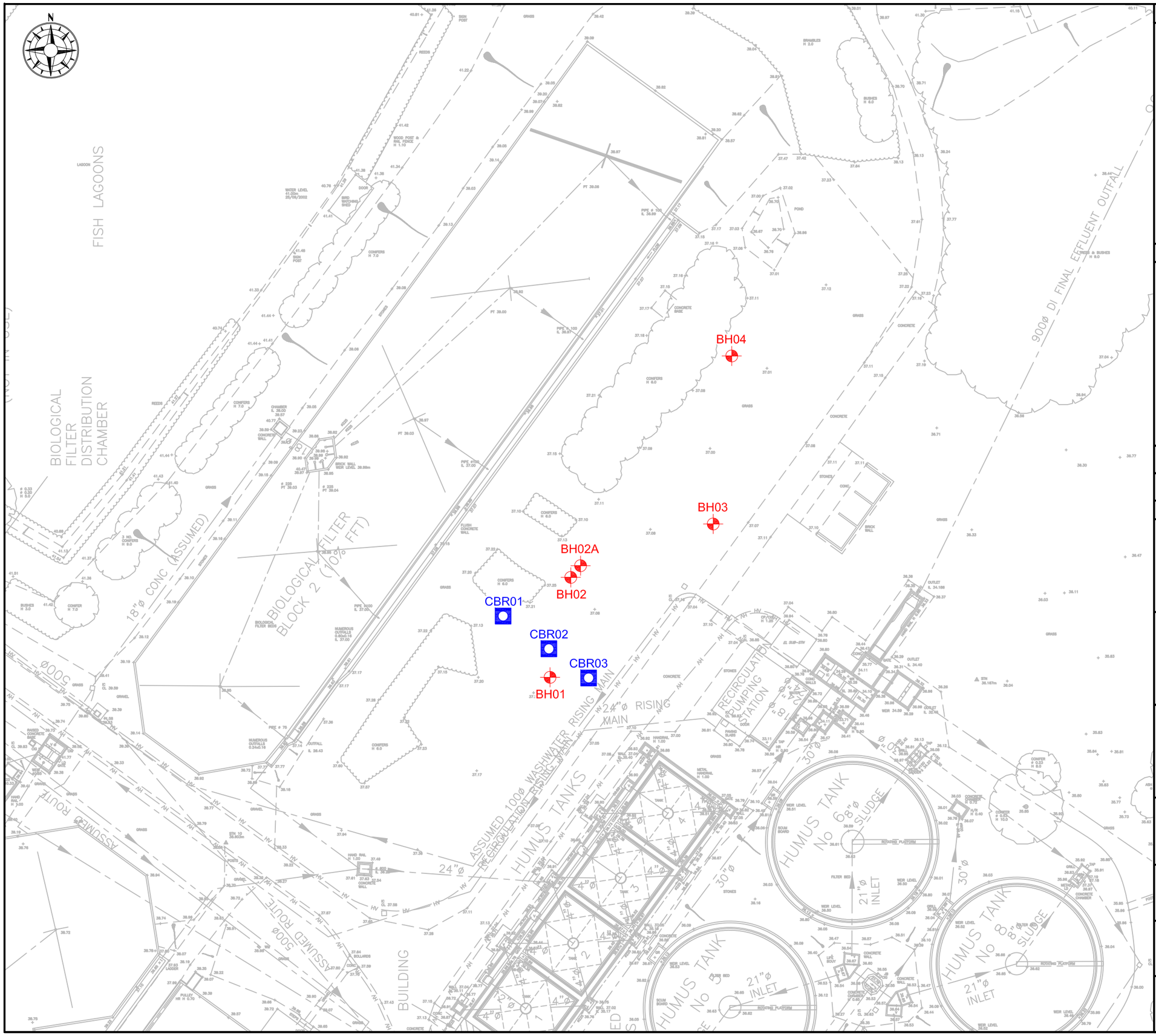
Site Location Plan	A1
Site Plan	A2

Site Location Plan



Reproduced from the 2002 Ordnance Survey 1:50 000 scale Landranger map No 172 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright, Environmental Services Group Limited. All rights reserved. Licence Number 100006060

Notes: Scale 1:50 000	**Project** Trowbridge STW, Wiltshire **Project No.** H6100-16 **Carried out for** Wessex Water Services Limited	**Figure** **A1**



GENERAL NOTES

1. Reproduced from Wessex Water Services Limited's Drawing No. D9702/0001 Rev No. B.
2. Hole Locations to National Grid Co-ordinate Reference System.

LEGEND TO SYMBOLS

Borehole Location

CBR Location

Scale: 1:500

0 5m 10 15 20 25

Rev	Drawn	Date	Approv.	Date	Modification Details
x	x	x	x	x	x

AMENDMENTS

Title

SITE PLAN

Project

TROWBRIDGE STW, WILTSHIRE

Client

WESSEX WATER SERVICES LIMITED

ESG

Date	Drawn By	Approv. By
07/12/2016	BS	AP

Sheet Size	Scale	Project No
A3	1:500	H6100-16

Drawing No	Rev
A2	0

APPENDIX B

EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
SPT Hammer Energy Ratio Report	SPT Hammer Reference JD5
Dynamic Probing Rig Energy Ratio Report	DP Rig Reference
Borehole Logs	BH01 to BH04 (inc. BH02A, BH04A and BH04B)

Key to Exploratory Hole Records

SAMPLES

Undisturbed

U	Driven tube sample	nominally 100 mm diameter and full recovery unless otherwise stated
UT	Driven thin wall tube sample	
TW	Pushed thin wall tube sample	
P	Pushed piston sample	
L	Liner sample (from Windowless or similar sampler), full recovery unless otherwise stated	
CBR	CBR mould sample	
BLK	Block sample	
CS	Core sample (from rotary core) taken for laboratory testing	
AMAL	Amalgamated sample	

Disturbed

D	Small sample
B	Bulk sample

Other

W	Water sample
G	Gas sample
	Environmental chemistry samples (in more than one container where appropriate)
ES	Soil sample
EW	Water sample

Comments

Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that attempt was made to take a tube sample, however, there was no recovery.

Monitoring samples taken after completion of hole construction are not shown on the exploratory hole logs.

TESTS

SPT S or SPT C — Standard Penetration Test, open shoe (S) or solid cone (C)

The Standard Penetration Test is defined in BS EN ISO 22476-3:2005+A1:2011. The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 the total blow count beyond the seating drive is given (without the N = prefix).

IV	*in situ* Vane shear strength, peak (p) and remoulded (r)
HV	Hand vane shear strength, peak (p) and remoulded (r)
PP	Pocket penetrometer test, converted to shear strength
KFH, KRH, KPI	Permeability tests (KFH = falling head, KRH = rising head; KPI = packer inflow); results provided in Field Records column (one value per stage for packer tests)

DRILLING RECORDS

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930:2015

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacings are presented. The term non-intact (NI) is used where the core is fragmented.

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss
NR	Not recovered

GROUNDWATER

▼	Groundwater strike
▽	Groundwater level after standing period

Key to Exploratory Hole Records

INSTALLATION

Standpipe/ piezometer

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:

SP Standpipe
SPIE Standpipe piezometer
PPIE Pneumatic piezometer
EPIE Electronic piezometer

Inclinometer or Slip Indicator

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:

ICE Biaxial inclinometer
ICM Inclinometer tubing for use with probe
SLIP Slip indicator

Settlement Points or Pressure Cells

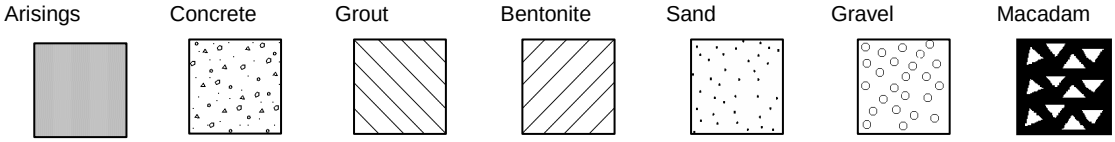
The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column:

ESET Electronic settlement cell/gauge
ETM Magnetic extensometer settlement point
EPCE Electronic embedment pressure cell
PPCE Electronic push in pressure cell

INSTALLATION LEGENDS

A legend describing the installation is shown in the rightmost column. Legends used to describe the backfill materials as indicated below.



NOTES

1 Soils and rocks are described in accordance with BS EN ISO 14688-1:2002+A1:2013 and 14689-1:2003 respectively as amplified by BS 5930:2015.

2 For fine soils, consistency determined during description is reported for those strata where undisturbed samples are available. Where the logger considers that the sample may not be representative of the condition in situ, for whatever reason, the reported consistency is given in brackets. The reliability of the sample is indicated by Probably or Possibly as appropriate. Hence (Probably firm) indicates the logger is reasonably confident of the assessment, but (Possibly firm) means less certainty. Where the samples available are too disturbed to allow a reasonable assessment of the in situ condition, no consistency is given.

3 Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs, however, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.

4 The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.

5 The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures

6 Water level observations of discernible entries during the advancing of the exploratory hole are given at the foot of the log and in the Legend column. The term "none observed" is used where no discrete entries are identified although this does not necessarily indicate that the hole has not been advanced below groundwater level. Under certain conditions groundwater cannot be observed, for instance, drilling with water flush or overwater, or boring at a rate much faster than water can make its way into the borehole In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.

7 The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.

SPT Calibration Report

EQUIPE GROUP
www.equipegroup.com

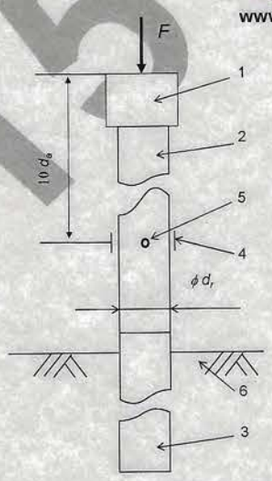
Hammer Energy Measurement Report

Type of Hammer	SPT HAMMER
Client	JACKSON DRILLING
Test No	EQU1392
Test Depth (m)	7.80
Date of Test	23 December 2015
Valid until	22 December 2016
Hammer ID	JD5

Mass of the hammer	m = 63.5kg
Falling height	h = 0.76m
E_{theor} =	$m \times g \times h$ = 473J

Characteristics of the instrumented rod

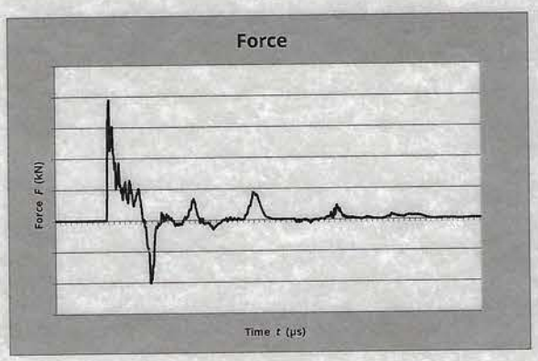
Diameter	d_r = 0.052 m
Length of the instrumented rod	0.558 m
Area	A = 11.61 cm^2
Modulus	E_a = 206843 MPa

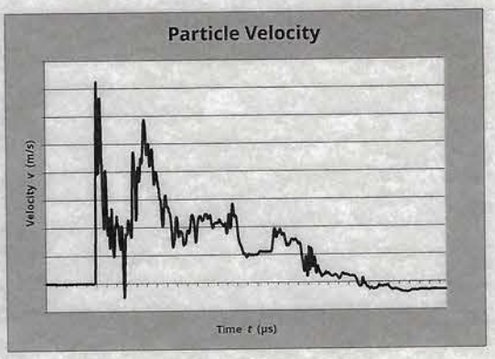


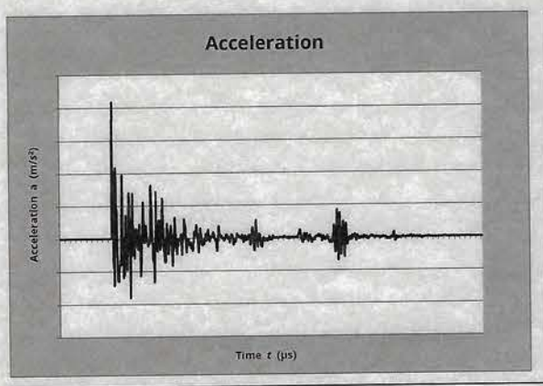
Key
1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

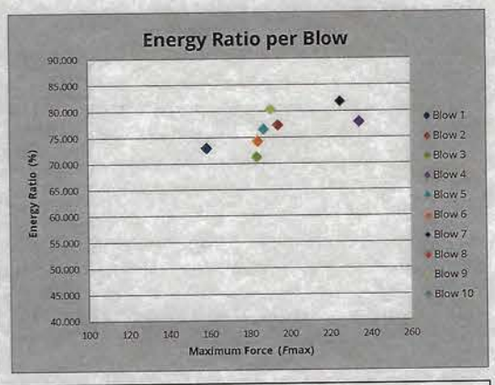
F Force
d_r Diameter of rod

Fig. B.1 and B.2 BS EN ISO 22476-3 : 2005 + A1 : 2011









Observations:
1.

E_{meas} = **0.363** kN-m

E_{theor} = **0.473** kN-m

Energy Ratio (E_r) $= \frac{E_{meas}}{E_{theor}}$ **76.79%**

Equipe SPT Analyzer Operators: MH

Prepared by: **Checked by:** **Date** 06/01/2016

 Equipe Group, The Paddocks, Home Farm Offices, The Upton Estate, Banbury, Oxfordshire, OX15 6HU
Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

Borehole Log

Drilled	LM/PM	**Start**	
Logged	ND		30/09/2016
Checked	AP	**End**	
Approved	LL		04/10/2016

Equipment, Methods and Remarks

Comacchio 205
Hand excavated inspection pit from 0.00m to 1.50m depth. Dynamic sampling from 1.50m to 7.20m. Rotary coring from 7.20m to 25.15m depth.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.50	3.00	101	4.50
3.00	4.50	101	
4.50	5.70	87	
5.70	7.20	87	
7.20	22.15	120	

Ground Level	37.15 mOD
Coordinates (m)	E 384953.00
National Grid	N 158777.00

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.20	ES 2			30/09/16	0800	Brown gravelly silty fine to medium SAND. Gravel is subangular to subrounded fine to coarse of chert, chalk and brick. (MADE GROUND)		(0.25)		
0.10 - 0.20	D 1							0.25 +36.90		
0.30 - 0.40	ES 4					Very stiff light brown to brown sandy gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of chalk, brick and chert. (MADE GROUND)		(0.20)		
0.30 - 0.40	D 3							0.45 +36.70		
0.50 - 0.60	ES 6							(0.55)		
0.50 - 0.70	B 5									
1.00 - 1.20	ES 8					Greyish brown sandy clayey angular to subangular fine to coarse GRAVEL of limestone and macadam. (MADE GROUND)		1.00 +36.15		
1.00 - 1.20	B 7									
1.20 - 1.65	SPTS		N=20 (2,5/5,5,5,5)							
1.20 - 1.65	D 9									
1.50 - 3.00	L 16		100% rec		Dry	Grey slightly silty sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		(1.00)		
2.00 - 2.10	D 10					Soft to firm yellowish brown mottled grey slightly sandy silty CLAY. Sand is fine to medium. (KELLWAY'S FORMATION)		2.00 +35.15		
2.10 - 2.30	ES 11							(0.85)		
3.00 - 3.45	SPTS		N=16 (2,2/3,5,5,3)	3.00	Dry	Stiff yellowish brown mottled grey and orange slightly sandy silty CLAY. Sand is fine to medium. (KELLWAY'S FORMATION)		2.85 +34.30		
3.00 - 4.50	L 17		100% rec	4.50	Dry					
3.00 - 3.45	D 12							(1.65)		
4.50 - 4.95	SPTS		N=16 (1,1/2,3,5,6)	4.50	Dry	Very stiff dark grey locally thinly laminated CLAY. Occasional shell fragments. (KELLWAY'S FORMATION)		4.50 +32.65		
4.50 - 5.70	L 18		100% rec	4.50	Dry					
4.50 - 4.95	D 13									
5.70 - 6.15	SPTS		N=23 (1,2/4,4,7,8)	4.50	Dry			(2.70)		
5.70 - 7.20	L 19		100% rec	4.50	Dry					
5.70 - 6.15	D 14									
7.20 - 7.65				4.50	Dry					
7.20 - 7.65	NA	NA	N=50 (5,7/8,13,20,9)			NO RECOVERY.		7.20 +29.95		
7.20 - 7.65	NA	NA	C 20					(0.45)		
7.20 - 7.65	NA	NA	D 15							
7.65 - 9.15			C 21			Very stiff dark grey locally thinly laminated CLAY. Occasional shell fragments. (KELLWAY'S FORMATION)	8.03-8.05 Silty sandy with shell fragments	7.65 +29.50		
7.65 - 9.15	100	NA						(1.50)		
	NA	NA								
	NA	NA								
				30/09/16	1800					
				4.50	Dry					
9.15 - 10.65			C 22	03/10/16	0800	Soft dark grey CLAY. (KELLWAY'S FORMATION)	9.15-9.20 AZCL	9.15 +28.00		
		NA		4.50	Dry					
	100	NA						(0.70)		
	NA	NA								
	NA									
9.15 - 10.65						Very stiff dark grey thinly laminated slightly		9.85 +27.30		

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	**Trowbridge STW, Wiltshire**
Project No.	**H6100-16**
Carried out for	**Wessex Water Services Limited**

Borehole

BH01

Borehole Log

Drilled	LM/PM	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.15 mOD
Logged	ND	30/09/2016	Comacchio 205	1.50	3.00	101	4.50	**Coordinates (m)**	E 384953.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00m to 1.50m depth. Dynamic sampling from 1.50m to 7.20m. Rotary coring from 7.20m to 25.15m depth.	3.00	4.50	101		**National Grid**	N 158777.00
Approved	LL	04/10/2016		4.50	5.70	87			
				5.70	7.20	87			
				7.20	22.15	120			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		NA NA NA				gravelly CLAY. Gravel is subangular fine to coarse of mudstone lithorelics. (KELLWAY'S FORMATION)		(1.00)		
10.65 - 12.15			C 23					10.85 +26.30		
10.65 - 12.15	100 NA NA					Very stiff dark grey thickly laminated slightly gravelly CLAY with occasional shell fragments. Gravel is subangular fine to coarse of mudstone lithorelics. Occasional partings of fine to medium sand between laminae. (KELLWAY'S FORMATION)	10.80-10.81 Some subangular pieces of coarse gravel of calcareous mudstone.			
12.15 - 13.65			C 24				11.79-11.80 Band of shell fragments			
12.15 - 13.65	100 NA NA									
13.65 - 15.15		NA NA NA	C 25					(5.80)		
13.65 - 15.15	100 NA NA									
15.15 - 16.65			C 26							
15.15 - 16.65	100 NA NA									
			Flush: 7.20 - 25.15 Air/mist 100%							
16.65 - 18.15		NA NA NA	C 27			Very stiff dark grey thinly laminated CLAY. (KELLWAY'S FORMATION)		16.65 +20.50		
								(0.35)		
		650 650 650				Weak dark grey lightly calcareous very shelly thickly laminated MUDSTONE. (KELLWAY'S FORMATION)		17.00 +20.15		
16.65 - 18.15	100 73 73							(0.65)		
						Medium strong light grey calcareous fossiliferous fine grained LIMESTONE. (CORNBRASH FORMATION). Weathering: Trace sand infill on discontinuity surfaces. Discontinuities: Medium spaced horizontal undulating rough.		17.65 +19.50		
18.15 - 19.65		NI 230 450	C 28							
							18.45-18.70 Subvertical fracture stepped rough with trace sand infill. Some voids in fracture (up to 2 mm diameter). 18.70-19.05 NI 19.10-19.15 Band of clayey gravel of limestone	(1.40)		
18.15 - 19.65	100 62 55							19.05 +18.10		
						Strong grey slightly calcareous very fossiliferous fine grained LIMESTONE. (CORNBRASH FORMATION). Weathering: Some clay infill up to 7 mm thick on discontinuity surfaces. Discontinuities: closely to medium spaced horizontal undulating rough.				
19.65 - 21.15			C 29							

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed
1	15.00		

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole BH01

Borehole Log

Drilled	LM/PM	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.15 mOD
Logged	ND	30/09/2016	Comacchio 205 Hand excavated inspection pit from 0.00m to 1.50m depth. Dynamic sampling from 1.50m to 7.20m. Rotary coring from 7.20m to 25.15m depth.	1.50	3.00	101	4.50	**Coordinates (m)**	E 384953.00
Checked	AP	**End**		3.00	4.50	101		**National Grid**	N 158777.00
Approved	LL	04/10/2016		4.50	5.70	87			
				5.70	7.20	87			
				7.20	22.15	120			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
								(1.95)		
19.65 - 21.15	100 89 72	NI 180 300								
			NA NA NA			Stiff grey to dark green thickly laminated CLAY. Frequent pockets of black organic material (up to 3 mm diameter). Rare voids (up to 3 mm diameter). (CORNBRASH FORMATION)		21.00 +16.15 (0.15)		
21.15 - 22.65		NI 70 140	C 30			Stiff to very stiff green thickly laminated CLAY. (CORNBRASH FORMATION)		21.15 +16.00 (0.50)		
			NA NA NA			Very stiff grey to dark green thickly laminated CLAY. Frequent pockets of black organic material (up to 3 mm diameter). Rare voids (up to 3 mm diameter). (CORNBRASH FORMATION)		21.65 +15.50 (0.30)		
21.15 - 22.65	100 NA NA							21.95 +15.20		
		NA NA NA				Weak green mottled dark green MUDSTONE. Occasional veins of dark brown organic material (up to 1 mm thick). Rare pockets of black organic material (up to 2 mm diameter). (CORNBRASH FORMATION). Discontinuities: closely spaced horizontal to dipping 5 degrees planar smooth with trace clay infill.		(0.70)		
22.65 - 24.15			C 31	03/10/16 4.50	1800 Dry			22.65 +14.50		
				04/10/16 4.50	0800 Dry					
22.65 - 24.15	100 97 80	NI 120 260				Medium strong to strong calcareous greenish grey interlaminated LIMESTONE AND MUDSTONE. (CORNBRASH FORMATIONS). Weathering: Up to 1 mm clay infill on discontinuity surfaces. Discontinuities: Closely to medium spaced horizontal to dipping 5 degrees planar smooth.		(1.40)		
24.15 - 25.15			C 32			Weak calcareous interlaminated LIMESTONE and MUDSTONE. (CORNBRASH FORMATION). Weathering: Trace clay infill on discontinuity surfaces. Discontinuities: closely spaced horizontal to dipping 5 degrees planar smooth.	24.00-24.05 Very stiff greenish grey clay 24.41-24.50 Extremely weak mudstone	24.05 +13.10		
24.15 - 25.15	100 100 56	NI 70 140						(1.10)		
				04/10/16 4.50	1800 15.37					
						END OF EXPLORATORY HOLE		25.15 +12.00		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH01

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.16 mOD
Logged	NJD	10/10/2016	Commachio Geo 205	1.20	1.65	92		**Coordinates (m)**	E 384956.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 1.65 m. SPT from 1.65 m to 1.73 m.	1.65	1.73	45		**National Grid**	N 158791.00
Approved	LL	10/10/2016	Terminated at 1.73 m depth due to obstruction. Relocated 2 m NE to BH02A.						

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.20	ES 2			07/10/16	0800	Brown gravelly silty fine to coarse SAND. Gravel is angular to rounded fine to medium of chert, clinker and brick. (MADE GROUND)		(0.20) 0.20 +36.96		
0.10 - 0.20	D 1									
0.40 - 0.50	ES 4					Dark brown sandy silty angular to subangular fine to coarse GRAVEL of limestone, clinker and brick. Occasional pockets of clay. (MADE GROUND)		(0.50)		
0.40 - 0.60	B 3							0.70 +36.46		
0.70 - 0.80	ES 6					Stiff becoming firm from 1.20 m depth grey slightly gravelly CLAY with orangish brown silty fine sand and dark brown sandy silt partings. Gravel is angular to rounded fine to medium of chalk and chert. (MADE GROUND)				
0.70 - 0.80	D 5			07/10/16	1800 Dry			(0.90)		
1.20 - 1.65	B 7			10/10/16	0800 Dry					
				10/10/16	1800 Dry					
1.65 - 1.73	SPTC		50 (25 for 75mm/50 for 5mm)		Dry	Medium strong light grey CONCRETE. (MADE GROUND)		1.60 (0.05) +35.56 1.65 (0.08) +35.51 1.73 +35.43		
						Hole progressed by SPT. END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
1.20 - 1.73	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH02

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.09 mOD
Logged	NJD	10/10/2016	Commachio Geo 205	0.00	11.90	102	3.00	**Coordinates (m)**	E 384957.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic window sampling from 1.20 m to 11.90 m. Rotary coring from 11.90 m to 25.40 m.	11.90	25.40	92		**National Grid**	N 158792.00
Approved	LL	11/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				10/10/16	0800	Brown very gravelly silty fine to coarse SAND. Gravel is angular to rounded fine to medium of chert, clinker and brick. (MADE GROUND)		(0.20) 0.20 +36.89		
						Dark brown sandy silty angular to subangular fine to coarse GRAVEL of limestone, clinker and brick. Occasional pockets of clay. Sand is fine to coarse. (MADE GROUND)		(0.60) 0.80 +36.29		
						Stiff grey slightly gravelly CLAY with orangish brown silty fine sand partings. Gravel is angular to rounded fine to coarse of various lithologies. (MADE GROUND)	1.20-1.65 Firm and light brown. 1.45 Angular cobble of clinker.	(0.85)		
1.20 - 1.50	ES 1				Dry					
1.20 - 1.65	L 14		100% rec							
1.50 - 1.60	D 2									
1.65 - 2.02	SPTC		N=20 (25 for		Dry			1.65 (0.10) +35.44		
1.65 - 3.00	L 15		75mm/13,3,2,2)		Dry			1.75 +35.34		
1.65 - 1.75	D 3		100% rec			Medium strong light greyish brown CONCRETE. Recovered as sandy angular to subangular fine to coarse gravel. (MADE GROUND)				
1.75 - 2.00	ES 4							(0.65)		
2.00 - 2.10	D 5					Stiff light brown mottled grey slightly sandy CLAY with orange silty fine sand partings. Sand is fine to medium. (Reworked KELLAWAYS FORMATION)				
						Stiff brownish grey slightly sandy CLAY with orangish brown fine sand and yellow silt partings. (Reworked KELLAWAYS FORMATION)		2.40 +34.69		
				10/10/16	1800		2.80-3.40 Shell fragments.	(1.00)		
3.00 - 3.45	SPTS		N=17 (2,2/3,4,5,5)		Dry		3.00-3.40 Gypsum crystals.			
3.00 - 4.50	L 16		100% rec	3.00	Dry					
3.00 - 3.45	D 6			11/10/16	0800					
				3.00	Dry					
3.40 - 3.60	ES 7					Very stiff grey CLAY with silty fine sand dustings. Occasional gypsum crystals and rare shell fragments. (KELLAWAYS FORMATION)		3.40 +33.69		
4.50 - 4.95	SPTS		N=23 (2,3/4,5,7,7)	3.00	Dry					
4.50 - 6.00	L 17		100% rec	3.00	Dry					
4.50 - 4.95	D 8						4.70-6.40 Orangish brown silty fine sand partings.	(3.00)		
6.00 - 6.45	SPTS		N=38 (5,7/7,10,10,11)	3.00	Dry					
6.00 - 7.50	L 18		100% rec	3.00	Dry					
6.00 - 6.45	D 9						6.28 Ammonite fragments.			
						Stiff grey sandy silty CLAY with silty fine sand dustings. Sand is fine. Occasional shell fragments. (KELLAWAYS FORMATION)		6.40 (0.10) +30.69		
						Very stiff grey CLAY. (KELLAWAYS FORMATION)		6.50 +30.59		
								(0.80)		
						Stiff grey sandy silty CLAY with silty fine sand dustings. Sand is fine to medium. Occasional shell fragments. (KELLAWAYS FORMATION)		7.30 +29.79		
7.50 - 7.95	SPTS		N=37 (5,6/8,9,9,11)	3.00	Dry					
7.50 - 9.00	L 19		100% rec	3.00	Dry			(0.70)		
7.50 - 7.95	D 10									
						Very stiff grey CLAY. (KELLAWAYS FORMATION)		8.00 +29.09		
								(1.20)		
9.00 - 9.45	SPTS		N=36 (5,6/8,8,9,11)	3.00	Dry					
9.00 - 10.50	L 20		100% rec	3.00	Dry					
9.00 - 9.45	D 11									
						Very stiff grey sandy silty CLAY. Sand is fine. Occasional shell fragments. (KELLAWAYS FORMATION)		9.20 +27.89		
								(0.40)		
						Very stiff grey CLAY. (KELLAWAYS FORMATION)	9.54 Fossil fragments.	9.60 +27.49		
								(0.70)		

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
0.00 - 23.99	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH02A

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.09 mOD
Logged	NJD	10/10/2016	Commachio Geo 205	0.00	11.90	102	3.00	**Coordinates (m)**	E 384957.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic window sampling from 1.20 m to 11.90 m. Rotary coring from 11.90 m to 25.40 m.	11.90	25.40	92		**National Grid**	N 158792.00
Approved	LL	11/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						Stiff grey sandy silty CLAY. Occasional shell fragments. (KELLAWAYS FORMATION)		10.30 +26.79 (0.20)		
10.50 - 10.95	SPTS		N=34 (3,4/5,8,10,11)	3.00	Dry			10.50 +26.59		
10.50 - 11.90	L 21		100% rec	3.00	Dry	Very stiff grey CLAY. (KELLAWAYS FORMATION)		(0.40)		
10.50 - 10.95	D 12							10.90 +26.19		
						Stiff grey silty sandy CLAY. Sand is fine. Occasional shell fragments. (KELLAWAYS FORMATION)		(0.50)		
						Very stiff grey CLAY with silty fine sand dustings. (KELLAWAYS FORMATION)		11.40 +25.69 (0.50)		
				11/10/16	1800					
11.90 - 12.31				3.00	Dry					
11.90 - 12.65			50 (10,14/13,14,15,8 for 35mm)	12/10/16	0800	Extremely weak medium to thickly bedded grey MUDSTONE with silty fine sand partings and dustings. Occasional shell fragments. (KELLAWAYS FORMATION) Discontinuities: Horizontal medium to widely spaced undulating smooth clean.	12.38 Drilling induced fracture	11.90 +25.19		
11.90 - 12.41	100		C 22	3.00	Dry		12.45-12.65 Core recovered in following run.			
11.90 - 12.65	100		D 13				12.93 Drilling induced fracture.			
12.65 - 13.40	100		C 23				13.17 Drilling induced fracture.			
12.65 - 13.40	99									
13.40 - 13.85	99			3.00	Dry		13.40-13.51 AZCL			
13.40 - 14.90			SPTC N=49 (4,7/10,12,13,14) C 24					(5.25)		
13.40 - 14.90	93 92 92	380 540 1420								
14.90 - 15.33				3.00	Dry		14.90-14.93 AZCL.			
14.90 - 16.40			SPTC 50 (5,9/11,12,15,12 for 55mm) C 25				14.91 Light brown calcareous accretion. 15.00 Light grey calcareous accretion 15.10 Fracture: 60 degrees planar smooth. Possible shear surface. 15.35 Drilling induced fracture 15.69 Drilling induced fracture			
14.90 - 16.40	98 97 93									
16.40 - 16.77				3.00	Dry		15.86 Light brown calcareous accretion. 16.40-16.51 AZCL. 16.84-17.16 Silty Sandy			
16.40 - 17.90			SPTC 50 (6,11/12,17,21 for 70mm) C 26					17.15 +19.94		
16.40 - 17.90	93 91 91					Extremely to very weak medium bedded dark grey silty sandy MUDSTONE with calcareous laminae. Frequent shell fragments increasing with depth. (KELLAWAYS FORMATION)		(0.62)		
17.90 - 18.14				3.00	Dry	Weak thickly bedded grey fine to medium grained clayey LIMESTONE with occasional very weak dark grey silty sandy mudstone partings. (CORNBRASH FORMATION)	17.78 Drilling induced fracture.	17.77 +19.32		
17.90 - 19.40		1160 1160 1160	SPTC 50 (20,5/35,15 for 20mm) C 27					(0.63)		
17.90 - 19.40	100 95 92					Medium strong medium bedded light grey fine grained LIMESTONE. (CORNBRASH FORMATION) Discontinuities: Horizontal undulating rough clean.	18.70-18.93 Fine to medium grained.	18.40 +18.69 (0.53)		
						Very weak thickly bedded grey fine to coarse grained clayey LIMESTONE with very closely spaced laminae and partings of extremely weak dark grey mudstone. (CORNBRASH FORMATION) Discontinuities: Very closely to medium spaced horizontal undulating rough clean.	19.13 Trace firm grey clay infill. 19.30 Drilling induced fracture. 19.36-19.40 Non-intact 19.40-19.41 AZCL	18.93 +18.16 (1.25)		
19.40 - 19.50		NI 180 410		3.00	Dry					
19.40 - 20.90			SPTC 50 (25 for 75mm/50 for 25mm) C 28							
						Hole continues on next sheet	19.99-20.18 Largely non-intact. Trace firm grey clay infill.			

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH02A

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.09 mOD
Logged	NJD	10/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic window sampling from 1.20 m to 11.90 m. Rotary coring from 11.90 m to 25.40 m.	0.00 11.90	11.90 25.40	102 92	3.00	**Coordinates (m)**	E 384957.00
Checked	AP	**End**						**National Grid**	N 158792.00
Approved	LL	11/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
19.40 - 20.90	99 86 86			12/10/16 3.00 3.00	1800 Dry Dry	Weak thickly bedded grey fine to medium grained clayey LIMESTONE with occasional very weak dark grey silty sandy mudstone partings. (CORNBRASH FORMATION)	20.32 Drilling induced fracture.	20.18 +16.91 (0.72)		
20.90 - 21.00 20.90 - 22.40			SPTC 50 (25 for 75mm/50 for 20mm) C 29	13/10/16 3.00	0800 Dry	Extremely to very weak medium to thickly bedded light grey calcareous MUDSTONE. (CORNBRASH FORMATION) Discontinuities: Medium to widely spaced horizontal undulating smooth clean.	20.90-20.91 AZCL. 20.91-21.32 Extremely closely spaced black carbonaceous partings and fragments.	20.90 +16.19		
20.90 - 22.40	99 99 99	330 750 1560					21.48 Drilling induced fracture. 21.82 Drilling induced fracture. 22.15 Drilling induced fracture.	(1.61)		
22.40 - 22.49 22.40 - 23.90			SPTC 50 (25 for 75mm/50 for 15mm) C 30	3.00	Dry	Very weak thinly interlaminated to very thinly interbedded light grey calcareous mudstone and weak clayey LIMESTONE. (CORNBRASH FORMATION) Discontinuities: Very closely to widely spaced horizontal planar smooth clean.	22.40-22.41 AZCL.	22.51 +14.58		
22.40 - 23.90	99 99 99						23.66 Drilling induced fracture.			
23.90 - 23.98 23.90 - 25.40		30 170 600	SPTC 50 (25 for 75mm/50 for 10mm) C 31	3.00	Dry			(2.89)		
23.90 - 25.40	97 87 77						24.90-24.94 AZCL. 25.01 Drilling induced fracture.			
				13/10/16 3.00	1800 Dry			25.40 +11.69		
						END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole BH02A

Borehole Log

Drilled	DH	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.03 mOD
Logged	NJD	05/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 10.25 m. Open holing from 10.25 m to 10.40 m. Rotary coring from 10.40 to 25.40 m.	1.20	10.40	92	4.50	**Coordinates (m)**	E 384975.00
Checked	AP	**End**		10.40	25.40	121		**National Grid**	N 158798.00
Approved	LL	07/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.20	ES 2			05/10/16	0800	Very stiff dark brown gravelly silty CLAY. Gravel is angular to rounded fine to medium of chert. (TOPSOIL)		(0.20) 0.20 +36.83		
0.10 - 0.20	D 1									
0.30 - 0.40	ES 4									
0.30 - 0.40	D 3									
0.50 - 0.70	B 5					Very stiff light brown becoming brownish grey from 0.60 m gravelly CLAY with low cobble content. Gravel is angular to rounded fine to coarse of chalk, chert and brick. Cobbles are angular of limestone and concrete. (MADE GROUND)		(0.80)		
1.00 - 1.10	ES 7							1.00 +36.03		
1.00 - 1.10	D 6									
1.20 - 2.25	L 17		100% rec		Dry	Stiff greyish brown to brown clayey slightly gravelly SILT with low cobble content. Gravel is angular to rounded fine to coarse of limestone and brick. Cobbles are angular of concrete. (MADE GROUND)				
1.20 - 2.00	B 8							(1.00)		
2.00 - 2.10	ES 9							2.00 +35.03		
2.25 - 2.70	SPTS		N=8 (1,1/2,1,2,3)	0.00	Dry	Firm becoming stiff from 2.80 m light brown mottled orange and grey sandy CLAY with orange clayey sand partings. Sand is fine to medium. (ALLUVIUM)	2.40-2.80 Very sandy.			
2.25 - 3.75	L 18		100% rec		Dry					
2.25 - 2.70	D 10						2.80-3.05 Slightly sandy.	(1.50)		
3.75 - 4.20	SPTS		N=14 (1,3/3,4,4,3)	0.00	Dry	Stiff brownish grey slightly sandy CLAY with orange clayey sandy silt partings. Sand is fine to medium. (Weathered KELLAWAYS FORMATION)		3.50 +33.53		
3.75 - 5.30	L 19		100% rec		Dry			(0.30)		
3.75 - 4.20	D 12					Very stiff grey CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		3.80 +33.23		
3.80 - 3.90	ES 11									
								(2.40)		
5.30 - 5.75	SPTS		N=16 (3,3/3,4,4,5)	0.00	Dry					
5.30 - 6.80	L 20		100% rec		Dry					
5.30 - 5.75	D 13									
						Very stiff grey slightly sandy silty CLAY with occasional calcareous accretions. (KELLAWAYS FORMATION)		6.20 +30.83		
								(0.55)		
6.80 - 7.25	SPTS		N=21 (2,3/4,5,6,6)	0.00	Dry	Very stiff grey CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		6.75 +30.28		
6.80 - 8.30	L 21		100% rec		Dry			(0.35)		
6.80 - 7.25	D 14					Very stiff grey slightly sandy silty CLAY with occasional shell fragments. (KELLAWAYS FORMATION)		7.10 +29.93		
								(0.60)		
						Very stiff grey CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		7.70 +29.33		
								(0.60)		
8.30 - 8.75	SPTS		N=32 (2,4/6,8,8,10)	0.00	Dry	Very stiff grey silty sandy CLAY with moderate shell and fossil fragments. (KELLAWAYS FORMATION)		8.30 +28.73		
8.30 - 9.80	L 22		100% rec		Dry			(0.40)		
8.30 - 8.75	D 15					Very stiff CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		8.70 +28.33		
								(1.55)		
9.80 - 10.25	SPTS		N=27 (5,5/4,6,8,9)	0.00	Dry					
9.80 - 10.25	D 16									

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed
1	6.18		
2	6.22		

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH03

Borehole Log

Drilled	DH	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.03 mOD
Logged	NJD	05/10/2016	Commachio Geo 205	1.20	10.40	92	4.50	**Coordinates (m)**	E 384975.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 10.25 m. Open holing from 10.25 m to 10.40 m. Rotary coring from 10.40 to 25.40 m.	10.40	25.40	121		**National Grid**	N 158798.00
Approved	LL	07/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				05/10/16	1800 Dry			10.25 (0.15) +26.78		
10.40 - 11.15			C 23	06/10/16	0800	NO RECOVERY.	10.40-10.45 AZCL.	10.40 +26.63		
10.40 - 11.15	93 0 0			4.50	6.18	Very stiff grey slightly sandy silty CLAY. Sand is fine to medium. Occasional shell fragments (up to 10mm). (KELLAWAYS FORMATION)	10.87 Drilling induced fracture.	(0.77)		
11.15 - 11.90			C 24			Stiff to very stiff grey thinly laminated CLAY. Rare shell fragments (up to 5mm). (KELLAWAYS FORMATION)		11.17 +25.86		
11.15 - 11.90	100 0 0						11.58 Drilling induced fracture. 11.65-11.87 Moderate shell fragments.	(0.83)		
11.90 - 12.28				4.50	Wet					
11.90 - 13.40			SPTC 50 (10,12/14,14,19,3 for 5mm) C 25			Soft to firm grey CLAY. Occasional shell fragments (up to 5mm). (KELLAWAYS FORMATION)	11.89-11.90 CRF. 11.90-12.55 Reduced strength due to CPT.	12.00 +25.03		
11.90 - 13.40	100 0 0	NA NA NA				Very stiff grey slightly sandy silty CLAY. Sand is fine to medium. Rare shell fragments (up to 5mm). (KELLAWAYS FORMATION)	12.15-12.90 Moderate shell fragments.	(0.54)		
								12.54 +24.49		
								(0.91)		
13.40 - 13.75				4.50	Wet		13.27 Drilling induced fractures.			
13.40 - 14.90			SPTC 50 (5,6/17,20,13 for 50mm) C 26			Soft to firm grey CLAY. (KELLAWAYS FORMATION)	13.34 Drilling induced fractures. 13.40-13.49 AZCL.	13.45 +23.58		
13.40 - 14.90	94 0 0					Stiff to very stiff grey thinly laminated CLAY. Rare shell fragments (up to 5mm). (KELLAWAYS FORMATION)		(0.40)		
								13.85 +23.18		
							14.51 35 degree fracture. 14.73 Drilling induced fracture.			
14.90 - 15.23				4.50	Wet					
14.90 - 16.40			SPTC 50 (13,12/15,19,16 for 30mm) C 27							
14.90 - 16.40	100 0 0	NI 130 350					15.40 Accidental cut. 15.44 Calcareous clasts. 15.51-15.62 Non-intact and reduced strength.	(2.93)		
				06/10/16	1800					
				4.50	Wet					
16.40 - 16.77				4.50	Wet					
16.40 - 17.90			SPTC 50 (9,11/12,15,23 for 75mm) C 28	07/10/16	0000		16.32 Drilling induced fracture. 16.40-16.42 AZCL. 16.42-16.47 Non-intact and reduced strength due to CPT.			
				4.50	6.22					
16.40 - 17.90	99 80 80	NA NA NA				Extremely weak grey sandy MUDSTONE. Occasional shell fragments (up to 10mm). (KELLAWAYS FORMATION)	16.97 Drilling induced fracture. 17.10 Drilling induced fracture. 17.25 Drilling induced fracture.	16.78 +20.25 (0.97)		
17.90 - 18.25				4.50	Wet			17.75 +19.28		
17.90 - 19.40		390 450 520	SPTC 50 (10,12/17,17,16 for 50mm) C 29			Medium strong thinly laminated grey and light grey fine to medium grained LIMESTONE. (CORNBRASH FORMATION) Discontinuities: Medium spaced horizontal undulating rough clean.	17.90-17.94 AZCL. 17.94-18.03 Non-intact with trace of firm grey clay infill.	(1.15)		
17.90 - 19.40	97 90 84							18.90 +18.13		
						Weak thinly bedded grey fine to medium grained clayey LIMESTONE with very closely spaced laminae and partings of extremely weak grey silty sandy mudstone. Occasional shell fragments (up to 10mm). (CORNBRASH FORMATION) Discontinuities: Closely to medium spaced horizontal undulating stepped rough.	19.18 Drilling induced fracture. 19.23-19.34 <5 mm firm grey clay infill. 19.29 Drilling induced fracture. 19.40-19.43 CRF. 19.51 Drilling induced fracture. 19.63 Drilling induced fracture.			
19.40 - 19.73		100 190 390		4.50	Wet					
19.40 - 20.90			SPTC 50 (17,8/20,19,11 for 25mm) C 30					(2.10)		
						Hole continues on next sheet				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
11.90 - 24.07	SPT hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole BH03

Borehole Log

Drilled	DH	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.03 mOD
Logged	NJD	05/10/2016	Commachio Geo 205	1.20	10.40	92	4.50	**Coordinates (m)**	E 384975.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 10.25 m. Open holing from 10.25 m to 10.40 m. Rotary coring from 10.40 to 25.40 m.	10.40	25.40	121		**National Grid**	N 158798.00
Approved	LL	07/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
19.40 - 20.90	100 0 0						20.12 Drilling induced fracture. 20.16-20.41 Extremely closely spaced dark brown to black carbonaceous partings. 20.40 Drilling induced fracture 20.50-21.12 Occasional closely spaced laminae and partings. 20.90-20.94 AZCL. 20.94 Possible <5 mm firm grey clay infill. 21.24 Drilling induced fracture. 21.55 Drilling induced fracture. 21.73 Drilling induced fracture. 21.81 Drilling induced fracture. 21.97 Drilling induced fracture. 22.19 Drilling induced fracture. 22.30 Drilling induced fracture. 22.48-22.50 Extremely closely spaced dark brown to black carbonaceous partings. 22.70 Drilling induced fracture. 22.81 Drilling induced fracture. 23.06-23.12 Non-intact and sandy. 23.48 Drilling induced fracture. 23.64 Drilling induced fracture. 23.90-23.96 AZCL. 24.39-24.42 Mainly non-intact. 24.87-24.93 Mainly non-intact and sandy. 25.02-25.12 Mainly non-intact and sandy. 25.26-25.29 Mainly non-intact and sandy.		
20.90 - 21.06				4.50	Wet					
20.90 - 22.40			SPTC 50 (25 for 75mm/30,20 for 15mm) C 31			Extremely weak to very weak locally thinly laminated greenish grey calcareous MUDSTONE. (CORNBRASH FORMATION) Discontinuities: Very closely to closely spaced horizontal planar smooth.		21.00 +16.03		
20.90 - 22.40	97 97 97	50 150 200						(1.65)		
22.40 - 22.58				4.50	Wet					
22.40 - 23.90			SPTC 50 (25 for 75mm/27,23 for 30mm) C 32			Thinly interlaminated to thinly interbedded very weak light grey calcareous MUDSTONE and weak grey clayey LIMESTONE. (CORNBRASH FORMATION) Discontinuities: Very closely to closely spaced horizontal planar smooth.		22.65 +14.38		
22.40 - 23.90	100 91 80									
23.90 - 24.07		30		4.50	Wet					
23.90 - 25.40		80 140	SPTC 50 (25 for 75mm/35,15 for 20mm) C 33					(2.75)		
23.90 - 25.40	96 89 13									
				07/10/16 4.50	1800 Wet					
						END OF EXPLORATORY HOLE		25.40 +11.63		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole BH03

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from**	**to**	**Diameter**	**Casing Depth**	**Ground Level**		36.99 mOD
Logged	NJD	14/10/2016	Commachio Geo 205	(m)	(m)	(mm)	(m)	**Coordinates (m)**		E 384977.00
Checked	AP	**End**	Hand excavated trial pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 1.75 m. SPT from 1.75 m to 1.84 m.	1.20	1.75	92		**National Grid**		N 158820.00
Approved	LL	14/10/2016	Terminated at 1.84 m depth due to obstruction. Relocated 2 m NE to BH04A.	1.75	1.84	45				

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.20	ES 2			14/10/16	0800	Dark brown sandy silty angular to subrounded fine to coarse GRAVEL of limestone, clinker and chert. Sand is fine to coarse. (MADE GROUND)		(0.30)		
0.10 - 0.20	D 1							0.30 +36.69		
0.40 - 0.50	ES 4					Very stiff light brown mottled grey slightly gravelly CLAY with orangish brown silty fine sand partings. Gravel is angular coarse of tile. (MADE GROUND)		(0.60)		
0.40 - 0.50	D 3									
0.70 - 0.90	B 5									
0.90 - 1.20	B 6					Brownish grey sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		0.90 +36.09		
								(0.85)		
				14/10/16	1800 Dry					
1.75 - 1.84	SPTC		50 (25 for 75mm/50 for 10mm)		Dry	Hole progressed by SPT.		1.75 (0.09) +35.24		
						END OF EXPLORATORY HOLE		1.84 +35.15		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
1.20 - 1.84	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	
Logged	NJD	14/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 1.75 m. SPT from 1.75 to 1.84. Terminated at 1.84 m due to obstruction. Relocated 2 m SE to BH04B.	1.20	1.75	92		**Coordinates (m)**	
Checked	AP	**End**		1.75	1.84	45		**National Grid**	
Approved	LL	14/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				14/10/16	0800	Dark brown sandy silty angular to subrounded fine to coarse GRAVEL of limestone, clinker and chert. Sand is fine to coarse. (MADE GROUND)		(0.20) 0.20		
						Very stiff light brown mottled grey slightly gravelly CLAY with orangish brown silty fine sand partings. Gravel is angular coarse of tile. (MADE GROUND)		(0.70) 0.90		
1.20 - 1.65	SPTC		N=26 (6,7/8,7,6,5)		Dry	Brownish grey sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		(0.85)		
				14/10/16	1800 Dry					
1.75 - 1.84	SPTC		50 (25 for 75mm/50 for 10mm)		Dry	Hole progressed by SPT.		1.75 (0.09) 1.84		
						END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
1.20 - 1.84	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04A

Sheet 1 of 1

Borehole Log

Drilled	TP ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	
Logged	JH	14/10/2016	Commachio Geo 205	1.20	8.70	102	3.00	**Coordinates (m)**	
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 8.70 m. Rotary coring from 8.70 m to 25.30m. SPT from 25.30 m to 25.72 m.	8.70	25.30	92		**National Grid**	
Approved	LL	19/10/2016		25.30	25.72	45			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				14/10/16	0800	Dark brown gravelly slightly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick, limestone, mudstone and concrete. Occasional rootlets. (MADE GROUND)				
				14/10/16	1800 Dry			(2.00)		
1.20	L 1			0.00	Dry					
1.20 - 1.75	ES 20		55% rec	17/10/16	0800 Dry					
1.75 - 1.84	SPTC		50 (25 for 75mm/50 for 20mm)	0.00	Dry					
2.00 - 2.50			L 2 60% rec	0.00	Dry	Dark brown and grey clayey angular to subangular fine to coarse GRAVEL of mixed lithologies including limestone, basalt and macadam. (MADE GROUND)		2.00		
2.00 - 3.00	100 0 0		ES 21	0.00	Dry			(0.70)		
2.50			L 3 60% rec							
2.50 - 3.00								2.70		
3.00 - 3.45				3.00	Dry	Firm grey mottled orange fissured slightly sandy CLAY. Sand is fine. Occasional pockets of fine sand. (Weathered KELLAWAYS FORMATION)				
3.00 - 4.50			SPTS N=13 (2,2/2,3,4,4)	3.00	Dry			(0.90)		
3.00			L 4 100% rec							
3.40			D 23 ES 22							
3.00 - 4.50	99 0 0					Soft to firm dark grey slightly sandy CLAY. Sand is fine to medium. (Weathered KELLAWAYS FORMATION)		3.60		
								(1.15)		
4.50 - 4.95				3.00	Dry					
4.50 - 6.00			SPTS N=16 (2,2/3,4,4,5)	3.00	Dry					
4.50			L 5 100% rec D 24			Soft thinly laminated dark grey CLAY. (Weathered KELLAWAYS FORMATION)		4.75		
4.50 - 6.00	99 0 0	NA NA NA								
								(2.10)		
6.00 - 6.45				3.00	Dry					
6.00 - 7.30			SPTS N=24 (2,3/3,6,7,8)	3.00	Dry					
6.00			L 6 100% rec D 25							
6.00 - 7.30	98 0 0					Stiff thinly laminated dark silty CLAY. (Weathered KELLAWAYS FORMATION)		6.85		
								(0.65)		
7.30 - 7.71				3.00	Dry					
7.30 - 8.70			SPTS 50 (5,10/16,15,12,7 for 35mm)	3.00	Dry					
7.30			L 7 100% rec D 26			Soft dark grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine of chert and quartzite. (Weathered KELLAWAYS FORMATION)		7.50		
								(0.50)		
7.30 - 8.80	93 0 0					Stiff thinly laminated dark grey CLAY. (Weathered KELLAWAYS FORMATION)		8.00		
								(0.80)		
				17/10/16	1800					
				3.00	Dry					
8.80 - 9.22				18/10/16	0800					
8.80 - 9.55			SPTS 50 (9,10/11,13,15,11 for 40mm)	3.00	Dry	Soft becoming stiff with depth dark grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine of mixed lithologies including quartzite and chert. (Weathered KELLAWAYS FORMATION)		8.80		
8.80			C 8	3.00	Dry					
8.80 - 9.55	95 0 0		D 27					(0.55)		
9.55 - 10.30						Very weak thinly laminated dark grey MUDSTONE. (KELLAWAYS FORMATION) Discontinuities: Medium spaced planar smooth partings along laminae.	9.35-11.06 Rarely grades to soft CLAY in thin beds.	9.35		
	100 100 100		C 9							
9.55 - 10.30										

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
0.00 - 1.20	No samples required
1.20 - 25.72	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04B

Borehole Log

Drilled	TP ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	
Logged	JH	14/10/2016	Commachio Geo 205	1.20	8.70	102	3.00	**Coordinates (m)**	
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 8.70 m. Rotary coring from 8.70 m to 25.30m. SPT from 25.30 m to 25.72 m.	8.70	25.30	92		**National Grid**	
Approved	LL	19/10/2016		25.30	25.72	45			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.30 - 10.72				3.00	Dry			(1.71)		
10.30 - 11.80		100 200 400	SPTC 50 (5,7/12,12,15,11 for 40mm) C 10							
10.30 - 11.80	97 97 97	200 250 320				Very weak thinly interlaminated dark grey silty MUDSTONE. (KELLAWAYS FORMATION) Discontinuities: Widely spaced horizontal planar smooth partings along laminae.		11.06		
11.80 - 12.22				3.00	Dry			(1.04)		
11.80 - 13.30		NA NA NA	SPTC 50 (6,9/13,12,13,12 for 40mm) C 11			Firm laminated dark grey CLAY. (KELLAWAYS FORMATION)	11.80-12.05 Weathered soft grey CLAY.	12.10		
11.80 - 13.30	96 96 94					Very weak thinly laminated dark grey silty MUDSTONE. (KELLAWAYS FORMATION) Discontinuities: Very closely to closely spaced horizontal planar occasionally stepped partings along laminae.	12.60-15.60 Rare brown nodules (up to 10mm). Possibly iron.	12.60		
13.30 - 13.64				3.00	Dry			(0.50)		
13.30 - 14.80			SPTC 51 (12,13/17,19,15 for 35mm) C 12							
13.30 - 14.80	99 99 90	100 150 350						(3.00)		
14.80 - 15.14				3.00	Dry					
14.80 - 16.30			SPTC 50 (11,9/16,14,20 for 45mm) C 13							
14.80 - 16.30	99 94 76					Very weak thinly laminated dark grey slightly silty MUDSTONE with rare laminae of fine sandstone. (KELLAWAYS FORMATION) Discontinuities: Medium spaced and locally closely spaced horizontal planar stepped smooth along laminae partings.		15.60		
16.30 - 16.63		40 120 150		3.00	Dry			(1.10)		
16.30 - 17.80			SPTC 50 (12,10/18,16,16 for 30mm) C 14					16.70		
16.30 - 17.80	98 98 93	70 180 280				Weak thinly laminated dark grey silty MUDSTONE. Occasional thin shell-rich beds. Shell content increases with depth. (KELLAWAYS FORMATION) Discontinuities: Medium spaced horizontal rough stepped partings.		(0.79)		
17.80 - 17.90		150 260 260		3.00	Dry	Medium strong thickly laminated dark grey silty fine to medium grained bioclastic LIMESTONE. (CORNBRASH FORMATION) Discontinuity: horizontal planar rough partings.	17.49-18.00 Sharp upper contact. Rare bioturbation below upper contact.	17.49		
17.80 - 19.30			SPTC 50 (25 for 75mm/50 for 20mm) C 15 NI NI 100			Strong light grey slightly silty medium grained ooidal and shelly LIMESTONE. (CORNBRASH FORMATION) Discontinuity: Horizontal undulating rough.	18.00-18.30 Occasional disseminations of pyrite.	(0.51)		
17.80 - 19.30	96 90 84	100 NI 500				Very strong thinly and thickly bedded light grey bioclastic slightly sandy fine to medium grained LIMESTONE. (CORNBRASH FORMATION) Discontinuity (Joint): Subvertical (~75 degrees) planar rough with calcitic coating.	18.30-18.94 Rare subvertical to vertical veins of calcite.	18.00 (0.30) 18.30 (0.64) 18.94		
19.30 - 19.40				3.00	Dry	Weak to medium strong lenticular cross-bedded light grey mottled dark grey silty bioclastic medium grained LIMESTONE with beds of poorly consolidated MUDSTONE. Shell content increases with depth. (CORNBRASH FORMATION) Discontinuities: Very closely to closely spaced	19.05-19.10 Non-intact.			
19.30 - 20.80		60 72 590	SPTC 50 (25 for 75mm/50 for 25mm) C 16					(2.09)		

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04B

Borehole Log

Drilled	TP ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	
Logged	JH	14/10/2016	Commachio Geo 205	1.20	8.70	102	3.00	**Coordinates (m)**	
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 8.70 m. Rotary coring from 8.70 m to 25.30m. SPT from 25.30 m to 25.72 m.	8.70	25.30	92		**National Grid**	
Approved	LL	19/10/2016		25.30	25.72	45			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
19.30 - 20.80	100 100 92					subhorizontal undulating smooth partings along beds.	20.40-21.03 Becomes medium strong with no mudstone beds.			
20.80 - 22.30			C 17							
20.80 - 22.30	93 93 83	70 150 304		18/10/16 3.00	1800 Dry	Weak poorly bedded dark green mottled light brown occasionally calcareous MUDSTONE. (FOREST MARBLE FORMATION) Discontinuities: Horizontal closely spaced undulating smooth occasionally rough partings along bedding.	21.03-22.85 Rare laminae of carbonaceous MUDSTONE.	21.03 (1.82)		
22.30 - 22.72				3.00	Dry					
22.30 - 23.80			SPTC 50 (5,7/12,12,15,11 for 40mm) C 18	19/10/16 3.00	0800 Dry					
22.30 - 23.80	96 77 75	170 200 250				Weak thinly to thickly laminated dark green and white MUDSTONE with occasional thin laminae of fine grained bioclastic LIMESTONE. (FOREST MARBLE FORMATION) Discontinuities: Closely spaced horizontal planar smooth partings along laminae.		22.85 (0.61) 23.46		
23.80 - 25.30			C 19			Weak to medium strong thickly interlaminated olive green and white MUDSTONE and LIMESTONE. (FOREST MARBLE FORMATION) Discontinuities: Medium spaced horizontal planar rough partings along laminations. One joint vertical stepped rough.		(1.84)		
23.80 - 25.30	66 55 48	40 170 290								
25.30 - 25.72			SPTC 50 (6,9/13,12,13,12 for 50mm)	3.00	Dry	Hole progressed by SPT.		25.30		
				19/10/16 3.00	1800 Dry			(0.42)		
						END OF EXPLORATORY HOLE		25.72		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04B

APPENDIX C

INSTRUMENTATION AND MONITORING

Installation Details	Table C1
Groundwater Monitoring	Table C2
Gas Monitoring	Table C3
Water Sampling Records	BH01, BH02A, BH03, BH04B

Installation Details

Instrument Reference	Instrument Type (See Notes)	Installation Date, dd/mm/yyyy	Pipe Diameter, mm	Instrument Base, mbgl	Response Zone Range, mbgl	Pipe Top Details	Headworks	Remarks
BH01 (1)	SPIE	04/10/2016	19	3.00	1.00 to 3.00	Gas tap	Flush	
BH01 (2)	SP	04/10/2016	50	24.00	12.00 to 24.00	Gas tap	Flush	
BH02A (1)	SP	11/10/2016	50	20.50	18.00 to 20.50	Gas tap	Flush	
BH02A (2)	SP	11/10/2016	19	2.50	1.80 to 2.50	Gas tap	Flush	
BH03 (1)	SP	17/10/2016	50	16.00	10.00 to 16.00	Gas tap	Flush	
BH03 (2)	SP	07/10/2016	19	1.50	0.50 to 1.50	Gas tap	Flush	
BH04B (1)	SP	19/10/2016	50	16.50	3.00 to 16.50	Gas tap	Flush	
BH04B (2)	SP	19/10/2016	19	2.20	0.50 to 2.20	Gas tap	Flush	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

Groundwater Monitoring

Instrument Reference	Instrument Type	Instrument Base, mbgl	Date Time dd/mm/yyyy hh:mm:ss	Depth to groundwater, mbgl	Comments
BH01 (1)	SPIE	3.00	17/11/2016 09:00:00	1.95	
BH01 (1)	SPIE	3.00	22/11/2016 13:10:00	0.47	
BH01 (1)	SPIE	3.00	30/11/2016 10:00:00	2.08	
BH01 (1)	SPIE	3.00	08/12/2016 09:10:00	1.87	
BH01 (1)	SPIE	3.00	12/01/2017 09:00:00	1.86	
BH01 (1)	SPIE	3.00	23/01/2017 12:10:00	2.00	
BH01 (1)	SPIE	3.00	06/02/2017 11:40:00	1.90	
BH01 (2)	SP	24.00	17/11/2016 10:00:00	2.25	
BH01 (2)	SP	24.00	22/11/2016 13:00:00	0.80	
BH01 (2)	SP	24.00	30/11/2016 10:30:00	2.10	
BH01 (2)	SP	24.00	08/12/2016 09:00:00	1.76	
BH01 (2)	SP	24.00	12/01/2017 09:10:00	2.05	
BH01 (2)	SP	24.00	23/01/2017 12:00:00	2.00	
BH01 (2)	SP	24.00	06/02/2017 11:30:00	2.00	
BH02A (1)	SP	20.50	12/01/2017 09:25:00	2.17	
BH02A (1)	SP	20.50	23/01/2017 12:20:00	1.90	
BH02A (1)	SP	20.50	06/02/2017 12:15:00	2.10	
BH02A (2)	SP	2.50	12/01/2017 09:35:00	1.57	
BH02A (2)	SP	2.50	23/01/2017 12:25:00	1.40	
BH02A (2)	SP	2.50	06/02/2017 12:20:00	1.60	
BH03 (1)	SP	16.00	12/01/2017 09:50:00	1.83	
BH03 (1)	SP	16.00	23/01/2017 12:35:00	1.70	
BH03 (1)	SP	16.00	06/02/2017 12:45:00	1.80	
BH03 (2)	SP	1.50	12/01/2017 10:00:00	1.70	
BH03 (2)	SP	1.50	23/01/2017 12:40:00	1.80	
BH03 (2)	SP	1.50	06/02/2017 12:40:00	1.70	
BH04B (1)	SP	16.50	12/01/2017 10:15:00	1.72	
BH04B (1)	SP	16.50	23/01/2017 12:50:00	1.70	
BH04B (1)	SP	16.50	06/02/2017 13:00:00	1.70	
BH04B (2)	SP	2.20	12/01/2017 10:25:00	1.70	
BH04B (2)	SP	2.20	23/01/2017 12:55:00	1.80	
BH04B (2)	SP	2.20	06/02/2017 13:00:00	1.70	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

Gas Monitoring

								Gas Concentrations						
Instrument Reference	Date Time dd/mm/yyyy hh:mm:ss	Reading Depth, mBGL	Air Temperature, oC	Baromentric Pressure, mbar	Instrument Base, mbgl	Gas Differential Pressure, Pa	Gas Flow Rate, l/hr	Carbon Dioxide, %vol	Carbon Monoxide, ppm	Hydrogen Sulphide, ppm	Methane, %LEL	Methane, %vol	Oxygen, %vol	Total VOCs, ppm
BH01 (1)	17/11/2016 09:00:00	0.00	9.0	992	3.00	0.0	0.0	6.5		0.0	0.0	0.0	8.5	
BH01 (1)	22/11/2016 13:10:00	0.00	7.0	996	3.00	0.0	0.0	0.0		0.0	0.0	0.0	20.5	
BH01 (1)	30/11/2016 10:00:00	0.00	0.0	1032	3.00	0.1	0.0	6.6		0.0	1.1	0.1	10.8	
BH01 (1)	08/12/2016 09:10:00	0.00	10.0	1011	3.00	0.6	0.2	0.0		0.0	0.0	0.0	20.5	
BH01 (1)	12/01/2017 09:00:00	0.00	5.0	992	3.00	0.0	0.0	0.0		0.0	0.0	0.0	20.4	
BH01 (1)	23/01/2017 12:10:00	0.00	3.0	1022	3.00	0.1	0.0	3.6		0.0	0.0	0.0	17.1	
BH01 (1)	06/02/2017 11:40:00	0.00	3.0	1013	3.00	-0.2	0.1	4.1		0.0	0.0	0.0	15.9	
BH01 (2)	17/11/2016 10:00:00	0.00	9.0	992	24.00	0.0	0.2	0.4		0.0	0.0	0.0	19.2	
BH01 (2)	22/11/2016 13:00:00	0.00	7.0	996	24.00	-0.2	0.0	1.2		0.0	0.0	0.0	18.6	
BH01 (2)	30/11/2016 10:30:00	0.00	0.0	1031	24.00	-2.6	-1.0	0.7		0.0	0.0	0.0	18.9	
BH01 (2)	08/12/2016 09:00:00	0.00	10.0	1014	24.00	-0.9	-0.3	0.0		0.0	0.0	0.0	20.5	
BH01 (2)	12/01/2017 09:10:00	0.00	5.0	993	24.00	0.0	0.3	0.1		0.0	0.0	0.0	20.2	
BH01 (2)	23/01/2017 12:00:00	0.00	3.0	1023	24.00	0.0	-0.2	0.1		0.0	0.0	0.0	19.3	
BH01 (2)	06/02/2017 11:30:00	0.00	3.0	1012	24.00	-2.3	-1.4	0.6		0.0	0.0	0.0	19.5	
BH02A (1)	12/01/2017 09:25:00	0.00	5.0	993	20.50	0.0	0.1	0.2		0.0	0.0	0.0	18.0	
BH02A (1)	23/01/2017 12:20:00	0.00	3.0	1023	20.50	0.0	0.0	0.8		0.0	0.0	0.0	19.1	
BH02A (1)	06/02/2017 12:15:00	0.00	3.0	1013	20.50	-0.1	0.2	0.3		0.0	0.0	0.0	16.9	
BH02A (2)	12/01/2017 09:35:00	0.00	5.0	993	2.50	0.0	0.0	0.0		0.0	0.0	0.0	20.1	
BH02A (2)	23/01/2017 12:25:00	0.00	3.0	1021	2.50	0.0	0.1	0.4		0.0	0.0	0.0	19.8	
BH02A (2)	06/02/2017 12:20:00	0.00	3.0	1013	2.50	-0.2	0.0	0.4		0.0	0.0	0.0	19.1	
BH03 (1)	12/01/2017 09:50:00	0.00	5.0	991	16.00	0.0	0.0	0.0		0.0	0.0	0.0	20.3	
BH03 (1)	23/01/2017 12:35:00	0.00	3.0	1023	16.00	0.2	0.0	0.1		0.0	0.0	0.0	20.2	
BH03 (1)	06/02/2017 12:45:00	0.00	3.0	1012	16.00	-0.1	-0.4	0.3		0.0	0.0	0.0	19.2	
BH03 (2)	12/01/2017 10:00:00	0.00	5.0	991	1.50	0.0	0.1	1.2		0.0	0.0	0.0	18.3	
BH03 (2)	23/01/2017 12:40:00	0.00	3.0	1020	1.50	0.1	-0.1	0.0		0.0	0.0	0.0	20.3	
BH03 (2)	06/02/2017 12:40:00	0.00	3.0	1012	1.50	0.0	0.1	0.6		0.0	0.0	0.0	16.3	
BH04B (1)	12/01/2017 10:15:00	0.00	5.0	992	16.50	0.0	0.1	0.0		0.0	0.0	0.0	20.3	
BH04B (1)	23/01/2017 12:50:00	0.00	3.0	1022	16.50	0.1	0.0	0.1		0.0	0.0	0.0	20.2	
BH04B (1)	06/02/2017 13:00:00	0.00	3.0	1013	16.50	-0.1	0.0	2.1		0.0	0.0	0.0	18.4	
BH04B (2)	12/01/2017 10:25:00	0.00	5.0	992	2.20	0.0	0.1	2.7		0.0	0.0	0.0	18.4	
BH04B (2)	23/01/2017 12:55:00	0.00	3.0	1023	2.20	0.2	0.0	0.2		0.0	0.0	0.0	20.3	

Notes: ND - not detected

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Figure C3

ESG **Water Sampling Record**

Project No	H6100-16
Project	Trowbridge STW, Wiltshire
Client	Wessex Water Services Limited
Borehole No	BH01
Site Area	
Date	06/02/2017

Purging Data

Initial Water Level, mBGL (a)	2
Base of Installation, m BGL (b)	24
Saturated Depth, m (c) (b-a)	22
Diameter of Installation, mm (d)	50
Base of Borehole, m (e)	25.15
Well Volume, litres (f) ($\pi d^2 c/4)x10^{-3}$	43.1969
Number of Well Volumes (g)	3
Purging Device	Bailer
Flow Rate, l/min (h)	3
Time to purge, min (gf/h)	60
Volume Purged, litres	120

Guideline Water Volumes

Borehole Diameter (mm)	Volume (litres/m)
17	0.23
50	2.0
95	7.1
100	8
150	18
200	32
380	113

Readings taken during purging

Water Level, mBGL							
Temperature, degC							
pH							
Dissolved O2, mg/l							
Conductivity, uS/m							
Redox Potential, mV							

Sampling Data

Sample Collection Depth, mBGL	2	Oil	NA
Sample No (use ddmmyy) EWM	W1	Appearance and Colour	Brown
Time Collected (hh:mm:ss)	113000	Odour	NA
Time since purge (minutes)	40	Sediment	NA
Containers: Number	1	Type	NA

Remarks

Weather	Cloudy
Notes and Comments	

Name	**Signature**

ESG **Water Sampling Record**

Project No	H6100-16
Project	Trowbridge STW, Wiltshire
Client	Wessex Water Services Limited
Borehole No	BH02A
Site Area	
Date	06/02/2017

Purging Data

Initial Water Level, mBGL (a)	2.1
Base of Installation, m BGL (b)	20.5
Saturated Depth, m (c) (b-a)	18.4
Diameter of Installation, mm (d)	50
Base of Borehole, m (e)	25.4
Well Volume, litres (f) ($\pi d^2 c/4)x10^{-3}$	36.12832
Number of Well Volumes (g)	3
Purging Device	Bailer
Flow Rate, l/min (h)	3
Time to purge, min (gf/h)	30
Volume Purged, litres	110

Guideline Water Volumes

Borehole Diameter (mm)	Volume (litres/m)
17	0.23
50	2.0
95	7.1
100	8
150	18
200	32
380	113

Readings taken during purging

Water Level, mBGL							
Temperature, degC							
pH							
Dissolved O2, mg/l							
Conductivity, uS/m							
Redox Potential, mV							

Sampling Data

Sample Collection Depth, mBGL		2.1	Oil
Sample No (use ddmmyy)	EWM	W1	Appearance and Colour
Time Collected (hh:mm:ss)		121500	Odour
Time since purge (minutes)		30	Sediment
Containers:	Number	1	Type

Remarks

Weather	Cloudy
Notes and Comments	

Name	**Signature**

ESG **Water Sampling Record**

Project No	H6100-16
Project	Trowbridge STW, Wiltshire
Client	Wessex Water Services Limited
Borehole No	BH03
Site Area	
Date	06/02/2017

Purging Data

Initial Water Level, mBGL (a)	1.8
Base of Installation, m BGL (b)	16
Saturated Depth, m (c) (b-a)	14.2
Diameter of Installation, mm (d)	50
Base of Borehole, m (e)	25.4
Well Volume, litres (f) ($\pi d^2 c/4)x10^{-3}$	27.88163
Number of Well Volumes (g)	3
Purging Device	Bailer
Flow Rate, l/min (h)	3
Time to purge, min (gf/h)	15
Volume Purged, litres	90

Guideline Water Volumes

Borehole Diameter (mm)	Volume (litres/m)
17	0.23
50	2.0
95	7.1
100	8
150	18
200	32
380	113

Readings taken during purging

Water Level, mBGL							
Temperature, degC							
pH							
Dissolved O2, mg/l							
Conductivity, uS/m							
Redox Potential, mV							

Sampling Data

Sample Collection Depth, mBGL	1.8	Oil	NA
Sample No (use ddmmyy) EWM	W1	Appearance and Colour	Brown
Time Collected (hh:mm:ss)	124500	Odour	None
Time since purge (minutes)	30	Sediment	None
Containers: Number	1	Type	

Remarks

Weather	Cloudy
Notes and Comments	

Name	**Signature**

ESG **Water Sampling Record**

Project No	H6100-16
Project	Trowbridge STW, Wiltshire
Client	Wessex Water Services Limited
Borehole No	BH04B
Site Area	
Date	06/02/2017

Purging Data

Initial Water Level, mBGL (a)	1.7
Base of Installation, m BGL (b)	16.5
Saturated Depth, m (c) (b-a)	14.8
Diameter of Installation, mm (d)	50
Base of Borehole, m (e)	25.72
Well Volume, litres (f) ($\pi d^2 c/4)x10^{-3}$	29.05973
Number of Well Volumes (g)	3
Purging Device	Bailer
Flow Rate, l/min (h)	3
Time to purge, min (gf/h)	10
Volume Purged, litres	30

Guideline Water Volumes

Borehole Diameter (mm)	Volume (litres/m)
17	0.23
50	2.0
95	7.1
100	8
150	18
200	32
380	113

Readings taken during purging

Water Level, mBGL							
Temperature, degC							
pH							
Dissolved O2, mg/l							
Conductivity, uS/m							
Redox Potential, mV							

Sampling Data

Sample Collection Depth, mBGL		1.7	Oil
Sample No (use ddmmyy)	EWM	W1	Appearance and Colour
Time Collected (hh:mm:ss)		131000	Odour
Time since purge (minutes)		15	Sediment
Containers:	Number	1	Type

Remarks

Weather	Cloudy
Notes and Comments	

Name	**Signature**

APPENDIX D
IN-SITU TESTING

California Bearing Ratio Tests	CB01 to CB03

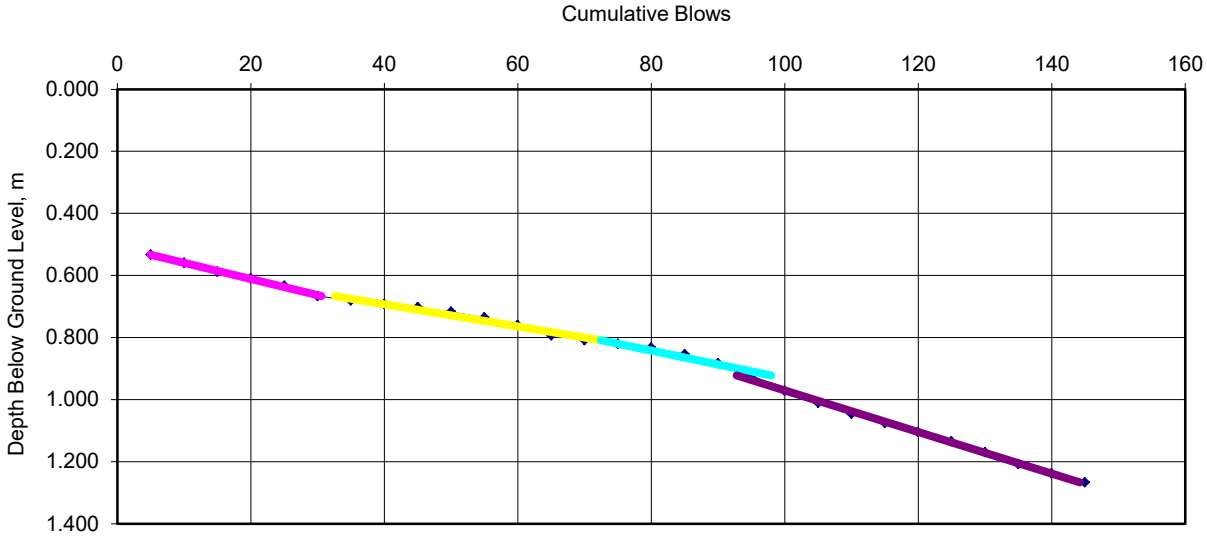
Dynamic Cone Penetrometer Test

Date of Test: 03/10/2016 Test Depth: 0.500 mBGL

Method: TRL PROBE

Remarks:

Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows
0.533	5	1.208	135						
0.559	10	1.238	140						
0.588	15	1.267	145						
0.610	20								
0.633	25								
0.666	30								
0.681	35								
0.692	40								
0.703	45								
0.717	50								
0.736	55								
0.760	60								
0.793	65								
0.809	70								
0.820	75								
0.833	80								
0.854	85								
0.883	90								
0.922	95								
0.972	100								
1.011	105								
1.046	110								
1.076	115								
1.105	120								
1.135	125								
1.170	130								



CBR Values

Top, mBGL	Base, mBGL	CBR, %[1]
0.53	0.67	52
0.67	0.81	78
0.81	0.92	62
0.92	1.27	40

Notes:

Calculated using DMRB Vol 7, Section 3, Part 2, HD29/08 (2008)

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Hole **CBR01**

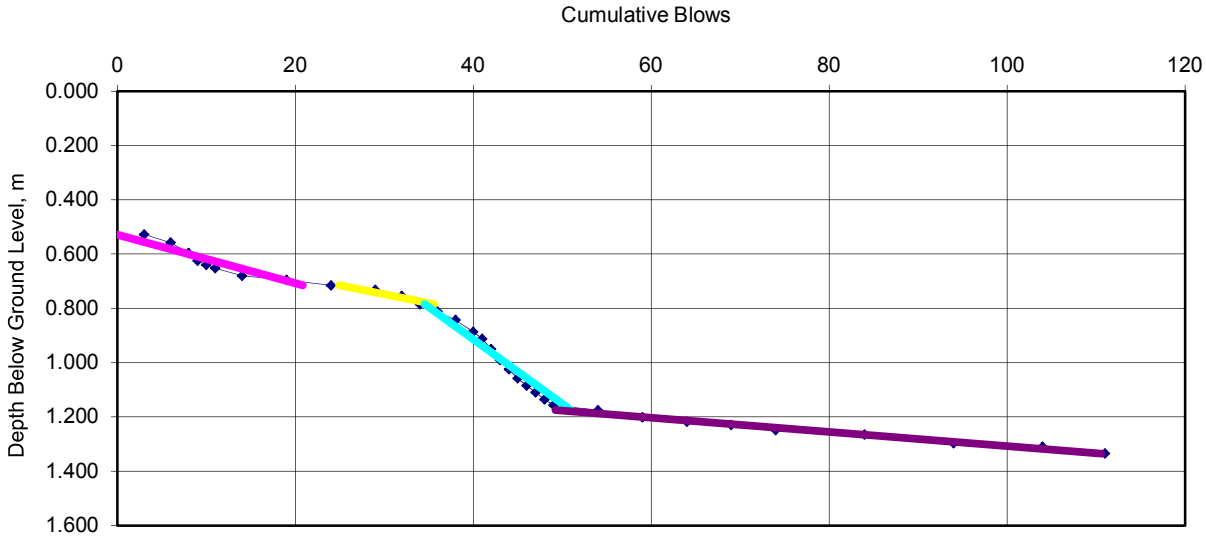
Dynamic Cone Penetrometer Test

Date of Test: 19/10/2016 Test Depth: 0.500 mBGL

Method: TRL PROBE

Remarks:

Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows
0.528	3	1.218	64						
0.558	6	1.230	69						
0.596	8	1.248	74						
0.625	9	1.265	84						
0.640	10	1.297	94						
0.652	11	1.310	104						
0.680	14	1.335	111						
0.696	19								
0.715	24								
0.732	29								
0.754	32								
0.785	34								
0.812	36								
0.843	38								
0.886	40								
0.912	41								
0.950	42								
0.990	43								
1.025	44								
1.058	45								
1.085	46								
1.109	47								
1.135	48								
1.157	49								
1.175	54								
1.201	59								



CBR Values

Top, mBGL	Base, mBGL	CBR, %[1]
0.53	0.72	29
0.72	0.79	41
0.79	1.18	10
1.18	1.34	100

Notes:

Calculated using DMRB Vol 7, Section 3, Part 2, HD29/08 (2008)

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Hole **CBR02**

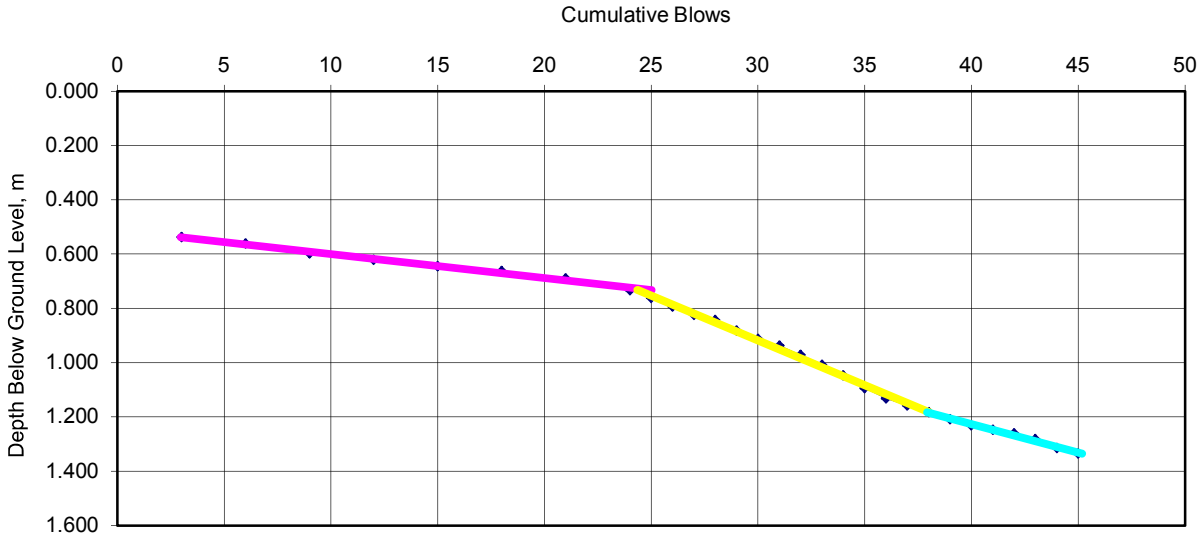
Dynamic Cone Penetrometer Test

Date of Test: 19/10/2016 Test Depth: 0.500 mBGL

Method: TRL PROBE

Remarks:

Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows	Depth, mBGL	Cumulative Blows
0.538	3	1.282	43						
0.561	6	1.314	44						
0.598	9	1.335	45						
0.621	12								
0.645	15								
0.663	18								
0.690	21								
0.733	24								
0.762	25								
0.793	26								
0.824	27								
0.843	28								
0.882	29								
0.912	30								
0.937	31								
0.972	32								
1.008	33								
1.047	34								
1.094	35								
1.132	36								
1.158	37								
1.183	38								
1.208	39								
1.231	40								
1.247	41								
1.260	42								



CBR Values

Top, mBGL	Base, mBGL	CBR, %[1]
0.54	0.73	30
0.73	1.18	7.5
1.18	1.34	12

Notes:

Calculated using DMRB Vol 7, Section 3, Part 2, HD29/08 (2008)

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Hole **CBR03**

APPENDIX E

GEOTECHNICAL LABORATORY TEST RESULTS

Index Properties – Summary of Results	INDX 1
Particle Size Distribution Analyses	PSD 1
Unconsolidated Undrained Triaxial Compression Tests – Summary of Results	UUSUM 1
One Dimensional Consolidation Test	OED 1
Point Load Index Tests	PLT 1
Shear Strength by Hand Vane	HV 1
BRE SD1 Tests	EFS/168818 and EFS/188933

INDEX PROPERTIES - SUMMARY OF RESULTS

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	*p* Mg/m3	*pd* Mg/m3	*w* %	< 425 µm sieve %	WL %	WP %	IP	*ps* Mg/m3	Remarks
BH01	10	2.00		D	Brown slightly sandy clayey GRAVEL.			5.4						
BH01	12	3.00		D	Greyish brown slightly sandy gravelly CLAY.			14	43	39 b	19	20		
BH01	14	5.70		D	Grey slightly sandy slightly gravelly CLAY.			21	99	54 a	22	32		
BH01	21	7.65		C	Grey fissured slightly sandy CLAY.			22	100	57 a	23	34		
BH01	22	9.15		C	Soft brownish grey slightly sandy slightly gravelly CLAY.			39						
BH01	23	10.65		C	Grey fissured slightly sandy CLAY.			20	99	50 a	22	28		
BH01	24	12.15		C	Very stiff brownish grey slightly sandy CLAY with occasional shell fragments.			19	99	47 a	21	26		
BH01	25	13.65		C	Grey fissured slightly sandy CLAY.			20	100	51 a	23	28		
BH01	26	15.15		C	Grey fissured slightly sandy CLAY.			25	100	57 a	29	28		
BH01	28	18.15		C	Grey slightly sandy slightly clayey GRAVEL. Gravel is limestone.			5						
BH01	31	22.65		C	Grey GRAVEL. Gravel is limestone.			5.3						
BH02A	15	1.65		L	Yellowish brown and light grey slightly sandy silty CLAY.			19						
BH02A	16	3.00		L	Stiff grey mottled yellowish brown slightly sandy CLAY with rare gypsum.			23						
BH02A	8	4.50		D	Grey slightly sandy slightly gravelly CLAY.			27	99	51 a	21	30		
BH02A	10	7.50		D	Grey slightly sandy slightly gravelly CLAY.			15	90	38 a	15	23		
BH02A	12	10.50		D	Grey slightly sandy CLAY.			22	100	52 a	23	29		
BH03	10	2.25		D	Yellowish brown and light grey slightly sandy slightly gravelly CLAY.			24	99	37 a	19	18		
BH03	15	8.30		D	Greyish brown slightly sandy slightly gravelly CLAY.			18	94	44 a	19	25		
BH03	24	11.15		C	Grey slightly sandy slightly gravelly CLAY.			25	99	42 a	19	23		
BH03	25	11.90		C	Grey slightly sandy slightly gravelly CLAY.			12	99	41 a	21	20		
BH03	27	14.90		C	Firm grey slightly sandy slightly gravelly CLAY.			30	100	56 a	27	29		
BH04B	23	3.00		D	Greyish brown slightly sandy slightly gravelly CLAY.			24	96	53 a	22	31		
BH04B	24	4.50		D	Grey slightly sandy slightly gravelly CLAY.			24	100	56 a	22	34		
BH04B	25	6.00		D	Grey slightly sandy CLAY.			19	100	48 a	25	23		

General notes: All above tests carried out to BS1377 : 1990 unless annotated otherwise. See individual test reports for further details.

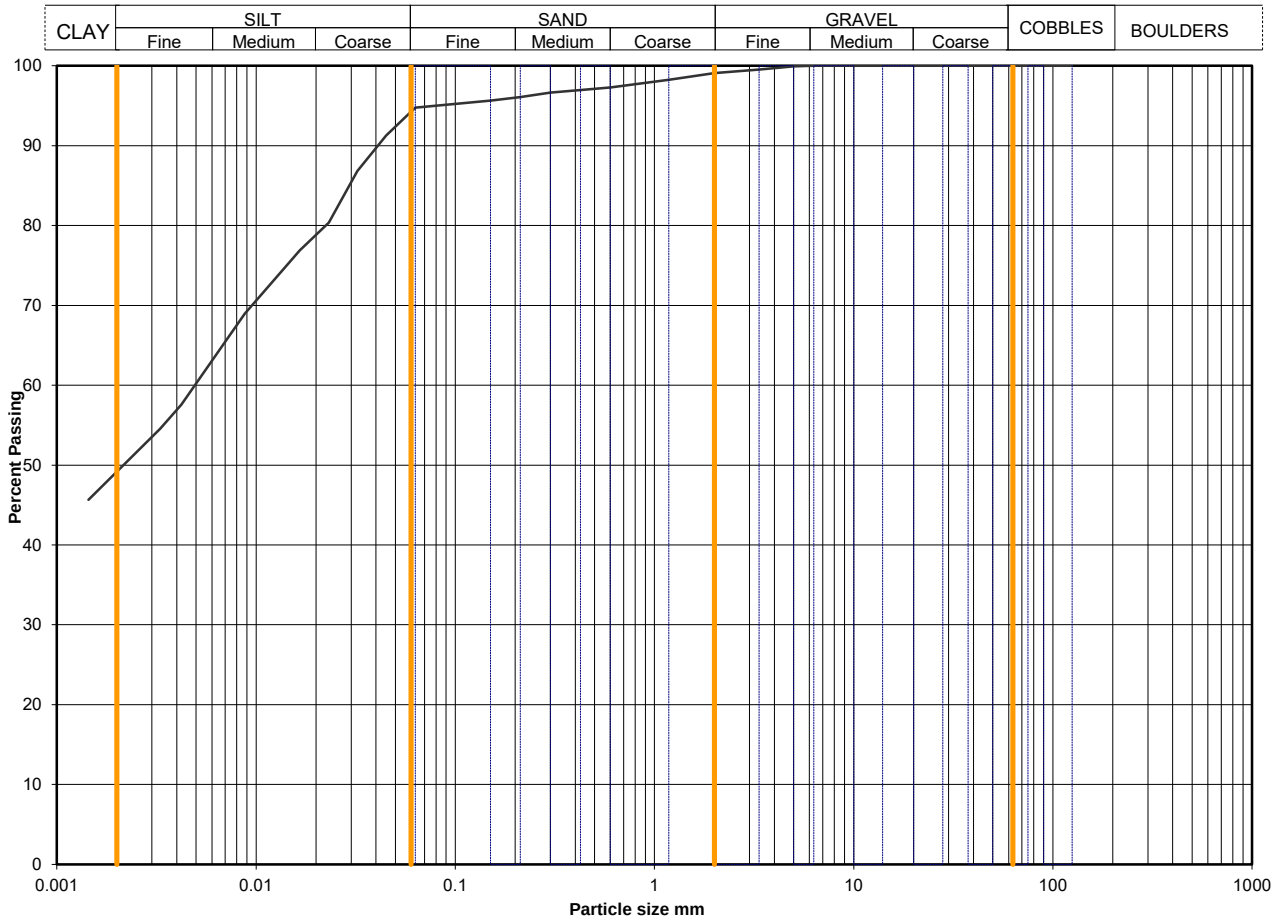
Key :

p	bulk density, linear	WL Liquid limit	WP	Plastic limit	<425um preparation	*ps*	*particle density*
pd	dry density	a 4 point cone test	NP	non - plastic	n from natural soil	-g = gas jar	
w	moisture content	b 1 point cone test	IP	Plasticity Index	s sieved specimen	-p = small pyknometer	
*	test carried out to BS EN ISO 17892-1 2014						

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

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH01
		Sample Depth (m BGL)	3
	H6100-1620161006031710	Sample Type and No	L17
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	95
90	100	0.0449	91
75	100	0.0322	87
63	100	0.0232	80
50	100	0.0166	77
37.5	100	0.0088	69
28	100	0.0042	58
20	100	0.0033	55
14	100	0.0014	46
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	99		
1.18	98		
0.600	97		
0.425	97	2.65 assumed	
0.300	97	Dry mass of sample, kg	
0.212	96		
0.150	96	3.0	
0.063	95		

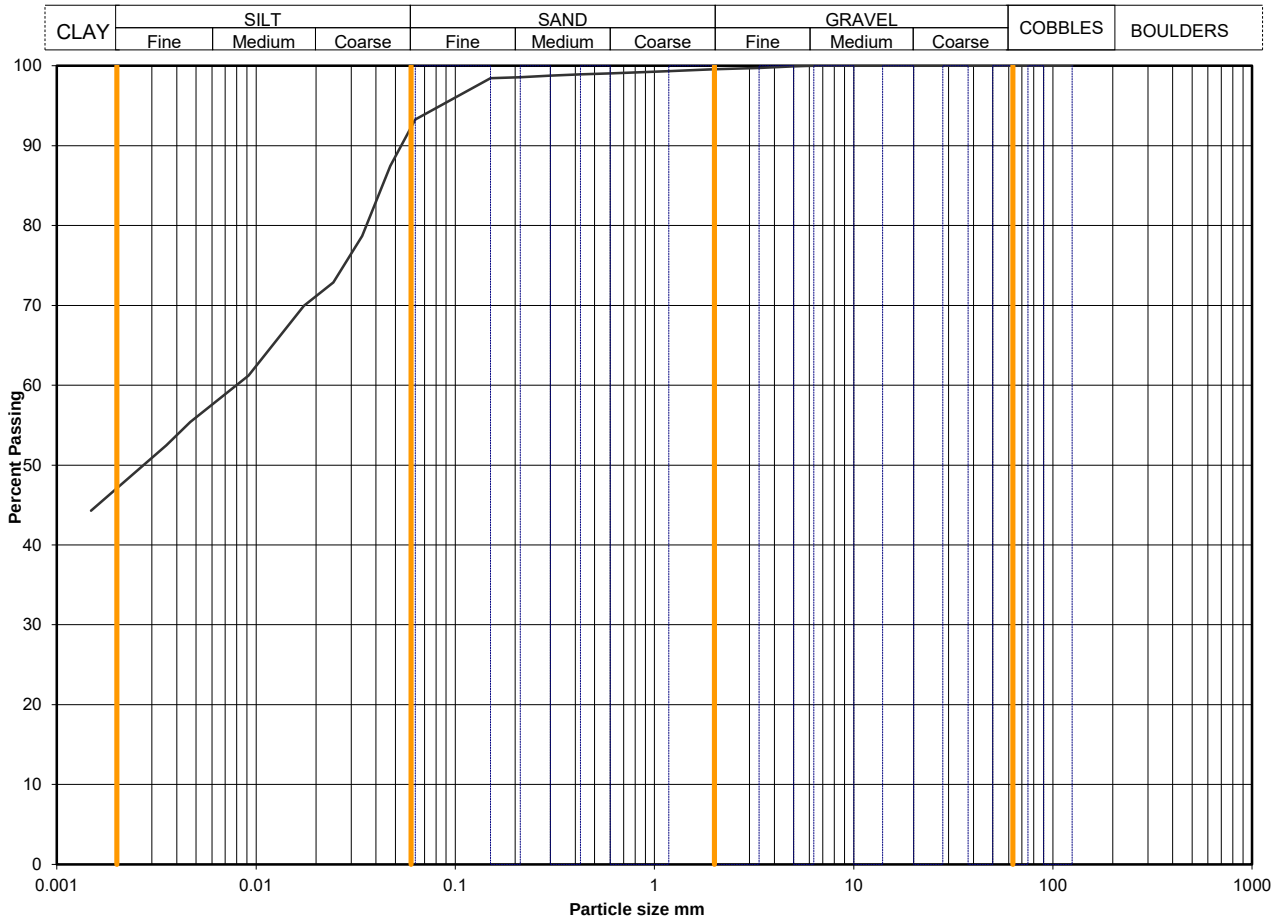
Soil description	Grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	1	1
	Sand	4	4
*<60mm values to aid description only	Silt	46	46
	Clay	49	49

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH01
		Sample Depth (m BGL)	12.15
	H6100-1620161006032755	Sample Type and No	C24
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	93
90	100	0.0472	87
75	100	0.0341	79
63	100	0.0244	73
50	100	0.0174	70
37.5	100	0.0092	61
28	100	0.0047	55
20	100	0.0035	52
14	100	0.0015	44
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	99		
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	98	1.2	
0.063	93		

Soil description	Very stiff brownish grey slightly sandy CLAY with occasional shell fragments.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

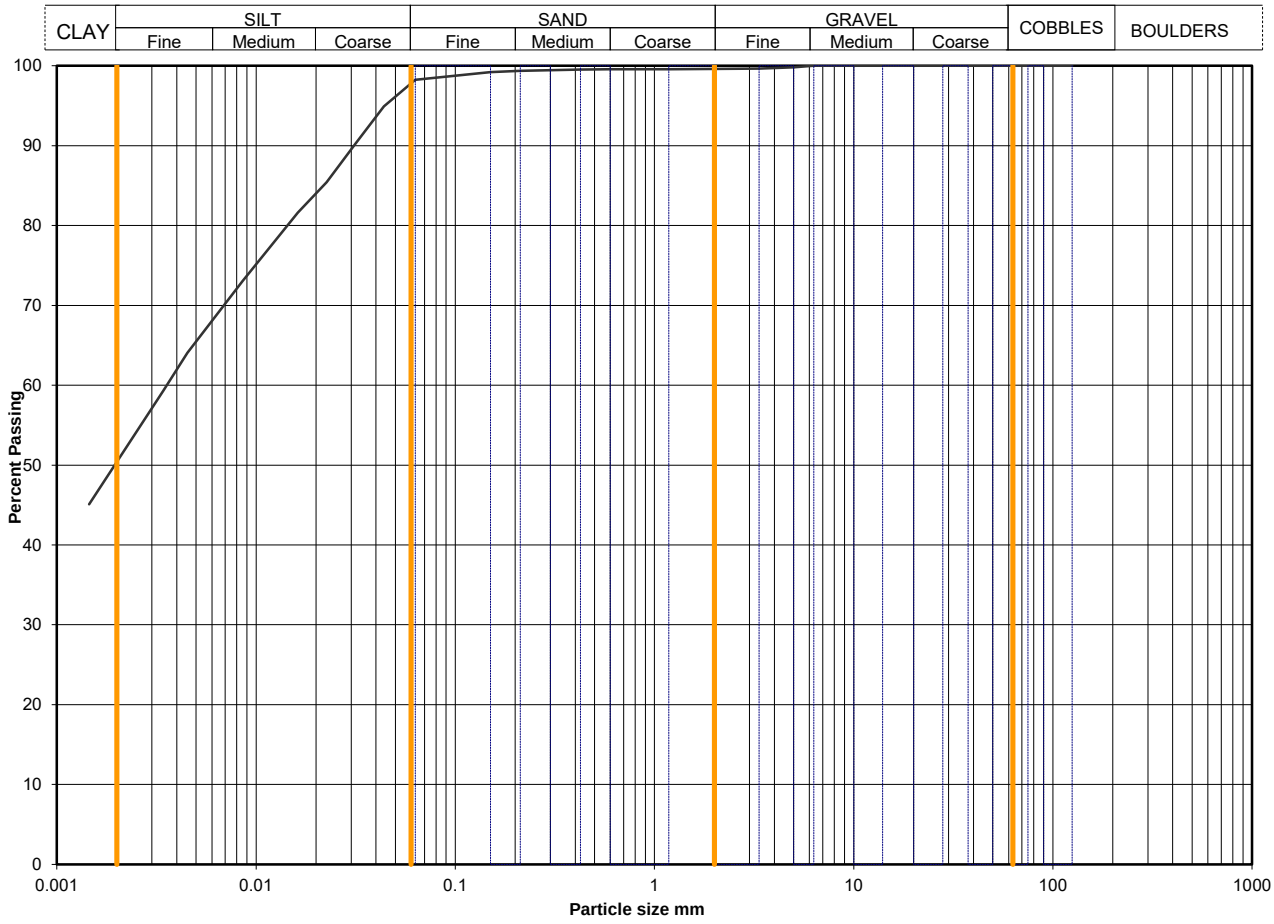
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	0	0
	Sand	6	6
*<60mm values to aid description only	Silt	46	46
	Clay	47	47

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH01
		Sample Depth (m BGL)	15.15
	H6100-1620161006032825	Sample Type and No	C26
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0438	95
75	100	0.0314	90
63	100	0.0226	85
50	100	0.0162	82
37.5	100	0.0086	73
28	100	0.0045	64
20	100	0.0034	59
14	100	0.0015	45
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	1.0	
0.063	98		

Soil description	Grey fissured slightly sandy CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

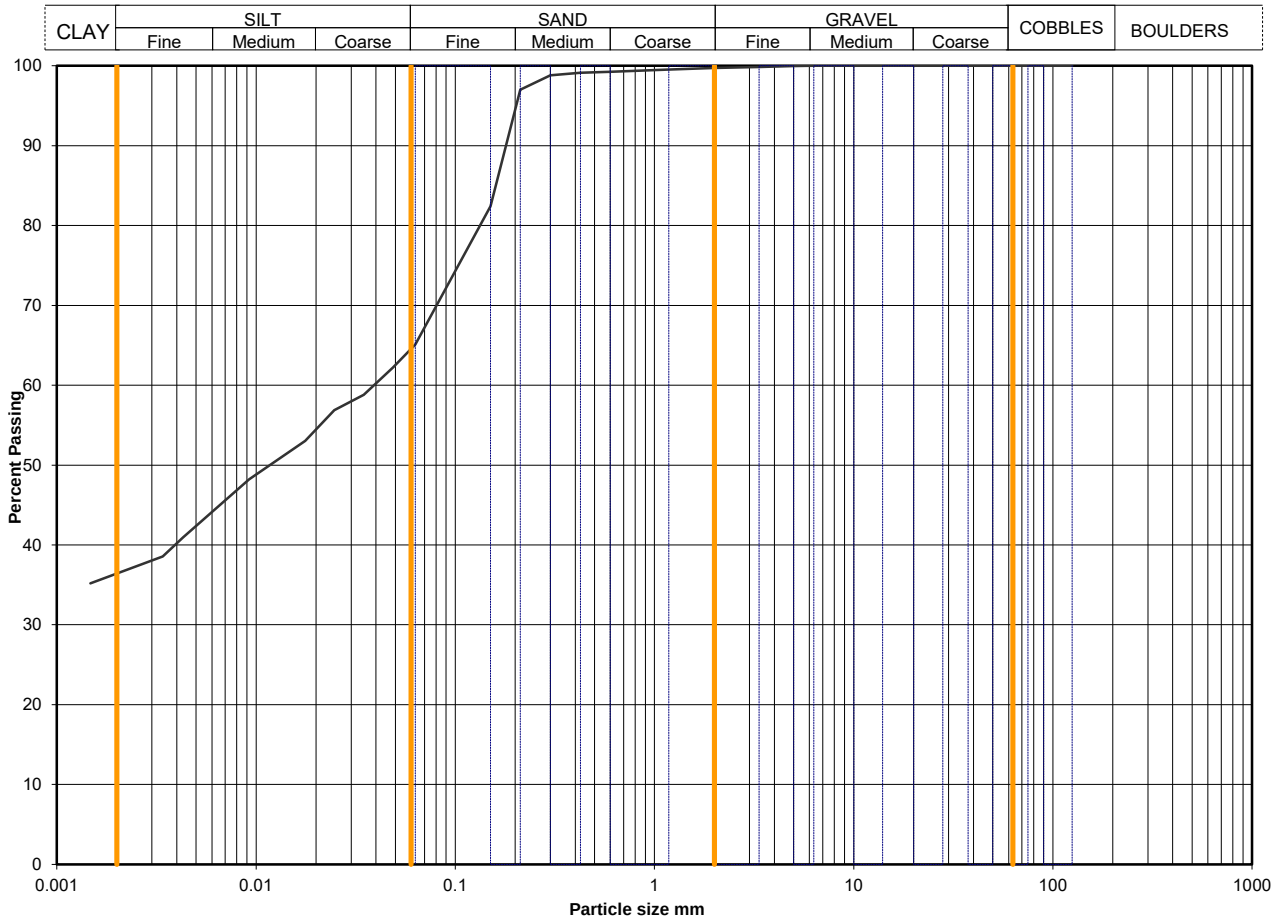
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	0	0
	Sand	1	1
*<60mm values to aid description only	Silt	48	48
	Clay	50	50

Uniformity Coefficient	D60 / D10	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH02A
		Sample Depth (m BGL)	1.65
	H6100-1620161019093115	Sample Type and No	L15
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	65
90	100	0.0486	62
75	100	0.0347	59
63	100	0.0247	57
50	100	0.0176	53
37.5	100	0.0092	48
28	100	0.0043	41
20	100	0.0034	39
14	100	0.0015	35
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	99		
0.425	99	2.65 assumed	
0.300	99		
0.212	97	Dry mass of sample, kg	
0.150	82	1.4	
0.063	65		

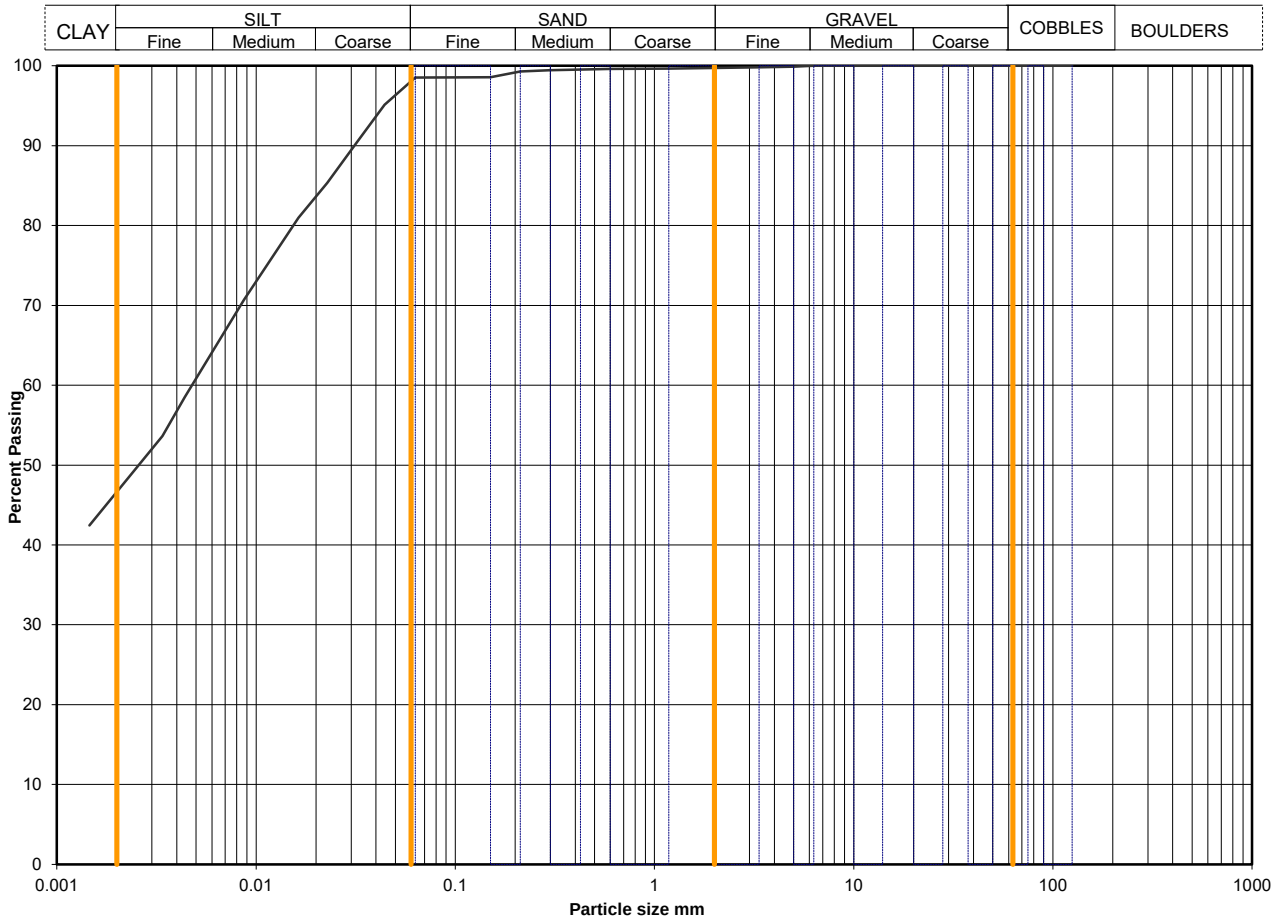
Soil description	Yellowish brown and light grey slightly sandy silty CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	0	0
	Sand	35	35
*<60mm values to aid description only	Silt	29	29
	Clay	36	36

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH02A
		Sample Depth (m BGL)	6
	H6100-1620161019093310	Sample Type and No	L18
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0441	95
75	100	0.0317	90
63	100	0.0228	85
50	100	0.0163	81
37.5	100	0.0087	71
28	100	0.0044	59
20	100	0.0034	54
14	100	0.0015	42
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	1.8	
0.063	99		

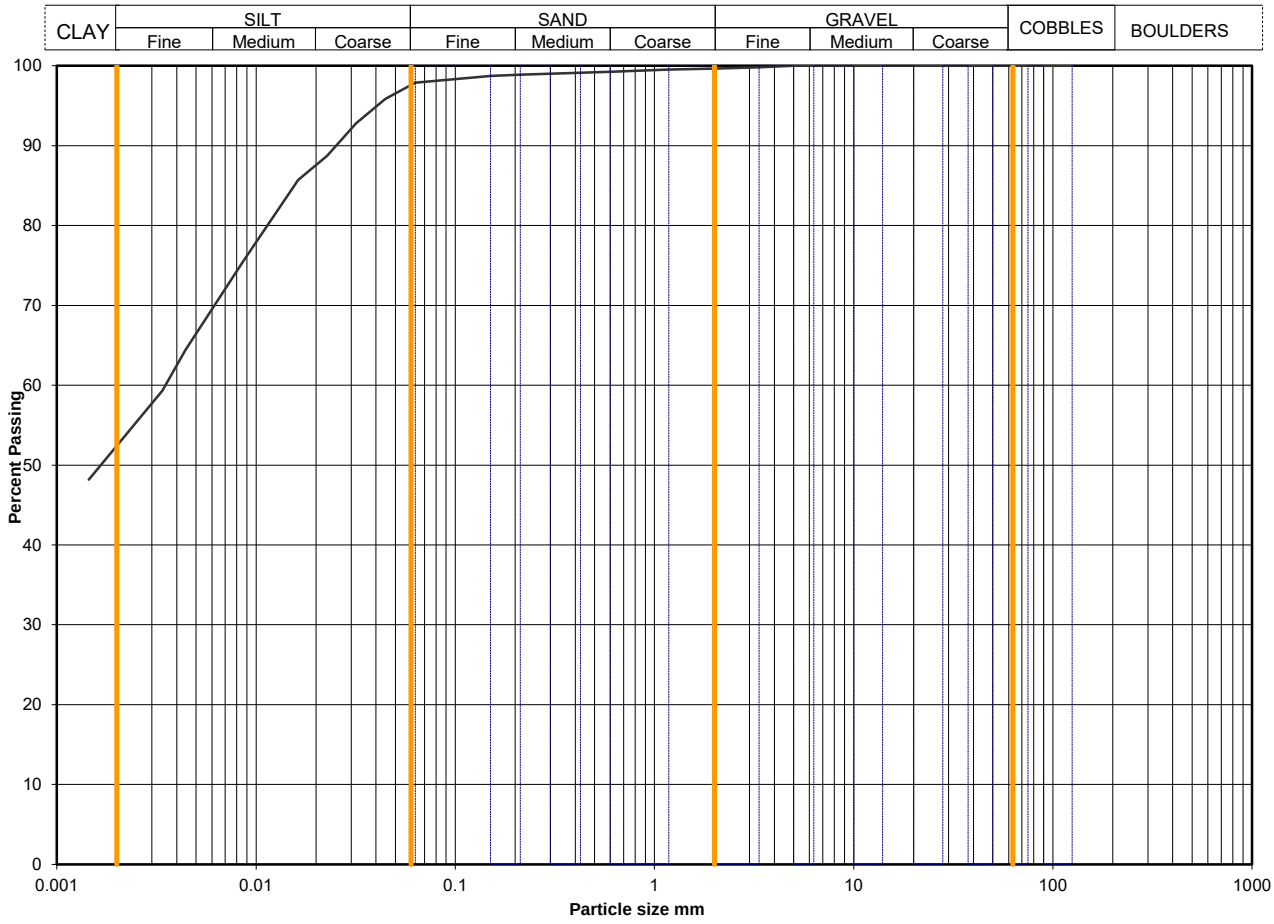
Soil description	Grey slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	0	0
	Sand	1	1
*<60mm values to aid description only	Silt	52	52
	Clay	47	47

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH02A
		Sample Depth (m BGL)	10.5
	H6100-1620161019093518	Sample Type and No	L21
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0445	96
75	100	0.0318	93
63	100	0.0228	89
50	100	0.0162	86
37.5	100	0.0086	76
28	100	0.0044	64
20	100	0.0034	59
14	100	0.0014	48
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	99		
0.425	99	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	1.5	
0.063	98		

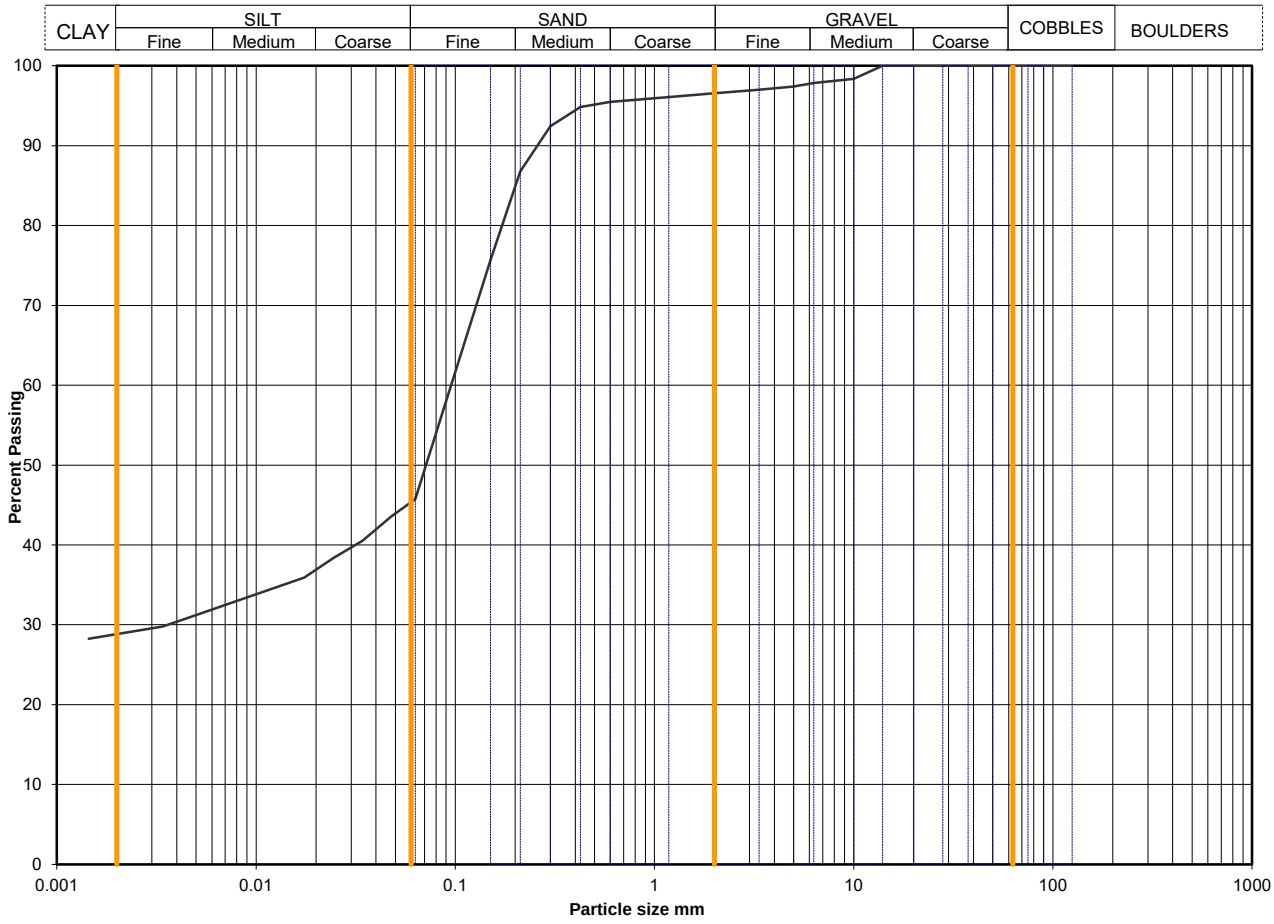
Soil description	Firm brown slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	0	0
	Sand	2	2
*<60mm values to aid description only	Silt	45	45
	Clay	52	52

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH03
		Sample Depth (m BGL)	2.25
	H6100-1620161013112222	Sample Type and No	L18
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	46
90	100	0.0478	44
75	100	0.0342	41
63	100	0.0244	38
50	100	0.0175	36
37.5	100	0.0091	33
28	100	0.0044	31
20	100	0.0034	30
14	100	0.0014	28
10	98		
6.3	98		
5.0	97		
3.35	97		
2.00	97		
1.18	96		
0.600	95		
0.425	95	2.65 assumed	
0.300	92	Dry mass of sample, kg	
0.212	87		
0.150	76	3.0	
0.063	46		

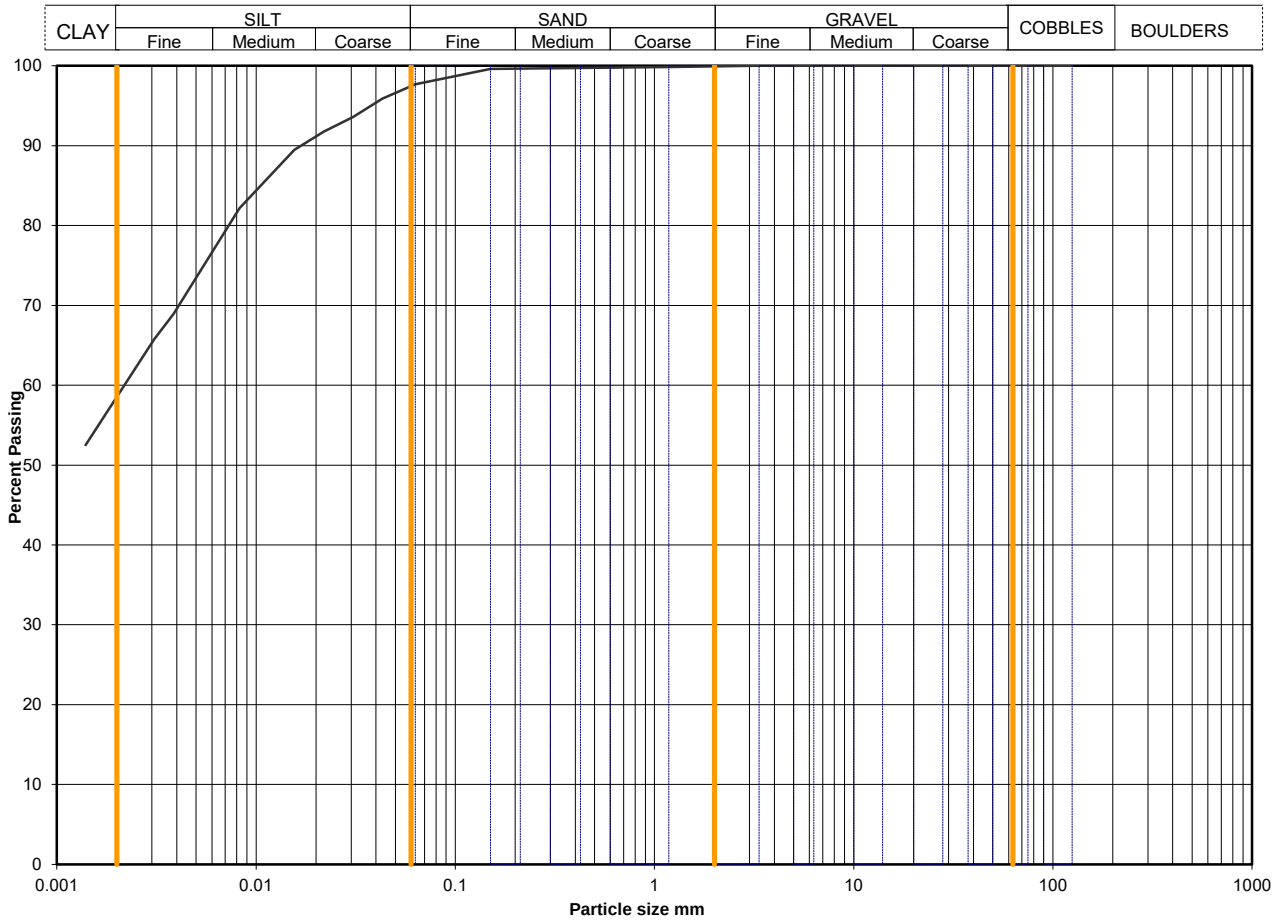
Soil description	Brown mottled grey slightly gravelly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	3	3
	Sand	51	51
*<60mm values to aid description only	Silt	17	17
	Clay	29	29

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH03
		Sample Depth (m BGL)	3.75
	H6100-1620161013112245	Sample Type and No	L19
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	98
90	100	0.0430	96
75	100	0.0307	94
63	100	0.0218	92
50	100	0.0156	89
37.5	100	0.0082	82
28	100	0.0039	69
20	100	0.0031	66
14	100	0.0014	52
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100	2.65 assumed	
0.300	100	Dry mass of sample, kg	
0.212	100		
0.150	100	2.3	
0.063	98		

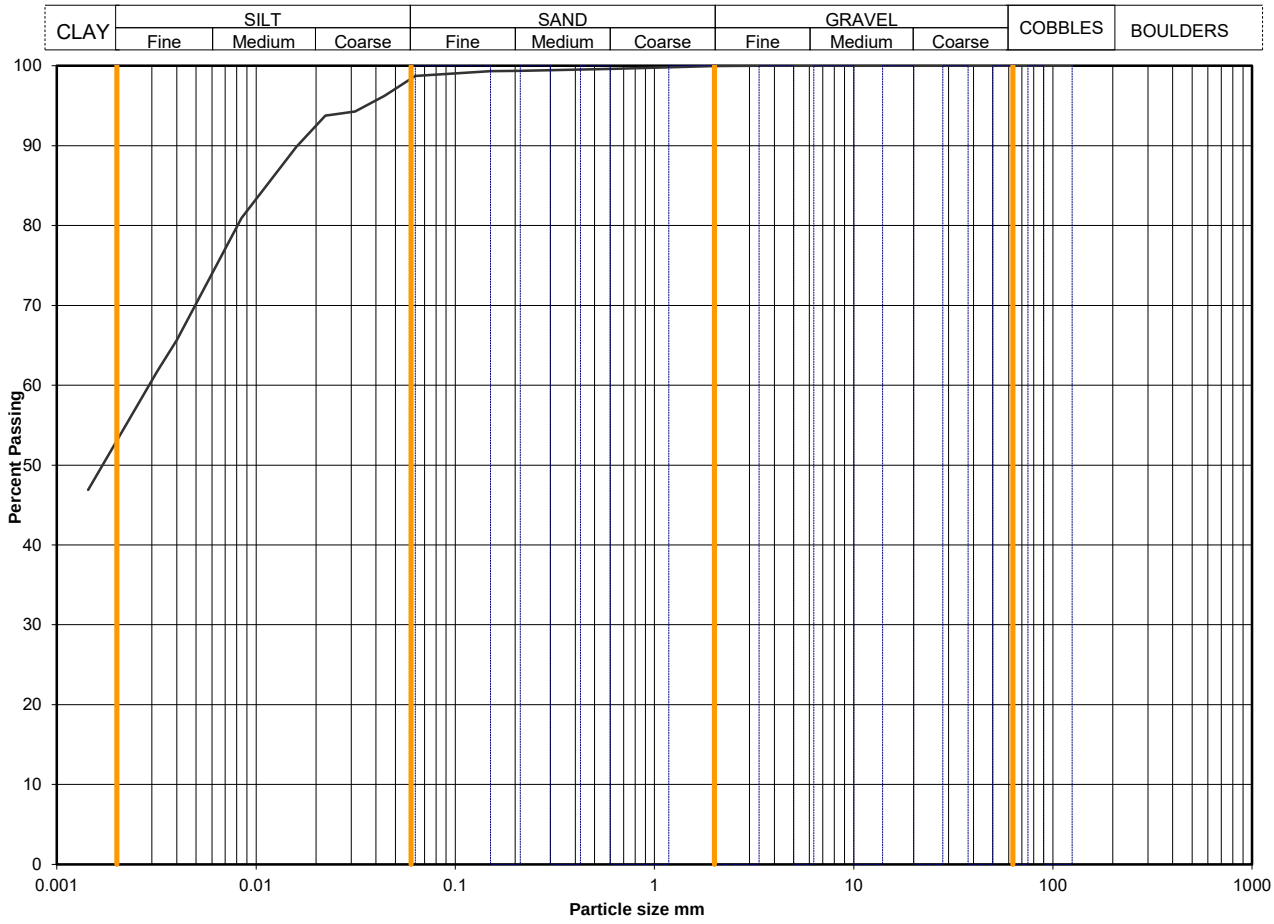
Soil description	Grey slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	0	0
	Sand	2	2
*<60mm values to aid description only	Silt	39	39
	Clay	59	59

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH04B
		Sample Depth (m BGL)	3
	H6100-1620161021103646	Sample Type and No	L4
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0441	96
75	100	0.0314	94
63	100	0.0222	94
50	100	0.0159	90
37.5	100	0.0085	81
28	100	0.0040	66
20	100	0.0032	62
14	100	0.0014	47
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100	2.65 assumed	
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	99	2.4	
0.063	99		

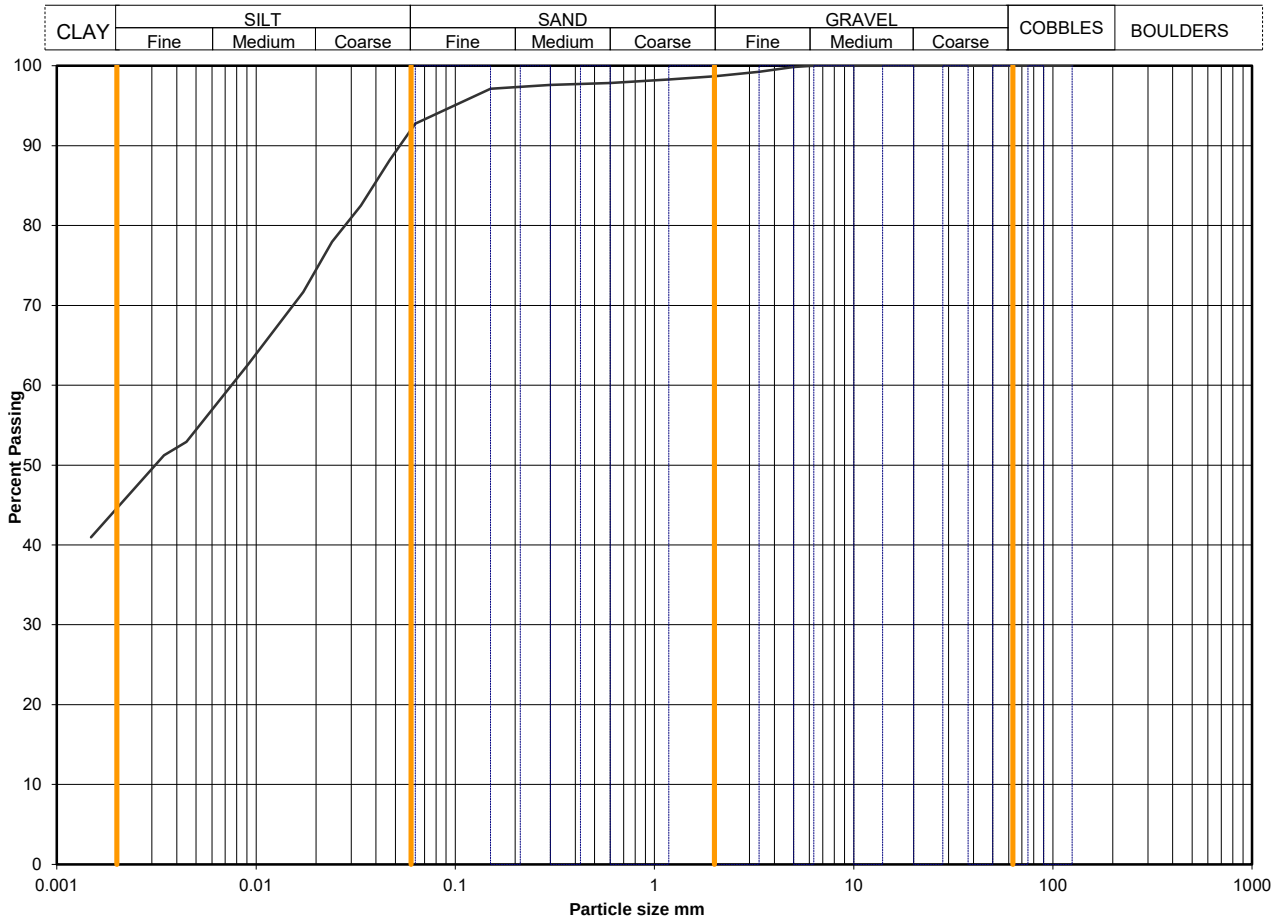
Soil description	Brownish grey slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	0	0
	Sand	1	1
*<60mm values to aid description only	Silt	46	46
	Clay	53	53

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH04B
		Sample Depth (m BGL)	7.3
	H6100-1620161021103808	Sample Type and No	L7
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	93
90	100	0.0469	88
75	100	0.0336	82
63	100	0.0240	78
50	100	0.0173	72
37.5	100	0.0091	63
28	100	0.0045	53
20	100	0.0034	51
14	100	0.0015	41
10	100		
6.3	100		
5.0	100		
3.35	99		
2.00	99		
1.18	98		
0.600	98		
0.425	98	2.65 assumed	
0.300	98	Dry mass of sample, kg	
0.212	97		
0.150	97	3.4	
0.063	93		

Soil description	Very stiff brownish grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	1	1
	Sand	6	6
*<60mm values to aid description only	Silt	48	48
	Clay	45	45

Uniformity Coefficient	**D60 / D10**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS WITHOUT MEASUREMENT OF PORE PRESSURE - SUMMARY OF RESULTS

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	Density bulk Mg/m3	Density dry Mg/m3	*w* %	Test type	Dia. mm	ó3 kPa	At failure / end of stage: Axial strain %	ó1 - ó3 kPa	*cu* kPa	MODE	Remarks
BH01	22	9.15		C	Soft brownish grey slightly sandy slightly gravelly CLAY.	1.94	1.4	39	UUM	84.0 84.0 84.0	180 270 360	2.5 4.0 13.0	13 16 19	7 8 10	C	
BH01	24	12.15		C	Very stiff brownish grey slightly sandy CLAY with occasional shell fragments.	2.08	1.75	19	UUM UUM	86.2 86.2	250 375	10.0 20.1	298 368	149 184	C	Ran to 20% on stage 2
BH02A	16	3.00		L	Stiff grey mottled yellowish brown slightly sandy CLAY with rare gypsum.	2.02	1.6	26	UUM	97.4 97.4 97.4	35 70 140	6.9 7.4 8.4	175 175 174	88 88 87	B	
BH02A	21	10.50		L	Firm brown slightly sandy CLAY.	1.96	1.52	29	UUM	86.1 86.1 86.1	225 340 450	7.0 9.0 11.0	77 82 85	39 41 43	C	
BH03	21	6.80		L	Stiff to very stiff greyish brown slightly gravelly CLAY.	2	1.61	25	UUM	76.0 76.0 76.0	140 210 280	4.5 5.0 6.5	193 201 198	97 101 99	B	
BH03	26	13.40		C	Very stiff friable dark greyish brown CLAY.	2.11	1.77	19	UUM	87.2 87.2 87.2	280 420 560	4.5 5.5 6.5	362 360 359	181 180 180	B	
BH04B	3	2.50		L	Firm to stiff brownish grey mottled yellowish brown slightly sandy CLAY.	2.02	1.64	23	UUM	97.7 97.7 97.7	25 50 100	7.4 9.4 19.3	101 106 118	51 53 59	P	
BH04B	5	4.50		L	Firm greyish brown CLAY.	2	1.58	27	UUM	96.7 96.7 96.7	50 100 200	6.9 8.4 12.9	104 107 111	52 54 56	B	
BH04B	7	7.30		L	Very stiff brownish grey slightly sandy slightly gravelly CLAY.	2.11	1.75	21	UUM	83.5 83.5 83.5	160 240 320	5.5 8.0 19.9	118 152 256	59 76 128	P	

General notes: Tests carried out in accordance with BS1377: Part 7: 1990, clause 8 for single stage, clause 9 for multistage tests. Specimens nominally 2:1 height diameter ratio and tested at a rate of strain of 2%/minute, unless annotated otherwise. See individual test reports for further details.

Legend

UU - single stage test (may be in sets of specimens)
UUM - multistage test on a single specimen
suffix R - remoulded or recompacted

ó3 cell pressure
ó1 - ó3 deviator stress
cu undrained shear strength

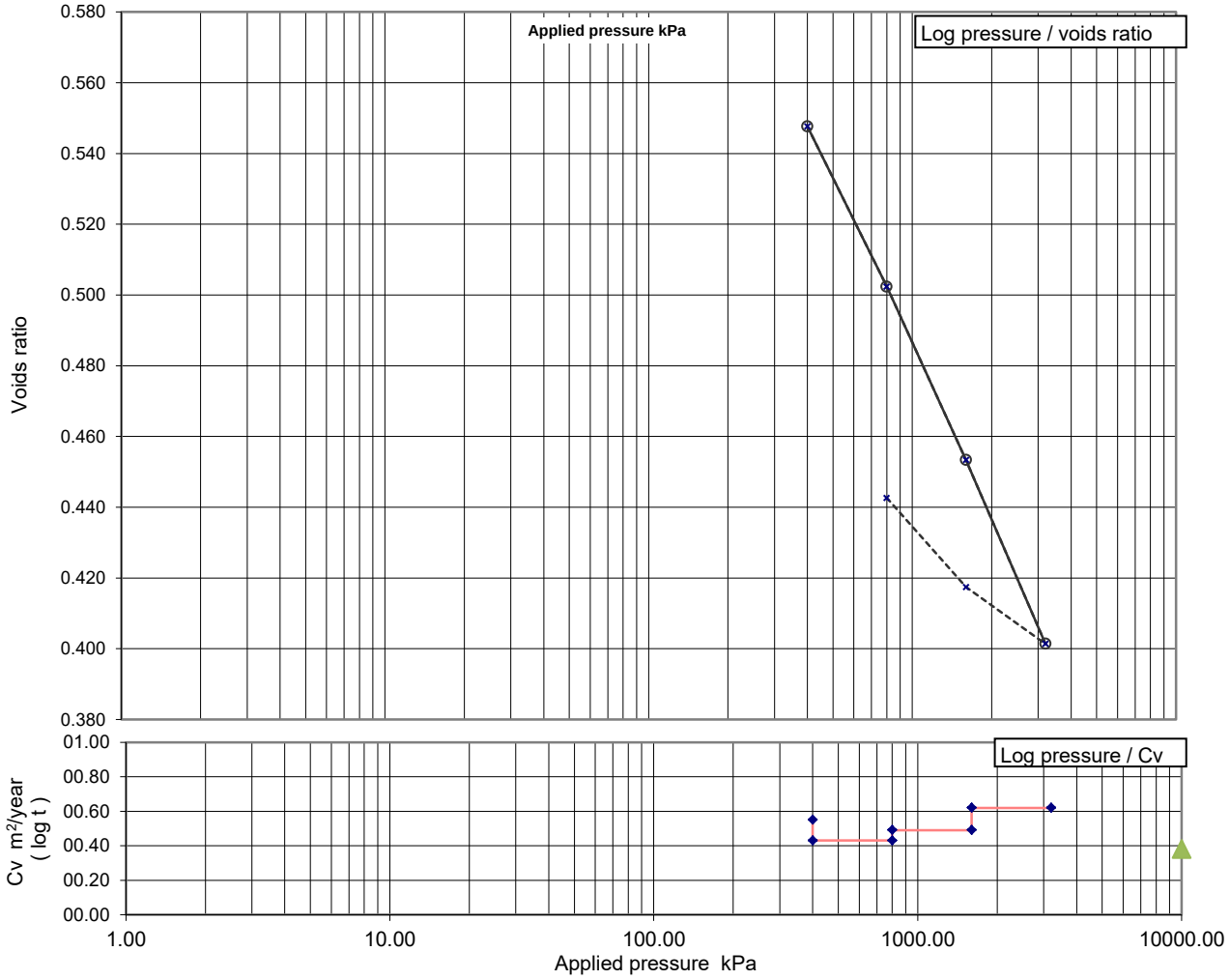
Mode of failure: P plastic; B brittle; C compound

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

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Sample Details:	SAMPLE ID:
	H6100-1620161019093214

Hole No	BH02A
Sample Depth (m BGL)	3
Sample Type and No	L16
Specimen Ref	



Soil description	Stiff grey mottled yellowish brown slightly sandy CLAY with rare gypsum.
Preparation	Undisturbed
Index properties (if available)	Liquid limit % — Plastic limit %

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m3
Diameter	75.02		mm
Height	19.92	18.16	mm
Voids ratio	0.582	0.443	
Moisture content	23	18	%
Bulk density	2.06	2.16	Mg/m3
Dry density	1.67	1.84	Mg/m3
Saturation	105	105	%
Average temperature for test	21		oC

Swelling pressure >200 kPa

Notes :

Specimen taken 430 mm from base of sample

Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/year	Cv (t90, root) m2/year	
200	0.5822				
400	0.5476	0.109	0.55	0.58	
800	0.5023	0.073	0.43	0.45	
1600	0.4533	0.041	0.49	0.53	
3200	0.4014	0.022	0.62	0.67	
1600	0.4174	0.007	-	-	
800	0.4426	0.022	-	-	

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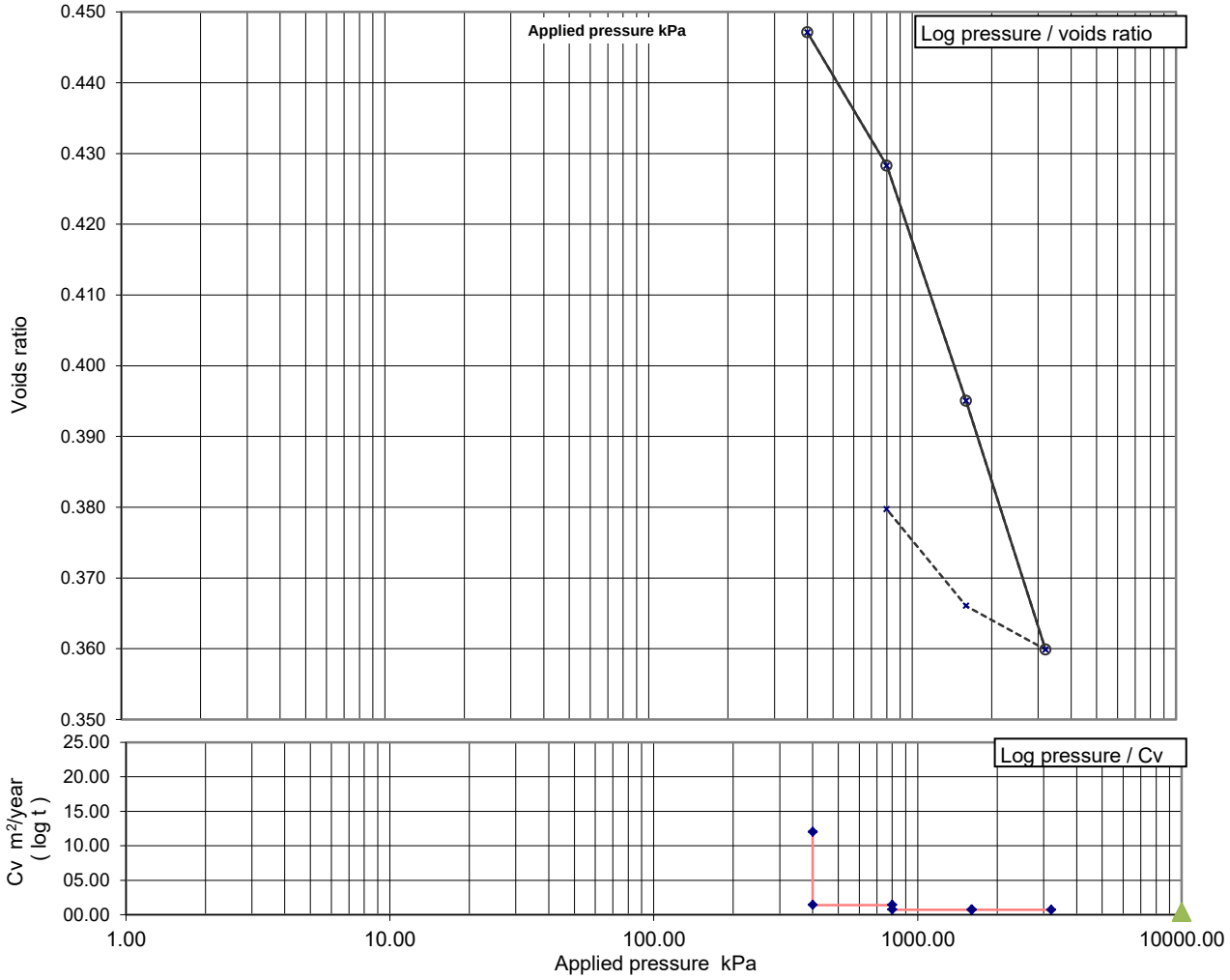
ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Sample Details:	SAMPLE ID:	Hole No	BH02A
	H6100-1620161019093432	Sample Depth (m BGL)	7.5
		Sample Type and No	L19
		Specimen Ref	



Soil description: Firm greyish brown slightly sandy slightly gravelly CLAY.

Preparation: Undisturbed

Index properties (if available): Liquid limit % | Plastic limit %

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m3
Diameter	75.03		mm
Height	18.96	18.01	mm
Voids ratio	0.453	0.380	
Moisture content	17	15	%
Bulk density	2.14	2.21	Mg/m3
Dry density	1.82	1.92	Mg/m3
Saturation	100	105	%
Average temperature for test	21		oC

Swelling pressure: >200 kPa

Notes :

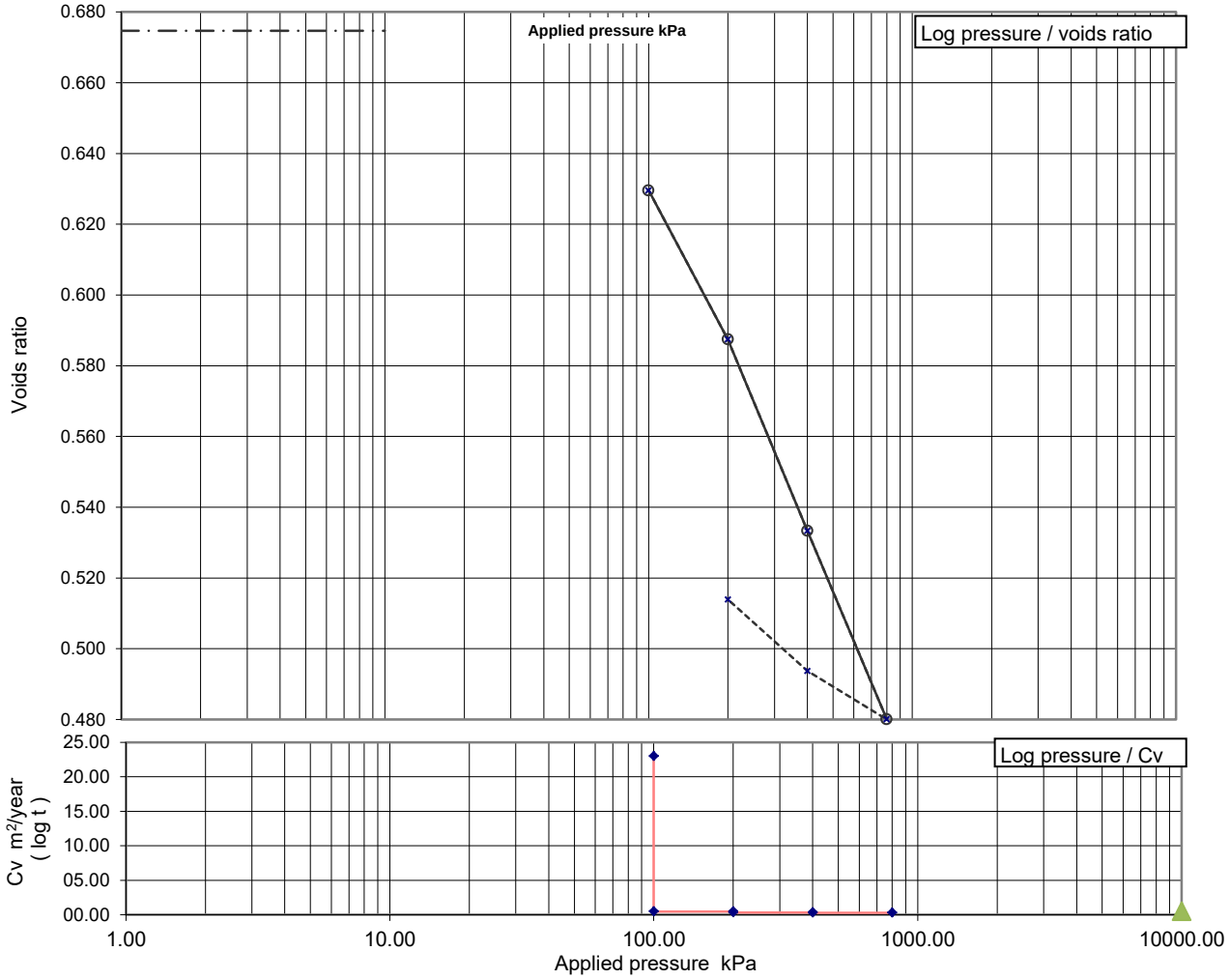
Specimen taken 190 mm from base of sample

Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/year	Cv (t90, root) m2/year	
200	0.4527				
400	0.4471	0.019	12	13	
800	0.4283	0.033	1.4	1.4	
1600	0.3950	0.029	0.73	0.79	
3200	0.3599	0.016	0.7	0.75	
1600	0.3661	0.003	-	-	
800	0.3797	0.012	-	-	

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

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Sample Details:	SAMPLE ID:	Hole No	BH02A
	H6100-1620161019093454	Sample Depth (m BGL)	9
		Sample Type and No	L20
		Specimen Ref	



Soil description: Firm greyish brown CLAY.

Preparation: Undisturbed

Index properties (if available): Liquid limit % | Plastic limit %

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m3
Diameter	75.02		mm
Height	18.98	17.15	mm
Voids ratio	0.675	0.514	
Moisture content	23	20	%
Bulk density	1.95	2.11	Mg/m3
Dry density	1.58	1.75	Mg/m3
Saturation	91	105	%
Average temperature for test	20		oC

Swelling pressure: not measured kPa

Notes :

Specimen taken 10 mm from base of sample

Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/year	Cv (t90, root) m2/year	
0	0.6747				
100	0.6295	0.270	23	25	
200	0.5874	0.258	0.46	0.48	
400	0.5333	0.170	0.33	0.35	
800	0.4800	0.087	0.28	0.31	
400	0.4937	0.023	-	-	
200	0.5139	0.068	-	-	

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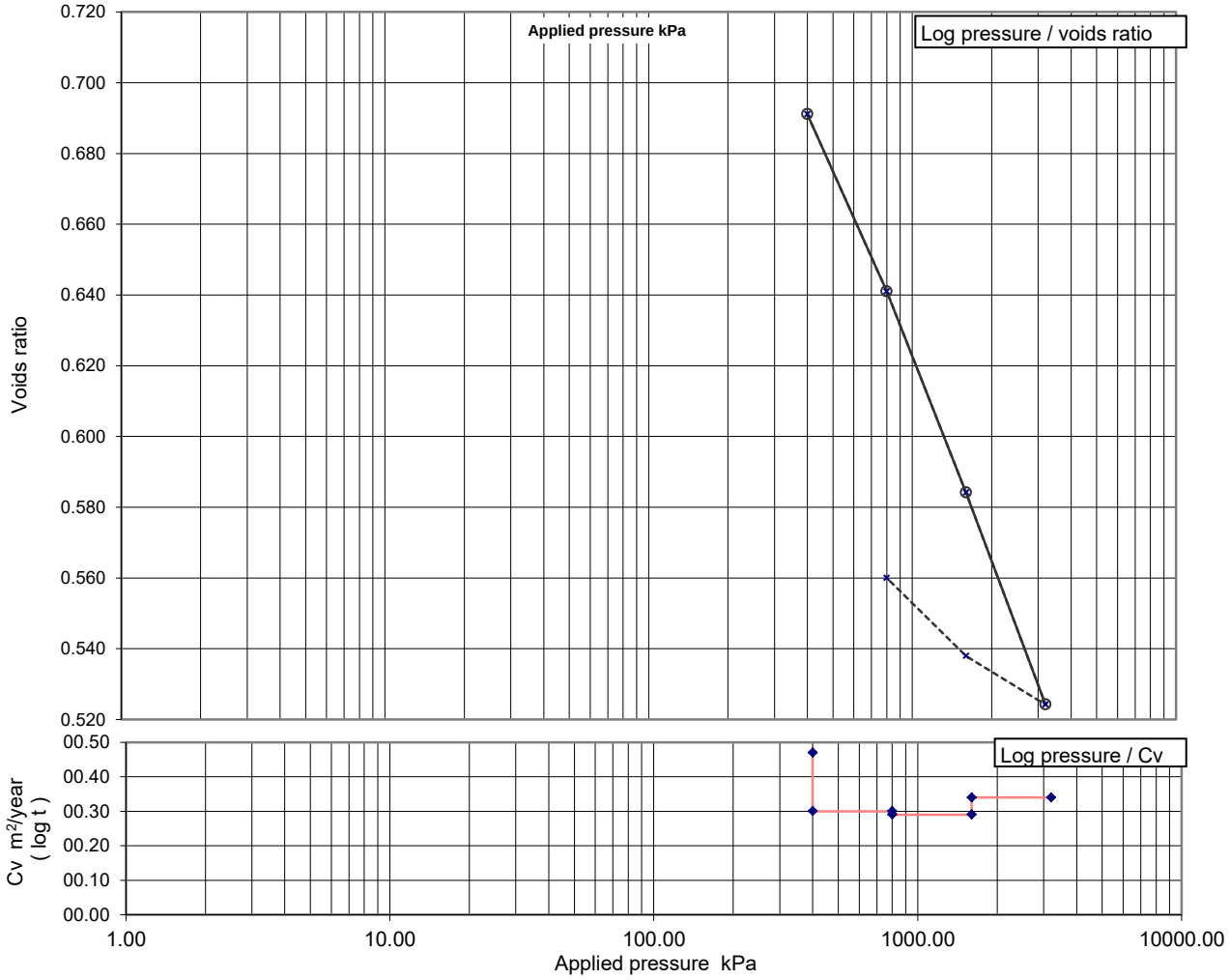
ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Sample Details:	SAMPLE ID:	Hole No	BH03
	H6100-1620161013112659	Sample Depth (m BGL)	14.9
		Sample Type and No	C27
		Specimen Ref	



Soil description	Firm grey slightly sandy slightly gravelly CLAY.			
Preparation	Undisturbed			
Index properties (if available)	Liquid limit %	56	Plastic limit %	27

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m3
Diameter	74.98		mm
Height	19.04	17.27	mm
Voids ratio	0.720	0.560	
Moisture content	27	22	%
Bulk density	1.95	2.07	Mg/m3
Dry density	1.54	1.70	Mg/m3
Saturation	98	104	%
Average temperature for test	21		oC

Swelling pressure >200 kPa

Notes :

Specimen taken 330 mm from base of sample

Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/year	Cv (t90, root) m2/year	
200	0.7204				
400	0.6911	0.085	0.47	0.5	
800	0.6410	0.074	0.3	0.32	
1600	0.5841	0.043	0.29	0.31	
3200	0.5242	0.024	0.34	0.36	
1600	0.5379	0.006	-	-	
800	0.5600	0.018	-	-	

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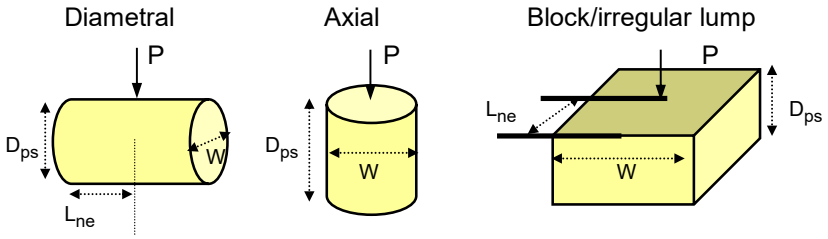
Point Load Index Test
ISRM:1985

All specimens tested at as received water content unless shown otherwise

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction (U = unknown or random)
L - parallel to planes of weakness
P - perpendicular to planes of weakness
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions				LOAD P	De equivalent diameter, mm	Point Load Index MPa F = (De/50)0.45		Remarks
							Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN		Is	Is(50)	
BH01	18.15	28	C			LIMESTONE/MUDSTONE	A	U	Y		87.0	45.0	40.0	1.20	66.56	0.27	0.31	
BH01	21.15	30	C			MUDSTONE	A	U	Y		87.4	48.0	45.0	1.40	70.76	0.28	0.33	
BH01	22.65	31	C			MUDSTONE/LIMESTONE	A	U	Y		87.1	47.0	41.0	5.30	67.43	1.17	1.33	
BH02A	16.40	26	C			CLAY	A	U	Y		87.6	62.0	52.0	0.30	76.16	0.05	0.06	
BH02A	17.90	27	C			LIMESTONE	A	U	Y		87.1	47.0	42.0	12.00	68.25	2.58	2.96	
BH02A	19.40	28	C			MUDSTONE/LIMESTONE	A	U	Y		87.3	46.0	43.0	3.80	69.13	0.80	0.92	
BH02A	22.40	30	C			MUDSTONE	A	U	Y		86.7	40.0	35.0	0.20	62.16	0.05	0.06	
BH03	17.90	29	C			MUDSTONE/LIMESTONE	A	U	Y		86.9	48.0	44.0	3.60	69.77	0.74	0.86	
BH03	19.40	30	C			MUDSTONE/LIMESTONE	A	U	Y		87.4	50.0	43.0	6.70	69.17	1.40	1.62	
BH03	20.90	31	C			LIMESTONE	A	U	Y		87.0	57.0	45.0	14.70	70.60	2.95	3.44	
BH03	22.40	32	C			LIMESTONE/MUDSTONE	A	U	Y		86.8	62.0	57.0	1.60	79.37	0.25	0.31	
BH03	23.90	33	C			MUDSTONE	A	U	Y		87.1	53.0	48.0	1.20	72.96	0.23	0.27	
BH04B	9.55	9	C			CLAY	A	U	Y		87.8	50.0	30.0	0.30	57.91	0.09	0.10	
BH04B	10.30	10	C			CLAY	A	U	Y		84.8	60.0	40.0	0.30	65.72	0.07	0.08	
BH04B	13.30	12	C			CLAY	A	U	Y		87.0	57.0	40.0	0.40	66.56	0.09	0.10	
BH04B	14.80	13	C			MUDSTONE	A	U	Y		86.7	49.0	42.0	0.30	68.09	0.06	0.07	
BH04B	17.80	15	C			LIMESTONE	A	U	Y		86.9	54.0	52.0	12.40	75.85	2.16	2.60	
BH04B	22.30	18	C			MUDSTONE	A	U	Y		86.7	56.0	54.0	1.50	77.21	0.25	0.31	

Shear Strength by Pilcon Hand method - Summary of Results

Hole No.	Sample				Soil Description	Undrained shear strength kPa	Residual shear strength kPa	Remarks
	No.	Depth (m)		type				
		from	to					
BH02A	24	13.40		C	Firm brownish grey slightly sandy CLAY.	58		Only one hand vane could be performed.

Notes :

1 Tests carried out in accordance with Manufacturers Instructions

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

QA Ref SLR Lvane Rev 2 Nov 2016	Project No Project Name	H6100-16 Trowbridge GI	Printed: 07/11/2016 16:40	**Figure** **HV**

Our Ref: EFS/168818 (Ver. 1)
Your Ref: H6100-16

November 2, 2016

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 09/12/16 when they will be discarded. Please call 01283 554547 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

JNColbourne

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT

1252

Report No. EFS/168818 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 3 samples described in this report were registered for analysis by ESG on 28-Oct-2016. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 02-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 02-Nov-2016

Tests marked '^' have been subcontracted to another laboratory.
Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :			mg/kg	mg/l	%	pH Units												
Method Codes :			ICPACIDS	ICPWSS	TSBRE1	WSLM50												
Method Reporting Limits :			20	10	0.005													
UKAS Accredited :			Yes	Yes	No	No												
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**SO4-- (acid sol)**	**SO4-- (H2O sol) mg/l**	**Total Sulphur.**	**pH (BS1377)**												
1635342	BH02A ES 1 1.20	**11-Oct-16**	1060	213	0.109	7.9												
1635343	BH03 ES 9 2.00	**06-Oct-16**	312	39	0.036	8.2												
1635344	BH03 ES 11 3.80	**06-Oct-16**	2070	332	1.01	7.7												

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Client Name	**ESG Limited Bridgend**
Contact	Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	**02-Nov-2016**
Report Number	**EFS/168818**
Table Number	**1**

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No S168818

Consignment No S59975
Date Logged 28-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	MethodID	CustServ	Dep.Opt			ICPACIDS	ICPBRE	ICPWSS	KONECL	KoneNO3	TSBRE1	WSLM50
		Sampled	REPORT A	DO Cl if pH<5.5	DO Mg if SO4(W)>3000	DO NO3 if pH<5.5	SO4-- (acid sol)	Magnesium (BRE)	SO4-- (H2O sol) mg/l	Chloride:(2:1)	Nitrate (BRE 2:1): mg/l	Total Sulphur.	pH (BS1377)
							✓		✓				
CL/1635342	BH02A 1.20	11/10/16											
CL/1635343	BH03 2.00	06/10/16											
CL/1635344	BH03 3.80	06/10/16											

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

 The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	TSBRE1	Oven Dried @ < 35°C	Determination of Total Carbon and/or Total Sulphur in solid samples by high temperature combustion/infrared detection
Soil	WSLM50	Oven Dried @ < 35°C	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Bridgend

Site : Trowbridge GI

Report Number : S16_8818

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1635342	BH02A ES 1 1.20	CLAY
CL/1635343	BH03 ES 9 2.00	CLAY
CL/1635344	BH03 ES 11 3.80	CLAY

Our Ref: EFS/168933 (Ver. 1)
Your Ref: H6100-16

November 4, 2016

Environmental Chemistry
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Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 13/12/16 when they will be discarded. Please call 01283 554547 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

JNColbourne

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT

1252

Report No. EFS/168933 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 1 sample described in this report were registered for analysis by ESG on 01-Nov-2016. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 04-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 04-Nov-2016

Tests marked '^' have been subcontracted to another laboratory.
Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :			mg/kg	mg/l	%	pH Units												
Method Codes :			ICPACIDS	ICPWSS	TSBRE1	WSLM50												
Method Reporting Limits :			20	10	0.005													
UKAS Accredited :			Yes	Yes	No	No												
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**SO4-- (acid sol)**	**SO4-- (H2O sol) mg/l**	**Total Sulphur.**	**pH (BS1377)**												
1635755	BH01 ES 11 2.10	**18-Oct-16**	582	150	0.031	7.3												

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Client Name	**ESG Limited Bridgend**
Contact	Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	**04-Nov-2016**
Report Number	**EFS/168933**
Table Number	**1**

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No S168933

Consignment No S_NonCon
Date Logged 01-Nov-2016

Report Due 07-Nov-2016

ID Number	Description	MethodID	CustServ	Dep.Opt			ICPACIDS	ICPBRE	ICPWSS	KONECL	KoneNO3	TSBRE1	WSLM50
		Sampled	REPORT A	DO Cl if pH<5.5	DO Mg if SO4(W)>3000	DO NO3 if pH<5.5	SO4-- (acid sol)	Magnesium (BRE)	SO4-- (H2O sol) mg/l	Chloride:(2:1)	Nitrate (BRE 2:1): mg/l	Total Sulphur.	pH (BS1377)
							✓		✓				
CL/1635755	BH01 2.10	18/10/16											

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

 The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	TSBRE1	Oven Dried @ < 35°C	Determination of Total Carbon and/or Total Sulphur in solid samples by high temperature combustion/infrared detection
Soil	WSLM50	Oven Dried @ < 35°C	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Bridgend
Site : Trowbridge GI
Report Number : S16_8933

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1635755	BH01 ES 11 2.10	CLAY

APPENDIX F

GEOENVIRONMENTAL LABORATORY TEST RESULTS

Soil Sample Analysis Test Reports	EFS/168812, EFS/168814 and EFS/168932
Leachate Sample Analysis Report	EXR/229287 and EXR/229296
Water Sample Analysis Report	EFS/235169 and EFS/232019

Our Ref: EFS/168812M (Ver. 1)
Your Ref: H6100-16

November 2, 2016

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
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Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 08/12/16 when they will be discarded. Please call 01283 554547 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

JNColbourne

J Colbourne
Project Co-ordinator
01283 554547

Environmental Chemistry, ESG, P.O. Box 100, Burton-upon-trent, DE15 0XD Tel: 01283 554400 Fax: 01283 554422
Environmental Scientifics Group Limited.
Registered No: 2880501

TEST REPORT

1252

Report No. EFS/168812M (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 2 samples described in this report were registered for analysis by ESG on 27-Oct-2016. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 02-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 6)
Table of PCB Congener Results (Page 7)
GC-FID Chromatograms (Pages 8 to 9)
Table of WAC Analysis Results (Page 10)
Table of Asbestos Screening Results (Page 11)
Analytical and Deviating Sample Overview (Pages 12 to 13)
Table of Method Descriptions (Pages 14 to 15)
Table of Report Notes (Page 16)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 02-Nov-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg
		Method Codes :	GROHSA	ICPACIDS	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PHSOIL	SFAPI	SFAPI	SFAPI
		Method Reporting Limits :	0.2	20	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16		0.5	0.5	0.5
		Accreditation Code:	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	N	UM	UM
LAB ID Number CL/	Client Sample Description	Sample Date	GRO (C6-C10)	SO4-- (acid sol)	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	pH units (AR)	Cyanide(Complex)(AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
1635299	BH04B ES 20 1.20	18-Oct-16	<0.2	1050	1.2	6.1	0.60	63.8	673.4	63.9	<0.5	18.9	<0.5	258.2	10.2	<0.6	<0.6	<0.6
1635300	BH04B ES 22 3.40	18-Oct-16	<0.3	1110	8.1	7.9	0.65	31.3	39.3	20	<0.6	34.1	<0.6	94.1	9	<0.6	<0.6	<0.6

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Client Name ESG Limited Bridgend

Contact Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	**02-Nov-2016**
Report Number	**EFS/168812M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Units :			mg/kg		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	Mol/kg	mg/kg	%	%	mg/l	mg/kg	%	µg/kg
Method Codes :			SFAPI	Sub002a	TMSS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	ANC	CALC_CR3	CEN Leachate	CEN Leachate	KONECL	KONECR	LOI(%MM)	PCBUSECDAR
Method Reporting Limits :			0.5		0.1	10	10	10	10	10	0.04	0.5			1	0.1	0.2	
Accreditation Code:			U	U	U	N	N	U	N	UM	N	N	N	N	N	N	N	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Phenol Index.(AR)**	**^Asbestos Screen**	**Tot.Moisture @ 105C**	**TPH Band (>C10-C16)**	**TPH Band (>C10-C40)**	**TPH Band (>C16-C21)**	**TPH Band (>C21-C35)**	**TPH by GCFID (AR)**	**Acid Neut. Capacity**	**Chromium (III)**	**Fraction of non-crushable material %**	**Fraction of sample above 4 mm %**	**Chloride:(2:1)**	**Chromium vi:**	**L.O.I. % @ 450C**	**PCB-7 Congeners Analysis**
1635299	BH04B ES 20 1.20	18-Oct-16	<0.6	NAIIS	13.0	<11	549	30	446	551	9.13	<63.8	0.0	78.1	28	<0.1	1.6	Req
1635300	BH04B ES 22 3.40	18-Oct-16	<0.6		20.4	<13		<13	44	59		<31.3			24	<0.1		

ESG

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Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name ESG Limited Bridgend

Contact Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	**02-Nov-2016**
Report Number	**EFS/168812M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Units :			% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg							
Method Codes :			WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	PAHMSUS							
Method Reporting Limits :			0.04	10	10	10	20	30	20	10								
Accreditation Code:			N	UM	UM	UM	U	UM	UM	UM								
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Total Organic Carbon**	**Benzene**	**Toluene**	**Ethyl Benzene**	**MTBE**	**Xylenes**	**m/p Xylenes**	**o Xylene**	**PAH (17) by GCMS**							
1635299	BH04B ES 20 1.20	18-Oct-16	1.52	<11	<11	<11	<23	<34	<23	<11	Req							
1635300	BH04B ES 22 3.40	18-Oct-16		<13	<13	<13	<25	<38	<25	<13	Req							

ESG

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Client Name ESG Limited Bridgend

Contact Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	**02-Nov-2016**
Report Number	**EFS/168812M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH04B ES 20 1.20	**Job Number:**	S16_8812M
LIMS ID Number:	CL1635299	**Date Booked in:**	27-Oct-16
QC Batch Number:	161236	**Date Extracted:**	31-Oct-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Nov-16
Directory:	116PAH.MS17\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	5.80	0.10	97	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	7.15	0.28	99	UM
Pyrene	129-00-0	7.44	0.25	98	UM
Benzo[a]anthracene	56-55-3	9.13	0.22	92	UM
Chrysene	218-01-9	9.18	0.17	95	UM
Benzo[b]fluoranthene	205-99-2	10.66	0.26	91	UM
Benzo[k]fluoranthene	207-08-9	10.70	0.10	92	UM
Benzo[a]pyrene	50-32-8	11.09	0.20	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.47	0.20	100	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	12.78	0.16	97	UM
Coronene	191-07-1 *	-	< 0.09	-	N
Total (USEPA16) PAHs	-	-	< 2.49	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	118
Acenaphthene-d10	119
Phenanthrene-d10	128
Chrysene-d12	161
Perylene-d12	220

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	86
Terphenyl-d14	75

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH04B ES 22 3.40	**Job Number:**	S16_8812M
LIMS ID Number:	CL1635300	**Date Booked in:**	27-Oct-16
QC Batch Number:	161236	**Date Extracted:**	31-Oct-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Nov-16
Directory:	116PAH.MS17\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Coronene	191-07-1 *	-	< 0.10	-	N
Total (USEPA16) PAHs	-	-	< 1.61	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	123
Acenaphthene-d10	125
Phenanthrene-d10	134
Chrysene-d12	155
Perylene-d12	193

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	85
Terphenyl-d14	75

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

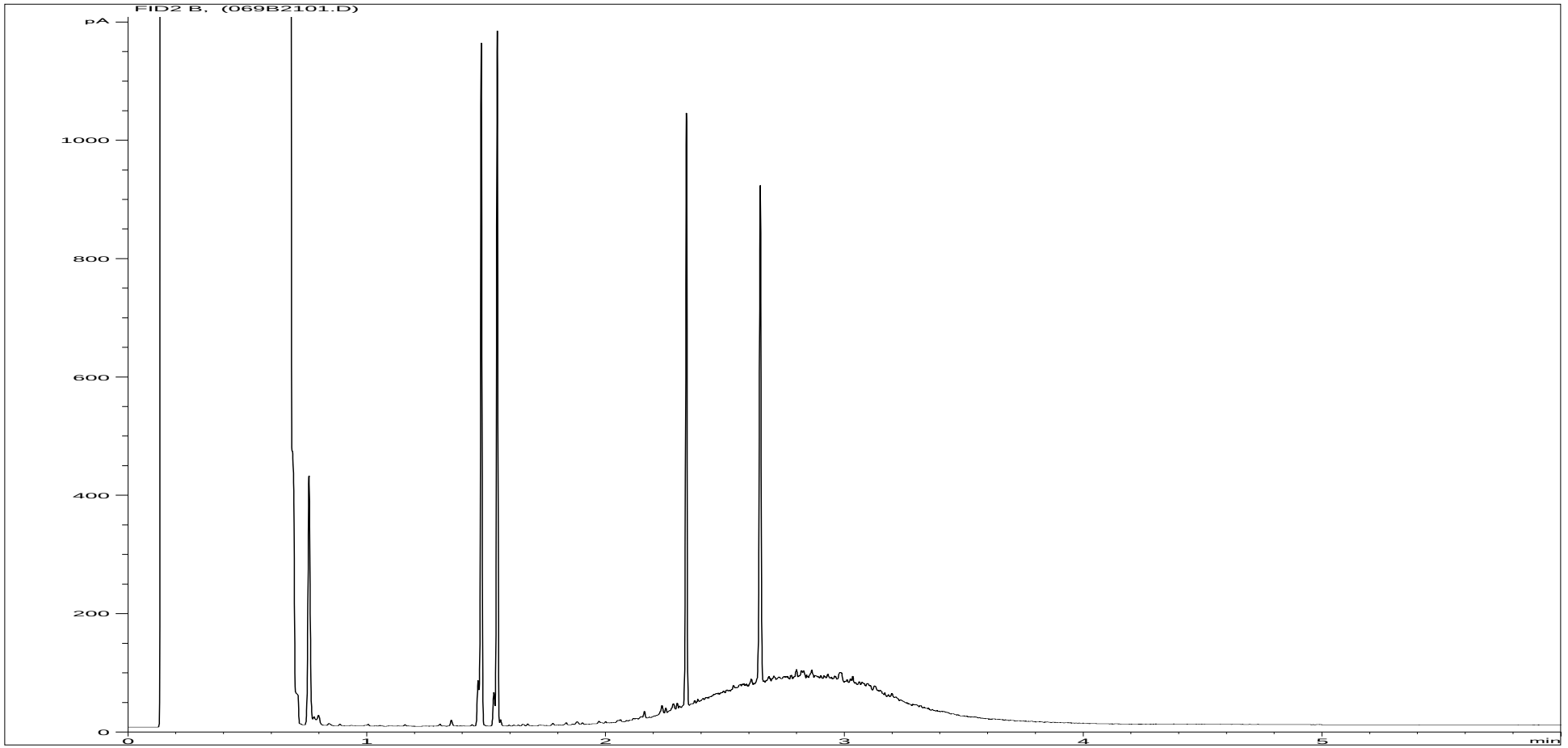
Polychlorinated Biphenyls (congeners)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI	**Matrix:**	Soil
Job Number:	S16_8812M	**Date Booked in:**	27-Oct-16
QC Batch Number:	161236	**Date Extracted:**	28-Oct-16
Directory:	1031PCB.GC70	**Date Analysed:**	31-Oct-16
Method:	Ultrasonic		
Accreditation code:	N		

			Concentration, (µg/kg)						
	Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
*	CL1635299	BH04B ES 20 1.20	<5.7	190.0	<5.7	<5.7	<5.7	<5.7	<5.7

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

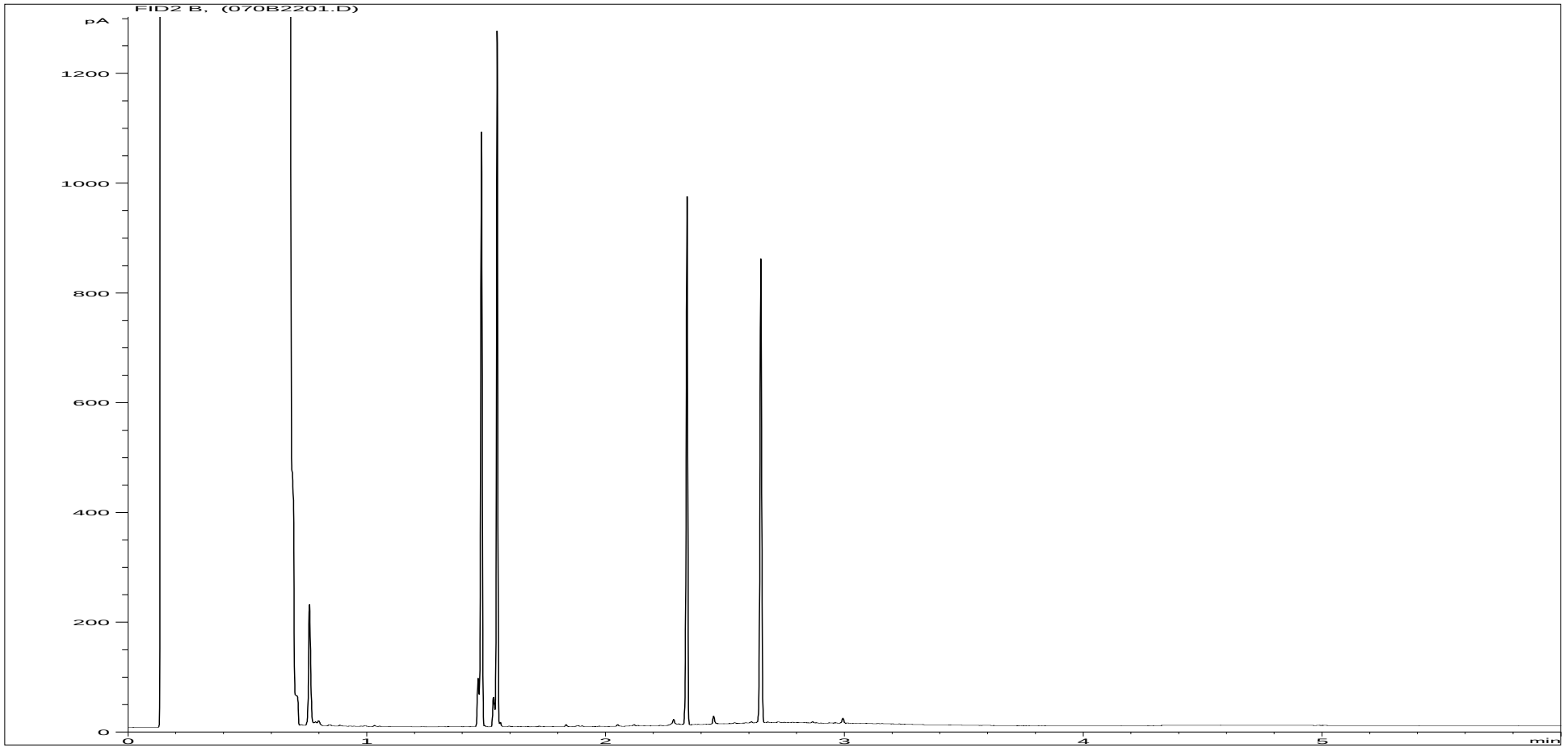
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635299	**Job Number:**	S16_8812M
Multiplier:	8	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH04B ES 20 1.20
Acquisition Date/Time:	31-Oct-16, 19:01:22		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\069B2101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635300	**Job Number:**	S16_8812M
Multiplier:	8	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH04B ES 22 3.40
Acquisition Date/Time:	31-Oct-16, 19:14:41		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\070B2201.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	ESG Limited Bridgend				**Leaching Data**	
					Weight of sample (kg)	0.230
Contact	Adam Putt				Moisture content @ 105°C (% of Wet Weight)	13.0
					Equivalent Weight based on drying at 105°C (kg)	0.225
Site	Trowbridge GI				Volume of water required to carry out 2:1 stage (litres)	0.445
					Fraction of sample above 4 mm %	78.100
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
BH04B ES 20 1.20		s16_8812M	CL/1635299	02-Nov-16	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	1.52	3	5	6
N	LOI450	Loss on Ignition (%)	1.6			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.206	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	549	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<2.59	100		
U	PHSOIL	pH (pH units)	10.2		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	9.13		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	8	8.5	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	202	<100					
U	ICPMSW	Arsenic	0.003	0.006	0.006	0.06	0.5	2	25
U	ICPWATVAR	Barium	0.11	0.03	0.22	0.4	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.004	0.005	0.008	0.05	0.5	10	70
U	ICPMSW	Copper	0.009	0.007	0.018	0.07	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.016	0.003	0.032	0.05	0.5	10	30
U	ICPMSW	Nickel	<0.001	<0.001	<0.002	<0.01	0.4	10	40
U	ICPMSW	Lead	0.001	0.004	0.002	0.04	0.5	10	50
U	ICPMSW	Antimony	0.003	0.002	0.006	0.02	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.012	0.011	0.024	0.11	4	50	200
U	KONENS	Chloride	17	3	34	49	800	15000	25000
U	ISEF	Fluoride	0.4	0.2	0.8	2	10	150	500
U	ICPWATVAR	Sulphate as SO4	40	10.1	80	141	1000	20000	50000
N	WSLM27	Total Dissolved Solids	157	63.8	314	762	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	7.1	81	14.2	711	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

ASBESTOS ANALYSIS RESULTS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates

1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-13537**
For the attention of:	ESG Limited Bridgend	**Report Date:**	**01/11/2016**
Site Address:	Trowbridge GI	**Project Number:**	**S168812**

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in < 10mm	% Asbestos by weight of Total Dried Sample	Moisture Content	Asbestos Fibre Types Identified
CL/1635299	18/10/16	BH04B 1.20 Soils	01/11/2016							NAIIS

Keys

NAACR = Not Analysed at Clients Request

NAIIS = No Asbestos Identified in Sample (Identification Only)

*** visible to naked eye**

NADIS = No Asbestos Detected in Sample (ID & Quant Only)

Name:	Nathan Brough	Authorised Signatory:
Position:	Lab Analyst	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 12 - February 2016. Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer **ESG Limited Bridgend**
Site **Trowbridge GI**
Report No **S168812M**

Consignment No S60148
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	MethodID	ANC	BTEXHSA		CALC_CR3	CEN Leachate					CustServ	GROHSA	ICPACIDS	ICPBOR	ICPMSS								KONECL	KONECR	LOI(%MM)
		Sampled	Acid Neut. Capacity	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	Chromium (III)	CEN Leac(P)1	CEN Leac(P)2	CEN Leac(P)C	Fraction of non-crushable material %	Fraction of sample above 4 mm %	REPORT A	GRO (C6-C10)	SO4-- (acid sol)	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	Chloride:(2:1)	Chromium vi:	L.O.I. % @ 450C
				✓	✓								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
CL/1635299	BH04B 1.20	18/10/16																									
CL/1635300	BH04B 3.40	18/10/16																									

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No S168812M

Consignment No S60148
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	MethodID	MCertS	PAHMSUS	PCBUSECOAR	PHSOIL	SFAPI				Sub002a	TMSS	TPHFIDUS					WSLM59
		Sampled	MCertS Analysis	PAH (17) by GCMS	PCB-7 Congeners Analysis	pH units (AR)	Cyanide(Complex)(AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)	Phenol Index.(AR)	^Asbestos Screen	Tot.Moisture @ 105C	TPH Band (>C10-C16)	TPH Band (>C10-C40)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH by GCFID (AR)	Total Organic Carbon
				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CL/1635299	BH04B 1.20	18/10/16																
CL/1635300	BH04B 3.40	18/10/16																

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ANC	Oven Dried @ < 35°C	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	CALC_CR3	Oven Dried @ < 35°C	Calculated from the difference between Total Chromium and Hexavalent Chromium
Soil	CEN Leachate	As Received	Determination of Oversize and Inert Material Content prior to leaching sample
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	KONECL	Oven Dried @ < 35°C	Determination of Chloride in Soil using water extraction at the stated water:soil ratio, discrete colorimetric detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	LOI(%MM)	Oven Dried @ < 35°C	Determination of loss on ignition for soil samples at specified temperature by gravimetry
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Bridgend
Site : Trowbridge GI
Report Number : S16_8812

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1635299	BH04B ES 20 1.20	Grey MADE GROUND
CL/1635300	BH04B ES 22 3.40	Grey CLAY

Our Ref: EFS/168814M (Ver. 1)
Your Ref: H6100-16

November 4, 2016

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 08/12/16 when they will be discarded. Please call 01283 554547 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

JNColbourne

J Colbourne
Project Co-ordinator
01283 554547

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Environmental Scientifics Group Limited.
Registered No: 2880501

TEST REPORT

1252

Report No. EFS/168814M (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 4 samples described in this report were registered for analysis by ESG on 27-Oct-2016. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 04-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
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On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 04-Nov-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg
		Method Codes :	GROHSA	ICPACIDS	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PHSOIL	SFAPI	SFAPI	SFAPI
		Method Reporting Limits :	0.2	20	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16		0.5	0.5	0.5
		Accreditation Code:	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	N	UM	UM
LAB ID Number CL/	Client Sample Description	Sample Date	GRO (C6-C10)	SO4-- (acid sol)	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	pH units (AR)	Cyanide(Complex)(AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
1635317	BH02A ES 1 1.20	11-Oct-16	<0.3	1090	3.5	12.2	0.5	40.1	22.9	93	<0.53	20.4	0.9	121.5	8.4	<0.6	<0.6	<0.6
1635318	BH03 ES 2 0.10	29-Sep-16	<0.2	1440	1.9	20.4	1.40	45.0	153.1	208.0	<0.52	38.4	0.9	404.3	8.1	<0.6	0.6	<0.6
1635319	BH03 ES 7 1.00	29-Sep-16	<0.2	1120	2.1	18.8	1.62	51.9	109.1	286.6	0.6	38	0.5	389.3	8.5	<0.6	<0.6	<0.6
1635320	BH03 ES 9 2.00	06-Oct-16	<0.3	338	1.6	16.3	<0.2	42.9	14.8	30.9	<0.5	18.5	<0.5	90.4	8.4	<0.7	0.7	<0.7

ESG

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Client Name	**ESG Limited Bridgend**
Contact	Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	**04-Nov-2016**
Report Number	**EFS/168814M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Units :			mg/kg		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	Mol/kg	mg/kg	%	%	mg/l	mg/kg	%	µg/kg
Method Codes :			SFAPI	Sub002a	TMSS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	ANC	CALC_CR3	CEN Leachate	CEN Leachate	KONECL	KONECR	LOI(%MM)	PCBUSECDAR
Method Reporting Limits :			0.5		0.1	10	10	10	10	10	0.04	0.5			1	0.1	0.2	
Accreditation Code:			U	U	U	N	N	U	N	UM	N	N	N	N	N	N	N	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Phenol Index.(AR)**	**^Asbestos Screen**	**Tot.Moisture @ 105C**	**TPH Band (>C10-C16)**	**TPH Band (>C10-C40)**	**TPH Band (>C16-C21)**	**TPH Band (>C21-C35)**	**TPH by GCFID (AR)**	**Acid Neut. Capacity**	**Chromium (III)**	**Fraction of non-crushable material %**	**Fraction of sample above 4 mm %**	**Chloride:(2:1)**	**Chromium vi:**	**L.O.I. % @ 450C**	**PCB-7 Congeners Analysis**
1635317	BH02A ES 1 1.20	11-Oct-16	<0.6	AM	21.9	<13	81	<13	63	82	4.45	<40.1			24	<0.1	5.6	Req
1635318	BH03 ES 2 0.10	29-Sep-16	<0.6	NAIIS	14.6	<12		21	316	317		<45.0	0.0	41.6	14	<0.1		
1635319	BH03 ES 7 1.00	29-Sep-16	<0.6	CH	13.4	15	973	97	766	975	6.38	<51.9			6	<0.1	6.8	Req
1635320	BH03 ES 9 2.00	06-Oct-16	<0.7		23.2	<13		<13	20	34		<42.9			5	<0.1		

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Sample Analysis

Date Printed	**04-Nov-2016**
Report Number	**EFS/168814M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Units :			% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg							
Method Codes :			WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	PAHMSUS							
Method Reporting Limits :			0.04	10	10	10	20	30	20	10								
Accreditation Code:			N	UM	UM	UM	U	UM	UM	UM								
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Total Organic Carbon**	**Benzene**	**Toluene**	**Ethyl Benzene**	**MTBE**	**Xylenes**	**m/p Xylenes**	**o Xylene**	**PAH (17) by GCMS**							
1635317	BH02A ES 1 1.20	11-Oct-16	2.32	<13	<13	<13	<26	<38	<26	<13	Req							
1635318	BH03 ES 2 0.10	29-Sep-16	6.02	<12	<12	<12	<23	<35	<23	<12	Req							
1635319	BH03 ES 7 1.00	29-Sep-16	5.13	<12	<12	<12	<23	<35	<23	<12	Req							
1635320	BH03 ES 9 2.00	06-Oct-16		<13	<13	<13	<26	<39	<26	<13	Req							

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Contact Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	**04-Nov-2016**
Report Number	**EFS/168814M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH02A ES 1 1.20	**Job Number:**	S16_8814M
LIMS ID Number:	CL1635317	**Date Booked in:**	27-Oct-16
QC Batch Number:	161236	**Date Extracted:**	31-Oct-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Nov-16
Directory:	116PAH.MS17\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	4.43	0.10	96	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	5.80	0.44	100	UM
Anthracene	120-12-7	5.85	0.20	97	U
Fluoranthene	206-44-0	7.15	1.40	99	UM
Pyrene	129-00-0	7.44	1.13	97	UM
Benzo[a]anthracene	56-55-3	9.13	0.80	96	UM
Chrysene	218-01-9	9.18	0.56	99	UM
Benzo[b]fluoranthene	205-99-2	10.66	0.83	95	UM
Benzo[k]fluoranthene	207-08-9	10.70	0.32	95	UM
Benzo[a]pyrene	50-32-8	11.09	0.68	96	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.47	0.56	87	UM
Dibenzo[a,h]anthracene	53-70-3	12.49	0.12	95	UM
Benzo[g,h,i]perylene	191-24-2	12.78	0.44	96	UM
Coronene	191-07-1 *	14.98	0.12	1	N
Total (USEPA16) PAHs	-	-	< 7.86	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	116
Acenaphthene-d10	117
Phenanthrene-d10	125
Chrysene-d12	151
Perylene-d12	200

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	88
Terphenyl-d14	76

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH03 ES 2 0.10	**Job Number:**	S16_8814M
LIMS ID Number:	CL1635318	**Date Booked in:**	27-Oct-16
QC Batch Number:	161236	**Date Extracted:**	31-Oct-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Nov-16
Directory:	116PAH.MS17\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	4.43	0.18	97	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	5.80	1.16	99	UM
Anthracene	120-12-7	5.85	0.43	97	U
Fluoranthene	206-44-0	7.15	4.88	99	UM
Pyrene	129-00-0	7.44	3.84	96	UM
Benzo[a]anthracene	56-55-3	9.13	2.61	94	UM
Chrysene	218-01-9	9.18	2.26	100	UM
Benzo[b]fluoranthene	205-99-2	10.66	3.09	93	UM
Benzo[k]fluoranthene	207-08-9	10.70	1.08	94	UM
Benzo[a]pyrene	50-32-8	11.09	2.31	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.47	2.20	87	UM
Dibenzo[a,h]anthracene	53-70-3	12.50	0.42	82	UM
Benzo[g,h,i]perylene	191-24-2	12.78	1.67	96	UM
Coronene	191-07-1 *	14.98	0.40	73	N
Total (USEPA16) PAHs	-	-	< 26.42	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	116
Acenaphthene-d10	117
Phenanthrene-d10	125
Chrysene-d12	156
Perylene-d12	215

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	87
Terphenyl-d14	75

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH03 ES 7 1.00	**Job Number:**	S16_8814M
LIMS ID Number:	CL1635319	**Date Booked in:**	27-Oct-16
QC Batch Number:	161236	**Date Extracted:**	31-Oct-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Nov-16
Directory:	116PAH.MS17\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.37	0.14	93	**UM**
Acenaphthylene	208-96-8	4.43	0.88	99	U
Acenaphthene	83-32-9	4.55	0.21	94	UM
Fluorene	86-73-7	4.94	0.22	97	UM
Phenanthrene	85-01-8	5.80	3.08	99	UM
Anthracene	120-12-7	5.85	1.36	98	U
Fluoranthene	206-44-0	7.15	11.70	99	UM
Pyrene	129-00-0	7.44	9.75	95	UM
Benzo[a]anthracene	56-55-3	9.13	8.14	92	UM
Chrysene	218-01-9	9.18	5.82	99	UM
Benzo[b]fluoranthene	205-99-2	10.67	10.42	96	UM
Benzo[k]fluoranthene	207-08-9	10.70	3.60	95	UM
Benzo[a]pyrene	50-32-8	11.09	8.22	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.47	9.03	86	UM
Dibenzo[a,h]anthracene	53-70-3	12.50	2.02	91	UM
Benzo[g,h,i]perylene	191-24-2	12.78	6.82	95	UM
Coronene	191-07-1 *	14.99	1.81	1	N
Total (USEPA16) PAHs	-	-	81.35	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	119
Acenaphthene-d10	122
Phenanthrene-d10	132
Chrysene-d12	173
Perylene-d12	257

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	86
Terphenyl-d14	74

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH03 ES 9 2.00	**Job Number:**	S16_8814M
LIMS ID Number:	CL1635320	**Date Booked in:**	27-Oct-16
QC Batch Number:	161236	**Date Extracted:**	31-Oct-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Nov-16
Directory:	116PAH.MS17\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Coronene	191-07-1 *	-	< 0.10	-	N
Total (USEPA16) PAHs	-	-	< 1.67	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	118
Acenaphthene-d10	119
Phenanthrene-d10	128
Chrysene-d12	152
Perylene-d12	193

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	88
Terphenyl-d14	77

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

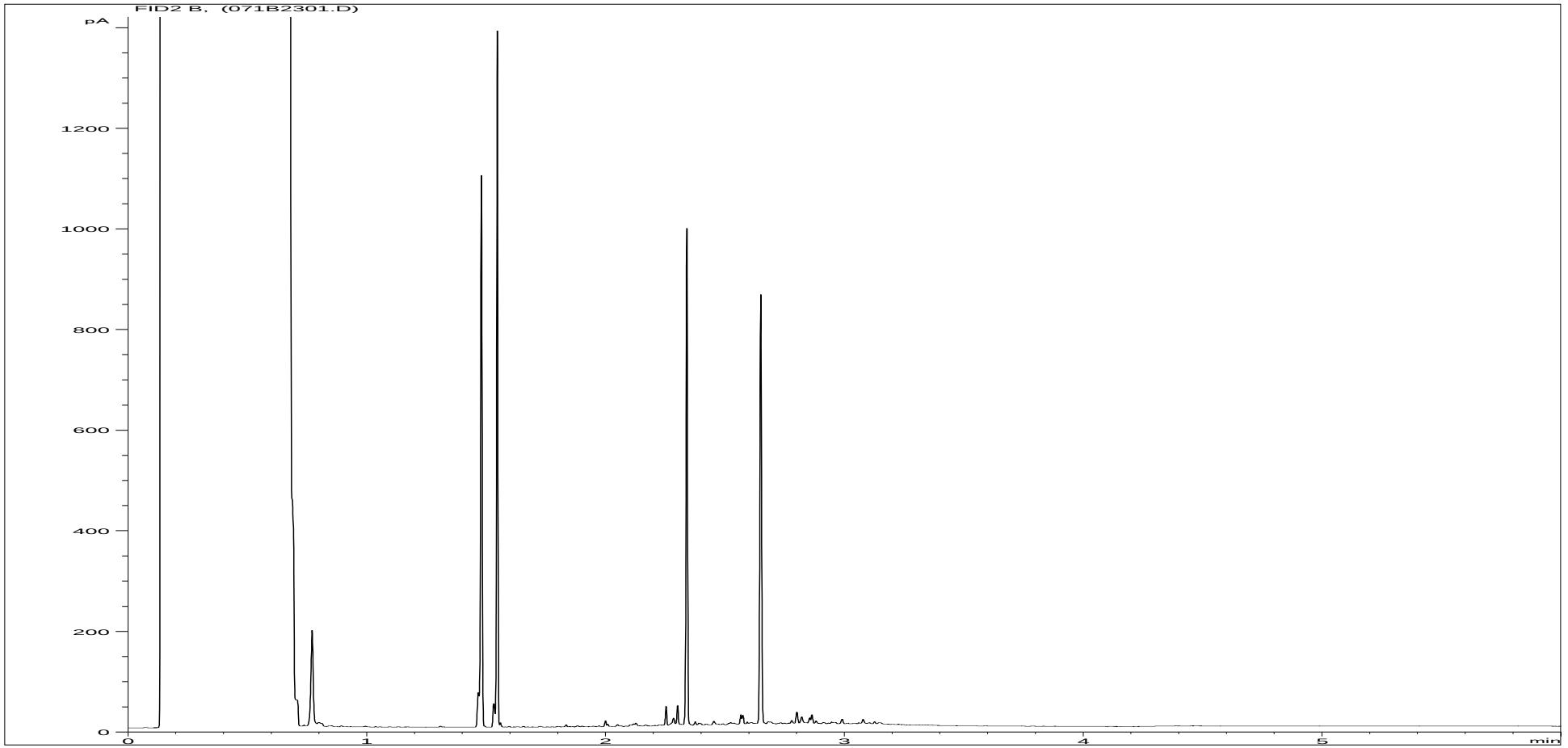
Polychlorinated Biphenyls (congeners)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI	**Matrix:**	Soil
Job Number:	S16_8814M	**Date Booked in:**	27-Oct-16
QC Batch Number:	161236	**Date Extracted:**	28-Oct-16
Directory:	1031PCB.GC70	**Date Analysed:**	31-Oct-16
Method:	Ultrasonic		
Accreditation code:	N		

			Concentration, (µg/kg)						
	Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
*	CL1635317	BH02A ES 1 1.20	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4
*	CL1635319	BH03 ES 7 1.00	<5.8	<5.8	<5.8	<5.8	9.4	10.6	8.4

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

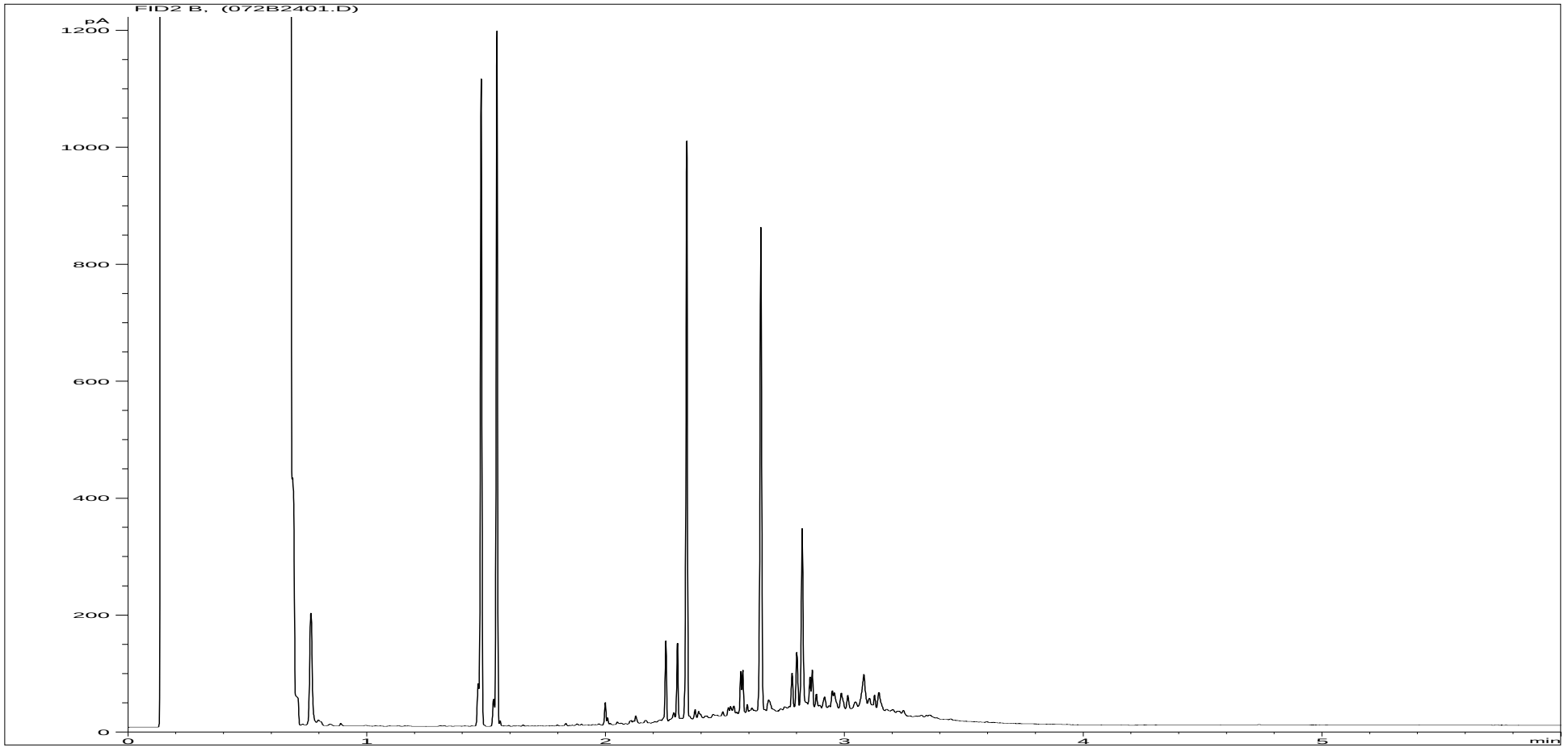
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635317	**Job Number:**	S16_8814M
Multiplier:	8	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH02A ES 1 1.20
Acquisition Date/Time:	31-Oct-16, 19:27:56		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\071B2301.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

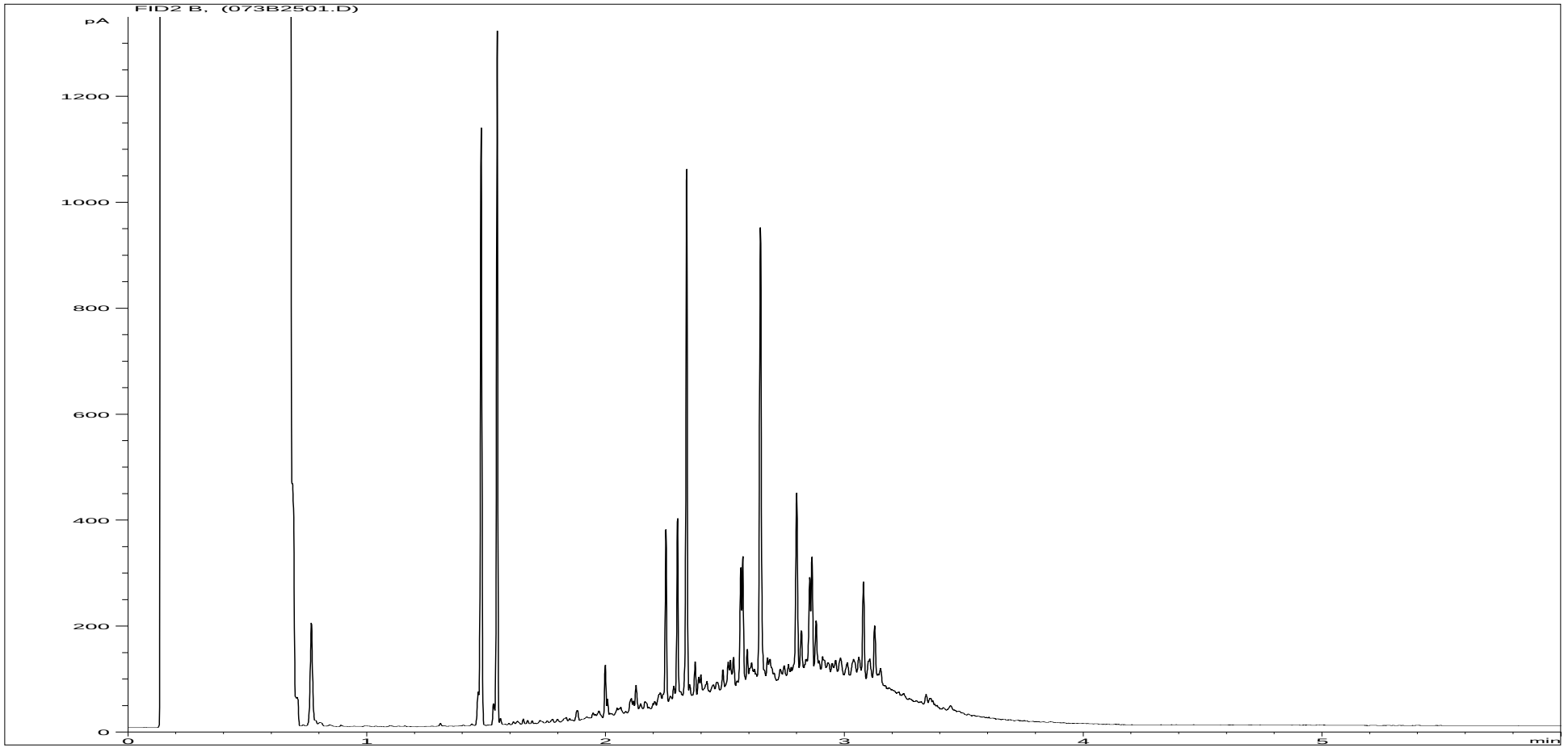
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635318	**Job Number:**	S16_8814M
Multiplier:	8	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH03 ES 2 0.10
Acquisition Date/Time:	31-Oct-16, 19:41:13		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\072B2401.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

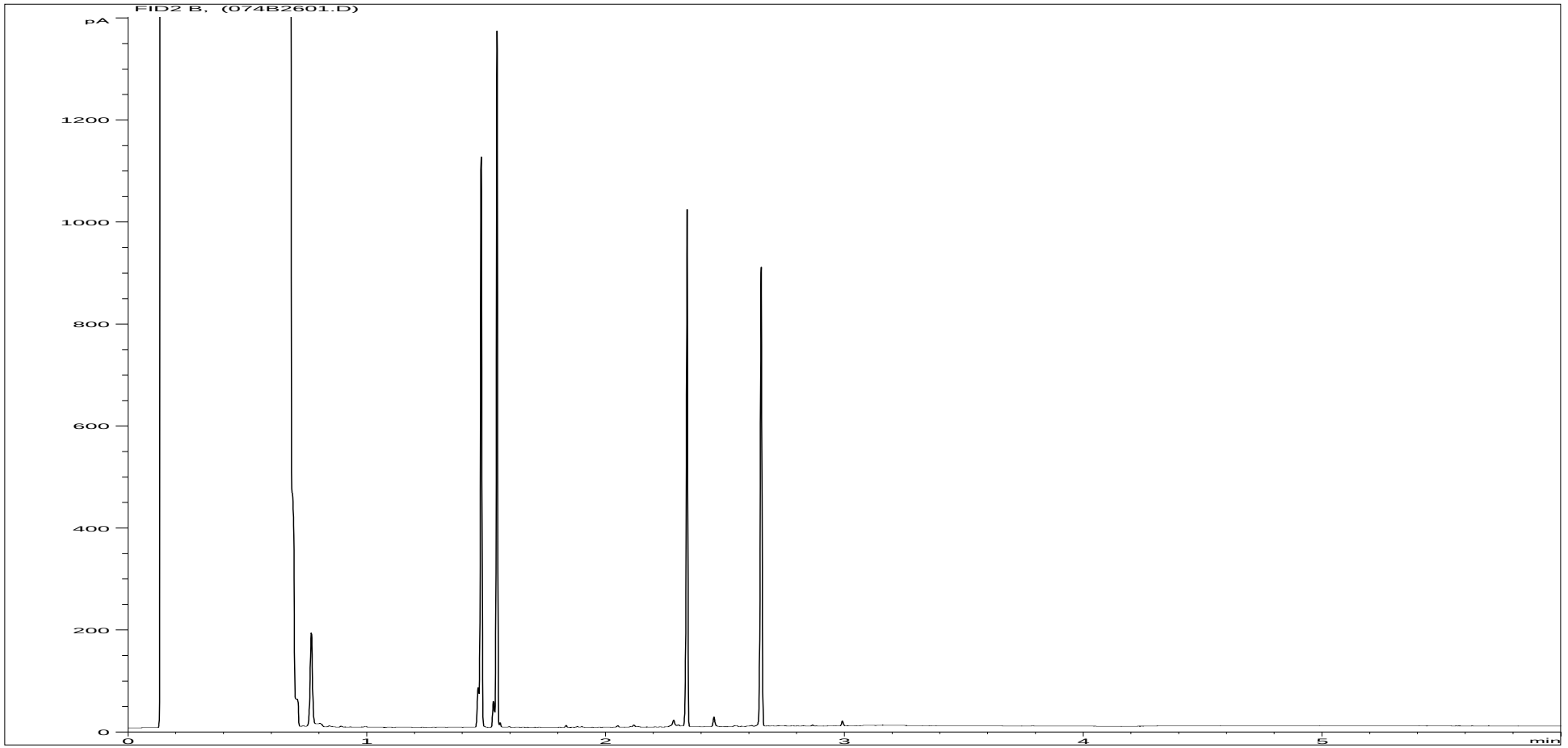
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635319	**Job Number:**	S16_8814M
Multiplier:	8	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH03 ES 7 1.00
Acquisition Date/Time:	31-Oct-16, 19:54:26		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\073B2501.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635320	**Job Number:**	S16_8814M
Multiplier:	8	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH03 ES 9 2.00
Acquisition Date/Time:	31-Oct-16, 20:07:38		
Datafile:	D:\TES\DATA\Y2016\103116TPH_GC4\103116 2016-10-31 14-29-47\074B2601.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	ESG Limited Bridgend				**Leaching Data**	
					Weight of sample (kg)	0.296
Contact	Adam Putt				Moisture content @ 105°C (% of Wet Weight)	21.9
					Equivalent Weight based on drying at 105°C (kg)	0.225
Site	Trowbridge GI				Volume of water required to carry out 2:1 stage (litres)	0.379
					Fraction of sample above 4 mm %	0.000
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
BH02A ES 1 1.20		s16_8814M	CL/1635317	04-Nov-16	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.32	3	5	6
N	LOI450	Loss on Ignition (%)	5.6			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.07	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	81	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<7.98	100		
U	PHSOIL	pH (pH units)	8.4		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	4.45		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except oo		mg/kg (dry weight)				
U	WSLM3	pH (pH units) oo	7.4	7.8	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) oo	607	266					
U	ICPMSW	Arsenic	0.002	0.001	0.004	0.01	0.5	2	25
U	ICPWATVAR	Barium	0.14	0.15	0.28	1.5	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.001	<0.002	<0.01	0.5	10	70
U	ICPMSW	Copper	0.004	0.006	0.008	0.06	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.009	0.011	0.018	0.11	0.5	10	30
U	ICPMSW	Nickel	0.001	0.001	0.002	0.01	0.4	10	40
U	ICPMSW	Lead	0.003	0.003	0.006	0.03	0.5	10	50
U	ICPMSW	Antimony	0.002	0.002	0.004	0.02	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.05	0.034	0.1	0.36	4	50	200
U	KONENS	Chloride	7	1	14	18	800	15000	25000
U	ISEF	Fluoride	0.6	0.7	1.2	7	10	150	500
U	ICPWATVAR	Sulphate as SO4	158	42.4	316	578	1000	20000	50000
N	WSLM27	Total Dissolved Solids	473	207	946	2425	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	7.3	6.6	14.6	67	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	ESG Limited Bridgend				**Leaching Data**	
					Weight of sample (kg)	0.262
Contact	Adam Putt				Moisture content @ 105°C (% of Wet Weight)	13.4
					Equivalent Weight based on drying at 105°C (kg)	0.225
Site	Trowbridge GI				Volume of water required to carry out 2:1 stage (litres)	0.413
					Fraction of sample above 4 mm %	35.000
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
BH03 ES 7 1.00		s16_8814M	CL/1635319	04-Nov-16	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	5.13	3	5	6
N	LOI450	Loss on Ignition (%)	6.8			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.0452	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	973	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	83.16	100		
U	PHSOIL	pH (pH units)	8.5		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	6.38		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except oo		mg/kg (dry weight)				
U	WSLM3	pH (pH units) oo	7.5	7.6	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) oo	281	138					
U	ICPMSW	Arsenic	0.002	0.005	0.004	0.05	0.5	2	25
U	ICPWATVAR	Barium	0.2	0.11	0.4	1.2	20	100	300
U	ICPMSW	Cadmium	<0.0001	0.0003	<0.0002	<0.003	0.04	1	5
U	ICPMSW	Chromium	0.003	0.008	0.006	0.07	0.5	10	70
U	ICPMSW	Copper	0.015	0.027	0.03	0.25	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.008	0.004	0.016	0.05	0.5	10	30
U	ICPMSW	Nickel	0.002	0.002	0.004	0.02	0.4	10	40
U	ICPMSW	Lead	0.011	0.047	0.022	0.42	0.5	10	50
U	ICPMSW	Antimony	0.008	0.005	0.016	0.05	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.036	0.099	0.072	0.91	4	50	200
U	KONENS	Chloride	2	2	4	20	800	15000	25000
U	ISEF	Fluoride	1.3	1.2	2.6	12	10	150	500
U	ICPWATVAR	Sulphate as SO4	33.3	7.3	67	108	1000	20000	50000
N	WSLM27	Total Dissolved Solids	219	107	438	1219	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	6	6.8	12	67	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

ASBESTOS ANALYSIS RESULTS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates

1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-13535**
For the attention of:	ESG Limited Bridgend	**Report Date:**	**02/11/2016**
Site Address:	Trowbridge GI	**Project Number:**	**S168814**

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in < 10mm	% Asbestos by weight of Total Dried Sample	Moisture Content	Asbestos Fibre Types Identified
CL/1635317	11/10/16	BH02A 1.20 Soils	02/11/2016							Amosite, (Insulating Board)
CL/1635318	29/09/16	BH03 0.10 Soils	02/11/2016							NAIIS
CL/1635319	29/09/16	BH03 1.00 Soils	02/11/2016							Chrysotile, (Free Fibres and Lagging)

Keys

NAACR = Not Analysed at Clients Request

NAIIS = No Asbestos Identified in Sample (Identification Only)

*** visible to naked eye**

NADIS = No Asbestos Detected in Sample (ID & Quant Only)

Name:	Stacey Innes	Authorised Signatory:
Position:	Lab Analyst	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 12 - February 2016. Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer **ESG Limited Bridgend**
Site **Trowbridge GI**
Report No **S168814M**

Consignment No S59694
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	Sampled	MethodID	ANC	BTEXHSA		CALC_CR3	CEN Leachate					CustServ	GROHSA	ICPACIDS	ICPBOR	ICPMSS									KONECL	KONECR	LOI(%MM)
				Acid Neut. Capacity	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	Chromium (III)	CEN Leac(P)1	CEN Leac(P)2	CEN Leac(P)C	Fraction of non-crushable material %	Fraction of sample above 4 mm %	REPORT A	GRO (C6-C10)	SO4-- (acid sol)	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	Chloride:(2:1)	Chromium vi:	L.O.I. % @ 450C
					✓	✓								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
CL/1635317	BH02A 1.20	11/10/16			E	E								E														
CL/1635318	BH03 0.10	29/09/16			E	E								E		E												
CL/1635319	BH03 1.00	29/09/16			E	E								E		E												
CL/1635320	BH03 2.00	06/10/16			E	E								E														

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No S168814M

Consignment No S59694
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	MethodID	MCertS	PAHMSUS	PCBUSECOAR	PHSOIL	SFAPI				Sub002a	TMSS	TPHFIDUS					WSLM59
		Sampled	MCertS Analysis	PAH (17) by GCMS	PCB-7 Congeners Analysis	pH units (AR)	Cyanide(Complex)(AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)	Phenol Index.(AR)	^Asbestos Screen	Tot.Moisture @ 105C	TPH Band (>C10-C16)	TPH Band (>C10-C40)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH by GCFID (AR)	Total Organic Carbon
				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CL/1635317	BH02A 1.20	11/10/16				E	E	E	E	E								
CL/1635318	BH03 0.10	29/09/16		E		E	E	E	E	E		E	E		E	E	E	
CL/1635319	BH03 1.00	29/09/16		E		E	E	E	E	E		E	E	E	E	E	E	
CL/1635320	BH03 2.00	06/10/16		E		E	E	E	E	E			E		E	E	E	

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ANC	Oven Dried @ < 35°C	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	CALC_CR3	Oven Dried @ < 35°C	Calculated from the difference between Total Chromium and Hexavalent Chromium
Soil	CEN Leachate	As Received	Determination of Oversize and Inert Material Content prior to leaching sample
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	KONECL	Oven Dried @ < 35°C	Determination of Chloride in Soil using water extraction at the stated water:soil ratio, discrete colorimetric detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	LOI(%MM)	Oven Dried @ < 35°C	Determination of loss on ignition for soil samples at specified temperature by gravimetry
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Bridgend

Site : Trowbridge GI

Report Number : S16_8814

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1635317	BH02A ES 1 1.20	Brown Stone CLAY
CL/1635318	BH03 ES 2 0.10	Brown Stone SILT
CL/1635319	BH03 ES 7 1.00	Brown Stone SILT
CL/1635320	BH03 ES 9 2.00	Brown CLAY

Our Ref: EFS/168932M (Ver. 1)
Your Ref: H6100-16

November 7, 2016

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 13/12/16 when they will be discarded. Please call 01283 554547 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

JNColbourne

J Colbourne
Project Co-ordinator
01283 554547

Environmental Chemistry, ESG, P.O. Box 100, Burton-upon-trent, DE15 0XD Tel: 01283 554400 Fax: 01283 554422
Environmental Scientifics Group Limited.
Registered No: 2880501

TEST REPORT

1252

Report No. EFS/168932M (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 1 sample described in this report were registered for analysis by ESG on 01-Nov-2016. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 07-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Page 5)
GC-FID Chromatograms (Page 6)
Analytical and Deviating Sample Overview (Pages 7 to 8)
Table of Method Descriptions (Page 9)
Table of Report Notes (Page 10)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 07-Nov-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg
		Method Codes :	GROHSA	ICPACIDS	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PHSOIL	SFAPI	SFAPI	SFAPI
		Method Reporting Limits :	0.2	20	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16		0.5	0.5	0.5
		Accreditation Code:	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	N	UM	UM
LAB ID Number CL/	Client Sample Description	Sample Date	GRO (C6-C10)	SO4-- (acid sol)	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	pH units (AR)	Cyanide(Complex)(AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
1635754	BH01 ES 11 2.10	18-Oct-16	<0.2	637	2.0	5.9	<0.2	28.0	12.3	8.7	<0.5	24.3	<0.5	78.9	7.9	<0.6	<0.6	<0.6

ESG

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

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Client Name	ESG Limited Bridgend
Contact	Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	07-Nov-2016
Report Number	EFS/168932M
Table Number	1

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Units :			mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/kg	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Method Codes :			SFAPI	TMSS	TPHFIDUS	TPHFIDUS	TPHFIDUS	TPHFIDUS	CALC_CR3	KONECL	KONECR	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
Method Reporting Limits :			0.5	0.1	10	10	10	10	0.5	1	0.1	0.04	10	10	10	20	30	20
Accreditation Code:			U	U	N	U	N	UM	N	N	N	N	UM	UM	UM	U	UM	UM
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Phenol Index.(AR)**	**Tot.Moisture @ 105C**	**TPH Band (>C10-C16)**	**TPH Band (>C16-C21)**	**TPH Band (>C21-C35)**	**TPH by GCFID (AR)**	**Chromium (III)**	**Chloride:(2:1)**	**Chromium vi:**	**Total Organic Carbon**	**Benzene**	**Toluene**	**Ethyl Benzene**	**MTBE**	**Xylenes**	**m/p Xylenes**
1635754	BH01 ES 11 2.10	**18-Oct-16**	<0.6	15.7	<12	<12	<12	13	<28.0	29	<0.1	0.27	<12	<12	<12	<24	<36	<24

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Contact	Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	**07-Nov-2016**
Report Number	**EFS/168932M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

		Units :	µg/kg	mg/kg															
		Method Codes :	BTEXHSA	PAHMSUS															
		Method Reporting Limits :	10																
		Accreditation Code:	UM																
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**o Xylene**	**PAH (17) by GCMS**															
1635754	BH01 ES 11 2.10	**18-Oct-16**	<12	Req															

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Client Name	**ESG Limited Bridgend**
Contact	Adam Putt

Trowbridge GI

Sample Analysis

Date Printed	**07-Nov-2016**
Report Number	**EFS/168932M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH01 ES 11 2.10	**Job Number:**	S16_8932M
LIMS ID Number:	CL1635754	**Date Booked in:**	01-Nov-16
QC Batch Number:	161254	**Date Extracted:**	03-Nov-16
Quantitation File:	Initial Calibration	**Date Analysed:**	04-Nov-16
Directory:	216PAH.MS17\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Coronene	191-07-1 *	-	< 0.09	-	N
Total (USEPA16) PAHs	-	-	< 1.52	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

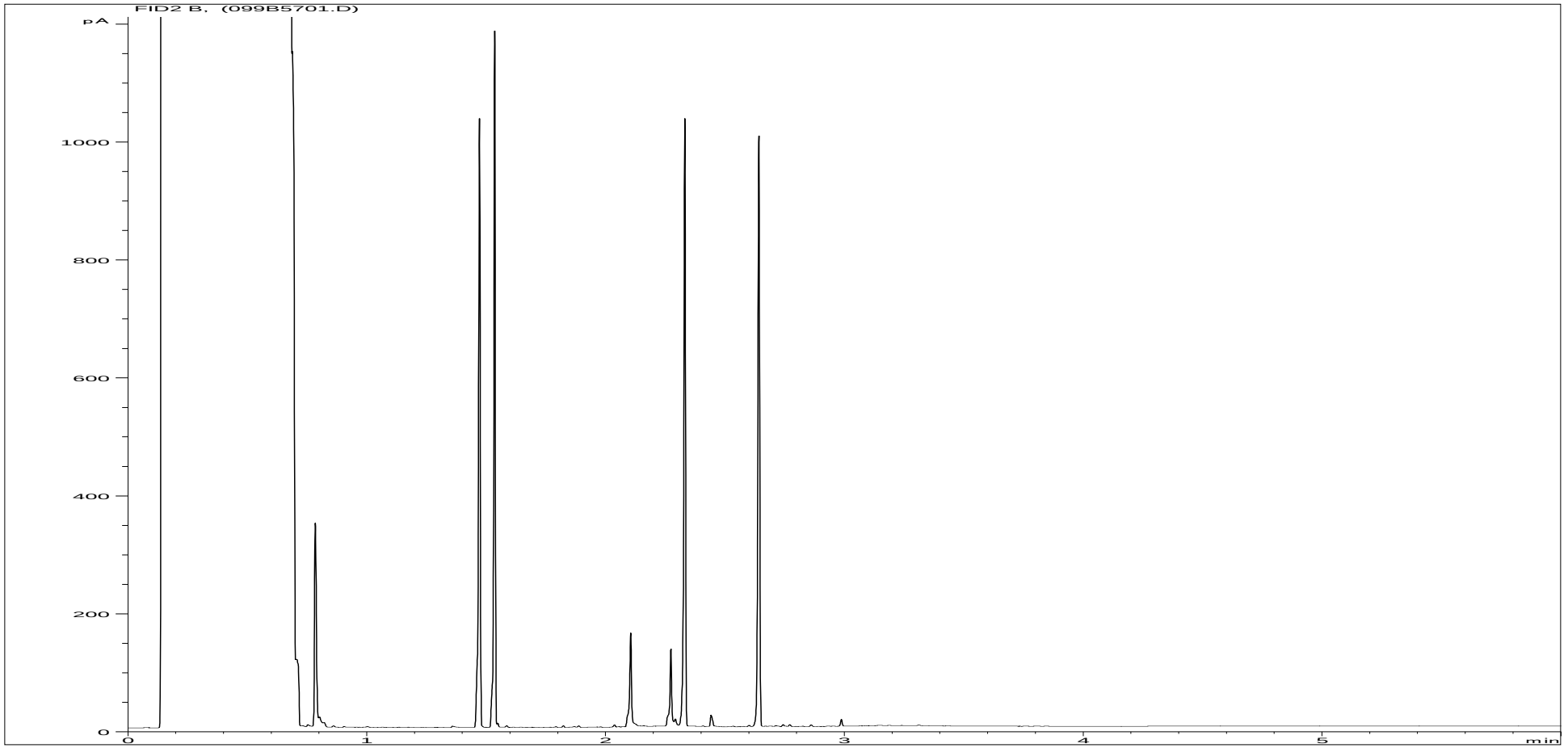
Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	74
Acenaphthene-d10	80
Phenanthrene-d10	83
Chrysene-d12	97
Perylene-d12	112

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	100
Terphenyl-d14	92

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1635754	**Job Number:**	S16_8932M
Multiplier:	8	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH01 ES 11 2.10
Acquisition Date/Time:	04-Nov-16, 03:27:28		
Datafile:	D:\TES\DATA\Y2016\110316TPH_GC3\110316 2016-11-03 15-22-26\099B5701.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No S168932M

Consignment No S60022
Date Logged 01-Nov-2016

Report Due 07-Nov-2016

ID Number	Description	MethodID	BTEXHSA		CALC_GR3	CustServ	GROHSA	ICPACIDS	ICPBOR	ICPMSS								KONECL	KONECR	MCertS	PAHMSUS	PHSOIL	SFAPI			
		Sampled	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	Chromium (III)	REPORT A	GRO (C6-C10)	SO4-- (acid sol)	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	Chloride:(2:1)	Chromium vi:	MCertS Analysis	PAH (17) by GCMS	pH units (AR)	Cyanide(Complex)(AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)	Phenol Index.(AR)
			✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓
CL/1635754	BH01 2.10	18/10/16	E	E			E																E	E	E	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No S168932M

Consignment No S60022
Date Logged 01-Nov-2016

Report Due 07-Nov-2016

ID Number	Description	MethodID	TMSS	TPHFIDUS				WSLM59
		Sampled	Tot.Moisture @ 105C	TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH by GCFID (AR)	Total Organic Carbon
			✓	✓	✓	✓	✓	
CL/1635754	BH01 2.10	18/10/16						

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	CALC_CR3	Oven Dried @ < 35°C	Calculated from the difference between Total Chromium and Hexavalent Chromium
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPACIDS	Oven Dried @ < 35°C	Determination of Total Sulphate in soil samples by Hydrochloric Acid extraction followed by ICPOES detection
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	KONECL	Oven Dried @ < 35°C	Determination of Chloride in Soil using water extraction at the stated water:soil ratio, discrete colorimetric detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Bridgend
Site : Trowbridge GI
Report Number : S16_8932

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1635754	BH01 ES 11 2.10	Grey/Brown CLAY

Our Ref: EXR/229287 (Ver. 1)
Your Ref: H6100-16

November 2, 2016

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
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Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

CEN Leachate 10:1 - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

JNColbourne

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT

1252

Report No. EXR/229287 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 1 sample described in this report were registered for analysis by ESG on 27-Oct-2016. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 02-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Page 4)
GC-FID Chromatograms (Page 5)
Analytical and Deviating Sample Overview (Pages 6 to 7)
Table of Additional Report Notes (Page 8)
Table of Method Descriptions (Page 9)
Table of Report Notes (Page 10)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 02-Nov-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :			pH units	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Method Codes :			WSLM3	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR	ICPMSW	ICPMSW	CALCNH4	KONENS	SFAPI
Method Reporting Limits :				3	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.01	0.0001	0.001	0.01	0.01	0.02
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**pH units w**	**Total Sulphur as SO4 (Dissolved) a**	**Nickel as Ni (Dissolved)**	**Chromium as Cr (Dissolved)**	**Cadmium as Cd (Dissolved)**	**PAH GC-MS (16) o**	**Copper as Cu (Dissolved)**	**Lead as Pb (Dissolved)**	**Zinc as Zn (Dissolved)**	**Arsenic as As (Dissolved)**	**Boron as B (Dissolved) a**	**Mercury as Hg (Dissolved)**	**Selenium as Se (Dissolved)**	**Ammoniacal Nitrogen as NH4**	**Ammoniacal Nitrogen as N**	**Cyanide (Free) as CN**
1744016	BH04B ES 20 1.20	27-Oct-16	7.8	8.8	<0.001	0.002	<0.0001	Req §	0.004	0.002	0.016	0.004	0.03	<0.0001	<0.001	0.01	<0.01	<0.02

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Client Name	**ESG Limited Bridgend**
Contact	Adam Putt

Trowbridge GI

CEN Leachate 10:1

Date Printed	**02-Nov-2016**
Report Number	**EXR/229287**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l		
Method Codes :			SFAPI	SFAPI	TPHFID	TPHFID	TPHFID	TPHFID	GROHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA		
Method Reporting Limits :			0.02	0.05		0.01	0.01	0.01	0.1	5	5	5	10	15	10	5		
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Cyanide (Total) as CN**	**Phenol Index as C6H5OH**	**TPH Band >C10-C16**	**TPH Band >C16-C21**	**TPH Band (>C21-C35)**	**TPH GC**	**GRO >C6->C10**	**Ethyl Benzene**	**Benzene**	**Toluene**	**MTBE**	**Xylenes**	**m/p Xylenes**	**o Xylene**		
1744016	BH04B ES 20 1.20	**27-Oct-16**	<0.02	<0.05	<0.01	<0.01	0.02	0.03	<0.1	<5	<5	<5	<10	<15	<10	<5		

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Client Name	**ESG Limited Bridgend**
Contact	Adam Putt

Trowbridge GI

CEN Leachate 10:1

Date Printed	**02-Nov-2016**
Report Number	**EXR/229287**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH04B ES 20 1.20	**Job Number:**	W22_9287
LIMS ID Number:	EX1744016	**Date Booked in:**	27-Oct-16
QC Batch Number:	160692	**Date Extracted:**	01-Nov-16
Quantitation File:	Initial Calibration	**Date Analysed:**	02-Nov-16
Directory:	116PAH.MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.05	0.096	87
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.21	0.021	88
Fluorene	86-73-7	4.56	0.015	89
Phenanthrene	85-01-8	5.35	0.070	97
Anthracene	120-12-7	5.40	0.014	95
Fluoranthene	206-44-0	6.63	0.052	94
Pyrene	129-00-0	6.91	0.043	95
Benzo[a]anthracene	56-55-3	8.56	0.030	87
Chrysene	218-01-9	8.60	0.018	91
Benzo[b]fluoranthene	205-99-2	10.06	0.022	78
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	10.48	0.013	91
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.444	-

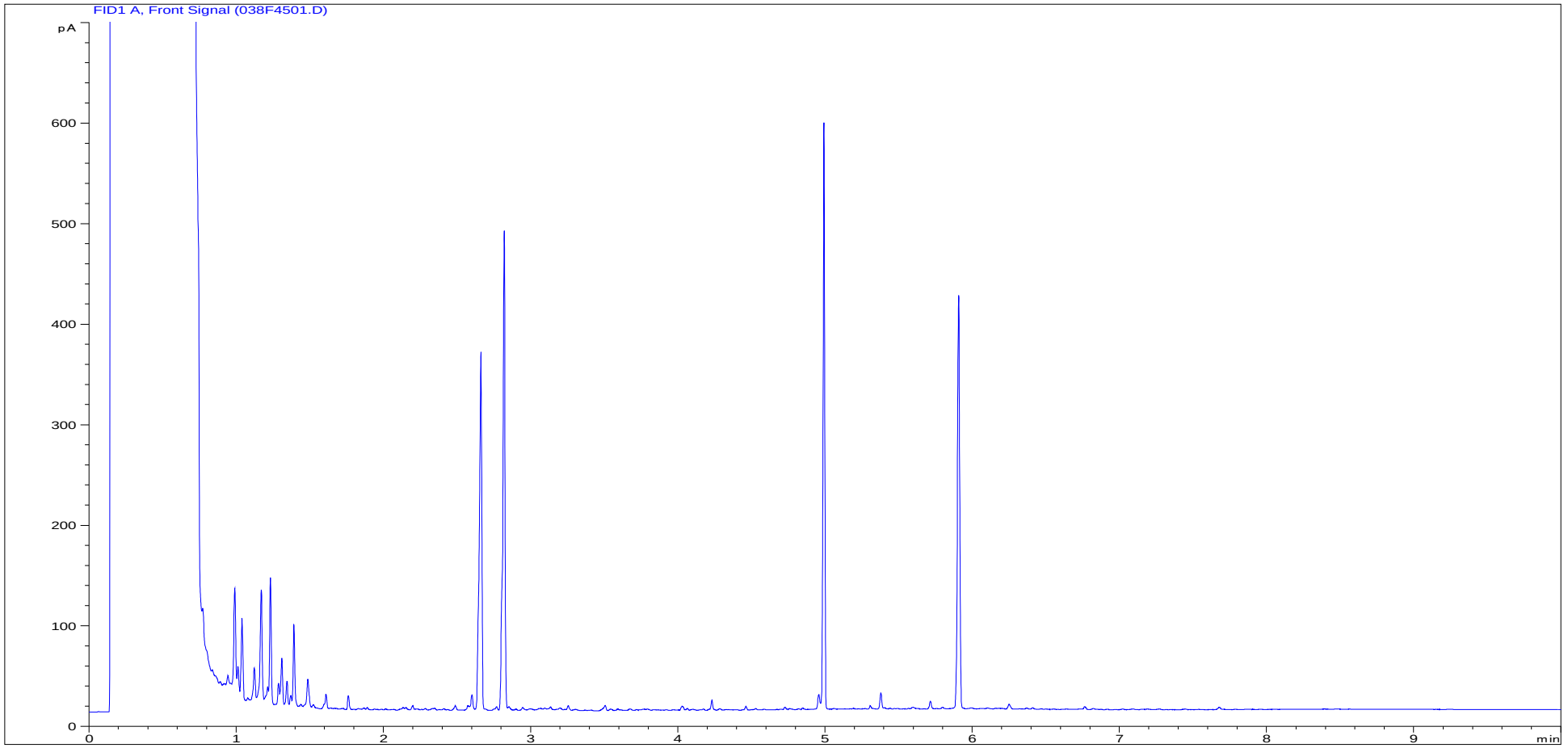
"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	106
Acenaphthene-d10	109
Phenanthrene-d10	109
Chrysene-d12	108
Perylene-d12	124

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	80
Terphenyl-d14	70

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1744016	**Job Number:**	W22_9287
Multiplier:	0.005	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge GI
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH04B ES 20 1.20
Acquisition Date/Time:	02-Nov-16, 04:33:17		
Datafile:	D:\TES\DATA\Y2016\110116TPH_GC17\110116 2016-11-01 15-06-52\038F4501.D		

Where individual results are flagged see report notes for status.

CEN Leachate 10:1 Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W229287

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No W229287

Consignment No S60148
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	Matrix Type	Sampled	MethodID	BTEXHSA	CALCNH4	CUSTSERV	GROHSA	ICPMSW									ICPWATVAR		KONENS	LeachPrep	PAHMSW
					BTEX-HSA + MTBE analysis	Ammoniacal Nitrogen as NH4 Calc	Report A (CEN)C	GRO >C6->C10	Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Total Sulphur as SO4 (Diss) VAR	Boron as B (Dissolved) VAR	Ammoniacal Nitrogen (Kone)	Leachate Prep	PAH GC-MS (16)
					✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EX/1744016	BH04B 1.20	Laboratory Produced Leachate	27/10/16																			

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No W229287

Consignment No S60148
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	Matrix Type	Sampled	MethodID	SFAPI			TPHFID				WSLM3
					Cyanide (Free) as CN SFA	Cyanide (Total) as CN SFA	Phenol Index SFA	TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH GC	pH units
					✓	✓	✓	✓	✓	✓	✓	✓
EX/1744016	BH04B 1.20	Laboratory Produced Leachate	27/10/16									

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Report Number : W/EXR/229287

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
TPHFID	EX1744016	The Secondary process control result associated with this Test has not wholly met the requirements of the Laboratory Quality Management System (QMS). All other Process controls (including the Primary Process control) are within specification. The Laboratory believes that the validity of the data has not been affected but in line with our QMS policy we have removed accreditation from the affected bandings (>c10->c12). These circumstances should be taken into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	BTEXHSA	As Received	Benzene, Toluene, Ethylbenzene, & Xylenes by headspace extraction GCFID quantitation
Water	CALCNH4	As Received	Ammoniacal Nitrogen expressed as NH4, calculated from Ammoniacal Nitrogen expressed as N
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Bridgend
Site : Trowbridge GI
Report Number : W22_9287

Lab ID Number	Client ID	Description
EX/1744016	BH04B ES 20 1.20	Laboratory Produced Leachate

Our Ref: EXR/229296 (Ver. 1)
Your Ref: H6100-16

November 4, 2016

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

CEN Leachate 10:1 - Trowbridge GI

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

JNColbourne

J Colbourne
Project Co-ordinator
01283 554547

TEST REPORT

1252

Report No. EXR/229296 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge GI

The 1 sample described in this report were registered for analysis by ESG on 27-Oct-2016. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 04-Nov-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Page 4)
GC-FID Chromatograms (Page 5)
Analytical and Deviating Sample Overview (Pages 6 to 7)
Table of Additional Report Notes (Page 8)
Table of Method Descriptions (Page 9)
Table of Report Notes (Page 10)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 04-Nov-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

Units :			pH units	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Method Codes :			WSLM3	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR	ICPMSW	ICPMSW	CALCNH4	KONENS	SFAPI
Method Reporting Limits :				3	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.01	0.0001	0.001	0.01	0.01	0.02
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**pH units w**	**Total Sulphur as SO4 (Dissolved) a**	**Nickel as Ni (Dissolved)**	**Chromium as Cr (Dissolved)**	**Cadmium as Cd (Dissolved)**	**PAH GC-MS (16) o**	**Copper as Cu (Dissolved)**	**Lead as Pb (Dissolved)**	**Zinc as Zn (Dissolved)**	**Arsenic as As (Dissolved)**	**Boron as B (Dissolved) a**	**Mercury as Hg (Dissolved)**	**Selenium as Se (Dissolved)**	**Ammoniacal Nitrogen as NH4**	**Ammoniacal Nitrogen as N**	**Cyanide (Free) as CN**
1744047	BH03 ES 2 0.10	27-Oct-16	7.5	6.1	0.002	<0.001	<0.0001	Req §	0.024	0.006	0.05	0.004	0.04	<0.0001	<0.001	<0.01	<0.01	<0.02

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name	**ESG Limited Bridgend**
Contact	Adam Putt

Trowbridge GI

CEN Leachate 10:1

Date Printed	**04-Nov-2016**
Report Number	**EXR/229296**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l		
Method Codes :			SFAPI	SFAPI	TPHFID	TPHFID	TPHFID	TPHFID	GROHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA		
Method Reporting Limits :			0.02	0.05		0.01	0.01	0.01	0.1	5	5	5	10	15	10	5		
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Cyanide (Total) as CN**	**Phenol Index as C6H5OH**	**TPH Band >C10-C16**	**TPH Band >C16-C21**	**TPH Band (>C21-C35)**	**TPH GC**	**GRO >C6->C10**	**Ethyl Benzene**	**Benzene**	**Toluene**	**MTBE**	**Xylenes**	**m/p Xylenes**	**o Xylene**		
1744047	BH03 ES 2 0.10	**27-Oct-16**	<0.02	<0.05	<0.01	0.01	0.03	0.06	<0.1	<5	<5	<5	<10	<165	<10	<5		

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name	**ESG Limited Bridgend**
Contact	Adam Putt

Trowbridge GI

CEN Leachate 10:1

Date Printed	**04-Nov-2016**
Report Number	**EXR/229296**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge GI		
Sample Details:	BH03 ES 2 0.10	**Job Number:**	W22_9296
LIMS ID Number:	EX1744047	**Date Booked in:**	27-Oct-16
QC Batch Number:	160692	**Date Extracted:**	01-Nov-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Nov-16
Directory:	116PAH.MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.05	0.236	96
Acenaphthylene	208-96-8	4.09	0.026	M
Acenaphthene	83-32-9	4.21	0.765	97
Fluorene	86-73-7	4.56	0.368	98
Phenanthrene	85-01-8	5.35	0.738	99
Anthracene	120-12-7	5.40	0.161	98
Fluoranthene	206-44-0	6.63	0.228	94
Pyrene	129-00-0	6.91	0.161	96
Benzo[a]anthracene	56-55-3	8.55	0.050	98
Chrysene	218-01-9	8.60	0.046	97
Benzo[b]fluoranthene	205-99-2	10.06	0.043	75
Benzo[k]fluoranthene	207-08-9	10.10	0.019	76
Benzo[a]pyrene	50-32-8	10.48	0.032	95
Indeno[1,2,3-cd]pyrene	193-39-5	11.85	0.026	76
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	12.13	0.024	89
Total (USEPA16) PAHs	-	-	< 2.933	-

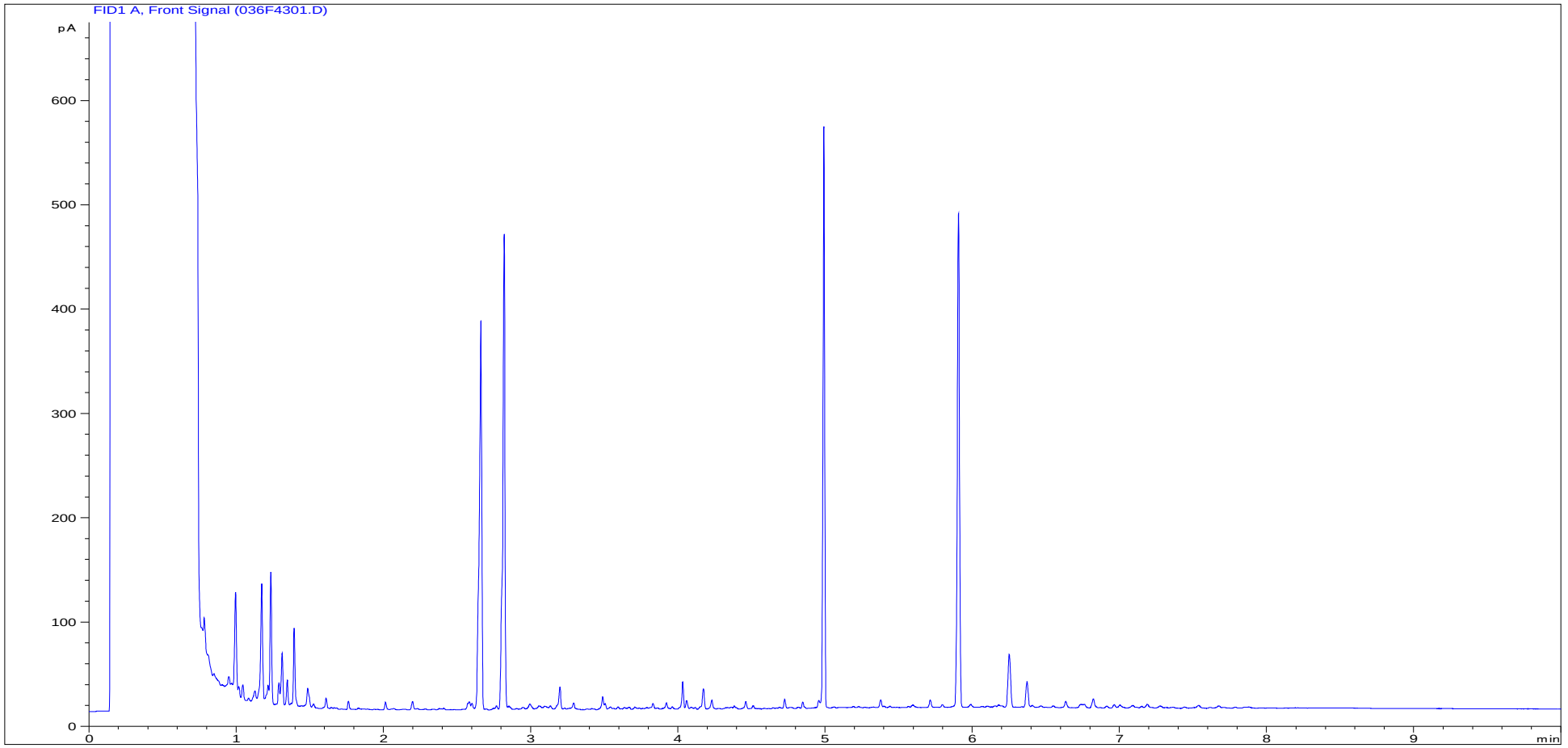
"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	90
Acenaphthene-d10	94
Phenanthrene-d10	94
Chrysene-d12	89
Perylene-d12	102

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	78
Terphenyl-d14	67

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1744047	**Job Number:**	W22_9296
Multiplier:	0.005	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge GI
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH03 ES 2 0.10
Acquisition Date/Time:	02-Nov-16, 03:57:39		
Datafile:	D:\TES\DATA\Y2016\110116TPH_GC17\110116 2016-11-01 15-06-52\036F4301.D		

Where individual results are flagged see report notes for status.

CEN Leachate 10:1 Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W229296

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No W229296

Consignment No S59694
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	Matrix Type	Sampled	BTEXHSA BTEX-HSA + MTBE analysis	CALCNH4 Ammoniacal Nitrogen as NH4 Calc	CUSTSERV Report A (CEN)C	GROHSA GRO >C6->C10	ICPMSW Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	ICPWATVAR Total Sulphur as SO4 (Diss) VAR	Boron as B (Dissolved) VAR	KONENS Ammoniacal Nitrogen (Kone)	LeachPrep Leachate Prep	PAHMSW PAH GC-MS (16)
		MethodID		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EX/1744047	BH03 0.10	Laboratory Produced Leachate	27/10/16																		

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site Trowbridge GI
Report No W229296

Consignment No S59694
Date Logged 27-Oct-2016

Report Due 03-Nov-2016

ID Number	Description	Matrix Type	Sampled	MethodID	SFAPI			TPHFID				WSLM3
					Cyanide (Free) as CN SFA	Cyanide (Total) as CN SFA	Phenol Index SFA	TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH GC	pH units
					✓	✓	✓	✓	✓	✓	✓	✓
EX/1744047	BH03 0.10	Laboratory Produced Leachate	27/10/16									

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
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D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Report Number : W/EXR/229296

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
TPHFID	EX1744047	The Secondary process control result associated with this Test has not wholly met the requirements of the Laboratory Quality Management System (QMS). All other Process controls (including the Primary Process control) are within specification. The Laboratory believes that the validity of the data has not been affected but in line with our QMS policy we have removed accreditation from the affected bandings (>c10->c12). These circumstances should be taken into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	BTEXHSA	As Received	Benzene, Toluene, Ethylbenzene, & Xylenes by headspace extraction GCFID quantitation
Water	CALCNH4	As Received	Ammoniacal Nitrogen expressed as NH4, calculated from Ammoniacal Nitrogen expressed as N
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Bridgend
Site : Trowbridge GI
Report Number : W22_9296

Lab ID Number	Client ID	Description
EX/1744047	BH03 ES 2 0.10	Laboratory Produced Leachate

Our Ref: EXR/235169 (Ver. 1)
Your Ref: H6100-16

February 15, 2017

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Joss Evans
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Joss Evans

Dear Joss Evans

Sample Analysis - H6100-16 Trowbridge

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

K Spencer
Project Co-ordinator
01283 554463

TEST REPORT

Report No. EXR/235169 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: H6100-16 Trowbridge

The 4 samples described in this report were registered for analysis by ESG on 09-Feb-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 15-Feb-2017

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Pages 4 to 7)
GC-FID Chromatograms (Pages 8 to 11)
Analytical and Deviating Sample Overview (Pages 12 to 13)
Table of Additional Report Notes (Page 14)
Table of Method Descriptions (Page 15)
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Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 15-Feb-2017

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

Units :			pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Method Codes :			WSLM3	WSLM2	KONENS	ICPWATVART	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSWT	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR	ICPMSW
Method Reporting Limits :				100	1	3	3	1	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.01	0.0001
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**pH units w**	**Conductivity uS/cm @ 25C w**	**Chloride as Cl w**	**Total Sulphur as SO4 (Total) a**	**Total Sulphur as SO4 (Dissolved) a**	**Magnesium as Mg (Dissolved) a**	**Nickel as Ni (Dissolved)**	**Chromium as Cr (Total)**	**Cadmium as Cd (Dissolved)**	**PAH GC-MS (16) o**	**Copper as Cu (Dissolved)**	**Lead as Pb (Dissolved)**	**Zinc as Zn (Dissolved)**	**Arsenic as As (Dissolved)**	**Boron as B (Dissolved) a**	**Mercury as Hg (Dissolved)**
1768544	BH01 W	06-Feb-17 11:40	7.6	5200	1070	671	747	23	0.004	0.002	0.0004	Req	0.003	<0.001	0.105	0.003	3.59	0.0001
1768545	BH02A W	06-Feb-17 12:10	7.8	5000	925	625	694	14	0.004	0.002	0.0001	Req	0.002	0.002	0.064	0.005	2.54	0.0001
1768546	BH03 W	06-Feb-17 12:40	7.5	4000	689	1310	1270	59	0.006	0.037	0.0002	Req	0.003	<0.001	0.105	0.002	4	<0.0001
1768547	BH04B W	06-Feb-17 13:20	7.4	4000	490	1310	1490	72	0.008	0.024	<0.0001	Req	0.002	<0.001	0.009	0.001	2.75	<0.0001

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Client Name ESG Limited Bridgend

Contact Joss Evans

H6100-16 Trowbridge

Sample Analysis

Date Printed	**15-Feb-2017**
Report Number	**EXR/235169**
Table Number	**1**

Where individual results are flagged see report notes for status.

		Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
		Method Codes :	ICPMSW	KONENS	CALC_NO3	KONENS	SFAPI	SFAPI	SFAS	SFAPI	GROHSA	TPHFID	TPHFID	TPHFID	TPHFID	GROHSA		
		Method Reporting Limits :	0.001	0.01	0.9	0.2	0.02	0.02	0.02	0.05	0.1		0.01	0.01	0.01	0.1		
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**Selenium as Se (Dissolved)**	**Ammoniacal Nitrogen as N**	**Nitrate as NO3 (Kone Calc) w**	**Nitrate as N**	**Cyanide (Free) as CN**	**Cyanide (Total) as CN**	**Sulphide as S**	**Phenol Index as C6H5OH**	**GRO-HSA o**	**TPH Band >C10-C16**	**TPH Band >C16-C21**	**TPH Band (>C21-C35)**	**TPH GC**	**GRO >C6->C10**		
1768544	BH01 W	06-Feb-17 11:40	0.011	0.5	15.1	3.4	<0.02	<0.02	<0.02	<0.05	<0.1	<0.01	<0.01	0.04	0.05	<0.1		
1768545	BH02A W	06-Feb-17 12:10	0.099	1.0	47.4	10.7	<0.02	<0.02	<0.02	<0.05	<0.1	<0.01	<0.01	0.04	0.06	<0.1		
1768546	BH03 W	06-Feb-17 12:40	0.002	0.8	4.4	1.0	<0.02	<0.02	<0.02	<0.05	<0.1	<0.01	<0.01	<0.01	0.02	<0.1		
1768547	BH04B W	06-Feb-17 13:20	0.001	0.16	<0.9	<0.2	<0.02	<0.02	<0.02	<0.05	<0.1	<0.01	<0.01	0.04	0.06	<0.1		

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Client Name **ESG Limited Bridgend**

Contact Joss Evans

H6100-16 Trowbridge

Sample Analysis

Date Printed	**15-Feb-2017**
Report Number	**EXR/235169**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: H6100-16 Trowbridge		
Sample Details:	BH01 W	**Job Number:**	w23_5169
LIMS ID Number:	EX1768544	**Date Booked in:**	09-Feb-17
QC Batch Number:	170078	**Date Extracted:**	13-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	14-Feb-17
Directory:	\021317MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	98
Acenaphthene-d10	100
Phenanthrene-d10	107
Chrysene-d12	101
Perylene-d12	100

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	88
Terphenyl-d14	78

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: H6100-16 Trowbridge		
Sample Details:	BH02A W	**Job Number:**	W23_5169
LIMS ID Number:	EX1768545	**Date Booked in:**	09-Feb-17
QC Batch Number:	170078	**Date Extracted:**	13-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	14-Feb-17
Directory:	\021317MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	100
Acenaphthene-d10	79
Phenanthrene-d10	121
Chrysene-d12	105
Perylene-d12	108

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	102
Terphenyl-d14	81

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: H6100-16 Trowbridge		
Sample Details:	BH03 W	**Job Number:**	w23_5169
LIMS ID Number:	EX1768546	**Date Booked in:**	09-Feb-17
QC Batch Number:	170078	**Date Extracted:**	13-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	14-Feb-17
Directory:	\021317MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	94
Acenaphthene-d10	76
Phenanthrene-d10	115
Chrysene-d12	96
Perylene-d12	91

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	117
Terphenyl-d14	79

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: H6100-16 Trowbridge		
Sample Details:	BH04B W	**Job Number:**	W23_5169
LIMS ID Number:	EX1768547	**Date Booked in:**	09-Feb-17
QC Batch Number:	170078	**Date Extracted:**	13-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	14-Feb-17
Directory:	\021317MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	6.91	0.012	76
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.172	-

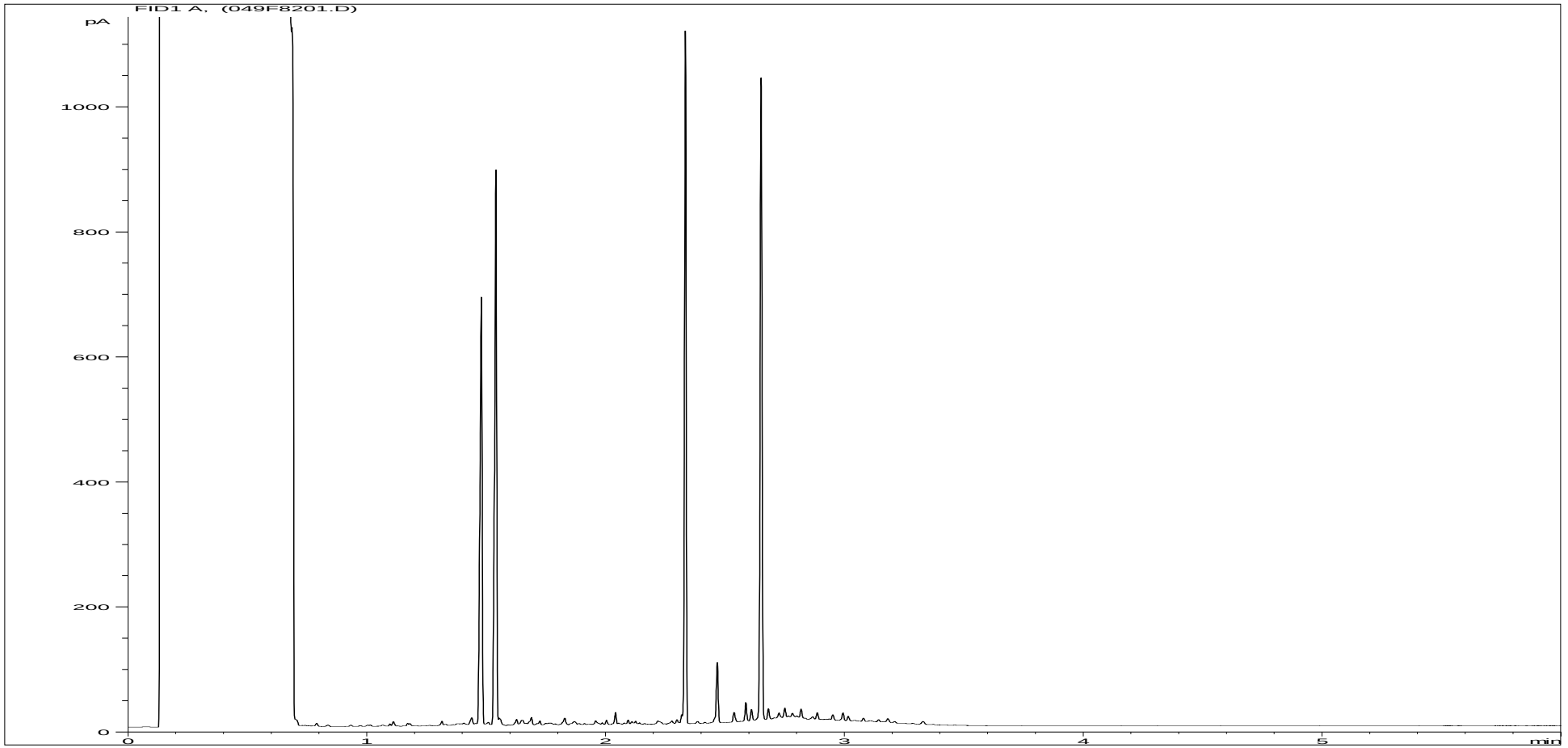
"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	93
Acenaphthene-d10	93
Phenanthrene-d10	111
Chrysene-d12	94
Perylene-d12	93

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	101
Terphenyl-d14	85

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

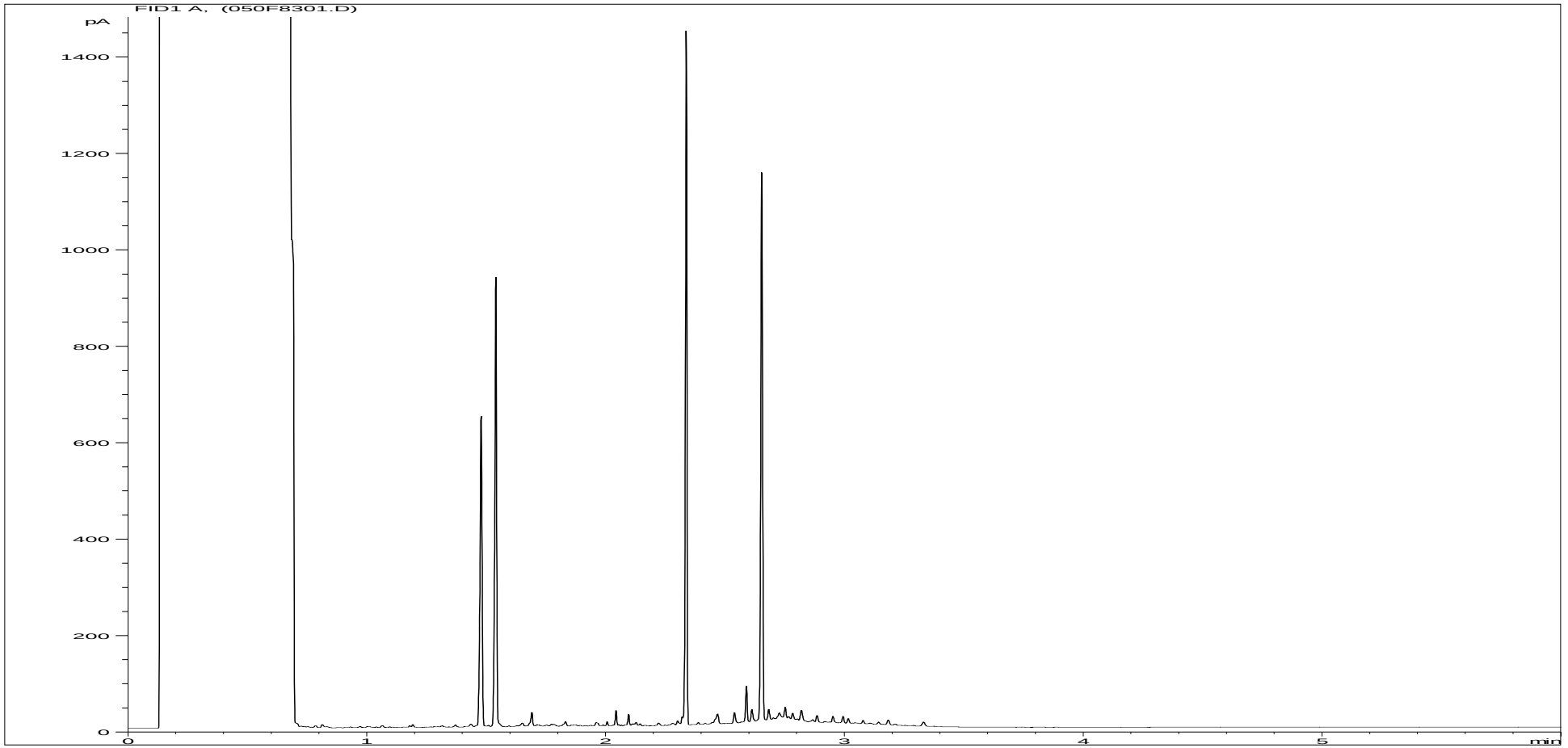
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1768544	**Job Number:**	W23_5169
Multiplier:	0.005	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	H6100-16 Trowbridge
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH01 W
Acquisition Date/Time:	14-Feb-17, 04:15:28		
Datafile:	D:\TES\DATA\Y2017\021317TPH_GC4\021317 2017-02-13 10-12-39\049F8201.D		

Where individual results are flagged see report notes for status.

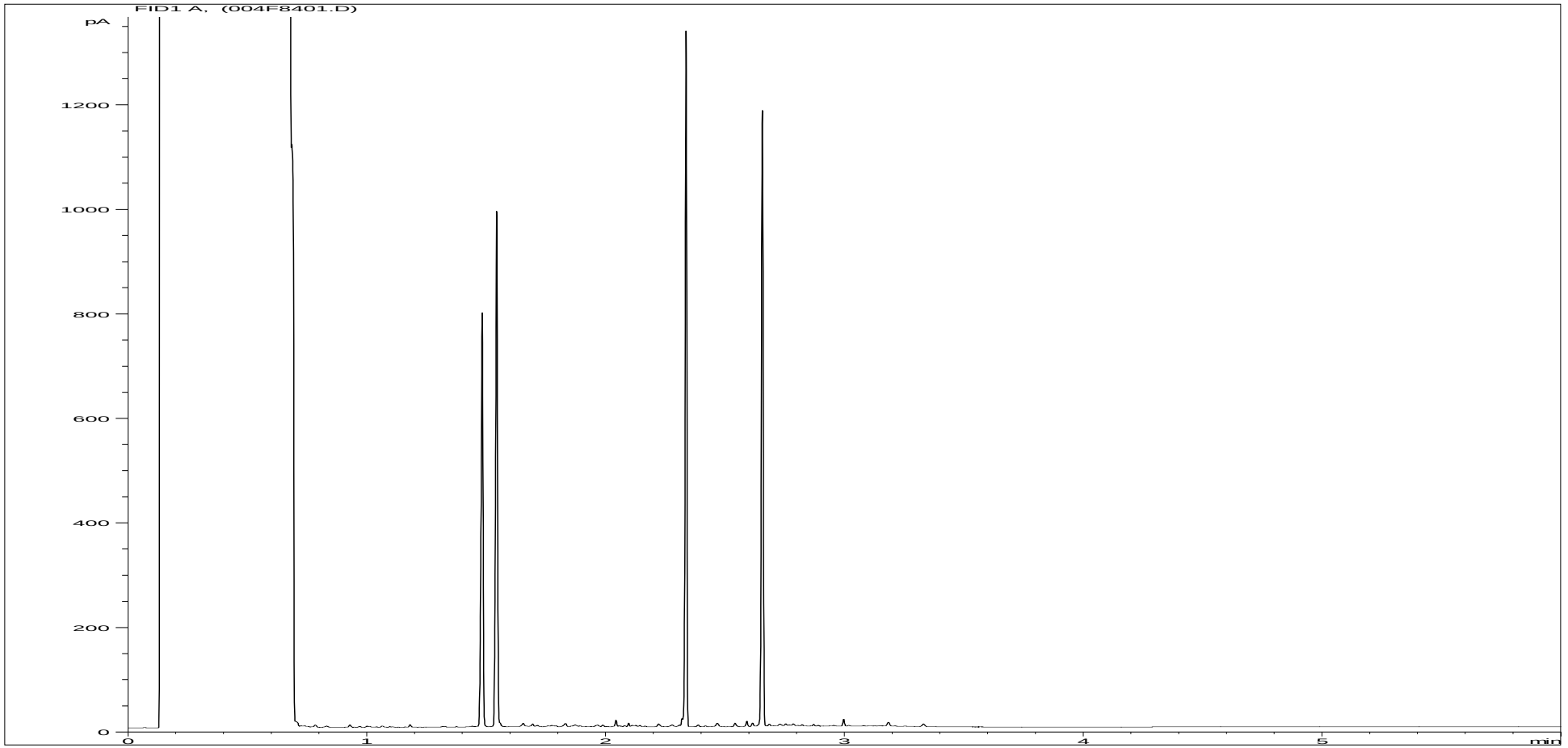
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1768545	**Job Number:**	W23_5169
Multiplier:	0.005	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	H6100-16 Trowbridge
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH02A W
Acquisition Date/Time:	14-Feb-17, 04:28:48		
Datafile:	D:\TES\DATA\Y2017\021317TPH_GC4\021317 2017-02-13 10-12-39\050F8301.D		

Where individual results are flagged see report notes for status.

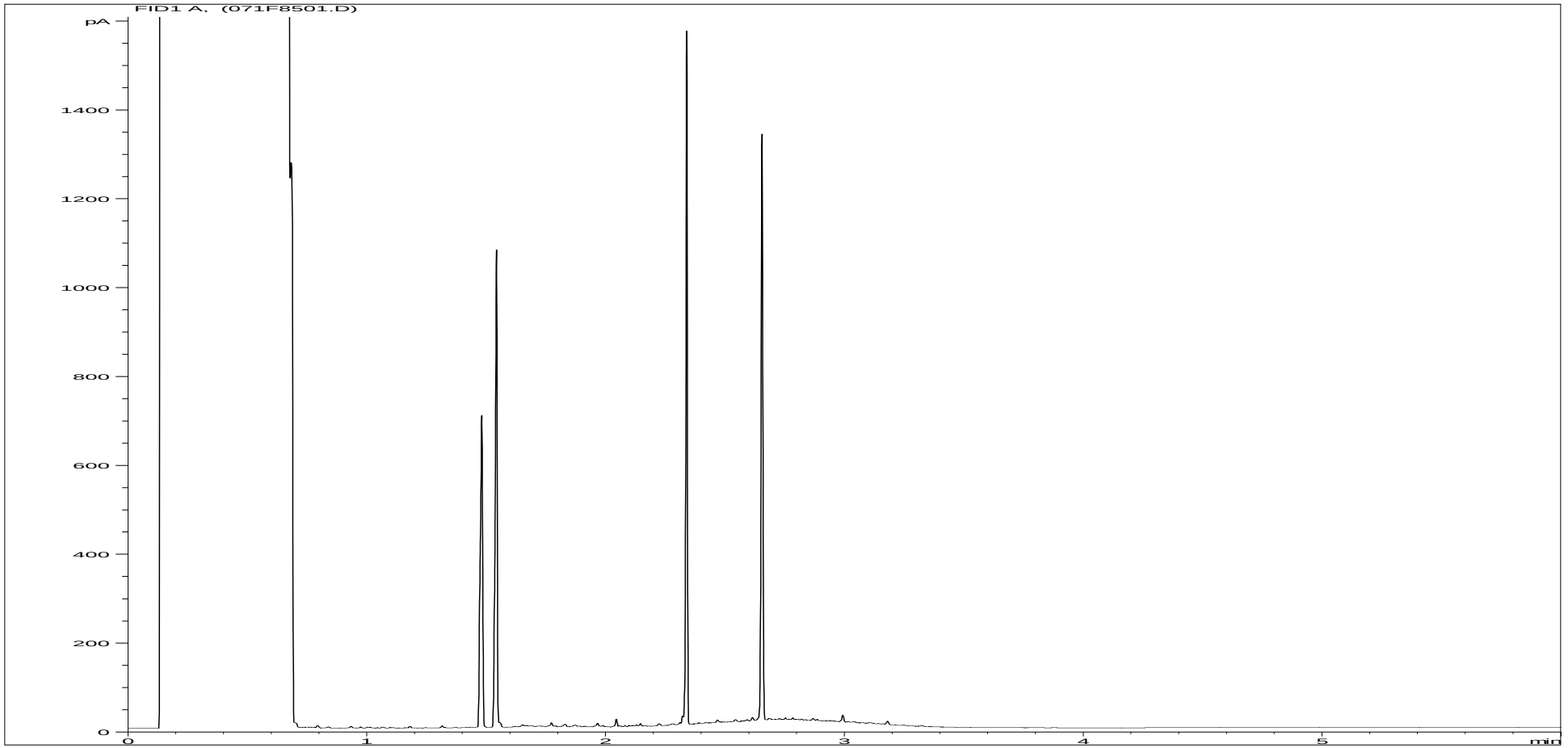
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1768546	**Job Number:**	W23_5169
Multiplier:	0.005	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	H6100-16 Trowbridge
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH03 W
Acquisition Date/Time:	14-Feb-17, 04:41:51		
Datafile:	D:\TES\DATA\Y2017\021317TPH_GC4\021317 2017-02-13 10-12-39\004F8401.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1768547	**Job Number:**	W23_5169
Multiplier:	0.005	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	H6100-16 Trowbridge
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH04B W
Acquisition Date/Time:	14-Feb-17, 04:54:57		
Datafile:	D:\TES\DATA\Y2017\021317TPH_GC4\021317 2017-02-13 10-12-39\071F8501.D		

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site H6100-16 Trowbridge
Report No W235169

Consignment No W115791
Date Logged 09-Feb-2017

Report Due 15-Feb-2017

ID Number	Description	Matrix Type	Sampled	BTEXHSA	CALC_NO3	CUSTSERV	GROHSA		ICPMSW								ICPMSWT	ICPWATVAR			ICPWATVART
		MethodID		BTEX-HSA + MTBE analysis	Nitrate as NO3 (Kone Calc)	Report A	GRO >C6->C10	GRO-HSA	Nickel as Ni MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Chromium as Cr MS (Total)	Total Sulphur as SO4 (Diss) VAR	Magnesium as Mg (Dissolved) VAR	Boron as B (Dissolved) VAR	Total Sulphur as SO4 (Tot) VAR
EX/1768544	BH01	Unclassified	06/02/17	A			A	A													
EX/1768545	BH02A	Unclassified	06/02/17	A			A	A													
EX/1768546	BH03	Unclassified	06/02/17	A			A	A													
EX/1768547	BH04B	Unclassified	06/02/17	A			A	A													

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site H6100-16 Trowbridge
Report No W235169

Consignment No W115791
Date Logged 09-Feb-2017

Report Due 15-Feb-2017

ID Number	Description	Matrix Type	Sampled	KONENS			PAHMSW	SFAPI			SFAS	TPHFID				WSLM2	WSLM3
		MethodID		Chloride as Cl (Kone)	Ammoniacal Nitrogen (Kone)	Nitrate as N (Kone calc)	PAH GC-MS (16)	Cyanide (Free) as CN SFA	Cyanide (Total) as CN SFA	Phenol Index SFA	Sulphide as S SFA	TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH GC	Conductivity uS/cm @ 25C	pH units
EX/1768544	BH01	Unclassified	06/02/17				A	B	B	B	B	A	A	A	A		
EX/1768545	BH02A	Unclassified	06/02/17				A	B	B	B	B	A	A	A	A		
EX/1768546	BH03	Unclassified	06/02/17				A	B	B	B	B	A	A	A	A		
EX/1768547	BH04B	Unclassified	06/02/17				A	B	B	B	B	A	A	A	A		

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Report Number : W/EXR/235169

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PAHMSW	EX1768544-8547	The Secondary process control result associated with this Test has not wholly met the requirements of the Laboratory Quality Management System (QMS). All other Process controls (including the Primary Process control) are within specification. The Laboratory believes that the validity of the data has not been affected but in line with our QMS policy we have removed accreditation from the affected analytes, Pyrene & Flourene. These circumstances should be taken into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPMSWT	As Received	Determination of Total Metals in water samples using nitric acid digestion and ICPMS quantitation
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ICPWATVART	As Received	Determination of Total Metals in water samples using nitric acid digestion and ICPOES quantitation
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Bridgend
Site : H6100-16 Trowbridge
Report Number : W23_5169

Lab ID Number	Client ID	Description
EX/1768544	BH01 W	Unclassified
EX/1768545	BH02A W	Unclassified
EX/1768546	BH03 W	Unclassified
EX/1768547	BH04B W	Unclassified

Our Ref: EXR/232019 (Ver. 1)
Your Ref: H6100-16

January 11, 2017

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Adam Putt
ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

For the attention of Adam Putt

Dear Adam Putt

Sample Analysis - Trowbridge

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

K Spencer
Project Co-ordinator
01283 554463

TEST REPORT

UKAS TESTING
1252

Report No. EXR/232019 (Ver. 1)

ESG Limited Bridgend
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Site: Trowbridge

The 3 samples described in this report were registered for analysis by ESG on 12-Dec-2016. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 11-Jan-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (10) Results (Pages 5 to 7)
Table of TPH Texas banding (0.01) (Page 8)
GC-FID Chromatograms (Pages 9 to 11)
Analytical and Deviating Sample Overview (Pages 12 to 14)
Table of Method Descriptions (Page 15)
Table of Report Notes (Page 16)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Operations Director
Energy & Waste Services

Date of Issue: 11-Jan-2017

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

			Units :	pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			Method Codes :	WSLM3	WSLM2	WSLM12	KONENS	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSWT	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR	ICPMSW
			Method Reporting Limits :		100		1	3	1	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.01	0.0001
			UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EX/	Client Sample Description	Sample Date		pH units w	Conductivity uS/cm @ 25C w	Total Alkalinity as CaCO3 w	Chloride as Cl w	Total Sulphur as SO4 (Dissolved) a	Magnesium as Mg (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Total)	Cadmium as Cd (Dissolved)	PAH GC-MS (16) o	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Boron as B (Dissolved) a	Mercury as Hg (Dissolved)
1755772	BH01 W	08-Dec-16		7.4	4160		705	727	33.2	0.01	0.001	0.0003	Req	0.003	<0.001	0.11	<0.001	2.78	<0.0001
1755773	SW1 W	08-Dec-16		7.9	817	268	51	67.4		0.002	0.002	<0.0001	Req	0.002	<0.001	0.013	0.002	0.04	<0.0001
1755774	SW2 W	08-Dec-16		7.8	848	271	54	70.5		0.002	0.004	<0.0001	Req	0.003	<0.001	0.024	0.002	0.04	<0.0001

ESG

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Client Name ESG Limited Bridgend

Contact Adam Putt

Trowbridge

Sample Analysis

Date Printed	**11-Jan-2017**
Report Number	**EXR/232019**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l
Method Codes :			ICPMSW	CALCNH4	KONENS	CALC_NO3	KONENS	SFAPI	SFAPI	SFAS	GROHSA	TPHFID	TPHFID	TPHFID	TPHFID	TPHFID	GROHSA	VOCHSAW
Method Reporting Limits :			0.001	0.01	0.01	0.9	0.2	0.02	0.02	0.02	0.1		0.01	0.01	0.01	0.01	0.1	1
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Selenium as Se (Dissolved)**	**Ammoniacal Nitrogen as NH4**	**Ammoniacal Nitrogen as N**	**Nitrate as NO3 (Kone Calc) w**	**Nitrate as N**	**Cyanide (Free) as CN**	**Cyanide (Total) as CN**	**Sulphide as S**	**GRO-HSA o**	**TPH Band >C10-C16**	**TPH Band >C16-C21**	**TPH Band (>C21-C35)**	**Carbon Banding**	**TPH GC**	**GRO >C6->C10**	**Benzene**
1755772	BH01 W	08-Dec-16	0.006	0.03	0.02	50.5	11.4	<0.02	<0.02	<0.02	<0.1	<0.01	0.01	0.01	Req	0.03	<0.1	<1
1755773	SW1 W	08-Dec-16	<0.001	0.03	0.02	35.4	8.0	<0.02	<0.02	<0.02	<0.1	<0.01	<0.01	0.01	Req	0.02	<0.1	<1
1755774	SW2 W	08-Dec-16	<0.001	0.03	0.02	37.2	8.4	<0.02	<0.02	<0.02	<0.1	<0.01	<0.01	0.02	Req	0.03	<0.1	<1

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Client Name ESG Limited Bridgend

Contact Adam Putt

Trowbridge

Sample Analysis

Date Printed	**11-Jan-2017**
Report Number	**EXR/232019**
Table Number	**1**

Where individual results are flagged see report notes for status.

		Units :	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	mg/l	mg/l	mg/l	mg/l						
		Method Codes :	VOCHSAW	VOCHSAW	VOCHSAW	VOCHSAW	VOCHSAW	VOCHSAW	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL						
		Method Reporting Limits :	1	1	2	1	1	2	0.0005	0.0005	0.0005	0.0005						
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No						
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**Toluene**	**Ethyl Benzene**	**Xylenes**	**m/p Xylenes**	**o Xylene**	**MTBE**	**Phenol**	**Cresols**	**Dimethylphenols**	**Trimethylphenols**						
1755772	BH01 W	**08-Dec-16**	<1	<1	<2	<1	<1	<1	0.0029	<0.0005	<0.0005	<0.0005						
1755773	SW1 W	**08-Dec-16**	<1	<1	<2	<1	<1	<1	<0.0005	<0.0005	<0.0005	<0.0005						
1755774	SW2 W	**08-Dec-16**	<1	<1	<2	<1	<1	<1	<0.0005	<0.0005	<0.0005	<0.0005						

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Client Name **ESG Limited Bridgend**

Contact Adam Putt

Trowbridge

Sample Analysis

Date Printed	**11-Jan-2017**
Report Number	**EXR/232019**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge		
Sample Details:	BH01 W	**Job Number:**	w23_2019
LIMS ID Number:	EX1755772	**Date Booked in:**	12-Dec-16
QC Batch Number:	170005	**Date Extracted:**	06-Jan-17
Quantitation File:	Initial Calibration	**Date Analysed:**	09-Jan-17
Directory:	\010917MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	3.94	0.012	73
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	8.04	0.011	69
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5*	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3*	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2*	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.173	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	121
Acenaphthene-d10	112
Phenanthrene-d10	115
Chrysene-d12	110
Perylene-d12	117

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	77
Terphenyl-d14	71

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge		
Sample Details:	SW1 W	**Job Number:**	W23_2019
LIMS ID Number:	EX1755773	**Date Booked in:**	12-Dec-16
QC Batch Number:	170005	**Date Extracted:**	06-Jan-17
Quantitation File:	Initial Calibration	**Date Analysed:**	09-Jan-17
Directory:	\010917MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.18	0.011	97
Pyrene	129-00-0	6.44	0.013	78
Benzo[a]anthracene	56-55-3	8.04	0.016	69
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	9.52	0.011	75
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5*	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3*	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2*	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.181	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	117
Acenaphthene-d10	107
Phenanthrene-d10	107
Chrysene-d12	102
Perylene-d12	109

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	91
Terphenyl-d14	76

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Bridgend: Trowbridge		
Sample Details:	SW2 W	**Job Number:**	w23_2019
LIMS ID Number:	EX1755774	**Date Booked in:**	12-Dec-16
QC Batch Number:	170005	**Date Extracted:**	06-Jan-17
Quantitation File:	Initial Calibration	**Date Analysed:**	09-Jan-17
Directory:	\010917MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.18	0.027	97
Pyrene	129-00-0	6.44	0.027	98
Benzo[a]anthracene	56-55-3	8.03	0.023	65
Chrysene	218-01-9	8.07	0.018	62
Benzo[b]fluoranthene	205-99-2	9.52	0.023	71
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	9.93	0.016	88
Indeno[1,2,3-cd]pyrene	193-39-5*	11.29	0.016	70
Dibenzo[a,h]anthracene	53-70-3*	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2*	11.57	0.011	64
Total (USEPA16) PAHs	-	-	< 0.251	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	115
Acenaphthene-d10	107
Phenanthrene-d10	109
Chrysene-d12	112
Perylene-d12	121

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	88
Terphenyl-d14	74

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

Customer and Site Details: ESG Limited Bridgend : Trowbridge
Job Number: W23_2019
QC Batch Number: 170005
Directory: D:\TES\DATA\Y2017\010617TPH_GC17\010617 2017-01-06 15-31-03\070B2501.D
Method: Bottle

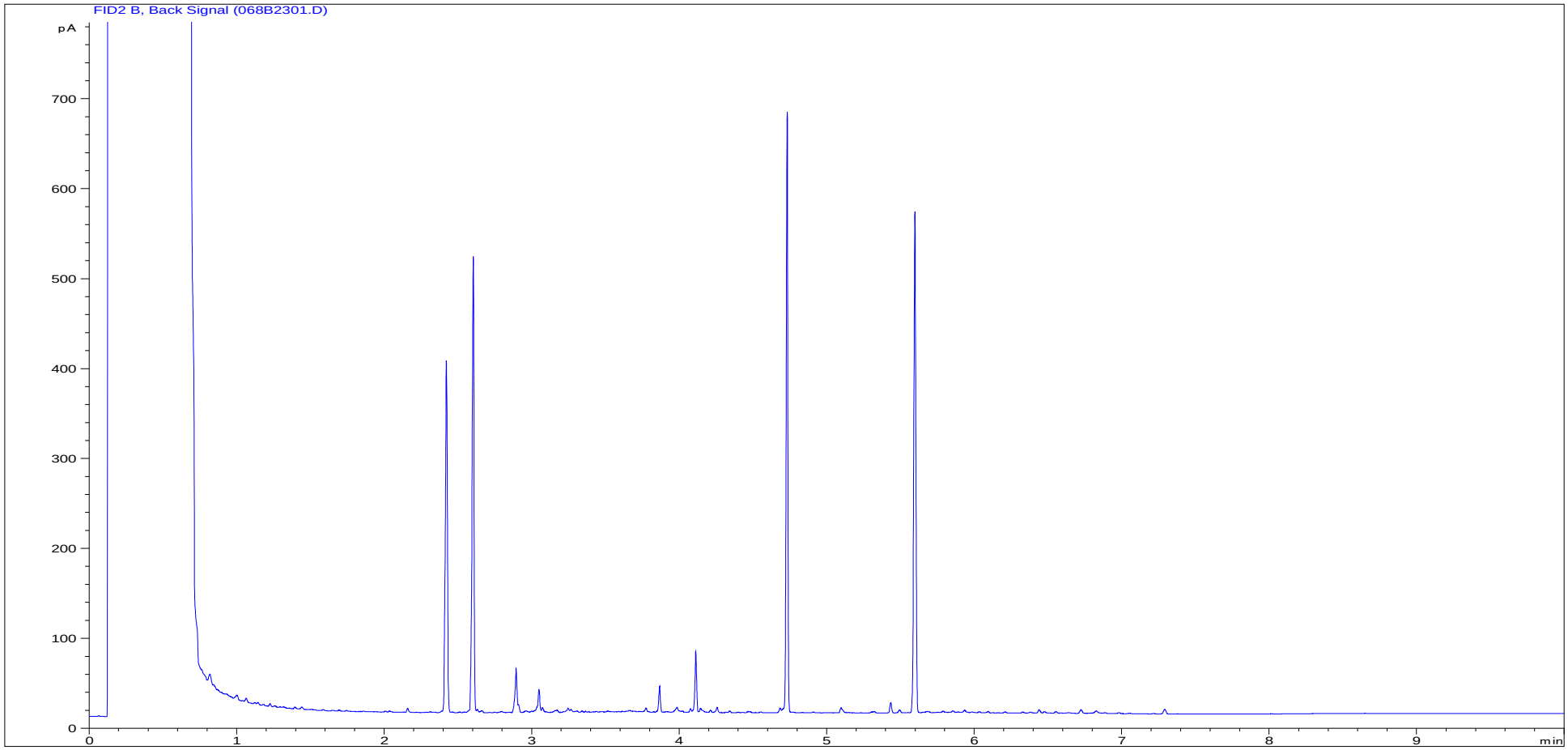
Matrix: Water
Date Booked in: 12-Dec-16
Date Extracted: 06-Jan-17
Date Analysed: 06-Jan-17, 23:01:49

*** Sample data with an asterisk are not UKAS accredited.**

		Concentration, (mg/l)				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
EX1755772	BH01 W	<0.01	<0.01	<0.01	0.01	0.013
EX1755773	SW1 W	<0.01	<0.01	<0.01	<0.01	0.011
EX1755774	SW2 W	<0.01	<0.01	<0.01	<0.01	0.019

Where individual results are flagged see report notes for status.

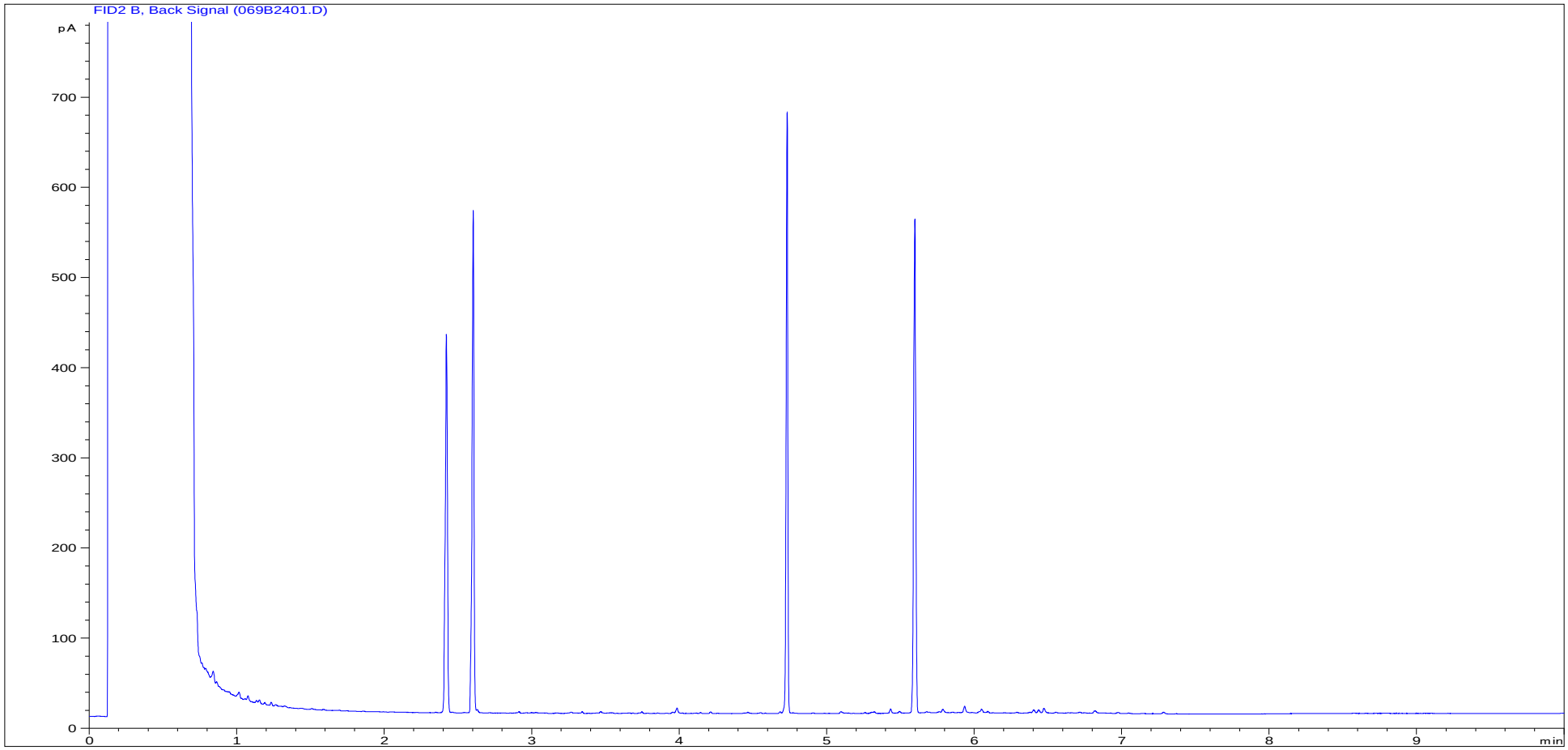
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1755772	**Job Number:**	W23_2019
Multiplier:	0.005	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH01 W
Acquisition Date/Time:	06-Jan-17, 22:25:33		
Datafile:	D:\TES\DATA\Y2017\010617TPH_GC17\010617 2017-01-06 15-31-03\068B2301.D		

Where individual results are flagged see report notes for status.

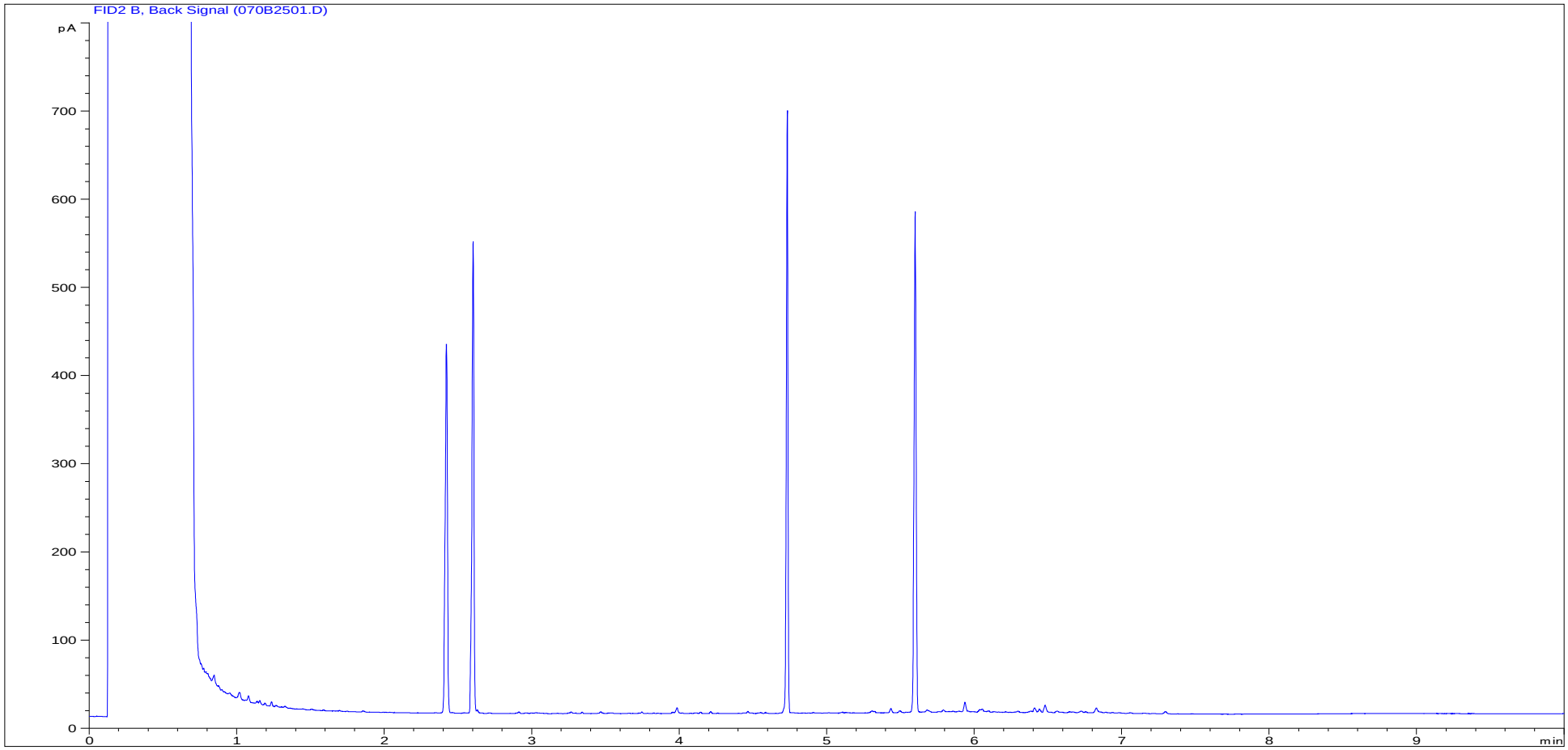
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1755773	**Job Number:**	W23_2019
Multiplier:	0.005	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	SW1 W
Acquisition Date/Time:	06-Jan-17, 22:43:34		
Datafile:	D:\TES\DATA\Y2017\010617TPH_GC17\010617 2017-01-06 15-31-03\069B2401.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1755774	**Job Number:**	W23_2019
Multiplier:	0.005	**Client:**	ESG Limited Bridgend
Dilution:	1	**Site:**	Trowbridge
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	SW2 W
Acquisition Date/Time:	06-Jan-17, 23:01:49		
Datafile:	D:\TES\DATA\Y2017\010617TPH_GC17\010617 2017-01-06 15-31-03\070B2501.D		

Where individual results are flagged see report notes for status.

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

Customer ESG Limited Bridgend
Site Trowbridge
Report No W232019

Consignment No W113284
Date Logged 12-Dec-2016

Report Due 12-Jan-2017

ID Number	Description	Matrix Type	Sampled	MethodID	CALC_NO3	CALCNH4	CUSTSERV	GROHSA		ICPMSW								ICPMSWT	ICPWATVAR			KONENS
					Nitrate as NO3 (Kone Calc)	Ammoniacal Nitrogen as NH4 Calc	Report A	GRO >C6->C10	GRO-HSA	Nickel as Ni MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Chromium as Cr MS (Total)	Total Sulphur as SO4 (Diss) VAR	Magnesium as Mg (Dissolved) VAR	Boron as B (Dissolved) VAR	Chloride as Cl (Kone)
					✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EX/1755772	BH01	Groundwater	08/12/16		E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
EX/1755773	SW1	Surface Water	08/12/16		E	E		E	E	E	E	E	E	E	E	E	E	E	E		E	E
EX/1755774	SW2	Surface Water	08/12/16		E	E		E	E	E	E	E	E	E	E	E	E	E	E		E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W232019

Customer ESG Limited Bridgend
Site Trowbridge
Report No W232019

Consignment No W113284
Date Logged 12-Dec-2016

Report Due 12-Jan-2017

ID Number	Description	Matrix Type	Sampled	MethodID	KONENS		PAHMSW	PHESPLCVL	SFAPI		SFAS	TPHFID						VOCHSAW					
					Ammoniacal Nitrogen (Kone)	Nitrate as N (Kone calc)	PAH GC-MS (16)	Phenols by HPLC (Low Level)	Cyanide (Free) as CN SFA	Cyanide (Total) as CN SFA	Sulphide as S SFA	TPH Band (>C10-C16)	TPH Band (>C16-C21)	TPH Band (>C21-C35)	TPH Carbon Banding	TPH GC	BTEX + MTBE Analysis HSA GC-MS	Benzene (µg/l)	Toluene (µg/l)	Ethyl Benzene (µg/l)	MTBE (µg/l)	Xylenes (µg/l)
					✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓
EX/1755772	BH01	Groundwater	08/12/16		E	E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E
EX/1755773	SW1	Surface Water	08/12/16		E	E	E		BE	BE	BE	E	E	E	E	E	E	E	E	E	E	E
EX/1755774	SW2	Surface Water	08/12/16		E	E	E		BE	BE	BE	E	E	E	E	E	E	E	E	E	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Customer ESG Limited Bridgend
Site Trowbridge
Report No W232019

Consignment No W113284
Date Logged 12-Dec-2016

Report Due 12-Jan-2017

ID Number	Description	Matrix Type	Sampled	MethodID		WSLM12	WSLM2	WSLM3
				VOCHSAW				
				m/p Xylenes (µg/l)	o Xylene (µg/l)	Total Alkalinity as CaCO3	Conductivity uS/cm @ 25C	pH units
				✓	✓	✓	✓	✓
EX/1755772	BH01	Groundwater	08/12/16	E	E		E	E
EX/1755773	SW1	Surface Water	08/12/16	E	E	E	E	E
EX/1755774	SW2	Surface Water	08/12/16	E	E	E	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	CALCNH4	As Received	Ammoniacal Nitrogen expressed as NH4, calculated from Ammoniacal Nitrogen expressed as N
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPMSWT	As Received	Determination of Total Metals in water samples using nitric acid digestion and ICPMS quantitation
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	PHEHPLCVL	As Received	Determination of Phenols by HPLC
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	VOCHSAW	As Received	Determination of Volatile Organics Compounds by Headspace GCMS
Water	WSLM12	As Received	Titration with Sulphuric Acid to required pH
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Bridgend
Site : Trowbridge
Report Number : W23_2019

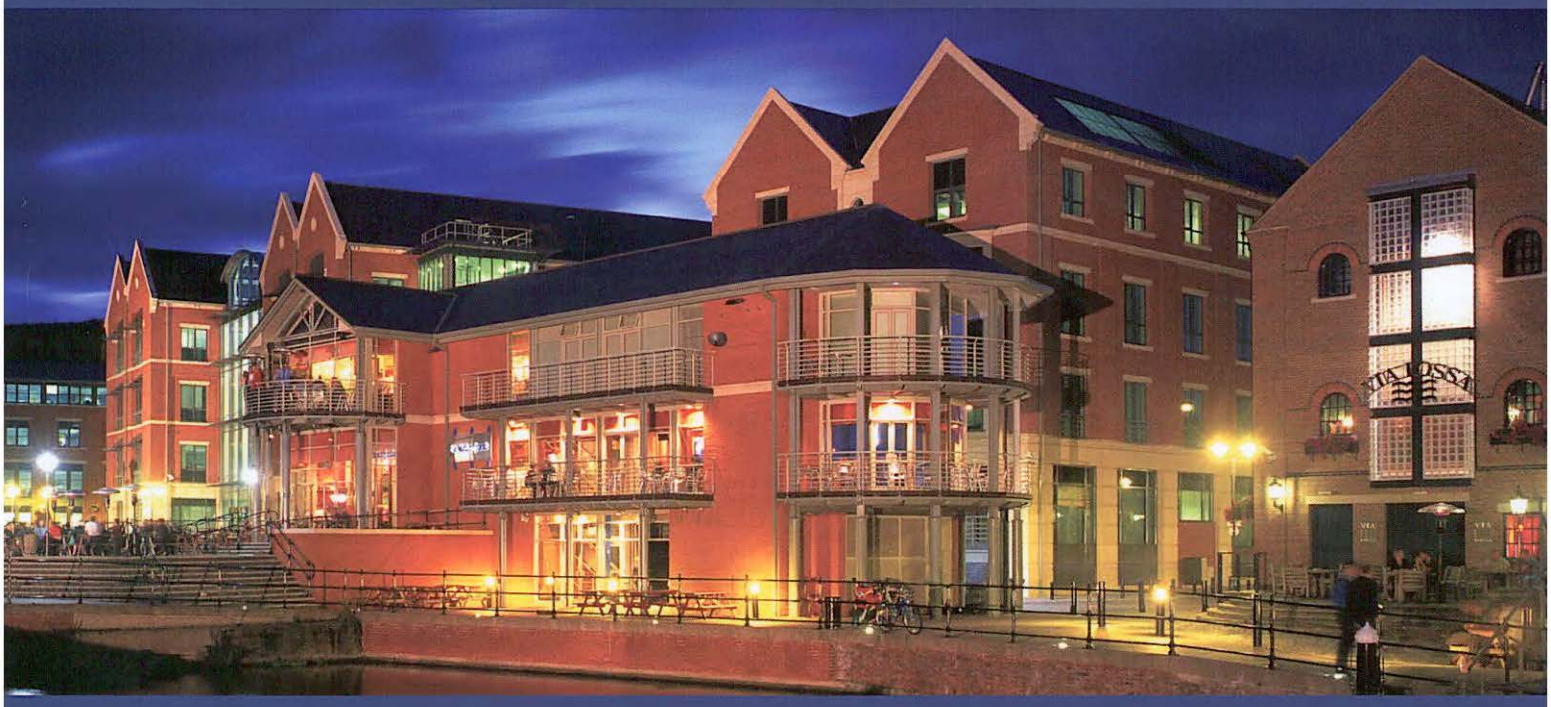
Lab ID Number	Client ID	Description
EX/1755772	BH01 W	Groundwater
EX/1755773	SW1 W	Surface Water
EX/1755774	SW2 W	Surface Water

ENVIRONMENTAL

Wessex Water

Trowbridge STW

Ground Investigation and Factual Report



Integrated Engineering and Environmental Consultants

environmental | water | transportation | civil | structural | highways | infrastructure

BWB CONSULTING

ENVIRONMENTAL

Wessex Water

Trowbridge STW

Ground Investigation and Factual Report

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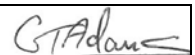
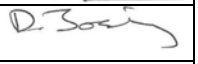
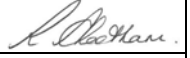
Date: April 2012

AUTHOR:	Greg Adams BSc, MSc, FGS	
CHECKED:	David Josling MEng	
APPROVED:	Rachel Cheetham BSc (Hons) MSc	
REPORT REF NO:	BME2019/01/V1	
STATUS:	FINAL	

Document Revision Status

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Figure 2 Exploratory Hole Location Plan

APPENDICES

Appendix 1 Legal Framework
Appendix 2 Site Photographs
Appendix 3 Drillers Logs
Appendix 4 Borehole Logs
Appendix 5 Trial Pit Logs
Appendix 6 Soil Chemical Laboratory Testing
Appendix 7 Geotechnical Laboratory Testing
Appendix 8 Gas and Groundwater Monitoring Results

1.0 INTRODUCTION

Instruction

1.1 BWB Consulting (BWB) was instructed by Wessex Water (the Client) to carry out a ground investigation at the site at Trowbridge Sewage Treatment Works (STW), Wiltshire. The details of the instruction to undertake the works were received by email confirmation in January 2012 and contained a detailed schedule of works from the client's consultants, Halcrow.

Objectives

1.2 The overall objectives of the investigation are to:

- Confirm prevailing ground and groundwater conditions at the exploratory hole locations;
- Undertake geotechnical and environmental soil testing as requested by the clients consultant;
- Undertake post fieldwork monitoring of ground gas and water; and
- Provide a factual account of the investigation.

1.3 This report presents the factual data relating to the ground investigation completed at the site.

1.4 The report forms part 1 of the Eurocode 7 Ground Investigation Report namely the presentation of geotechnical information.

1.5 Details of the BWB approach and legal framework for the investigation of contaminated land are presented in **Appendix 1**.

Limitations

1.6 The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at that time.

1.7 All of the comments and opinions contained in this report, including any conclusions, are based on the information obtained by BWB during our investigations.

1.8 There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

1.9 Any diagram or opinion of the possible configuration of the findings is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

1.10 Except as otherwise requested by the Client, BWB is not obliged and disclaims any obligation to update the report for events taking place after:

a) the date on which this assessment was undertaken; and
b) the date on which the final report is delivered.

1.11 BWB makes no representation whatsoever concerning the legal significance of its findings or to other legal matters referred to in the following report.

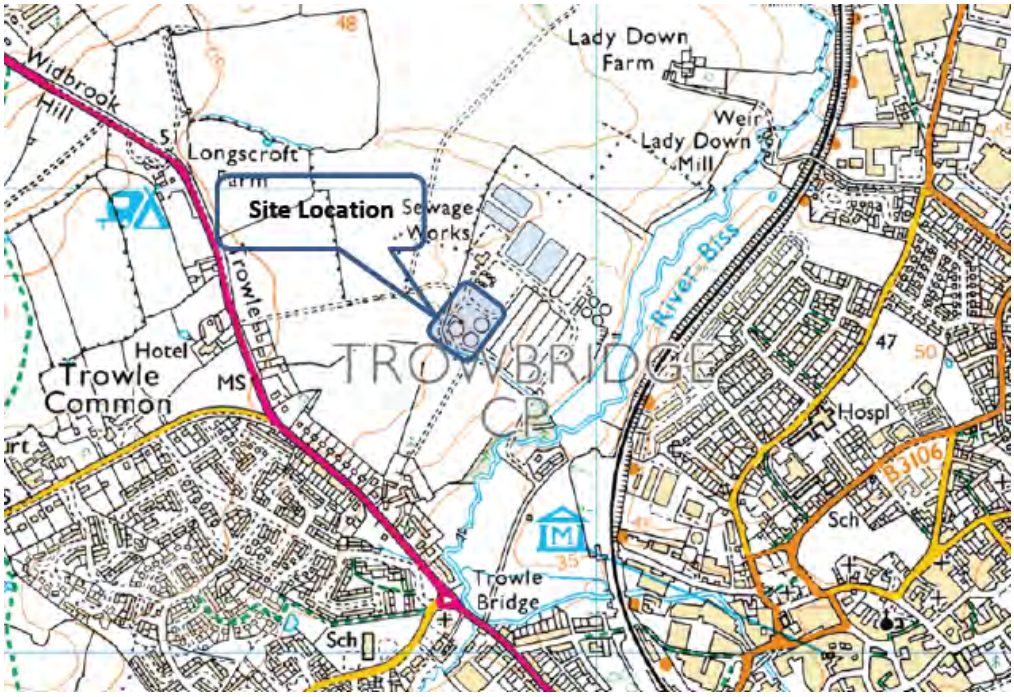
1.12 This report has been prepared for the sole use of Wessex Water. No other third parties may rely upon or reproduce the contents of this report without the written permission of BWB. If any unauthorised third party comes into possession of this report they rely on it at their own risk and the authors do not owe them any Duty of Care or Skill.

2.0 SITE SETTING

Site Location

2.1 The site is located within the Trowbridge Sewage Treatment Works in Trowbridge, to the East of Trowle Common, located at national grid reference 384757, 158798. The location of the site is shown below as **Figure 1**.

Figure 1: Site Location Plan



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Site Description

2.2 The site comprises part of the operational Trowbridge sewage treatment works. The site is generally flat, gently sloping from north west to south east, photographs of the site are presented as **Appendix 2**.

2.3 Farmers' fields surround the site on all sides with the River Bliss located within 500m to the east of site.

Published Geology

2.4 A review of the published geology has found that the local bedrock geology underlying the site is the Kellaway Formation comprising of mudstone.

Site History

2.5 The site has been associated with a sewage treatment works as far back as is known about the site.

Proposed Development

2.6 It is understood that the proposed development is to extend the existing Trowbridge Sewage Treatment Works with a new digester and sludge storage tanks. The proposed development can be seen as part of **Figure 2**.

3.0 SITE WORK AND LABORATORY TESTING

Scope of Works

3.1 The layout of the site and the positioning of all exploratory hole locations are presented as **Figure 2.**

3.2 Intrusive works were undertaken between 9th February and 21st February 2012 and comprised the following works:

- 2no cable percussion boreholes followed on with rotary drilling techniques to a maximum depth of 20.53m bgl. The drillers logs are presented as **Appendix 3** and the borehole logs and core photographs are presented as **Appendix 4**;
- Standard penetration testing (SPT's) carried out within each borehole, results can be found on the appropriate borehole logs;
- Installation of 2no. 50mm ground gas and water monitoring pipes for the purpose of subsequent ground gas and water monitoring;
- 5no machine excavated trial pits to a maximum depth of 3.00m bgl, designated TP2 to TP6. The trial pit logs and photographs are presented as **Appendix 5**; and
- Hand shear vane tests undertaken within each of the trial pits to provide strength characteristics of cohesive materials. The results are presented on the appropriate trial pit logs.

3.3 The ground investigation was carried out in general accordance with BS5930: 1999 'Code of practice for Site Investigations', and BS10175: 2000 'Code of Practice for Investigations of Potentially Contaminated Sites'. The ground investigation and exploratory holes were supervised and logged by a BWB geo-environmental engineer.

Sampling and Analytical Strategy

3.4 Soil samples were obtained from all exploratory hole locations for geotechnical and chemical testing.

3.5 Following correspondence with Halcrow (the client's Consultant), soil samples were sent to a UKAS and MCERTS accredited laboratory and tested for the following suite of chemical analysis:

- 3no. samples tested for sulphate content of acid extract from soil, sulphate content of water extract from soil, water soluble chloride content, acid soluble chloride content and pH value;
- 2no. samples tested for Total Petroleum Hydorcarbons (TPH) (C6-C40), speciated Polycyclic Aromatic Hydrocarbons (PAH) (16) and asbestos screens; and
- 3no. samples tested for total waste acceptance criteria.

3.6 The results of the chemical analysis are presented as **Appendix 6**.

3.7 Groundwater samples were obtained from BH1 using bailers and from BH2 using low flow kit for chemical testing.

3.8 Geotechnical samples collected from all exploratory hole locations were sent to a UKAS accredited laboratory for geotechnical analysis. Geotechnical testing was carried out in general accordance with BS1377: 1990.

3.9 The soil and rock geotechnical tests undertaken comprised of the following:

- 19no. moisture content and Atterberg Limit analyses;
- 11no. particle size distribution tests via wet sieve techniques;
- 11no. particle size distribution tests via sedimentation techniques;
- 3no. one dimensional consolidation tests;
- 5no. 3x38mm diameter triaxial tests;
- 5no. quick undrained triaxial tests; and
- 2no. consolidated undrained triaxial tests.

3.10 The results of the geotechnical laboratory testing are presented as **Appendix 7**.

4.0 ON SITE OBSERVATIONS

Ground Conditions

4.1 The ground investigation found the ground conditions present at site to confirm the information reviewed from published geology. The ground conditions encountered comprised topsoil over the weathered Kellaway Formation described as sandy clay, grading into very stiff clay tending to a weak mudstone below 19.0m bgl. Significant thicknesses of made ground were observed to depths of 3.00m bgl, comprising reworked natural material, in the south east of the site.

Visual or Olfactory Evidence of Contamination

4.2 No visual or olfactory evidence of contamination was observed within or surrounding any of the exploratory hole locations.

Groundwater

4.3 Groundwater was observed within BH2 at 11.14m bgl and within TP6 at 1.50m bgl.

4.4 In situ testing of dissolved oxygen, pH, conductivity and redox potential was conducted during the post fieldwork monitoring at both boreholes. The results are presented as **Appendix 8**.

Ground Gas

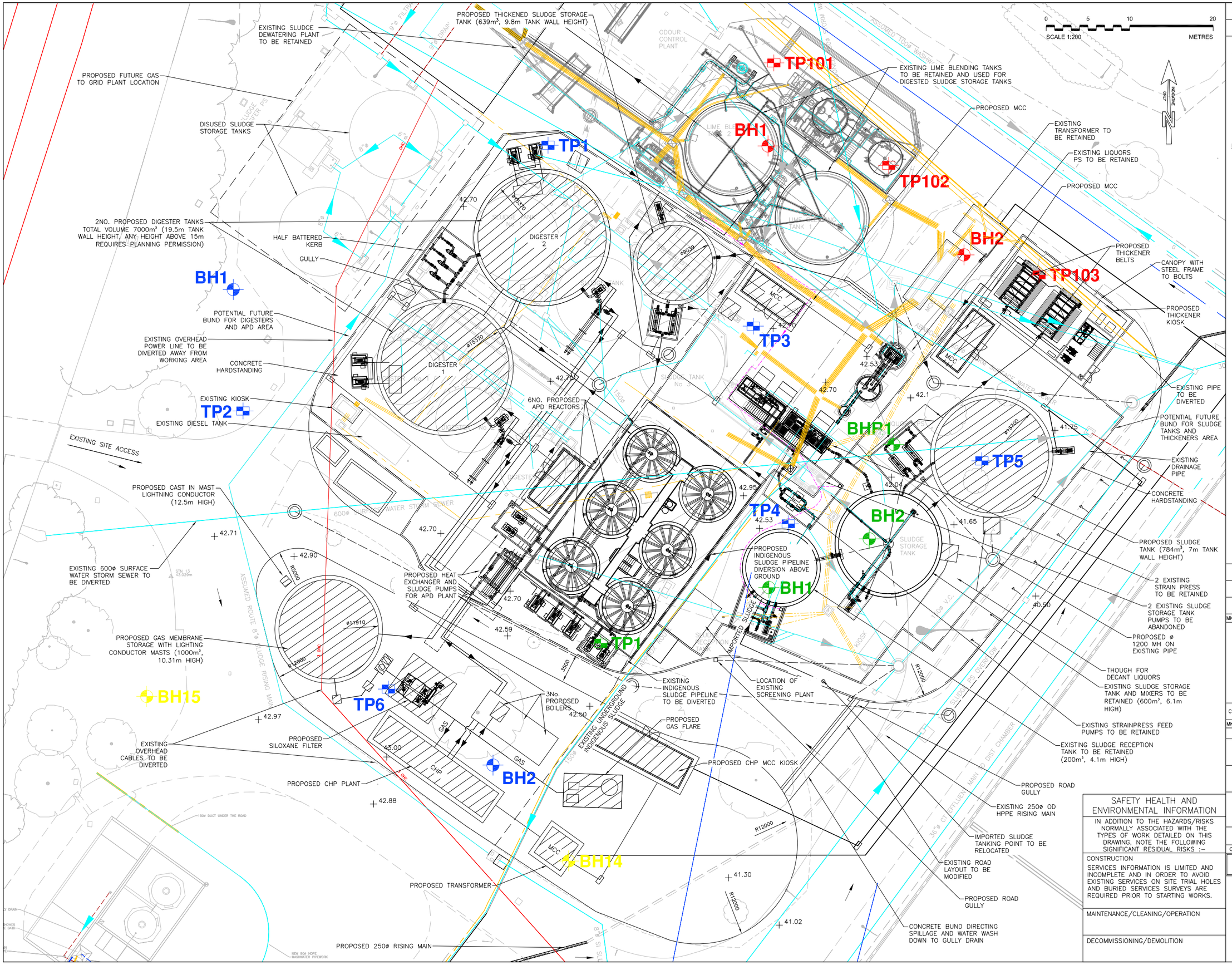
4.5 A single ground gas monitoring event was carried out on the 22nd February 2012, the results are presented as **Appendix 8**.

BWB Consulting Ltd **April 2012**

FIGURES

FIGURE 2

EXPLORATORY HOLE LOCATION PLAN



SITE ID	13318
NGR	ST 84894 58775

NOTES

1. ANY MAPS SHOWN ON THIS DRAWING ARE REPRODUCED FROM THE ORDNANCE SURVEY MAP WITH THE PERMISSION OF HER MAJESTY'S STATIONERY OFFICE © CROWN COPYRIGHT
2. UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETRES & ALL LEVELS ARE IN METRES AOD.

LEGEND:

- SITE ACCESS
- STRUCTURAL SOILS GROUND INVESTIGATION 2004
- CJ ASSOCIATES GROUND INVESTIGATION 2008
- GEOTECHNICS GROUND INVESTIGATION 2008
- PROPOSED GROUND INVESTIGATION 2011
- PIPEWORK
- BT OVERGROUND
- BT UNDERGROUND
- BT OTHER
- GAS
- CABLE DUCTS
- WASHWATER
- CABLE TRAY
- POTABLE WATER
- ODOUR PIPEWORK
- DRAINS
- DOSING LINES
- OVERHEAD CABLE

MK	REVISIONS	DRN	CHK	APP	DATE

MK	CONSULTANT REVISIONS	DRN	CHK	APP	DATE
C	XX	JAR			08/02/12

WUTRAD-HGL-00-XX-DR-CIV-00107-02-00

TROWBRIDGE STW

ADVANCED DIGESTION

GROUND INVESTIGATION PLAN

PRELIMINARY

ORIGINAL DRAWING SIZE A1 | SCALE AS SHOWN

DRAWING NUMBER D9542/0107 | REV. C

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS :–

CONSTRUCTION

SERVICES INFORMATION IS LIMITED AND INCOMPLETE AND IN ORDER TO AVOID EXISTING SERVICES ON SITE TRIAL HOLES AND BURIED SERVICES SURVEYS ARE REQUIRED PRIOR TO STARTING WORKS.

MAINTENANCE/CLEANING/OPERATION

DECOMMISSIONING/DEMOLITION

Wessex Water

Wessex Engineering & Construction Services

APPENDICES

APPENDIX 1

LEGAL FRAMEWORK

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source - pathway - target relationship in accordance with the approach set out in the 1995 Environment Act, The Contaminated Land (England) Regulations 2000 and the DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land. Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

a) significant harm is being caused or there is a significant possibility of such harm being caused;
b) significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

- Source: Substances that are potential contaminants or pollutants that may cause harm;
- Pathway: A potential route by which contaminants can move from the source to the receptor; and
- Receptor or target: A receptor that may be harmed, for example the water environment, humans, water, flora and fauna.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. Therefore, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the intended use of the site, its characteristics and its surroundings.

The key principle which underpins this approach is the ‘suitable for use’ criterion. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and appropriate and cost effective remediation techniques exist, taking into account the actual or intended use of the site.

Guidance

BWB Consulting Ltd is a registered Engineering Practice and is regulated by the Institution of Civil Engineers.

This report has been prepared in accordance with:

- CLR11 – Model Procedures
- Contamination and Environmental Matters - Their implications for Property Professionals (2nd Edition RICS Nov 2003)
- Brownfields – Managing the development of previously developed land – A client’s guide, CIRIA 2002
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides, dated March 2002
- DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990

- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002

And any other protocols advised by DEFRA and the EA and guidance's prepared by BSI, CERTA, BURA, and other industry advisory bodies including BS5930 and BS10175.

Judicial Precedents and Legislation

The following non-exhaustive list of legislative framework documents has been considered in the compilation of this document.

- The Environment Act (1995)
- The Environment Protection Act (1990)
- The Water Resources Act (1991)
- The Radioactive Substances Act (1993)
- The Pollution Prevention and Control (England and Wales) Regulations (2000)
- The Contaminated Land (England) Act (2000)
- The Environment Act 1995 (Commencement No.16 and Saving Provision) (England) Order (2000)
- The Contaminated Land (England) (Amendment) Regulations (2001)
- The Landfill Regulations (England and Wales) Regulations (2002)
- The Landfill (England and Wales) (Amendment) Regulations (2004)
- Rylands v Fletcher - Private Nuisance, Escape
- Health and Safety at Work Act
- The Building Regulations 1991, Part C of Schedule 1
- The controlled Waste Regulations 1992
- Special Waste Regulations 1996.

Neither the list of guidance documents nor the list of judicial precedents and legislation should be considered exclusive or comprehensive. There are approximately 85 individual items of legislation regulating contaminated land work. BWB makes every effort to ensure that all are adhered to in the preparation and presentation of this report.

Technical Competence

BWB is a leading specialist multi-disciplinary engineering practice working in the contaminated land market. Most of the workload undertaken by BWB is within the commercial property development market dealing with brownfield re-development and associated environmental and geotechnical issues.

Established in 1990, BWB is at the forefront of environmental asset management providing expertise in environmental risk assessments, environmental site investigations, geotechnical site investigations and remediation strategies.

BWB's staff come from a wide variety of backgrounds within the geotechnical and environmental sectors and are all degree qualified. Specialists include geotechnical engineers, geologists, environmental engineers, IEMA auditors, chartered environmental surveyors, chartered engineers; up to SiLC (Specialist in Land Condition) accreditation.

BWB's technical protocols are described in our reports and are strictly adhered to by quality control checks in the field and in the laboratory. BWB only uses UKAS and

MCERTS accredited laboratories for all methods used to derive determinant concentrations.

BWB operates a quality assurance process under iso9001:2000 which facilitates rigorous in-house administrative and technical protocols and is assessed externally every 6 months. BWB also initiates a robust health and safety program for each site and are an investor in people ensuring the regular training of staff in new guidance's and techniques.

APPENDIX 2

SITE PHOTOGRAPHS

Photo 1 Entrance to site from un-named road

Photo 2 Location of BH1 and TP2

Photo 3 Existing sludge storage tanks

Photo 4 Filter beds located to the south east of site

Photo 5 Location of BH2 and Balfour Beatty contractors on site

APPENDIX 3

DRILLERS LOGS

Daily Report Sheet Rotary

Site:- TROWBRIDGE STW
Job Number:- AA0125
Client:- BWB
Date:- WED 22.2.2012
Rig:- COMACCHIO 300

BH 2
Sheet 1 of 2

KING ROAD AVENUE
AVONMOUTH
BRISTOL BS11 9HF
Tel: 0117 982 1473
Fax: 0117 982 8200
C.J. associates

TIME RECORD	Total Hours	Start Time	Finish Time
Transport		Dayworks	
Rig Moving		Running Casing/Pulling Casing	
Open Hole Drilling		Repairs & Maintenance	
Core Drilling		Other	

DRILLING RECORD

Run No	From	To	Drilled	Recovery	Chked	Number	Location
PICKED UP GAS OIL, GRAVEL AND CORE BOXES AT YARD TRAVELLED TO SITE.							
4	15.20	16.70	1.50	1.50			
SPT	16.70	7-11-13-19	18/66mm				
5	16.70	18.20	1.50	1.50			
SPT	18.20	7-11-14-18	18/61mm				
6	18.20	19.70	1.50	1.50			
SPT	19.70	8-13-16-18	16/52mm				
FOR INSTALLATION DETAILS OF 50MM PIPE INSTALLED IN BH2 SEE SHEET 2 of 2							

STRATA & PENETRATION TESTS

From	To	Description of Strata
15.20	19.70	FIRM GREY CLAYS.
		Depth at end of day

Water Record

Depth Struck	Depth +20mins

Daily Water Level Record	Depth Hole	Depth Water
Start of am shift	15.20	13.46
End of am shift		
Start of pm shift		
End of BH	19.70	15.28
After pulling casing		
After 24hrs		

CORE BOXES USED 11.00 – 19.70 3 BOXES
Flush Record AIR 400/170 cfm COMPRESSOR

Open Hole Type	Open Hole Return	Coring Type	Coring Return
		AIR/MIST	GOOD

BENTONITE USED

Bit Record

Type & Size	Number	Depth Drilled
PDC 412		15.20 – 19.70

CASING RECORD

Size	From	To
SIMMITREX	GL	8.50

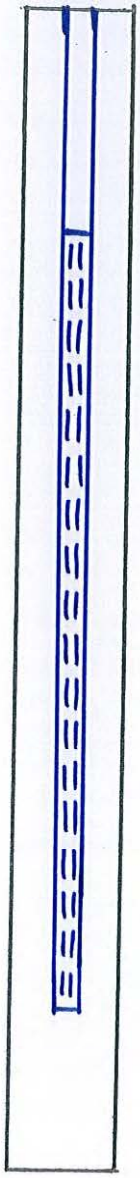
Water added to assist boring? YES
If so depth? 15.20 – 19.70
Crew G HADDOCK A EVANS
Signature of driller
Verified by Client

50mm Standpipe Installation

Site TROWBRIDGE STW
Job Number AA0125
Client BWB

2
WEDNESDAY
22 · 2 · 2012

C.J. associates



— GL
CONCRETE
— 0·20
BENTONITE SEAL
— 1·00

GRAVEL FILTER

— 19·00
BENTONITE SEAL
— 19·70

GL - 1·00 PLAIN PIPE.
1·00 - 19·00 SLOTTED PIPE.

FLUSH COVER AND GAS VALVE FITTED.

Daily Report Sheet Rotary

Site:- TROWBRIDGE STW

Job Number:- AA0125

Client:- BWB

Date:- MON 20.2.2012

Rig:- COMACCHIO 300

BH / Sheet / of /

KING ROAD AVENUE
AVONMOUTH
BRISTOL BS11 9HF
Tel: 0117 982 1473
Fax: 0117 982 8200
C.J. associates

TIME RECORD	Total Hours	Start Time	Finish Time
Transport		Dayworks	
Rig Moving		Running Casing/Pulling Casing	
Open Hole Drilling		Repairs & Maintenance	
Core Drilling		Other	

DRILLING RECORD

Run No	From	To	Drilled	Recovery	Chked	Number	Location
MOBILIZED TO SITE.							
TRACKED RIG TO BH2							
SET UP							
RUN SIMMITREX CASING IN 2.00MTS.							
REDRILLED CASING DOWN FROM							
2.00 — 12.50MTS							
FILLING WATER BOWSER (1HR)							
1	12.50	13.50	1.00	1.00			
SPT	13.50	4·8·11·17·18·	4/5mm				
2	13.50	15.00	1.50	1.34			
SPT	15.00	5·9·18·24·	8/30mm				
3	15.00	16.50	1.50	1.40			
SPT	16.50	5·11·13·19·	18/63mm				
4	16.50	18.00	1.50	1.50			
SPT	18.00	8·15·19·21·	10/38mm				
5	18.00	19.05	1.05	1.05.			

STRATA & PENETRATION TESTS

From	To	Description of Strata
12.50	19.05	GREY FIRM CLAYS WITH SOME SHELLS.
		Depth at end of day

Water Record

Depth Struck	Depth +20mins

Daily Water Level Record	Depth Hole	Depth Water
Start of am shift	/	3.72
End of am shift		
Start of pm shift		
End of pm shift	19.05	14.72
After pulling casing		
After 24hrs		

CORE BOXES USED

Flush Record AIR 400/170 cfm COMPRESSOR

Open Hole Type	Open Hole Return	Coring Type	Coring Return
AIR	GOOD	AIR/MIST	GOOD

BENTONITE USED

Bit Record

Type & Size	Number	Depth Drilled
PDC 412		12.50 - 19.05

CASING RECORD

Size	From	To
SIMMITREX	GL	12.50

Water added to assist boring YES. Crew G HADDOCK A EVANS

If so depth? 10.20 - 19.05 Signature of driller

Verified by Client

Daily Report Sheet Rotary

Site:- TROWBRIDGE STW
Job Number:- AA0125
Client:- BWB
Date:- TUES 21.2.2012
Rig:- COMACCHIO 300

BH 1
Sheet 1 of 3

KING ROAD AVENUE
AVONMOUTH
BRISTOL BS11 9HF
Tel: 0117 982 1473
Fax: 0117 982 8200
C.J. associates

TIME RECORD	Total Hours	Start Time	Finish Time
Transport		Dayworks	
Rig Moving		Running Casing/Pulling Casing	
Open Hole Drilling		Repairs & Maintenance	
Core Drilling		Other	

DRILLING RECORD

Run No	From	To	Drilled	Recovery	Chked	Number	Location
FILLING WATER BOWSER (½HR)							
6	19.05	20.30	1.25	1.00			
SPT	20.30	18.7/38mm	28.22/50mm				
½hr off site, GETTING MATERIALS FOR INSTALLATION							
INSTALLATION DETAILS FOR 50mm PIPE INSTALLED IN BH1 SEE SHEET 2 OF 3							
1HR MOVING EVERYTHING TO BH2							

STRATA & PENETRATION TESTS

From	To	Description of Strata
19.05	20.30	FIRM GREY CLAYS.
		Depth at end of day

Water Record

Depth Struck	Depth +20mins

Daily Water Level Record	Depth Hole	Depth Water
Start of am shift	19.05	14.84
End of am shift		
Start of pm shift		
End of BH	20.30	17.72
After pulling casing		
After 24hrs		

CORE BOXES USED 12.50 – 20.30 3 BOXES
Flush Record AIR 400/170 cfm COMPRESSOR

Open Hole Type	Open Hole Return	Coring Type	Coring Return
		AIR/MIST	GOOD

BENTONITE USED

Bit Record

Type & Size	Number	Depth Drilled
PDC 412		19.05 – 20.30

CASING RECORD

Size	From	To
SIMMITREX	GL	12.50

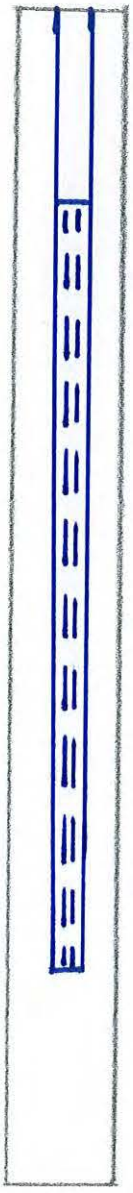
Water added to assist boring YES
Crew GHADDOCK A EVANS
If so depth? 19.05 – 20.30
Signature of driller
Verified by Client

50mm
Standpipe installation

Site TROWBRIDGE STW
Job No AA0125
Client BWB

[redacted] 1
[redacted] TUES 21/2/2012

C.J. associates



GL – 1.00 PLAIN PIPE.
1.00 – 19.00 SLOTTED PIPE.

FLUSH COVER AND GAS VALVE FITTED.

Daily Report Sheet Rotary

Site:- TROWBRIDGE STW
Job Number:- AA0125
Client:- BWB
Date:- TUES 21.2.2012
Rig:- COMACCHIO 300

BH 2
Sheet 3 of 3

KING ROAD AVENUE
AVONMOUTH
BRISTOL BS11 9HF
Tel: 0117 982 1473
Fax: 0117 982 8200
C.J. associates

TIME RECORD	Total Hours	Start Time	Finish Time
Transport		Dayworks	
Rig Moving		Running Casing/Pulling Casing	
Open Hole Drilling		Repairs & Maintenance	
Core Drilling		Other	

DRILLING RECORD

Run No	From	To	Drilled	Recovery	Chked	Number	Location
SET RIG UP AT BH2 POSITION							
RUN SIMMITREX CASING IN TO 1.20							
REDRILLED CASING DOWN FROM							
1.20 – 8.50							
REDRILLED 8.50 – 11.00 WITH							
4½" DRAGBIT.							
1	11.00	12.20	1.20	1.20			
SPT 12.20 7.7.12.17.18 3/4mm							
2	12.20	13.70	1.50	1.50			
SPT 13.70 5.9.11.13.19. 7/23mm							
3	13.70	15.20	1.50	1.50			
SPT 15.20 7.13.19.17.14/60mm							
½hr REPAIRING MIST PUMP							

STRATA & PENETRATION TESTS

From	To	Description of Strata
11.00	15.20	FIRM GREY CLAYS.
		Depth at end of day

Water Record

Depth Struck	Depth +20mins

Daily Water Level Record	Depth Hole	Depth Water
Start of am shift		
End of am shift		
Start of pm shift		
End of pm shift	15.20	13.52
After pulling casing		
After 24hrs		

CORE BOXES USED

Flush Record AIR 400/170 cfm COMPRESSOR

Open Hole Type	Open Hole Return	Coring Type	Coring Return
AIR	GOOD	AIR/MIST	GOOD

BENTONITE USED

Bit Record

Type & Size	Number	Depth Drilled
PDC 412		11.00 – 15.20

CASING RECORD

Size	From	To
SIMMITREX	GL	8.50

Water added to assist boring? YES
If so depth? 900 – 15.20
Crew G HADDOCK A EVANS
Signature of driller
Verified by Client

Cable Percussion Borehole Log Sheet

BH No: **1**

Site: **Trowbridge STW**

Job Number: **AA0125**

Client: BWB Consulting

Rig Type: Dando 2000

Start Date: 10/02/2012

Finish Date: 10/02/2012

Vertical Scale: 1:50

Total BH Depth: 12.37m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPT's) Test type	Blow Counts Seat.	Test Drive	N-value	Pen. (mm) Seat	Test	U100 Samples: Blows % recovery	Water Strike / Standing Water	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
											(0.50)		Grass / topsoil (Driller's description).	
0.50 - 1.20	B1									0.50			Orange / brown clay (Driller's description).	
1.20		S	1,2	1,2,2,3	N=8	150	300							
1.20 - 1.65	D2													
1.20 - 1.65	B3													
1.70 - 2.00	T4													
2.00 - 2.45	U5							128b 80%			(3.10)			
2.50 - 3.00	T6													
3.00		S	3,3	3,4,4,6	N=17	150	300							
3.00 - 3.45	D7													
3.00 - 3.50	B8													
3.50 - 4.00	T9													
										3.60	(0.20)		grey siltstone (Driller's description).	
4.00 - 4.45	U10							110b 100%		3.80			Blue / grey sandy clay (Driller's description).	
4.50 - 5.00	T11													
5.00		S	4,5	6,6,6,8	N=26	150	300							
5.00 - 5.45	D12													
5.00 - 5.50	B13													
6.00 - 6.50	T14													
6.50 - 6.95	U15							109b 60%						
7.50 - 8.00	T16													
8.00		S	5,6	6,7,8,9	N=30	150	300				(8.57)			
8.00 - 8.45	D17													
8.00 - 8.50	B18													
9.00 - 9.50	T19													
9.50 - 9.95	U20							170b 100%						

(Continued on next sheet)

Hole Progress with Time (Depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks
		1.65		

Chiselling		
From (m)	To (m)	Time (hrs)
3.60	3.80	

Casing Record	
Depth (m)	Dia. (mm)
1.65	

Groundwater Strikes (depths in m. below G.L.)				
Strike	Casing	Water (20mins)	Sealed	Remarks
No Groundwater encountered				

General Remarks:

Drilled By: AN

Logged By:

Cable Percussion Borehole Log Sheet

BH No: **1**

Site: **Trowbridge STW**

Job Number: **AA0125**

Client: BWB Consulting

Rig Type: Dando 2000

Start Date: 10/02/2012

Finish Date: 10/02/2012

Vertical Scale: 1:50

Total BH Depth: 12.37m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPT's) Test type	Blow Counts Seat.	Test Drive	N-value	Pen. (mm) Seat	Test	U100 Samples: Blows % recovery	Water Strike ↓ Standing Water ▽	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
10.50 - 11.00	T21												Blue / grey sandy clay (Driller's description).	
11.00		S	8,8	10,10,15,15	N>50	150	145							
11.00 - 11.43	D22													
11.00 - 11.50	B23													
11.50 - 12.00	T24													
12.00		S	10,12	13,15,22,-	N>50	150	220							
12.00 - 12.37	D25													
										12.37			BOREHOLE CONTINUED BY ROTARY DRILLING	

Hole Progress with Time (Depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks
	12.37			

Chiselling		
From (m)	To (m)	Time (hrs)

Casing Record	
Depth (m)	Dia. (mm)

Groundwater Strikes (depths in m. below G.L.)				
Strike	Casing	Water (20mins)	Sealed	Remarks
No Groundwater Encountered				

General Remarks:

Drilled By: AN

Logged By:

Cable Percussion Borehole Log Sheet

BH No: **2**

Site: **Trowbridge STW**

Start Date: 09/02/2011

Job Number: **AA0125**

Finish Date: 09/02/2011

Client: BWB Consulting

Vertical Scale: 1:50

Rig Type: Dando 2000

Total BH Depth: 11.14m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPT's) Test type	Blow Counts Seat.	Test Drive	N-value	Pen. (mm) Seat	Test	U100 Samples: Blows % recovery	Water Strike ↓ Standing Water ▽	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
										0.30	(0.30)		Grass / topsoil (Driller's description).	
0.50 - 1.20	B1												Orange / brown clay (Driller's description).	
											(1.30)			
1.20		S	1,2	3,3,3,3	N=12	150	300							
1.20 - 1.65	D2													
1.20 - 1.65	B3													
										1.60				
1.70 - 2.00	T4												Orange / green silty / sandy clay (Driller's description).	
2.00 - 2.45	U5							130b 100%			(0.90)			
2.50 - 3.00	T6									2.50			Blue / grey sandy clay (Driller's description).	
3.00		S	2,3	3,4,4,5	N=16	150	300							
3.00 - 3.45	D7													
3.00 - 3.50	B8													
3.50 - 4.00	T9													
4.00 - 4.45	U10							63b 70%						
4.50 - 5.00	T11													
5.00		S	4,5	5,5,8,8	N=26	150	300							
5.00 - 5.45	D12													
5.00 - 5.50	B13													
6.00 - 6.50	T14													
6.50 - 6.95	U15							120b 100%						
											(8.64)			
7.50 - 8.00	T16													
8.00		S	5,6	6,7,9,9	N=31	150	300							
8.00 - 8.45	D17													
8.00 - 8.50	B18													
9.00 - 9.50	T19													
9.50 - 9.95	U20							140b 70%						

(Continued on next sheet)

Hole Progress with Time (Depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks
		1.65		

Chiselling		
From (m)	To (m)	Time (hrs)

Casing Record	
Depth (m)	Dia. (mm)
1.65	

Groundwater Strikes (depths in m. below G.L.)				
Strike	Casing	Water (20mins)	Sealed	Remarks
	1.65			

General Remarks:

Drilled By: AN
Logged By:

Cable Percussion Borehole Log Sheet

BH No: **2**

Site: **Trowbridge STW**

Job Number: **AA0125**

Client: BWB Consulting

Rig Type: Dando 2000

Start Date: 09/02/2011

Finish Date: 09/02/2011

Vertical Scale: 1:50

Total BH Depth: 11.14m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPT's) Test type	Blow Counts Seat.	Test Drive	N-value	Pen. (mm) Seat	Test	U100 Samples: Blows % recovery	Water Strike / Standing Water	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
10.50 - 11.00	T21												Blue / grey sandy clay (Driller's description).	
11.00 11.00 - 11.14	D22	S	13,12	50,-,-,-	N>50	100	35			11.14			BOREHOLE CONTINUED BY ROTARY DRILLING	

Hole Progress with Time (Depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks
	11.14		11.14	

Chiselling		
From (m)	To (m)	Time (hrs)

Casing Record	
Depth (m)	Dia. (mm)

Groundwater Strikes (depths in m. below G.L.)				
Strike	Casing	Water (20mins)	Sealed	Remarks
11.14		10.70		

General Remarks:

Drilled By: AN
Logged By:

APPENDIX 4

BOREHOLE LOGS AND PHOTOGRAPHS

Project Title Trowbridge STW		**Hole Ref.**	BH1
Client Wessex Water		**Project No.**	BME2019
Plant used Dando 2000 / Comacchio 300		**Start Date** 09/02/2012	**End Date** 21/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		0.15	MADE GROUND: Grass over dark brown slightly clayey slightly gravelly sandy TOPSOIL. Gravel is subangular fine and medium of flint, mudstone, rare brick and concrete with frequent rootlets.			B	0.50	1.20		
		0.65				DJV		0.50		
			MADE GROUND: Reworked soft orangish brown and greyish brown occasionally mottled orange slightly gravelly sandy CLAY with angular cobble of concrete at 0.30m bgl (150x220x260mm). Gravel is angular to subangular fine and medium of mudstone, slate and rare brick with rare rootlets.						1.20 (S)	N=8 (1,2/1,2,2,3)
						DJV	1.50	1.50		
			Firm becoming stiff below 4.00m light grey and blueish grey locally silty CLAY with frequent orange mottling and rare rootlets to 1.30m bgl.						3.00 (S)	N=17 (3,3/3,4,4,6)
									5.00 (S)	N=26 (4,5/6,6,6,8)
									8.00 (S)	N=30 (5,6/6,7,8,9)

Continued next sheet

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 12.37m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.53m bgl.
3. Chiselling undertaken between 3.60m bgl and 3.80m bgl.
4. Simmitrex casing advanced to a depth of 12.50m bgl.
5. No water strike.
6. No visual or olfactory evidence encountered within the exploratory hole.
7. Installation of a 50mm gas and groundwater standpipe with a response zone between 1.00m bgl and 19.00m bgl.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 1 of 3

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS
Environment Group
5th Floor
Waterfront House
Station Street
Nottingham
NG2 3DQ
Tel : 0115 9241100
Fax : 0115 9503966

Project Title	Trowbridge STW	**Hole Ref.**	BH1
Client	Wessex Water	**Project No.**	BME2019
Plant used	Dando 2000 / Comacchio 300	**Start Date** 09/02/2012	**End Date** 21/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
			Firm becoming stiff below 4.00m light grey and blueish grey locally silty CLAY with frequent orange mottling and rare rootlets to 1.30m bgl.							
		11.00	Stiff becomnig very stiff below 12.00m, dark greyish blue and dark blue slightly sandy gravelly CLAY locally tending to extremely weak weathered mudstone. Gravel is angular fine to coarse of mudstone.						11.00 (S)	N=50 (8,8/10,10,15,15)
									12.00 (S)	50 (10,12/13,15,22,0 for 0mm)
		13.15	Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly with weak mudstone from 19.00m bgl.						13.50 (S)	50 (4,8/11,17,18,4 for 5mm)
			Pyrite nodule							
									15.00 (S)	50 (5,9/18,24,8 for 30mm)
									16.50 (S)	50 (5,11/13,19,18 for 63mm)
			Non intact zone						18.00 (S)	50 (8,15/19,21,10 for 38mm)
			Non intact zone							
			Non intact zone							
			Not silty							
			Continued next sheet							

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 12.37m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.53m bgl.
3. Chiselling undertaken between 3.60m bgl and 3.80m bgl.
4. Simmitrex casing advanced to a depth of 12.50m bgl.
5. No water strike.
6. No visual or olfactory evidence encountered within the exploratory hole.
7. Installation of a 50mm gas and groundwater standpipe with a response zone between 1.00m bgl and 19.00m bgl.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 2 of 3

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS
Environment Group
5th Floor
Waterfront House
Station Street
Nottingham
NG2 3DQ
Tel : 0115 9241100
Fax : 0115 9503966

Project Title Trowbridge STW		**Hole Ref.**	BH1
Client Wessex Water		**Project No.**	BME2019
Plant used Dando 2000 / Comacchio 300		**Start Date** 09/02/2012	**End Date** 21/02/2012

Groundwater		Depth	Description of Strata	Level	Legend	Samples			In-situ Testing	
Strike	Well	(m)		(mAOD)		Type	Depth From	Depth To	Depth (m) (SPT Type)	Result
			Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly with weak mudstone from 19.00m bgl.						20.30 (S)	50 (18,7 for 38mm/28,22 for 50mm
		20.53	*End of hole at 20.53 m*							

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 12.37m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.53m bgl.
3. Chiselling undertaken between 3.60m bgl and 3.80m bgl.
4. Simmitrex casing advanced to a depth of 12.50m bgl.
5. No water strike.
6. No visual or olfactory evidence encountered within the exploratory hole.
7. Installation of a 50mm gas and groundwater standpipe with a response zone between 1.00m bgl and 19.00m bgl.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 3 of 3

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS
Environment Group
5th Floor
Waterfront House
Station Street
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NG2 3DQ
Tel : 0115 9241100
Fax : 0115 9503966

Project Title	Trowbridge STW	**Hole Ref.**	BH2
Client	Wessex Water	**Project No.**	BME2019
Plant used	Dando 2000 / Comacchio 300	**Start Date** 10/02/2012	**End Date** 22/01/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		0.20	MADE GROUND: Grass over dark brown clayey slightly gravelly sandy TOPSOIL. Gravel is angular to subangular fine to coarse of flint, mudstone and limestone with frequent rootlets.			B	0.50	1.20		
		0.60				DJV	0.80	0.80		
			MADE GROUND: Reworked soft brown and greyish brown with occasional orange mottling slightly sandy CLAY with occasional rootlets.			D B	1.20	1.65	1.20 (S)	N=12 (1,2/3,3,3,3)
						D	1.70	2.00		
			Soft becoming firm below 1.20m with depth brown and greyish brown with occasional orange mottling slightly sandy CLAY with occasional rootlets. Occasional orangish brown fine sand pockets			U	2.00	2.45		
		2.50				D	2.50	3.00		
						DJV B D	3.00	3.00 3.50 3.45	3.00 (S)	N=16 (2,3/3,4,4,5)
			Firm locally tending to stiff below 3.00m, greyish blue and dark greyish blue slightly sandy CLAY with rare shell fragments (<20mm) to 4.00m bgl.							
			Firm locally tending to stiff greyish blue and dark greyish blue locally slightly sandy CLAY with rare shell fragments (<20mm) to 4.00m bgl.			U D	4.00	4.45 4.00		
						D	4.50	5.00		
						D B	5.00	5.45 5.50	5.00 (S)	N=26 (4,5/5,5,8,8)
		6.00	Becoming stiff locally silty and slightly sandy Stiff greyish blue and grey locally silty slightly sandy CLAY. Becoming stiff locally silty and slightly sandy			D	6.00	6.50		
						U	6.50	6.95		
						D	7.50	8.00		
						D B	8.00	8.45 8.50	8.00 (S)	N=31 (5,6/6,7,9,9)
						D	9.00	9.50		
						U	9.50	9.95		
			Continued next sheet							

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 11.06m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.05m bgl.
3. Simmitrex casing advanced to a depth of 8.50m bgl.
4. Groundwater strikes encountered at 11.14m bgl rising to 10.70m bgl after 20 minutes.
5. No visual or olfactory evidence encountered within the exploratory hole.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 1 of 3

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Project Title Trowbridge STW		**Hole Ref.**	BH2
Client Wessex Water		**Project No.**	BME2019
Plant used Dando 2000 / Comacchio 300		**Start Date** 10/02/2012	**End Date** 22/01/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
			Firm locally tending to stiff greyish blue and dark greyish blue locally slightly sandy CLAY with rare shell fragments (<20mm) to 4.00m bgl.							
		10.70				D	10.70	11.00		
			Stiff greyish blue and grey locally silty slightly sandy CLAY.							
		11.00				D	11.00	11.06	11.00 (S)	50 (13,12 for 25mm/50 for 35mm
▽ 11.14		11.40								
			Very stiff dark blue and dark greyish blue sandy gravelly CLAY tending to extremely weak weathered mudstone. Gravel is angular fine to coarse of weathered mudstone.							
			Grey weak silty fossiliferous MUDSTONE. Fractures are horizontal, planar, rough with silt infilling.						12.20 (S)	50 (7,7/12,17,18,3 for 4mm)
			Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly of weak mudstone from 19.00m.							
			Non intact zone							
			Non intact zone						13.70 (S)	50 (5,9/11,13,19,7 for 23mm)
			Non intact zone							
			Tending to extremely weak mudstone						15.20 (S)	50 (7,13/19,17,14 for 60mm)
			Tending to extremely weak mudstone						16.70 (S)	50 (7,11/13,19,18 for 66mm)
			Non intact zone							
			Occasional fossils present							
			Horizontal fracture with silt infilling						18.20 (S)	50 (7,11/14,18,18 for 61mm)
			Silt band							
			Silt band							
			Tending to extremely weak and weak mudstone						19.70 (S)	50 (8,13/16,18,16 for 52mm)
			Continued next sheet							

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 11.06m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.05m bgl.
3. Simmitrex casing advanced to a depth of 8.50m bgl.
4. Groundwater strikes encountered at 11.14m bgl rising to 10.70m bgl after 20 minutes.
5. No visual or olfactory evidence encountered within the exploratory hole.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 2 of 3

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Project Title Trowbridge STW		**Hole Ref.**	BH2
Client Wessex Water		**Project No.**	BME2019
Plant used Dando 2000 / Comacchio 300		**Start Date** 10/02/2012	**End Date** 22/01/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		20.05	Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly of weak mudstone from 19.00m.							
			End of hole at 20.05 m							

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 11.06m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.05m bgl.
3. Simmitrex casing advanced to a depth of 8.50m bgl.
4. Groundwater strikes encountered at 11.14m bgl rising to 10.70m bgl after 20 minutes.
5. No visual or olfactory evidence encountered within the exploratory hole.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 3 of 3

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Job Name: Trowbridge STW
Job No: BME2019
Core Photos

Photo 1 BH1 Core 12.50m to 15.70m

Photo 2 BH1 Core 15.70m to 18.70

Job Name: Trowbridge STW
Job No: BME2019
Core Photos

Photo 3 BH1 Core 18.70m to 20.00m

Photo 4 BH2 Core 11.00m to 14.00m

Job Name: Trowbridge STW
Job No: BME2019
Core Photos

Photo 5 BH2 Core 14.00m to 17.00m

Photo 5 BH2 Core 17.00m to 19.70m

APPENDIX 5

TRIAL PIT LOGS AND PHOTOGRAPHS

Project Title Trowbridge STW		**Hole Ref.**	TP2
Client Wessex Water		**Project No.**	BME2019
Plant used JCB 3CX		**Start Date** 10/02/2012	**End Date** 10/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		0.10	MADE GROUND: Grass over dark brown clayey sandy TOPSOIL with frequent rootlets.			DJV	0.40	0.40	0.20	SV = 71 kN/m2 SV = 60 kN/m2 SV = 65 kN/m2
			MADE GROUND: Firm orangish brown and grey slightly sandy slightly gravelly CLAY. Gravel is angular fine to coarse of brick, siltstone, mudstone and rare coal fragments.			B	0.60	0.90		
		1.00	Locally gravelly			B	1.20	1.60	1.20	SV = 64 kN/m2 SV = 60 kN/m2 SV = 61 kN/m2
			Soft orangish brown and brownish grey frequently mottled orange locally silty slightly gravelly CLAY. Gravel is angular fine and medium of weathered mudstone.			DJV	1.90	1.90		
			Becoming stiff and gravelly			B	2.40	2.70	2.50	SV = 80 kN/m2 SV = 88 kN/m2 SV = 87 kN/m2
		3.00	*End of hole at 3.00 m*							

REMARKS

1. Trial pit terminated at scheduled depth of 3.00m bgl.
2. No visual or olfactory evidence encountered.
3. Side walls were stable throughout the excavation.
4. No groundwater encountered during excavation.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 1 of 1

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Project Title Trowbridge STW		**Hole Ref.**	TP3
Client Wessex Water		**Project No.**	BME2019
Plant used JCB 3CX		**Start Date** 10/02/2012	**End Date** 10/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		0.15	MADE GROUND: Grey sandy GRAVEL of angular to subangular fine to coarse of mixed lithologies including limestone.			D	0.00	0.10		
						B	0.50	0.80	0.60	SV = 75 kN/m2 SV = 68 kN/m2 SV = 69 kN/m2
		1.00	MADE GROUND: Firm orangish brown and grey occasionally mottled orange slighly sandy slightly gravelly CLAY with rare rootlets. Gravel is angular to subangular fine to coarse of brick and tile fragments.			DJV	0.90	0.90		
						DJV	1.20	1.20		
						B	1.50	1.80		
			MADE GROUND: Firm becoming stiff from 2.00m, dark grey and dark greenish grey with frequent black staining slightly sandy gravelly CLAY with organic odour. Cobble of subangular concrete at 1.60m bgl (350*220*200mm). Gravel is angular to subangular fine to caorse of brick, concrete, mudstone and siltstone.						2.00	SV = 95 kN/m2 SV = 90 kN/m2 SV = 93 kN/m2
						D	2.30	2.30		
		3.00				D	2.80	2.80		
			End of hole at 3.00 m							

REMARKS

1. Trial pit terminated at scheduled depth of 3.00m bgl.
2. No visual or olfactory evidence encountered.
3. Side walls were stable throughout the excavation.
4. No groundwater encountered during excavation.

SOIL SAMPLE TYPE

D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS

SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER

▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 1 of 1

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Project Title Trowbridge STW	**Hole Ref.** TP4
Client Wessex Water	**Project No.** BME2019
Plant used JCB 3CX	**Start Date** 10/02/2012 **End Date** 10/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		0.20	MADE GROUND: Grass over dark brown clayey slightly gravelly sandy TOPSOIL. Gravel is subangular fine to coarse of mudstone and brick with freuent rootlets.			DJV	0.10	0.10		
						B	0.40	0.70	0.50	SV = 110 kN/m2
						DJV	0.60	0.60		SV = 112 kN/m2
										SV = 115 kN/m2
		1.60	MADE GROUND: Firm tending to stiff from 0.50m, orangish brown and grey mottled orange slightly sandy slightly gravelly CLAY with angular cobble of concrete at 1.50m bgl. Gravel is angular fine to coarse of brick, flint and mudstone with occasional decomposing rootlets and roots. Locally becoming silty			D	1.20	1.20		
						B	1.60	2.00		
		3.00	MADE GROUND: Firm dark grey and blueish grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of mudstone and brick with frequent decomposing rootlets and roots. Becoming soft			DJV	2.50	2.50		
			End of hole at 3.00 m							

REMARKS

1. Trial pit terminated at scheduled depth of 3.00m bgl.
2. No visual or olfactory evidence encountered.
3. Side walls were stable throughout the excavation.
4. No groundwater encountered during excavation.

SOIL SAMPLE TYPE

D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS

SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER

▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 1 of 1

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Project Title Trowbridge STW	**Hole Ref.** TP5
Client Wessex Water	**Project No.** BME2019
Plant used JCB 3CX	**Start Date** 10/02/2012 **End Date** 10/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		0.20	MADE GROUND: Grass over dark brown slightly clayey sandy TOPSOIL with frequent rootlets and angular cobble of brick.			DJV	0.40	0.40		
						B	0.60	0.90	0.60	SV = 90 kN/m2 SV = 100 kN/m2 SV = 102 kN/m2
			MADE GROUND: Stiff orangish brown and grey mottled orange slightly sandy slightly gravelly CLAY with occasional rootlets and rare roots. Gravel is angular to subangular fine to coarse of mudstone, siltstone, sandstone and rare brick fragments.			DJV	1.10	1.10		
						B	1.30	1.70	1.30	SV = 75 kN/m2 SV = 61 kN/m2 SV = 71 kN/m2
		2.00	Firm slightly sandy locally silty Becoming dark grey			DJV	2.10	2.10		
						B	2.50	2.70		
		3.00	MADE GROUND: Firm dark grey and blueish grey occasionally stained black slightly sandy slightly gravelly locally silty CLAY with occasional decomposing rootlets. Gravel is angular fine to coarse of mudstone.			D	3.00	3.00		
			End of hole at 3.00 m							

REMARKS

1. Trial pit terminated at scheduled depth of 3.00m bgl.
2. No visual or olfactory evidence encountered.
3. Side walls were stable throughout the excavation.
4. No groundwater encountered during excavation.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 1 of 1

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Project Title Trowbridge STW		**Hole Ref.**	TP6
Client Wessex Water		**Project No.**	BME2019
Plant used JCB 3CX		**Start Date** 10/02/2012	**End Date** 10/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		0.20	MADE GROUND: Grass over dark brown slightly clayey sandy TOPSOIL with frequent rootlets and roots. Cobble of angular concrete at 0.15m bgl.			DJV	0.15	0.15		
						D				
						DJV	0.40	0.40		
		0.60	MADE GROUND: Firm orangish brown and grey slightly sandy CLAY. Gravel is fine and medium of rare brick fragments.			B	0.60	0.90	0.70	SV = 68 kN/m2 SV = 70 kN/m2 SV = 67 kN/m2
						DJV	1.20	1.20	1.20	SV = 72 kN/m2 SV = 70 kN/m2 SV = 60 kN/m2
▽ 1.50			Firm becoming stiff below 1.50m, grey frequently mottled orangish brown slightly sandy gravelly CLAY. Gravel is angular fine and medium of extremely weak weathered mudstone.			D	1.50	1.50		
			Becoming stiff and gravelly			B	1.90	2.20		
						D	2.60	2.60		
		3.00	*End of hole at 3.00 m*			D	3.00	3.00		

REMARKS

1. Trial pit terminated at scheduled depth of 3.00m bgl.
2. No visual or olfactory evidence encountered.
3. Side walls were stable throughout the excavation.
4. Groundwater seepage at 1.50m bgl.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 1 of 1

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Photo 1 Back end of TP2

Photo 2 Side of TP2

Photo 3 Side of TP2

Photo 4 Front end of TP2

Photo 5 Spoil from TP2

Photo 6 Back end of TP3

Photo 7 Side of TP3

Photo 8 Base of TP3

Photo 9 Side of TP3

Photo 10 Front end of TP3

Photo 11 Spoil from TP3

Photo 12 Back end of TP4

Photo 13 Side of TP4

Photo 14 Side of TP4

Photo 15 Front end of TP4

Photo 16 Spoil from TP4

Photo 17 Back end of TP5

Photo 18 Side of TP5

Photo 19 Side of TP5

Photo 20 Front end of TP5

Photo 21 Spoil from TP5

Photo 22 Back end of TP6

Photo 23 Side of TP6

Photo 24 Side of TP6

Photo 25 Front end of TP6

Photo 26 Spoil from TP6

APPENDIX 6

SOIL CHEMICAL LABORATORY TESTING

ALcontrol Laboratories

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: mkt@alcontrol.com
Website: www.alcontrol.com

BWB Consulting
Livery Place
35 Livery Street
Colmore Business District
Birmingham
B3 2PB

Attention: Greg Adams

CERTIFICATE OF ANALYSIS

Date:	16 April 2012
Customer:	H_BWB_BRM
Sample Delivery Group (SDG):	120216-81
Your Reference:	BME2019
Location:	Trowbridge
Report No:	177836

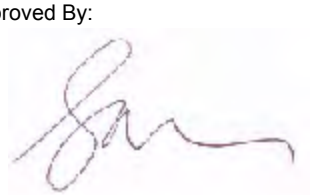
This report has been revised and directly supersedes 174209 in its entirety.

We received 18 samples on Tuesday February 14, 2012 and 8 of these samples were scheduled for analysis which was completed on Monday April 16, 2012. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:



Sonia McWhan

Operations Manager

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
5183062	BH 1		0.50	09/02/2012
5183063	BH 1		1.50	09/02/2012
5183060	BH 2		0.80	09/02/2012
5183061	BH 2		3.00	09/02/2012
5183077	BH 2		4.00	10/02/2012
5183072	TP 2		1.90	10/02/2012
5183070	TP 3		0.90	10/02/2012
5183076	TP 3		1.20	10/02/2012
5183067	TP 4		0.10	10/02/2012
5183068	TP 4		0.60	10/02/2012
5183069	TP 4		2.50	10/02/2012
5183064	TP 5		0.40	10/02/2012
5183065	TP 5		1.10	10/02/2012
5183066	TP 5		2.10	10/02/2012
5183073	TP 6		0.15	10/02/2012
5183074	TP 6		0.40	10/02/2012
5183075	TP 6		1.20	10/02/2012

Only received samples which have had analysis scheduled will be shown on the following pages.

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

SOLID

Results Legend

X Test

N No Determination Possible

Lab Sample No(s)			5183071	5183072	5183070	5183076	5183068	5183064	5183065	5183075
Customer Sample Reference			TP 2	TP 2	TP 3	TP 3	TP 4	TP 5	TP 5	TP 6
AGS Reference										
Depth (m)			0.40	1.90	0.90	1.20	0.60	0.40	1.10	1.20
Container			1kg TUB	250g Amber Jar (AL	60g VOC (ALE215)	1kg TUB	250g Amber Jar (AL	250g Amber Jar (AL	1kg TUB	250g Amber Jar (AL	60g VOC (ALE215)	1kg TUB	250g Amber Jar (AL	250g Amber Jar (AL	1kg TUB	250g Amber Jar (AL	60g VOC (ALE215)	1kg TUB	250g Amber Jar (AL
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 3		X				X					X			X			
Anions by Kone (soil)	All	NDPs: 0 Tests: 3				X				X									X
Anions by Kone (w)	All	NDPs: 0 Tests: 3	X					X							X				
Asbestos Identification (Soil)	All	NDPs: 0 Tests: 2					X					X							
CEN 2:1 Readings	All	NDPs: 0 Tests: 3	X					X							X				
CEN 8:1 Readings	All	NDPs: 0 Tests: 3	X					X							X				
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 3	X					X							X				
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 3	X					X							X				
Fluoride	All	NDPs: 0 Tests: 3	X					X							X				
GRO by GC-FID (S)	All	NDPs: 0 Tests: 3			X				X								X		
Loss on Ignition in soils	All	NDPs: 0 Tests: 3		X				X							X				
Mercury Dissolved	All	NDPs: 0 Tests: 3	X					X							X				
Mineral Oil	All	NDPs: 0 Tests: 3		X				X							X				
PAH by GCMS	All	NDPs: 0 Tests: 2					X							X					
PAH Value of soil	All	NDPs: 0 Tests: 3		X				X							X				

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

SOLID

Results Legend

- X — Test
- N — No Determination Possible

Lab Sample No(s)			5183071	5183071	5183071	5183072	5183072	5183070	5183070	5183076	5183076	5183076	5183068	5183068	5183064	5183064	5183065	5183065	5183065	5183075	5183075
Customer Sample Reference			TP 2	TP 2	TP 2	TP 2	TP 2	TP 3	TP 3	TP 3	TP 3	TP 3	TP 4	TP 4	TP 5	TP 5	TP 5	TP 5	TP 5	TP 6	TP 6
AGS Reference																					
Depth (m)			0.40	0.40	0.40	1.90	1.90	0.90	0.90	1.20	1.20	1.20	0.60	0.60	0.40	0.40	1.10	1.10	1.10	1.20	1.20
Container			1kg TUB	250g Amber Jar (AL	60g VOC (ALE215)	1kg TUB	250g Amber Jar (AL	1kg TUB	250g Amber Jar (AL	1kg TUB	250g Amber Jar (AL	60g VOC (ALE215)	1kg TUB	250g Amber Jar (AL	1kg TUB	250g Amber Jar (AL	1kg TUB	250g Amber Jar (AL	60g VOC (ALE215)	1kg TUB	250g Amber Jar (AL
PCBs by GCMS	All	NDPs: 0 Tests: 3		X							X							X			
pH	All	NDPs: 0 Tests: 6	X			X				X			X				X			X	
Phenols by HPLC (W)	All	NDPs: 0 Tests: 3	X							X							X				
Sample description	All	NDPs: 0 Tests: 8		X			X		X		X			X		X		X			X
Total Dissolved Solids	All	NDPs: 0 Tests: 3	X							X							X				
Total Organic Carbon	All	NDPs: 0 Tests: 3		X							X							X			
Total Sulphate	All	NDPs: 0 Tests: 3					X							X							X
TPH c6-40 Value of soil	All	NDPs: 0 Tests: 2							X							X					

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
5183071	TP 2	0.40	Light Brown	Clay	<0.063 mm	Stones	None
5183072	TP 2	1.90	Light Brown	Silty Clay Loam	0.063 - 0.1 mm	None	None
5183070	TP 3	0.90	Dark Brown	Silty Clay	0.063 - 0.1 mm	None	None
5183076	TP 3	1.20	Light Brown	Clay	<0.063 mm	None	None
5183068	TP 4	0.60	Light Brown	Silty Clay	0.063 - 0.1 mm	None	None
5183064	TP 5	0.40	Dark Brown	Silty Clay	0.063 - 0.1 mm	None	None
5183065	TP 5	1.10	Light Brown	Silty Clay	0.063 - 0.1 mm	Stones	None
5183075	TP 6	1.20	Light Brown	Silty Clay Loam	0.063 - 0.1 mm	None	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample R	TP 2	TP 2	TP 3	TP 3	TP 4	TP 5
			Depth (m)	0.40	1.90	0.90	1.20	0.60	0.40
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	10/02/2012	10/02/2012	10/02/2012	10/02/2012	10/02/2012	10/02/2012
			Sample Time	.	.	.	.	.	.
			Date Received	14/02/2012	14/02/2012	14/02/2012	14/02/2012	14/02/2012	14/02/2012
			SDG Ref	120216-81	120216-81	120216-81	120216-81	120216-81	120216-81
			Lab Sample No.(s)	5183071	5183072	5183070	5183076	5183068	5183064
			AGS Reference						
Loss on ignition	<0.7 %	TM018		4.92 M			4.38 M		
Mineral oil >C10-C40	<1 mg/kg	TM061		32.7 § #			52 § #		
Organic Carbon, Total	<0.2 %	TM132		0.513 §			0.568 §		
pH	1 pH Units	TM133		8.06 § M	4.84 M		7.86 § M	7.78 M	
TPH >C6-C40	<10 mg/kg	TM154				164 #			<10 #
PCB congener 28	<3 µg/kg	TM168		<3 § M			<3 § M		
PCB congener 52	<3 µg/kg	TM168		<3 § M			<3 § M		
PCB congener 101	<3 µg/kg	TM168		<3 § M			<3 § M		
PCB congener 118	<3 µg/kg	TM168		<3 § M			<3 § M		
PCB congener 138	<3 µg/kg	TM168		<3 § M			<3 § M		
PCB congener 153	<3 µg/kg	TM168		<3 § M			<3 § M		
PCB congener 180	<3 µg/kg	TM168		<3 § M			<3 § M		
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168		<21			<21		
ANC @ pH 4	<0.03 mol/kg	TM182		0.118			0.0809		
ANC @ pH 6	<0.03 mol/kg	TM182		0.044			0.0375		
Polyaromatic hydrocarbons, Total 17	<10 mg/kg	TM213		<10			<10		
Sulphate, Total	<48 mg/kg	TM221			1120 M			1200 M	
Water Soluble Sulphate as SO4 2:1 Extract	<0.008 g/l	TM243			0.0423 M			0.625 M	
Chloride (soluble)	<5 mg/kg	TM243			6.46 M			21.9 M	

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample R	TP 5	TP 6
			Depth (m)	1.10	1.20
			Sample Type	Soil/Solid	Soil/Solid
			Date Sampled	10/02/2012	10/02/2012
			Sample Time	.	.
			Date Received	14/02/2012	14/02/2012
			SDG Ref	120216-81	120216-81
			Lab Sample No.(s)	5183065	5183075
			AGS Reference		
Loss on ignition	<0.7 %	TM018		4.61 M	
Mineral oil >C10-C40	<1 mg/kg	TM061		34.6 #	
Organic Carbon, Total	<0.2 %	TM132		0.357 #	
pH	1 pH Units	TM133		8.22 M	4.86 M
PCB congener 28	<3 µg/kg	TM168		<3 M	
PCB congener 52	<3 µg/kg	TM168		<3 M	
PCB congener 101	<3 µg/kg	TM168		<3 M	
PCB congener 118	<3 µg/kg	TM168		<3 M	
PCB congener 138	<3 µg/kg	TM168		<3 M	
PCB congener 153	<3 µg/kg	TM168		<3 M	
PCB congener 180	<3 µg/kg	TM168		<3 M	
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168		<21	
ANC @ pH 4	<0.03 mol/kg	TM182		0.0757	
ANC @ pH 6	<0.03 mol/kg	TM182		<0.03	
Polyaromatic hydrocarbons, Total 17	<10 mg/kg	TM213		<10	
Sulphate, Total	<48 mg/kg	TM221			1190 M
Water Soluble Sulphate as SO4 2:1 Extract	<0.008 g/l	TM243			0.0494 M
Chloride (soluble)	<5 mg/kg	TM243			19.6 M

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

GRO by GC-FID (S)

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample R	TP 2	TP 3	TP 5			
			Depth (m)	0.40	1.20	1.10			
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid			
			Date Sampled	10/02/2012	10/02/2012	10/02/2012			
			Sample Time	.	.	.			
			Date Received	14/02/2012	14/02/2012	14/02/2012			
			SDG Ref	120216-81	120216-81	120216-81			
			Lab Sample No.(s)	5183071	5183076	5183065			
			AGS Reference						
GRO Surrogate % recovery**	%	TM089		103	89	120			
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		<5 §	<5 §	<5 #			
Benzene	<10 µg/kg	TM089		<10 §	<10 §	<10 M			
Toluene	<2 µg/kg	TM089		<2 §	<2 §	<2 M			
Ethylbenzene	<3 µg/kg	TM089		<3 §	<3 §	<3 M			
m,p-Xylene	<6 µg/kg	TM089		<6 §	<6 §	<6 M			
o-Xylene	<3 µg/kg	TM089		<3 §	<3 §	<3 M			
sum of detected mpo xylene by GC	<9 µg/kg	TM089		<9	<9	<9			
sum of detected BTEX by GC	<24 µg/kg	TM089		<24	<24	<24			

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

PAH by GCMS

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
§	Deviating sample.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed

Component	LOD/Units	Method	Customer Sample R	TP 3	TP 5			
			Depth (m)	0.90	0.40			
			Sample Type	Soil/Solid	Soil/Solid			
			Date Sampled	10/02/2012	10/02/2012			
			Sample Time	.	.			
			Date Received	14/02/2012	14/02/2012			
			SDG Ref	120216-81	120216-81			
			Lab Sample No.(s)	5183070	5183064			
			AGS Reference					
Naphthalene-d8 % recovery**	%	TM218		92 §	91.1 §			
Acenaphthene-d10 % recovery**	%	TM218		91.4 §	90.5 §			
Phenanthrene-d10 % recovery**	%	TM218		88.4 §	88.6 §			
Chrysene-d12 % recovery**	%	TM218		83.1 §	82.3 §			
Perylene-d12 % recovery**	%	TM218		81.9 §	82 §			
Naphthalene	<9 µg/kg	TM218		12.5 § M	<9 § M			
Acenaphthylene	<12 µg/kg	TM218		<12 § M	<12 § M			
Acenaphthene	<8 µg/kg	TM218		<8 § M	<8 § M			
Fluorene	<10 µg/kg	TM218		<10 § M	<10 § M			
Phenanthrene	<15 µg/kg	TM218		25.2 § M	<15 § M			
Anthracene	<16 µg/kg	TM218		<16 § M	<16 § M			
Fluoranthene	<17 µg/kg	TM218		38 § M	<17 § M			
Pyrene	<15 µg/kg	TM218		32.2 § M	<15 § M			
Benz(a)anthracene	<14 µg/kg	TM218		27.7 § M	<14 § M			
Chrysene	<10 µg/kg	TM218		19 § M	<10 § M			
Benzo(b)fluoranthene	<15 µg/kg	TM218		29.1 § M	<15 § M			
Benzo(k)fluoranthene	<14 µg/kg	TM218		<14 § M	<14 § M			
Benzo(a)pyrene	<15 µg/kg	TM218		20.8 § M	<15 § M			
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		<18 § M	<18 § M			
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<23 § M	<23 § M			
Benzo(g,h,i)perylene	<24 µg/kg	TM218		<24 § M	<24 § M			
PAH, Total Detected USEPA 16	<118 µg/kg	TM218		204 §	<118 §			

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Asbestos Identification - Soil

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	TP 3 NS Z 0.90 SOLID 10/02/2012 00:00:00 120216-81 5,183,070 TM048	12/03/12	Martin Cotterell	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	TP 5 NS Z 0.40 SOLID 10/02/2012 00:00:00 120216-81 5,183,064 TM048	12/03/12	Martin Cotterell	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference		**Site Location**	Trowbridge
Mass Sample taken (kg)	0.220	**Moisture Content Ratio (%)**	26
Mass of dry sample (kg)	0.175	**Dry Matter Content Ratio (%)**	79.4
Particle Size <4mm	>95%		

Case	
SDG	120216-81
Lab Sample Number(s)	5183065
Sampled Date	10-Feb-2012
Customer Sample Ref.	TP 5
Depth (m)	1.10

Solid Waste Analysis

		Landfill Waste Acceptance Criteria Limits		
		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.357	3	5	6
Loss on Ignition (%)	4.61	-	-	10
Sum of BTEX (mg/kg)	<0.024	6	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	34.6	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.22	-	<6 or >9	-
ANC to pH 6 (mol/kg)	<0.03	-	-	-
ANC to pH 4 (mol/kg)	0.0757	-	-	-

Eluate Analysis

	C_2 Concⁿ in 2:1 eluate	C_8 Concⁿ in 8:1 eluate	A_2 2:1 concⁿ leached	$A_{2\text{-}10}$ Cumulative concⁿ leached	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	mg/l		mg/kg				
Arsenic	0.000548	0.000433	0.0011	0.00446	0.5	2	25
Barium	0.0118	0.00659	0.0236	0.0719	20	100	300
Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
Chromium	<0.00022	<0.00022	<0.000441	<0.0022	0.5	10	70
Copper	0.00374	0.00308	0.0075	0.0316	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.00002	<0.0001	0.01	0.2	2
Molybdenum	0.00039	0.000487	0.000781	0.00476	0.5	10	30
Nickel	0.000949	0.00123	0.0019	0.012	0.4	10	40
Lead	0.000031	0.0019	0.0000621	0.0168	0.5	10	50
Antimony	<0.00016	<0.00016	<0.000321	<0.0016	0.06	0.7	5
Selenium	0.00148	0.000443	0.00295	0.00562	0.1	0.5	7
Zinc	0.00454	0.0013	0.00909	0.0167	4	50	200
Chloride	2.9	3.3	5.81	32.6	800	15000	25000
Fluoride	0.943	1.13	1.89	11.1	10	150	500
Sulphate (soluble)	59.5	21.2	119	256	1000	20000	50000
Total Dissolved Solids	197	97.3	394	1090	4000	60000	100000
Total Monohydric Phenols (W)	0.05	<0.016	0.1	<0.16	1	-	-
Dissolved Organic Carbon	6.17	3.54	12.4	38.4	500	800	1000

Leach Test Information

	2:1	8:1
Date Prepared	06-Mar-2012	08-Mar-2012
pH (pH Units)	8.854	7.839
Conductivity (µS/cm)	248.00	121.00
Temperature (°C)	21.10	14.70
Volume Leachant (Litres)	0.305	1.400
Volume of Eluate VE1 (Litres)	0.200	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates

16/04/2012 16:13:33

16:13:18 16/04/2012

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference		**Site Location**	Trowbridge
Mass Sample taken (kg)	0.213	**Moisture Content Ratio (%)**	21.6
Mass of dry sample (kg)	0.175	**Dry Matter Content Ratio (%)**	82.3
Particle Size <4mm	>95%		

Case	
SDG	120216-81
Lab Sample Number(s)	5183071
Sampled Date	10-Feb-2012
Customer Sample Ref.	TP 2
Depth (m)	0.40

Solid Waste Analysis

		Landfill Waste Acceptance Criteria Limits		
		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.513	3	5	6
Loss on Ignition (%)	4.92	-	-	10
Sum of BTEX (mg/kg)	<0.024	6	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	32.7	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.06	-	<6 or >9	-
ANC to pH 6 (mol/kg)	0.044	-	-	-
ANC to pH 4 (mol/kg)	0.118	-	-	-

Eluate Analysis

	C_2 Concⁿ in 2:1 eluate	C_8 Concⁿ in 8:1 eluate	A_2 2:1 concⁿ leached	$A_{2\text{-}10}$ Cumulative concⁿ leached	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	mg/l		mg/kg				
Arsenic	0.00104	0.000499	0.00207	0.00536	0.5	2	25
Barium	0.0231	0.00893	0.0463	0.099	20	100	300
Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
Chromium	0.00299	0.00223	0.00597	0.0228	0.5	10	70
Copper	0.0127	0.00208	0.0253	0.0281	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.00002	<0.0001	0.01	0.2	2
Molybdenum	0.00243	0.00198	0.00485	0.0201	0.5	10	30
Nickel	0.00192	0.000655	0.00384	0.00742	0.4	10	40
Lead	0.000766	0.000691	0.00153	0.00696	0.5	10	50
Antimony	0.000517	0.00037	0.00103	0.0038	0.06	0.7	5
Selenium	0.000607	<0.00039	0.00121	<0.0039	0.1	0.5	7
Zinc	0.00277	0.00222	0.00553	0.0226	4	50	200
Chloride	3.5	-	7	-	800	15000	25000
Fluoride	0.572	-	1.14	-	10	150	500
Sulphate (soluble)	<2	-	<4	-	1000	20000	50000
Total Dissolved Solids	162	-	324	-	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.032	<0.16	1	-	-
Dissolved Organic Carbon	12.3	-	24.5	-	500	800	1000

Leach Test Information

	2:1	8:1
Date Prepared	07-Apr-2012	11-Apr-2012
pH (pH Units)	8.424	8.157
Conductivity (µS/cm)	216.00	82.10
Temperature (°C)	21.10	20.00
Volume Leachant (Litres)	0.312	1.400
Volume of Eluate VE1 (Litres)	0.120	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates

16/04/2012 16:13:33

16:13:18 16/04/2012

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference		**Site Location**	Trowbridge
Mass Sample taken (kg)	0.216	**Moisture Content Ratio (%)**	23.8
Mass of dry sample (kg)	0.175	**Dry Matter Content Ratio (%)**	80.8
Particle Size <4mm	>95%		

Case	
SDG	120216-81
Lab Sample Number(s)	5183076
Sampled Date	10-Feb-2012
Customer Sample Ref.	TP 3
Depth (m)	1.20

Solid Waste Analysis

		Landfill Waste Acceptance Criteria Limits		
		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.568	3	5	6
Loss on Ignition (%)	4.38	-	-	10
Sum of BTEX (mg/kg)	<0.024	6	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	52	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.86	-	<6 or >9	-
ANC to pH 6 (mol/kg)	0.0375	-	-	-
ANC to pH 4 (mol/kg)	0.0809	-	-	-

Eluate Analysis

	C_2 Concⁿ in 2:1 eluate	C_8 Concⁿ in 8:1 eluate	A_2 2:1 concⁿ leached	$A_{2\text{-}10}$ Cumulative concⁿ leached	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	mg/l		mg/kg				
Arsenic	0.00352	0.00134	0.00704	0.0162	0.5	2	25
Barium	0.326	0.034	0.651	0.707	20	100	300
Cadmium	0.000132	<0.0001	0.000264	<0.001	0.04	1	5
Chromium	0.00161	0.000946	0.00322	0.0103	0.5	10	70
Copper	0.0188	0.00242	0.0376	0.0448	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.00002	<0.0001	0.01	0.2	2
Molybdenum	0.00433	0.00302	0.00865	0.0318	0.5	10	30
Nickel	0.0133	0.00387	0.0266	0.0505	0.4	10	40
Lead	0.0142	0.000108	0.0284	0.0188	0.5	10	50
Antimony	0.000636	0.000803	0.00127	0.00782	0.06	0.7	5
Selenium	0.00378	0.000536	0.00754	0.00944	0.1	0.5	7
Zinc	0.132	0.00251	0.264	0.188	4	50	200
Chloride	8.9	<2	17.8	<20	800	15000	25000
Fluoride	<0.5	-	<0.999	-	10	150	500
Sulphate (soluble)	926	151	1850	2480	1000	20000	50000
Total Dissolved Solids	1240	336	2480	4500	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.032	<0.16	1	-	-
Dissolved Organic Carbon	26.4	7.75	52.8	101	500	800	1000

Leach Test Information

	2:1	8:1
Date Prepared	04-Apr-2012	08-Apr-2012
pH (pH Units)	8.109	8.019
Conductivity (µS/cm)	1,634.00	445.00
Temperature (°C)	20.50	21.10
Volume Leachant (Litres)	0.308	1.400
Volume of Eluate VE1 (Litres)	0.220	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates

16/04/2012 16:13:33

16:13:18 16/04/2012

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Notification of Deviating Samples

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5309181	TP 3	0.90	SOLID	PAH by GCMS	Acenaphthene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Acenaphthene-d10 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Acenaphthylene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Anthracene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benz(a)anthracene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benzo(a)pyrene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benzo(b)fluoranthene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benzo(g,h,i)perylene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Benzo(k)fluoranthene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Chrysene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Chrysene-d12 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Dibenzo(a,h)anthracene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Fluoranthene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Fluorene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Indeno(1,2,3-cd)pyrene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Naphthalene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Naphthalene-d8 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	PAH, Total Detected USEPA 16	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Perylene-d12 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Phenanthrene	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Phenanthrene-d10 % recovery**	Sample holding time exceeded
5309181	TP 3	0.90	SOLID	PAH by GCMS	Pyrene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Acenaphthene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Acenaphthene-d10 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Acenaphthylene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Anthracene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benz(a)anthracene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benzo(a)pyrene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benzo(b)fluoranthene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benzo(g,h,i)perylene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Benzo(k)fluoranthene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Chrysene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Chrysene-d12 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Dibenzo(a,h)anthracene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Fluoranthene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Fluorene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Indeno(1,2,3-cd)pyrene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Naphthalene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Naphthalene-d8 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	PAH, Total Detected USEPA 16	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Perylene-d12 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Phenanthrene	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Phenanthrene-d10 % recovery**	Sample holding time exceeded
5309244	TP 5	0.40	SOLID	PAH by GCMS	Pyrene	Sample holding time exceeded
5426084	TP 3	1.20	SOLID	pH	pH	Sample holding time exceeded
5426091	TP 2	0.40	SOLID	pH	pH	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 101	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 118	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 138	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 153	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 180	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 28	Sample holding time exceeded
5429648	TP 3	1.20	SOLID	PCBs by GCMS	PCB congener 52	Sample holding time exceeded
5429653	TP 3	1.20	SOLID	Mineral Oil	Mineral oil >C10-C40	Sample holding time exceeded
5429660	TP 3	1.20	SOLID	Total Organic Carbon	Organic Carbon, Total	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 101	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 118	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 138	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 153	Sample holding time exceeded

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 180	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 28	Sample holding time exceeded
5429662	TP 2	0.40	SOLID	PCBs by GCMS	PCB congener 52	Sample holding time exceeded
5429664	TP 2	0.40	SOLID	Mineral Oil	Mineral oil >C10-C40	Sample holding time exceeded
5429670	TP 2	0.40	SOLID	Total Organic Carbon	Organic Carbon, Total	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	Benzene	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	Ethylbenzene	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	m,p-Xylene	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	Methyl tertiary butyl ether (MTBE)	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	o-Xylene	Sample holding time exceeded
5449528	TP 2	0.40	SOLID	GRO by GC-FID (S)	Toluene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	Benzene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	Ethylbenzene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	m,p-Xylene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	Methyl tertiary butyl ether (MTBE)	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	o-Xylene	Sample holding time exceeded
5449586	TP 3	1.20	SOLID	GRO by GC-FID (S)	Toluene	Sample holding time exceeded

Note : Test results may be compromised

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM114		Leaching Procedure for CEN Two Stage BatchTest 2:1/8:1 Cumulative		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM154	In - house Method	Determination of Petroleum Hydrocarbons by EZ Flash GC-FID in the Carbon range C6- C40		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM182	CEN/TC 292 - WI 292046-chacterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM221	Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd	Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer		
TM243		Mixed Anions In Soils By Kone		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

CERTIFICATE OF ANALYSIS

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Test Completion Dates

Lab Sample No(s)	5183071	5183072	5183070	5183076	5183068	5183064	5183065	5183075
Customer Sample Ref.	TP 2	TP 2	TP 3	TP 3	TP 4	TP 5	TP 5	TP 6
AGS Ref.								
Depth	0.40	1.90	0.90	1.20	0.60	0.40	1.10	1.20
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
ANC at pH4 and ANC at pH 6	11-Apr-2012			11-Apr-2012			09-Mar-2012	
Anions by Kone (soil)		09-Mar-2012			09-Mar-2012			09-Mar-2012
Anions by Kone (w)	16-Apr-2012			13-Apr-2012			14-Mar-2012	
Asbestos Identification (Soil)			12-Mar-2012			12-Mar-2012		
CEN 2:1 Leachate (2 Stage)	11-Apr-2012			05-Apr-2012			06-Mar-2012	
CEN 2:1 Readings	13-Apr-2012			10-Apr-2012			09-Mar-2012	
CEN 8:1 Leachate (2 Stage)	13-Apr-2012			10-Apr-2012			09-Mar-2012	
CEN 8:1 Readings	13-Apr-2012			13-Apr-2012			12-Mar-2012	
Dissolved Metals by ICP-MS	16-Apr-2012			13-Apr-2012			13-Mar-2012	
Dissolved Organic/Inorganic Carbon	14-Apr-2012			13-Apr-2012			13-Mar-2012	
Fluoride	16-Apr-2012			13-Apr-2012			14-Mar-2012	
GRO by GC-FID (S)	14-Apr-2012			14-Apr-2012			13-Mar-2012	
Loss on Ignition in soils	11-Apr-2012			13-Apr-2012			09-Mar-2012	
Mercury Dissolved	16-Apr-2012			13-Apr-2012			13-Mar-2012	
Mineral Oil	12-Apr-2012			12-Apr-2012			09-Mar-2012	
PAH by GCMS			14-Mar-2012			14-Mar-2012		
PAH Value of soil	13-Apr-2012			13-Apr-2012			09-Mar-2012	
PCBs by GCMS	11-Apr-2012			11-Apr-2012			10-Mar-2012	
pH	14-Apr-2012	08-Mar-2012		14-Apr-2012	08-Mar-2012		12-Mar-2012	08-Mar-2012
Phenols by HPLC (W)	16-Apr-2012			13-Apr-2012			13-Mar-2012	
Sample description	06-Apr-2012	07-Mar-2012	12-Mar-2012	06-Apr-2012	07-Mar-2012	12-Mar-2012	07-Mar-2012	07-Mar-2012
Total Dissolved Solids	13-Apr-2012			12-Apr-2012			12-Mar-2012	
Total Organic Carbon	12-Apr-2012			12-Apr-2012			09-Mar-2012	
Total Sulphate		12-Mar-2012			12-Mar-2012			12-Mar-2012
TPH c6-40 Value of soil			13-Mar-2012			13-Mar-2012		

SDG:	120216-81	**Location:**	Trowbridge	**Order Number:**	ne11/493
Job:	H_BWB_BRM-2	**Customer:**	BWB Consulting	**Report Number:**	177836
Client Reference:	BME2019	**Attention:**	Greg Adams	**Superseded Report:**	174209

Appendix

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors
employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5 -C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY

ANALYSIS	D&C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENT EXTRACTABLE MATTER	D&C	DCM	SOXTHERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
ELEMENTAL SULPHUR	D&C	DCM	SOXTHERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOXTHERM	GC-MS
HERBICIDES	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
PESTICIDES	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE:ACETONE	END OVER END	GC-FID
EPH CWG BY GC	D&C	HEXANE:ACETONE	END OVER END	GC-FID
PCB AROCLOR 1254 / PCB CON	D&C	HEXANE:ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE:ACETONE	MICROWAVE TM218.	GC-MS
>C6-C40	WET	HEXANE:ACETONE	SHAKER	GC-FID
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE:ACETONE	SHAKER	GC-FID
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DCM:ACETONE	SONICATE	GC-MS

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
PCB AROCLOR 1254	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
SVOC	DCM	LIQUID/LIQUID SHAKE	GC MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PESTOCP/OPP	DCM	LIQUID/LIQUID SHAKE	GC MS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GC MS
PHENOLS MS	ACETONE	SOLID PHASE EXTRACTION	GC MS
TPH by INFRARED (IR)	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
MINERAL OIL by IR	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
GLYCOLS	NONE	DIRECT INJECTION	GC FID

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -
Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX 7

GEOTECHNICAL LABORATORY TESTING

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH1
Sample		U
Depth	m	4.00
Depth within original sample	mm	60

Description
Slightly sandy CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.7
Mean initial sample diameter	mm	38.6
Sample mass	g	204.31
Initial moisture content	%	18
Rate of strain	%/min	4.13
Initial bulk density	Mg/m^3	2.07
Initial dry density	Mg/m^3	1.76

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	100
Membrane correction	kPa	2.3
Deviator stress	kPa	324
Cumulative strain at failure	%	14
Shear strength	kPa	162
Consistency		Very Stiff

Checked

Approved

Issue Date 21/03/2012 11:25

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH1
Sample		U
Depth	m	4.00
Depth within original sample	mm	60

Description
Slightly sandy CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.3
Mean initial sample diameter	mm	37.7
Sample mass	g	202.62
Initial moisture content	%	16
Rate of strain	%/min	4.15
Initial bulk density	Mg/m^3	2.16
Initial dry density	Mg/m^3	1.86

Failure Mode

Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	150
Membrane correction	kPa	2.5
Deviator stress	kPa	467
Cumulative strain at failure	%	15
Shear strength	kPa	234
Consistency		Very Stiff

Checked

Approved

Issue Date 21/03/2012 11:35

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH1
Sample		U
Depth	m	4.00
Depth within original sample	mm	60

Description
Grey, slightly sandy CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.9
Mean initial sample diameter	mm	38.0
Sample mass	g	205.58
Initial moisture content	%	17
Rate of strain	%/min	4.12
Initial bulk density	Mg/m³	2.14
Initial dry density	Mg/m³	1.83

Failure Mode

Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	200
Membrane correction	kPa	2.5
Deviator stress	kPa	489
Cumulative strain at failure	%	15
Shear strength	kPa	244
Consistency		Very Stiff

Checked

Approved

Issue Date 21/03/2012 11:43

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH1
Sample		U
Depth	m	6.50
Depth within original sample	mm	160

Description
Grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.6
Mean initial sample diameter	mm	37.7
Sample mass	g	195.83
Initial moisture content	%	13
Rate of strain	%/min	4.14
Initial bulk density	Mg/m^3	2.08
Initial dry density	Mg/m^3	1.84

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	150
Membrane correction	kPa	1.9
Deviator stress	kPa	476
Cumulative strain at failure	%	11
Shear strength	kPa	238
Consistency		Very Stiff

Checked

Approved

Issue Date 21/03/2012 10:10

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9489

Hole		BH1
Sample		U
Depth	m	6.50
Depth within original sample	mm	200

Description
Grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	85.3
Mean initial sample diameter	mm	38.2
Sample mass	g	182.66
Initial moisture content	%	15
Rate of strain	%/min	4.10
Initial bulk density	Mg/m^3	1.87
Initial dry density	Mg/m^3	1.63

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	200
Membrane correction	kPa	2.8
Deviator stress	kPa	260
Cumulative strain at failure	%	18
Shear strength	kPa	130
Consistency		Stiff

Checked

Approved

Issue Date 21/03/2012 10:19

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH1
Sample		U
Depth	m	6.50
Depth within original sample	mm	260

Description
Grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.5
Mean initial sample diameter	mm	38.6
Sample mass	g	164.91
Initial moisture content	%	19
Rate of strain	%/min	4.14
Initial bulk density	Mg/m^3	1.67
Initial dry density	Mg/m^3	1.40

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	400
Membrane correction	kPa	2.7
Deviator stress	kPa	343
Cumulative strain at failure	%	18
Shear strength	kPa	172
Consistency		Very Stiff

Checked

Approved

Issue Date 21/03/2012 10:27

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH1
Sample		U
Depth	m	9.50
Depth within original sample	mm	70

Description
Grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.3
Mean initial sample diameter	mm	38.2
Sample mass	g	194.41
Initial moisture content	%	22
Rate of strain	%/min	4.15
Initial bulk density	Mg/m^3	2.02
Initial dry density	Mg/m^3	1.65

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	250
Membrane correction	kPa	1.3
Deviator stress	kPa	287
Cumulative strain at failure	%	7
Shear strength	kPa	143
Consistency		Stiff

Checked

Approved

Issue Date 21/03/2012 10:46

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH1
Sample		U
Depth	m	9.50
Depth within original sample	mm	70

Description
Grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	82.8
Mean initial sample diameter	mm	38.3
Sample mass	g	186.79
Initial moisture content	%	23
Rate of strain	%/min	4.23
Initial bulk density	Mg/m^3	1.96
Initial dry density	Mg/m^3	1.60

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	300
Membrane correction	kPa	1.7
Deviator stress	kPa	277
Cumulative strain at failure	%	10
Shear strength	kPa	138
Consistency		Stiff

Checked

Approved

Issue Date 21/03/2012 10:54

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH1
Sample		U
Depth	m	9.50
Depth within original sample	mm	70

Description
Grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	83.9
Mean initial sample diameter	mm	37.8
Sample mass	g	189.65
Initial moisture content	%	22
Rate of strain	%/min	4.17
Initial bulk density	Mg/m^3	2.02
Initial dry density	Mg/m^3	1.66

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	200
Membrane correction	kPa	1.6
Deviator stress	kPa	347
Cumulative strain at failure	%	8
Shear strength	kPa	173
Consistency		Very Stiff

Checked

Approved

Issue Date 21/03/2012 10:37

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole		BH2
Sample		U
Depth	m	6.50
Depth within original sample	mm	140

Description
Dark grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.5
Mean initial sample diameter	mm	38.5
Sample mass	g	190.02
Initial moisture content	%	19
Rate of strain	%/min	4.14
Initial bulk density	Mg/m^3	1.94
Initial dry density	Mg/m^3	1.62

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	150
Membrane correction	kPa	1.4
Deviator stress	kPa	532
Cumulative strain at failure	%	8
Shear strength	kPa	266
Consistency		Very Stiff

Checked

Approved

Issue Date 21/03/2012 15:45

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH2
Sample		U
Depth	m	6.50
Depth within original sample	mm	140

Description
Dark grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.4
Mean initial sample diameter	mm	38.8
Sample mass	g	189.73
Initial moisture content	%	20
Rate of strain	%/min	4.15
Initial bulk density	Mg/m^3	1.90
Initial dry density	Mg/m^3	1.58

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	200
Membrane correction	kPa	1.6
Deviator stress	kPa	511
Cumulative strain at failure	%	9
Shear strength	kPa	255
Consistency		Very Stiff

Checked

Approved

Issue Date 21/03/2012 15:52

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH2
Sample		U
Depth	m	6.50
Depth within original sample	mm	140

Description
Grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	82.8
Mean initial sample diameter	mm	38.5
Sample mass	g	184.03
Initial moisture content	%	20
Rate of strain	%/min	4.23
Initial bulk density	Mg/m^3	1.91
Initial dry density	Mg/m^3	1.59

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	250
Membrane correction	kPa	3.0
Deviator stress	kPa	279
Cumulative strain at failure	%	20
Shear strength	kPa	140
Consistency		Stiff

Checked

Approved

Issue Date 21/03/2012 15:58

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH2
Sample		U
Depth	m	2.00
Depth within original sample	mm	60

Description
Mottled orange-grey CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.6
Mean initial sample diameter	mm	37.6
Sample mass	g	197.93
Initial moisture content	%	22
Rate of strain	%/min	4.14
Initial bulk density	Mg/m³	2.11
Initial dry density	Mg/m³	1.73

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	50
Membrane correction	kPa	2.8
Deviator stress	kPa	162
Cumulative strain at failure	%	18
Shear strength	kPa	81
ConsistencyMottled o		Firm to Stiff

Checked

Approved

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site	Trowbridge STW
Client	BWB Consulting
Job Number	AA0125
Lab Number	L9481

Hole		BH2
Sample		U
Depth	m	2.00
Depth within original sample	mm	60

Description
Medium brown, mottled orange CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.5
Mean initial sample diameter	mm	37.3
Sample mass	g	184.73
Initial moisture content	%	23
Rate of strain	%/min	4.14
Initial bulk density	Mg/m³	2.00
Initial dry density	Mg/m³	1.62

Failure Mode

Membrane type	Latex
Membrane thickness	0.3

Cell pressure	kPa	100
Membrane correction	kPa	2.8
Deviator stress	kPa	160
Cumulative strain at failure	%	18
Shear strength	kPa	80
Consistency		Firm to Stiff

Checked

Approved

Determination of Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure

cjassociates

BS1377:Part 7:1990: Clause 8

Site Trowbridge STW
Client BWB Consulting
Job Number AA0125
Lab Number L9481

Hole		BH2
Sample		U
Depth	m	2.00
Depth within original sample	mm	160

Description
Medium brown, mottled orange CLAY.

Orientation within original sample		Vertical
Preparation		Undisturbed
Mean initial sample height	mm	84.1
Mean initial sample diameter	mm	37.4
Sample mass	g	193.26
Initial moisture content	%	20
Rate of strain	%/min	4.16
Initial bulk density	Mg/m^3	2.09
Initial dry density	Mg/m^3	1.74

Failure Mode

Membrane type		Latex
Membrane thickness		0.3

Cell pressure	kPa	150
Membrane correction	kPa	2.9
Deviator stress	kPa	391
Cumulative strain at failure	%	19
Shear strength	kPa	196
Consistency		Very Stiff

Checked

Approved

Issue Date 21/03/2012 09:45

Laboratory Report

GEO Site & Testing Services Limited

Contract Number: 15507

Client's Reference: AA0125-L9481-S3954

Report Date: 02-04-2012

Client Name: C J Associates
King Roads Avenue
Bristol
BS11 9HF

Contract Title: Trowbridge STW
For the attention of: Vince Simmonds

Date Received: 19-03-2012
Date Commenced: 19-03-2012
Date Completed: 18-04-2012

Test Description	Quantity	Checked	Approved
One-dimensional Consolidation 75mm or 50mm diameter specimens (5 days) 1377 : 1990 Part 5 : 3 *	3		
CU SS 100mm single stage test on a 102 mm diameter Part 8 Continued specimen at one confining pressure, test duration four days. 1377:1990 Part 8 : 8	2		

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - Denotes test included in laboratory scope of accreditation**
 # - Denotes test carried out by approved contractor

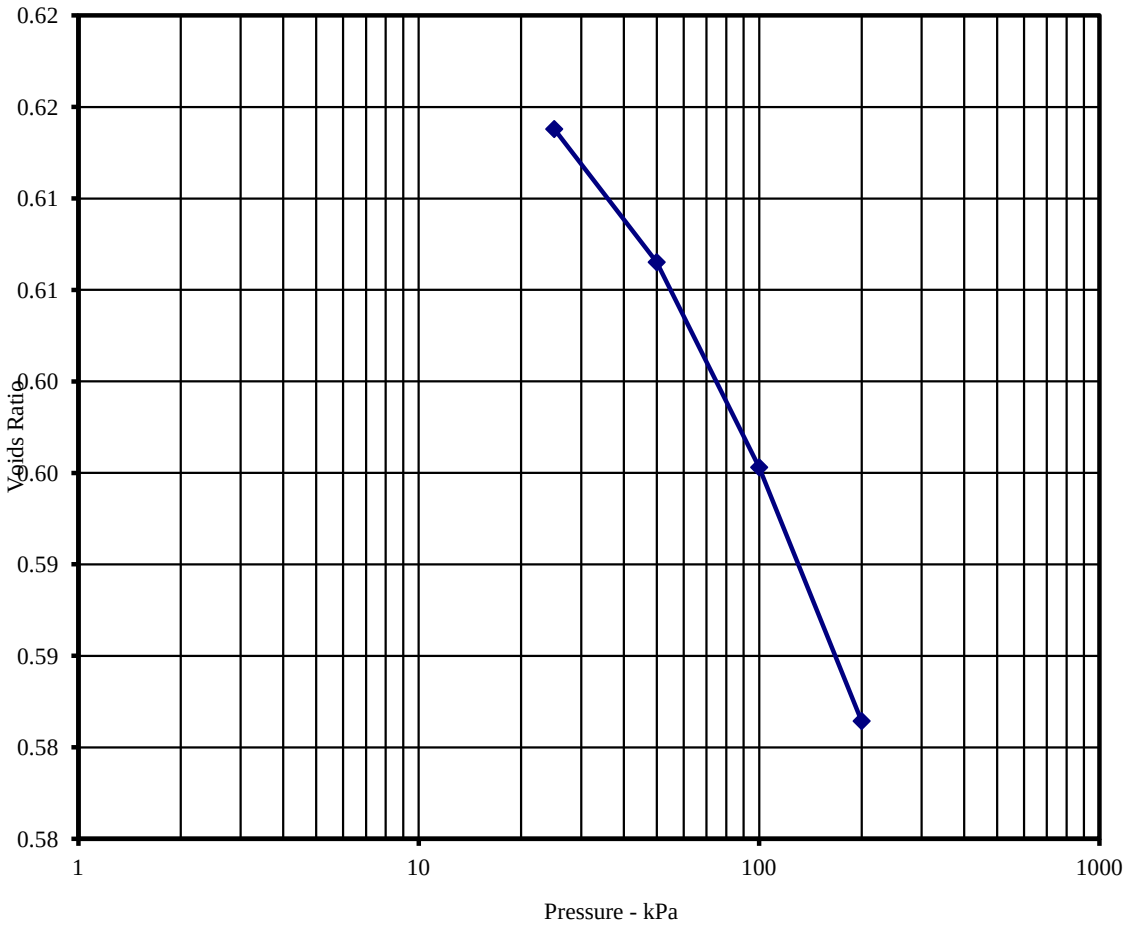
Approved Signatories:
Paul Evans (Quality Manager), Emma Williams (Office Manager),
Benjamin Sharp (Laboratory Coordinator), Alex Wynn (Business Development Manager).

ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Client ref:	**AA0125-L9481-S3954**
Location:	**Trowbridge STW**
Contract Number:	**15507-190312**
Hole/Sample Number:	**BH1**
Depth (m) :	**2.00 - 2.45**
Sample Type:	**U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	21						
Bulk Density (Mg/m3):	1.98	0	-	25	0.099	2.435	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.64	25	-	50	0.180	10.446	20'C
Voids Ratio:	0.6178	50	-	100	0.140	3.211	Location of specimen with sample
Degree of saturation:	90.6	100	-	200	0.087	1.548	top
Height (mm):	18.9						Remarks:
Diameter (mm)	75						
Particle Density (Mg/m3):	2.65						
Assumed							



GSTL GEO Site & Testing Services Limited

Checked by B Sharp

Approved by D P Evans

Date approved 17/04/12

UKAS TESTING 2788

ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Client ref: AA0125-L9481-S3954

Location: Trowbridge STW

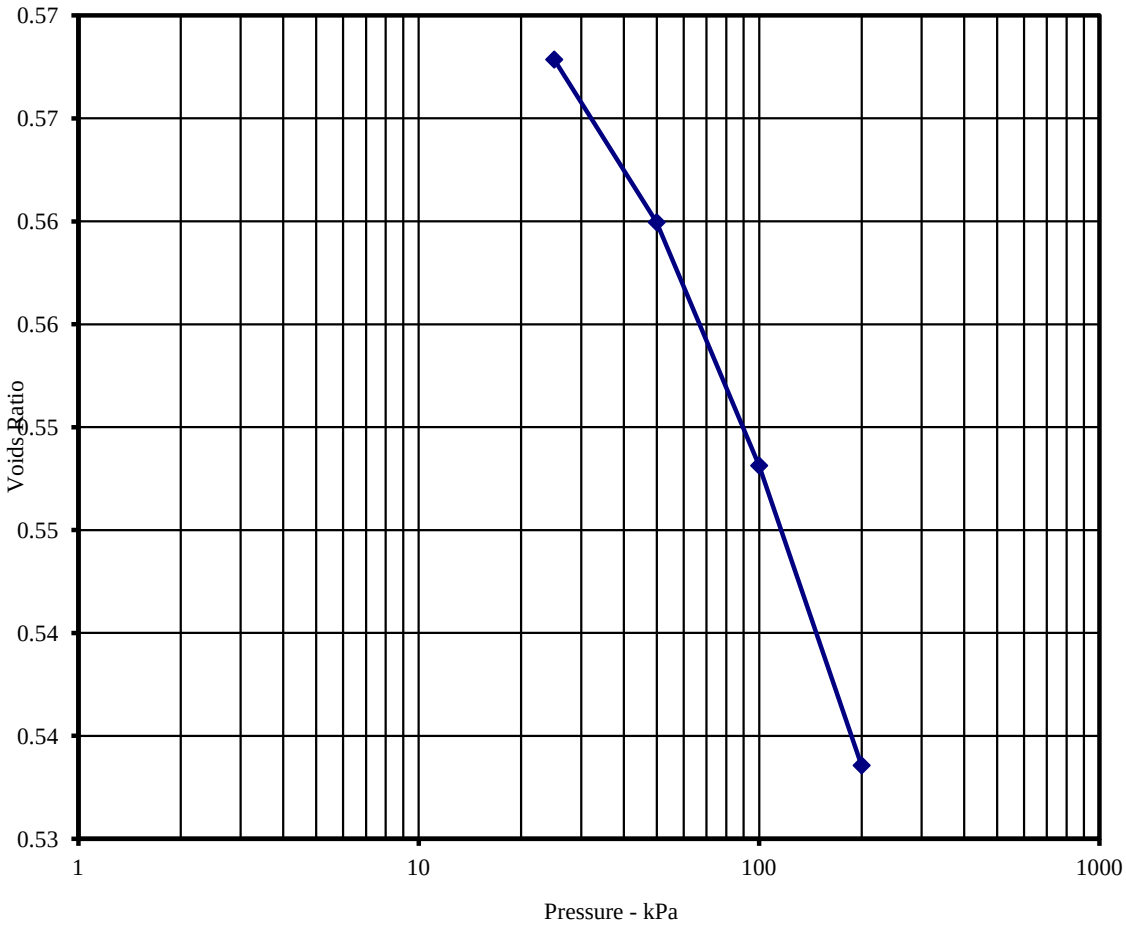
Contract Number: 15507-190312

Hole/Sample Number: BH1

Depth (m) : 2.00 - 2.45

Sample Type: U

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Method of time fitting used Cv Calculated using t90
Moisture Content (%):	20						
Bulk Density (Mg/m3):	2.01	0	-	25	0.135	2.433	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.68	25	-	50	0.202	10.421	20'C
Voids Ratio:	0.5732	50	-	100	0.152	3.200	Location of specimen with sample
Degree of saturation:	90.4	100	-	200	0.094	1.541	top
Height (mm):	18.9						Remarks:
Diameter (mm)	75						
Particle Density (Mg/m3):	2.65						
Assumed							



GSTL GEO Site & Testing Services Limited

Checked by B Sharp

Approved by D P Evans

Date approved 17/04/12

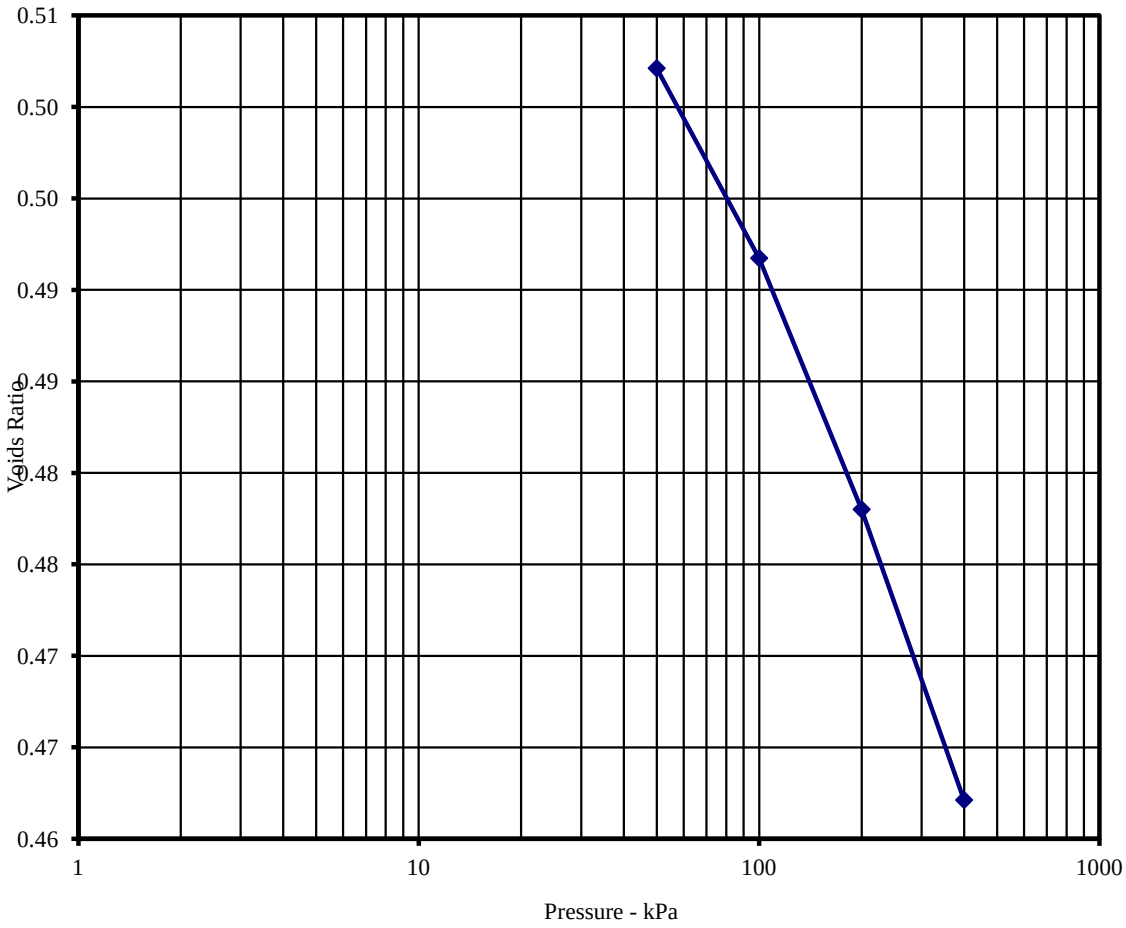
UKAS TESTING 2788

ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Client ref:	**AA0125-L9481-S3954**
Location:	**Trowbridge STW**
Contract Number:	**15507-190312**
Hole/Sample Number:	**BH2**
Depth (m) :	**4.00 - 4.45**
Sample Type:	**U**

Initial Conditions		Pressure Range			Mv	Cv	Method of time fitting used
Moisture Content (%):	18	kPa			m2/MN	m2/yr	Cv Calculated using t90
Bulk Density (Mg/m3):	2.07	0	-	50	0.089	2.431	Nominal Laboratory Temperature
Dry Density (Mg/m3):	1.76	50	-	100	0.138	10.380	20'C
Voids Ratio:	0.5088	100	-	200	0.092	3.176	Location of specimen with sample
Degree of saturation:	92.3	200	-	400	0.054	1.524	top
Height (mm):	18.9						Remarks:
Diameter (mm)	75						
Particle Density (Mg/m3):	2.65						
Assumed							



GSTL GEO Site & Testing Services Limited

Checked by B Sharp

Approved by D P Evans

Date approved 17/04/12

UKAS TESTING 2788

Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Brown sandy silty CLAY

Initial Specimen Conditions

Height	mm	206.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	1617.92
Mass	g	3245.60
Dry Mass	g	2625.20
Density	Mg/m^3	2.01
Dry Density	Mg/m^3	1.62
Moisture Content	%	24
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	24
Density	Mg/m^3	2.04
Dry Density	Mg/m^3	1.65

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Date

Client Ref

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GSTL
GEO Site & Testing Services Limited

Trowbridge

Contract No

15507- 190312

Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012

Test Setup

Date started	24/03/2012
Date Finished	14/04/2012
Top Drain Used	y
Base Drain Used	y
Side Drains Used	y
Pressure System Number	P6
Cell Number	C6

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	95.00
Differential Pressure	kPa	5.00
Final Cell Pressure	kPa	600.00
Final Pore Pressure	kPa	600.00
Final B Value		0.98

Consolidation

Effective Pressure	kPa	50.00	100.00	200.00
Cell Pressure	kPa	600.00	600.00	600.00
Back Pressure	kPa	550.00	500.00	400.00
Excess Pore Pressure	kPa	50.00	100.00	200.00
Pore Pressure at End	kPa	550.00	500.00	400.00
Consolidated Volume	cm^3	1613.32	1605.52	1592.62
Consolidated Height	mm	205.80	201.47	195.81
Consolidated Area	mm^2	7839.09	7968.88	8133.66
Vol. Compressibility	m^2/MN	0.00517	0.00967	0.02009
Consolidation Coef.	$m^2/yr.$	45.83801	4.93520	2.10481

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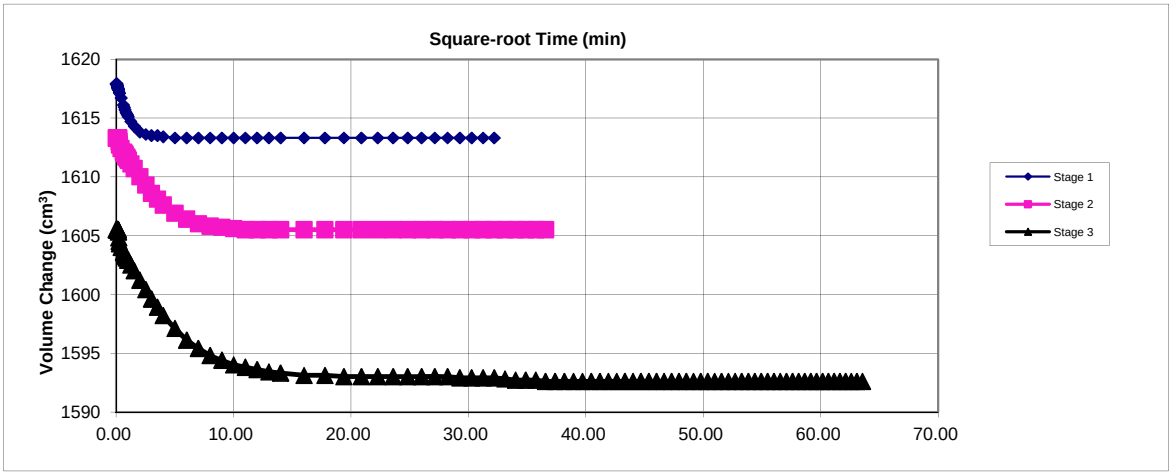
Consolidated Undrained Triaxial Compression Test

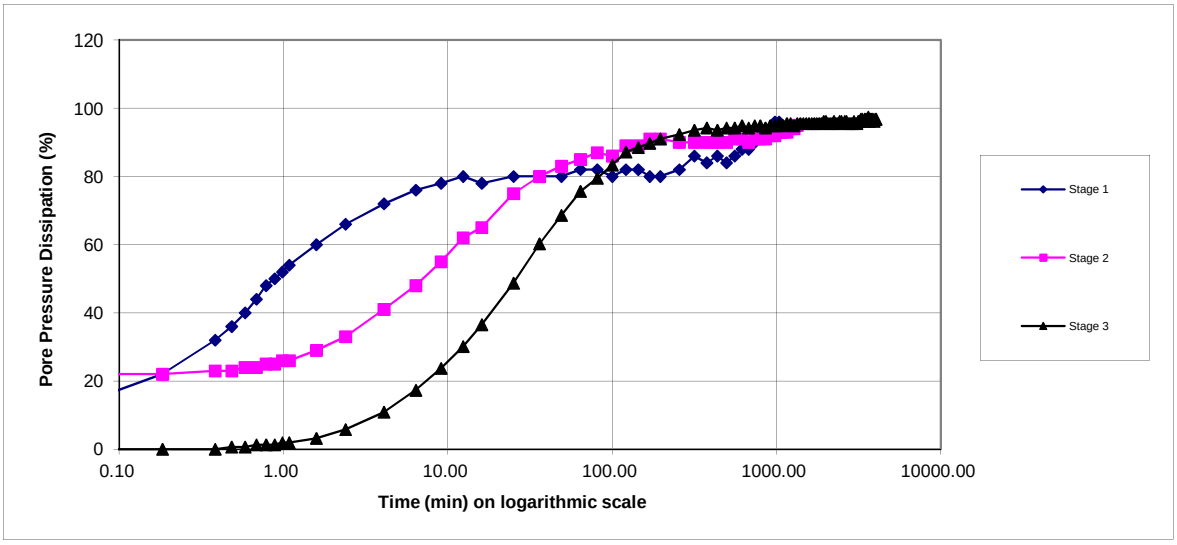
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012

Consolidation Stage





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18/04/12
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Contract No

15507- 190312

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Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012

Shearing

Initial Cell Pressure	kPa	600	600	600
Initial Pore Pressure	kPa	550	500	400
Rate of Strain	mm/min	0.0858	0.0839	0.0434
Max Deviator Stress				
Axial Strain		1.997	4.929	7.549
Axial Stress	kPa	91.813	139.51	257.17
Cor. Deviator stress	kPa	89.005	135.47	252.88
Effective Major Stress	kPa	112.005	189.47	376.88
Effective Minor Stress	kPa	24.000	54.00	124.00
Effective Stress Ratio		4.667	3.509	3.04
s'	kPa	68.003	121.74	250.44
t'	kPa	44.003	67.74	126.44
Max Effective Priciple Stress Ratio				
Axial Strain		1.890	3.535	6.737
Axial Stress	kPa	91.012	131.500	245.069
Cor. Deviator stress	kPa	87.213	127.617	240.829
Effective Major Stress	kPa	110.213	176.617	357.829
Effective Minor Stress	kPa	23.000	49.000	117.000
Effective Stress Ratio		4.792	3.604	3.058
s'	kPa	66.606	112.808	237.414
t'	kPa	43.606	63.808	120.414
Shear Resistance Angle	degs			25.0
Cohesion c'	kPa			20

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18/04/12

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Trowbridge

Client Ref

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Contract No

15507- 190312

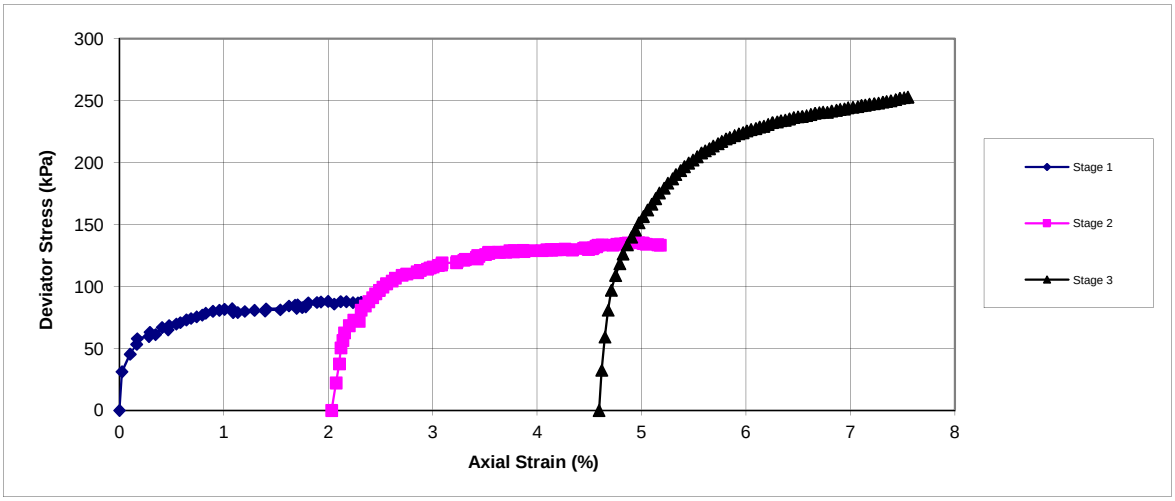
Consolidated Undrained Triaxial Compression Test

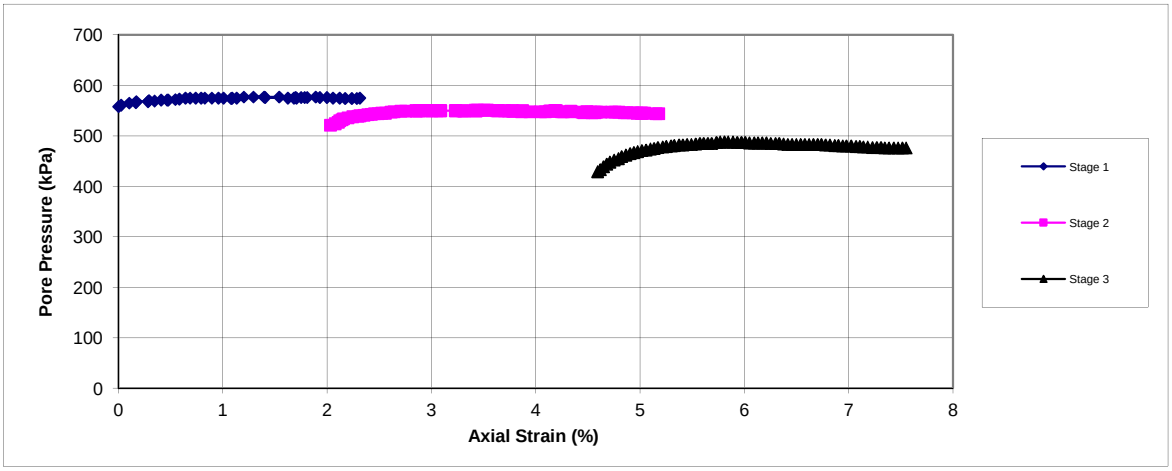
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012

Shearing Stage





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18/04/12
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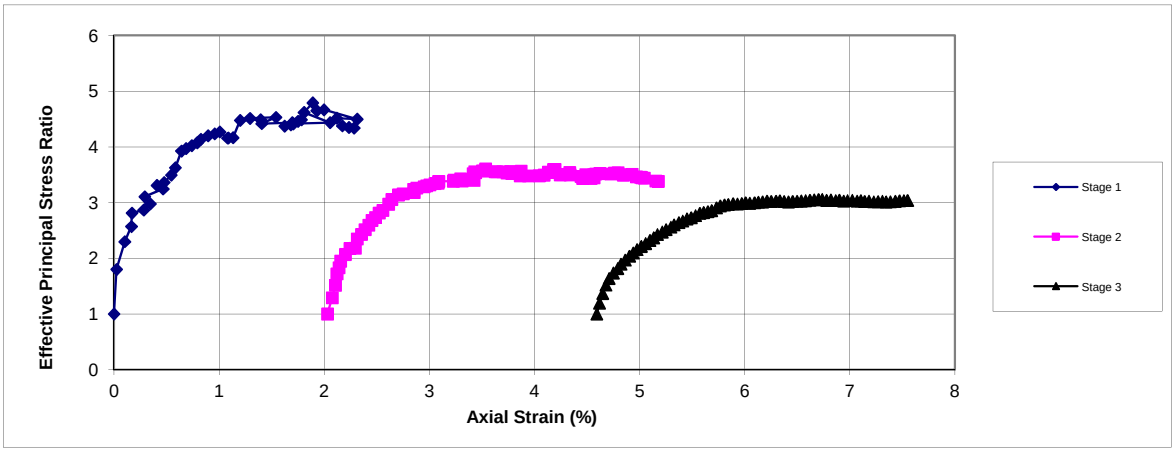
Consolidated Undrained Triaxial Compression Test

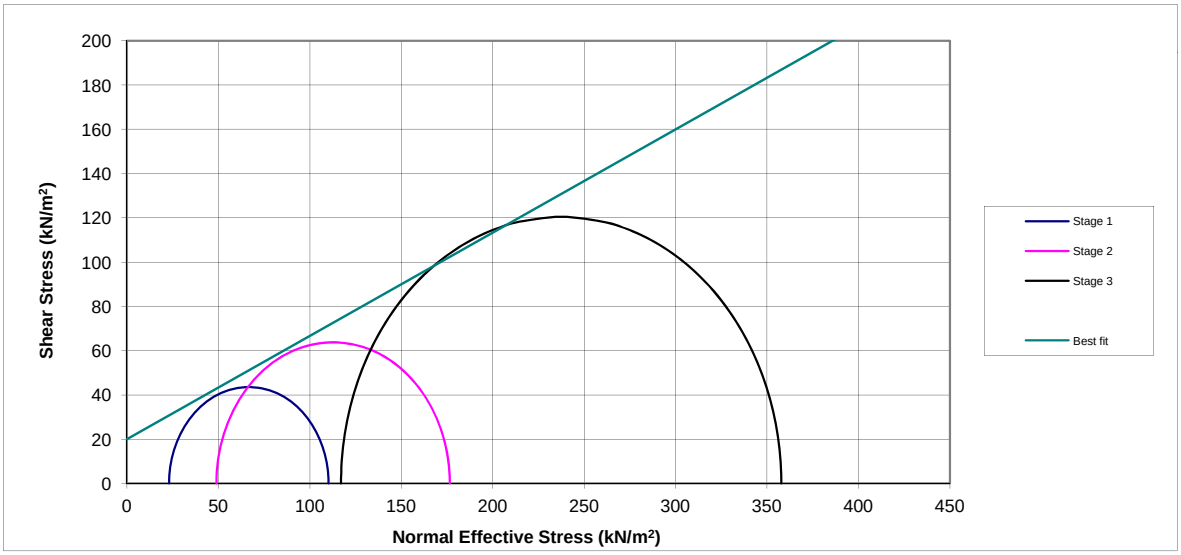
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012

Shearing Stage





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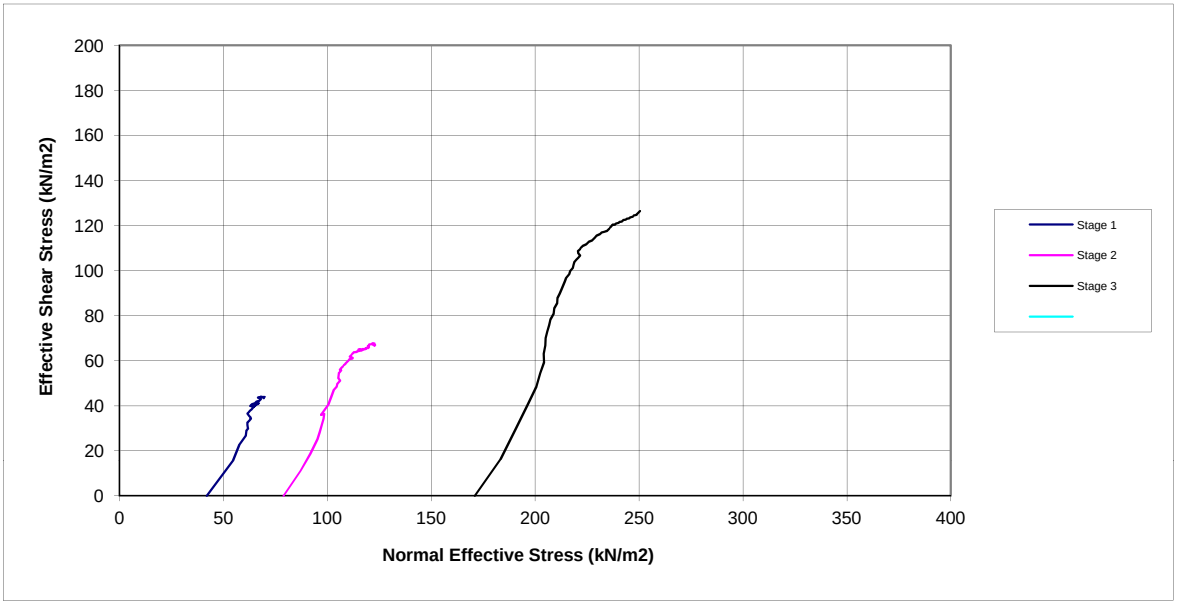
Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH1
Sample No.		U5
Depth	m	2.00-2.45
Date		18/04/2012

Shearing Stage



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Client Ref

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GEO Site & Testing Services Limited

Trowbridge

Contract No

15507- 190312

Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012
Disturbed / Undisturbed		undisturbed

Description of Specimen

Brown silty sandy Clay.

Initial Specimen Conditions

Height	mm	206.00
Diameter	mm	102.00
Area	mm^2	8171.28
Volume	cm^3	1683.28
Mass	g	3448.20
Dry Mass	g	2802.40
Density	Mg/m^3	2.05
Dry Density	Mg/m^3	1.66
Moisture Content	%	23
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	22
Density	Mg/m^3	2.08
Dry Density	Mg/m^3	1.70

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GEO Site & Testing Services Limited

Trowbridge STW

Client Ref

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Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Test Setup

Date started	24/03/2012
Date Finished	12/04/2012
Top Drain Used	y
Base Drain Used	y
Side Drains Used	y
Pressure System Number	P4
Cell Number	C4

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	95.00
Differential Pressure	kPa	5.00
Final Cell Pressure	kPa	500.00
Final Pore Pressure	kPa	487.00
Final B Value		1.00

Consolidation

Effective Pressure	kPa	50.00	100.00	200.00
Cell Pressure	kPa	500.00	500.00	500.00
Back Pressure	kPa	450.00	400.00	300.00
Excess Pore Pressure	kPa	50.00	100.00	200.00
Pore Pressure at End	kPa	450.00	400.00	300.00
Consolidated Volume	cm^3	1674.58	1662.98	1646.08
Consolidated Height	mm	205.65	197.04	189.42
Consolidated Area	mm^2	8143.13	8439.75	8690.32
Vol. Compressibility	m^2/MN	0.01149	0.01732	0.03387
Consolidation Coef.	$m^2/yr.$	10.86324	3.45681	2.26784

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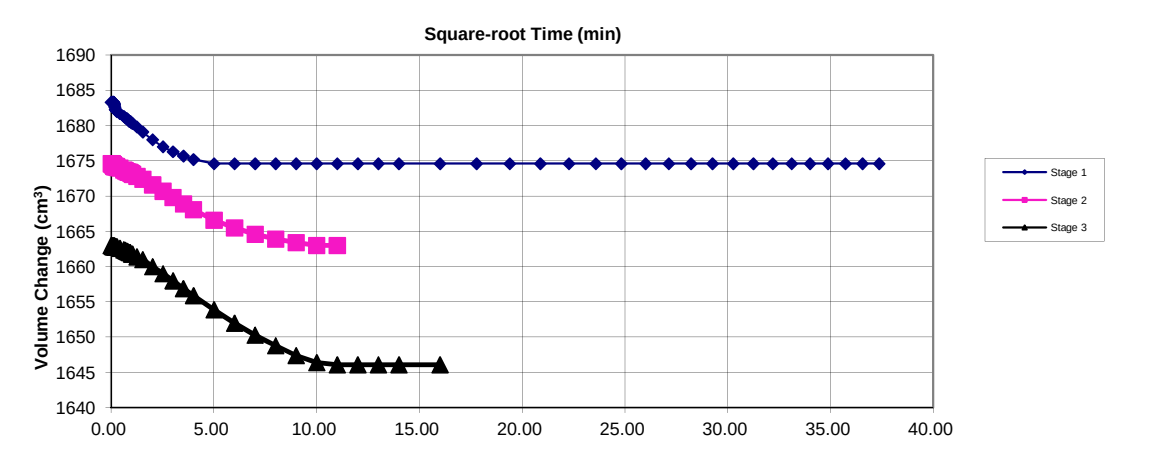
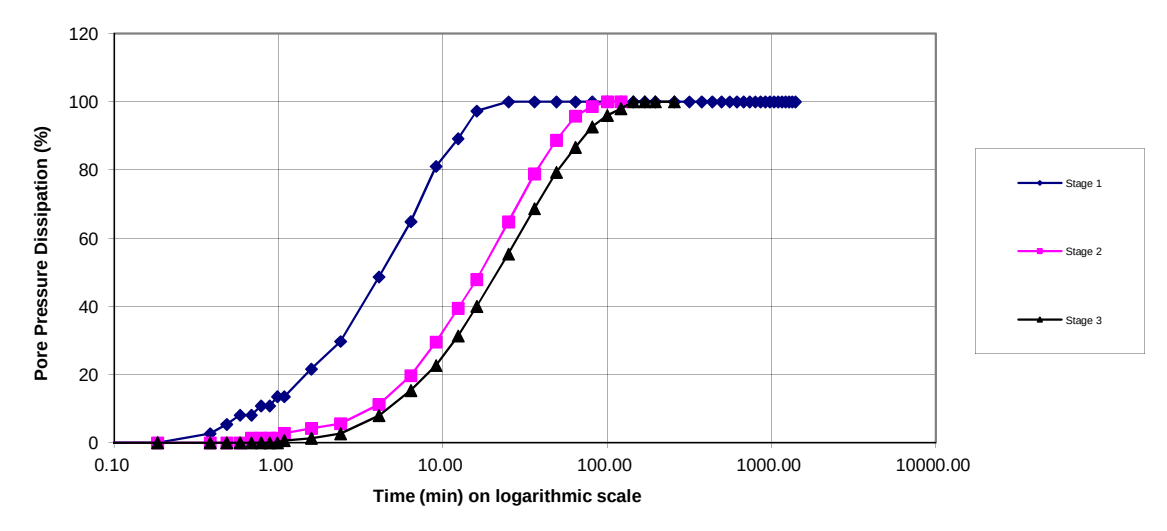
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Consolidation Stage





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Consolidated Undrained Triaxial Compression Test

BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Shearing

Initial Cell Pressure	kPa	500	500	500
Initial Pore Pressure	kPa	450	400	300
Rate of Strain	mm/min	0.0857	0.0690	0.0435
Max Deviator Stress				
Axial Strain		4.697	7.498	10.363
Axial Stress	kPa	114.389	177.99	301.13
Cor. Deviator stress	kPa	111.381	173.69	296.69
Effective Major Stress	kPa	154.381	245.69	423.69
Effective Minor Stress	kPa	44.000	72.00	127.00
Effective Stress Ratio		3.509	3.412	3.34
s'	kPa	99.191	158.85	275.34
t'	kPa	55.191	86.85	148.34
Max Effective Priciple Stress Ratio				
Axial Strain		3.516	6.280	8.552
Axial Stress	kPa	113.888	171.467	277.171
Cor. Deviator stress	kPa	109.970	167.300	272.837
Effective Major Stress	kPa	148.970	231.300	380.837
Effective Minor Stress	kPa	39.000	64.000	108.000
Effective Stress Ratio		3.820	3.614	3.526
s'	kPa	93.985	147.650	244.418
t'	kPa	54.985	83.650	136.418
Shear Resistance Angle	degs			32.0
Cohesion c'	kPa			8

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Trowbridge STW

Client Ref

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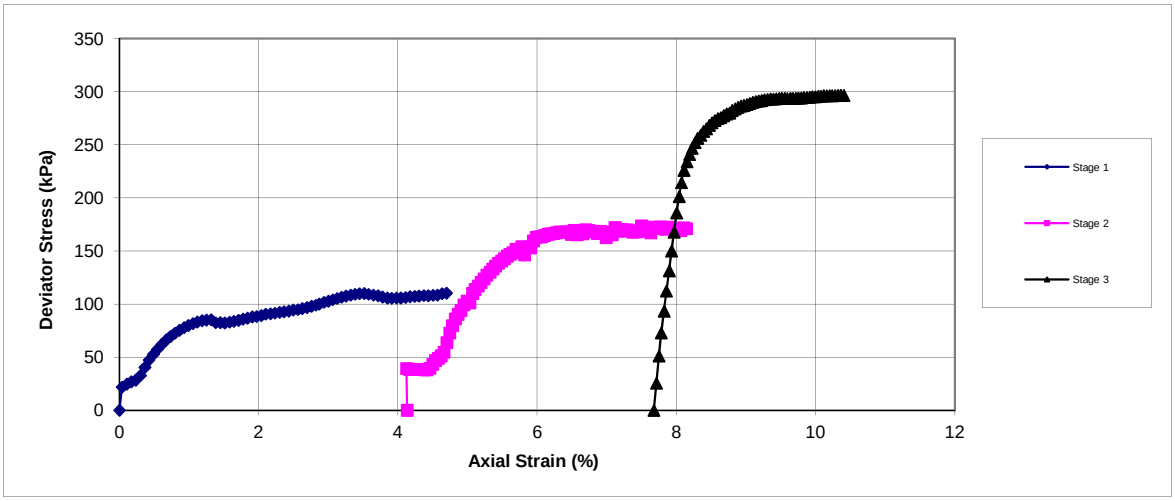
Consolidated Undrained Triaxial Compression Test

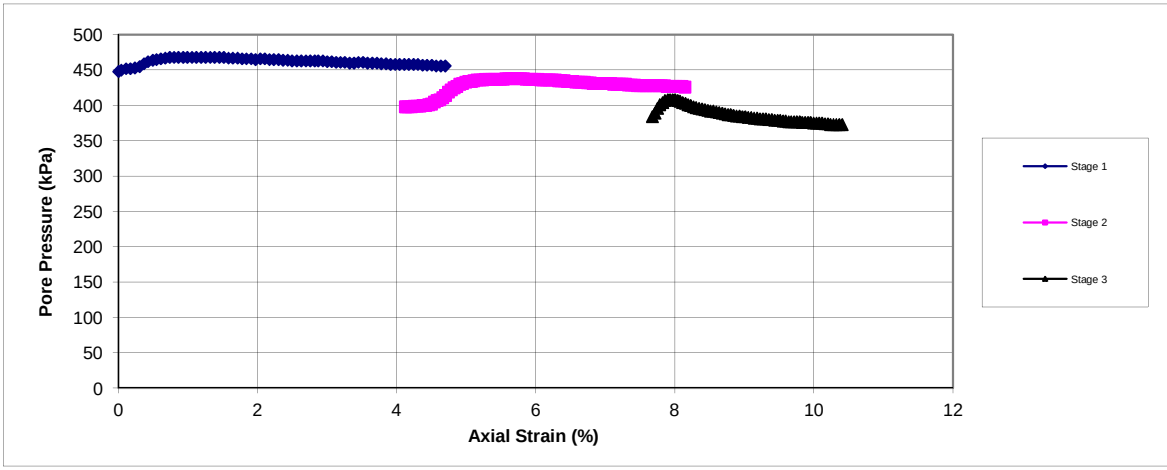
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Shearing Stage





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Contract No

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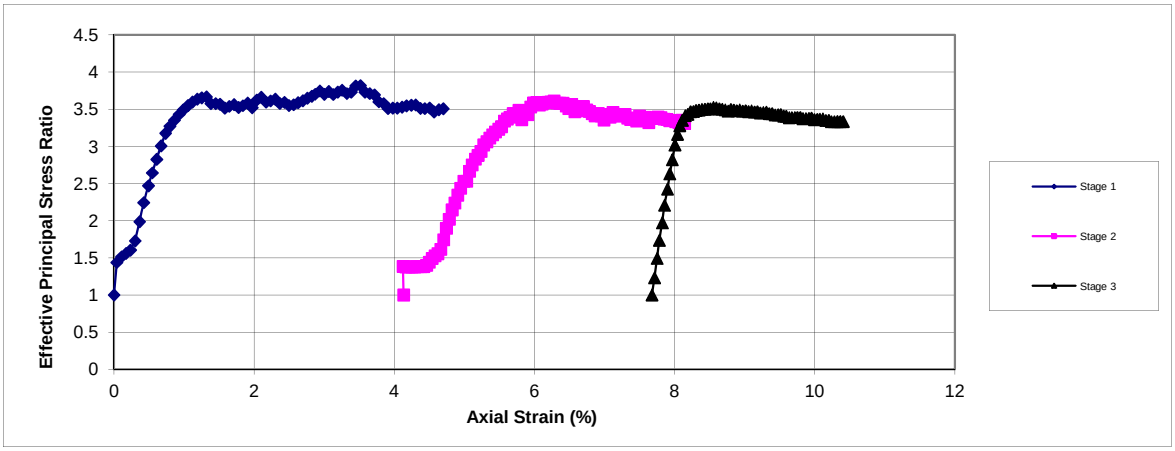
Consolidated Undrained Triaxial Compression Test

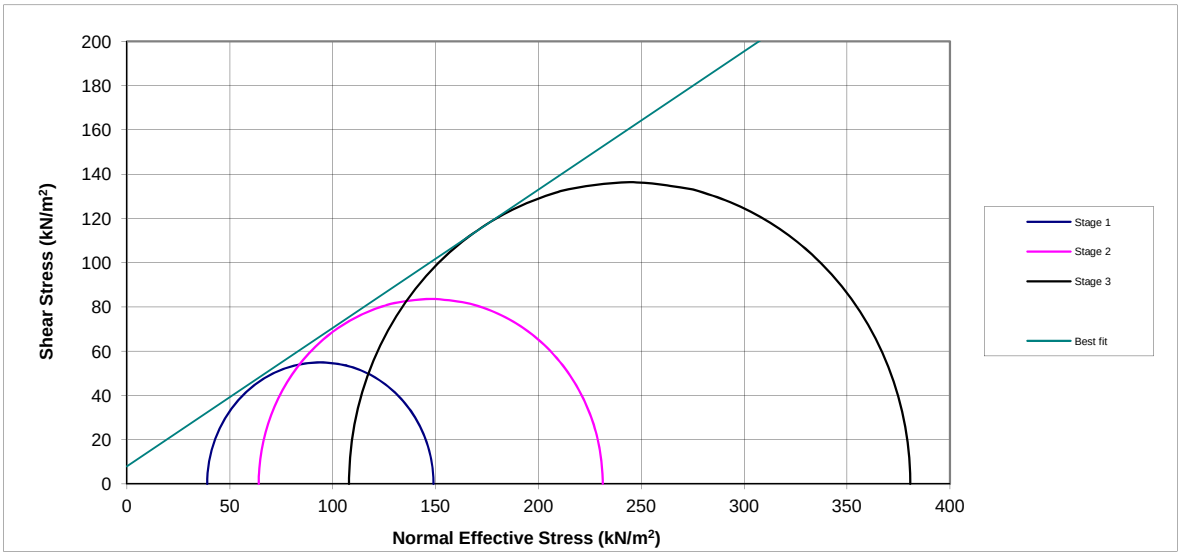
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Shearing Stage





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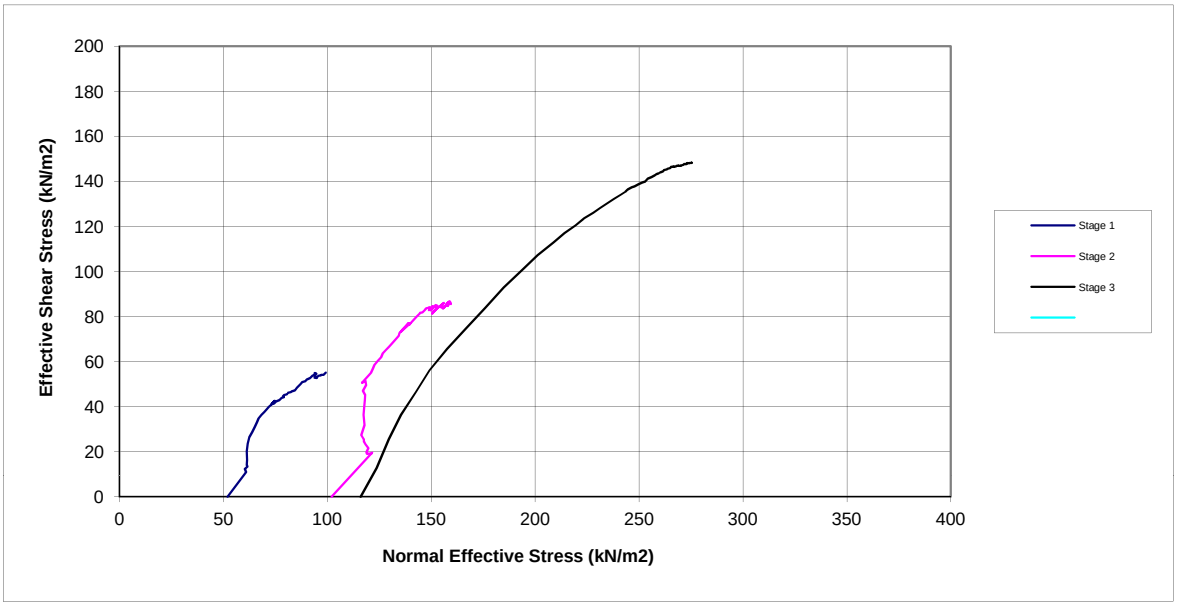
BS 1377 : Part 8 : 1990

Specimen Details

Borehole		BH2
Sample No.		U10
Depth	m	4.00-4.45
Date		18/04/2012

Shearing Stage



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AA0125

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GEO Site & Testing Services Limited

Trowbridge STW

Contract No

15507 - 190312

Index Property Test Results

Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

Lab Number

UKAS Testing Laboratory 1429

Hole	Sample	Depth (m)	Method	History	MC (%)	LL (%)	Ret (%)	PL (%)	Pa (%)	PI (%)	Class	Description
BH1	D	1.70	1	1	20	55	0	28	100	27	CH	Refer to log sheets
BH1	D	3.50	1	2	11	39	56	19	44	20	CI	Refer to log sheets
BH1	D14	6.00	1	1	23	38	3	20	97	18	CI	Refer to log sheets
BH1	D	9.00	1	1	30	48	2	24	98	24	CI	Refer to log sheets
BH2	D	1.20	1	1	24	51	0	23	100	28	CH	Refer to log sheets
BH2	D	1.70	1	1	21	49	0	26	100	23	CI	Refer to log sheets
BH2	D	3.50	1	1	21	40	0	20	100	20	CI	Refer to log sheets

Key

MC - Moisture content
LL - Liquid Limit
Ret - Percentage retained on 425 micron test sieve
PL - Plastic limit
Pa - Percentage passing the 425 micron test sieve
PI - Plasticity Index

History

(1) Sample was tested from the natural state. Particles greater than 425 microns removed by hand (BS1377:Part2:1990:4.2.3)
(2) Sample was wet sieved through 425 micron test sieve (BS1377:Part2:1990:4.2.4)
(3) Sample was air dried at less than 50 degrees Centigrade and passed through the 425 micron sieve
(4) Unknown

Methods

[1] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by One point Cone Penetrometer
[2] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by Four Point Cone Penetrometer

Samples were prepared in accordance with BS1377:Part1:1990

Classification is based on the plasticity chart - Fig 2.6 of Manual of Soil Laboratory Testing - Volume 1 by K.H.Head.
NOTE - 'O' is added to the symbol for soils containing a significant amount of organic material (determined by visual inspection) e.g. MHO

Checked

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Index Property Test Results

Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

Lab Number

UKAS Testing Laboratory 1429

Hole	Sample	Depth (m)	Method	History	MC (%)	LL (%)	Ret (%)	PL (%)	Pa (%)	PI (%)	Class	Description
BH2	D	6.00	1	1	26	53	1	25	99	28	CH	Refer to log sheets
BH2	D	9.00	1	1	28	55	0	26	100	29	CH	Refer to log sheets
TP2	B	0.60	1	1	31	57	0	27	100	30	CH	Refer to log sheets
TP2	B	2.40	1	1	20	49	0	24	100	25	CI	Refer to log sheets
TP3	B	0.50	1	2	27	48	14	27	86	21	CI	Refer to log sheets
TP3	B	1.50	1	1	25	59	0	25	100	34	CH	Refer to log sheets
TP4	B	0.40	1	1	24	45	0	23	100	22	CI	Refer to log sheets

Key

MC - Moisture content
LL - Liquid Limit
Ret - Percentage retained on 425 micron test sieve
PL - Plastic limit
Pa - Percentage passing the 425 micron test sieve
PI - Plasticity Index

History

(1) Sample was tested from the natural state. Particles greater than 425 microns removed by hand (BS1377:Part2:1990:4.2.3)
(2) Sample was wet sieved through 425 micron test sieve (BS1377:Part2:1990:4.2.4)
(3) Sample was air dried at less than 50 degrees Centigrade and passed through the 425 micron sieve
(4) Unknown

Methods

[1] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by One point Cone Penetrometer
[2] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by Four Point Cone Penetrometer

Samples were prepared in accordance with BS1377:Part1:1990

Classification is based on the plasticity chart - Fig 2.6 of Manual of Soil Laboratory Testing - Volume 1 by K.H.Head.
NOTE - 'O' is added to the symbol for soils containing a significant amount of organic material (determined by visual inspection) e.g. MHO

Checked

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Index Property Test Results

Site **Trowbridge STW**

Client **BWB Consulting**

Job Number AA0125

Lab Number

UKAS Testing Laboratory 1429

Hole	Sample	Depth (m)	Method	History	MC (%)	LL (%)	Ret (%)	PL (%)	Pa (%)	PI (%)	Class	Description
TP4	B	1.60	1	2	27	51	4	24	96	27	CH	Refer to log sheets
TP5	B	0.60	1	1	15	44	0	22	100	22	CI	Refer to log sheets
TP5	B	2.50	1	1	32	53	0	25	100	28	CH	Refer to log sheets
TP6	B	1.90	1	1	24	49	0	22	100	27	CI	Refer to log sheets
TP6	D	2.90	1	2	18	45	4	26	96	19	CI	Refer to log sheets

Key

MC - Moisture content
LL - Liquid Limit
Ret - Percentage retained on 425 micron test sieve
PL - Plastic limit
Pa - Percentage passing the 425 micron test sieve
PI - Plasticity Index

History

(1) Sample was tested from the natural state. Particles greater than 425 microns removed by hand (BS1377:Part2:1990:4.2.3)
(2) Sample was wet sieved through 425 micron test sieve (BS1377:Part2:1990:4.2.4)
(3) Sample was air dried at less than 50 degrees Centigrade and passed through the 425 micron sieve
(4) Unknown

Methods

[1] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by One point Cone Penetrometer
[2] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by Four Point Cone Penetrometer

Samples were prepared in accordance with BS1377:Part1:1990

Classification is based on the plasticity chart - Fig 2.6 of Manual of Soil Laboratory Testing - Volume 1 by K.H.Head.
NOTE - 'O' is added to the symbol for soils containing a significant amount of organic material (determined by visual inspection) e.g. MHO

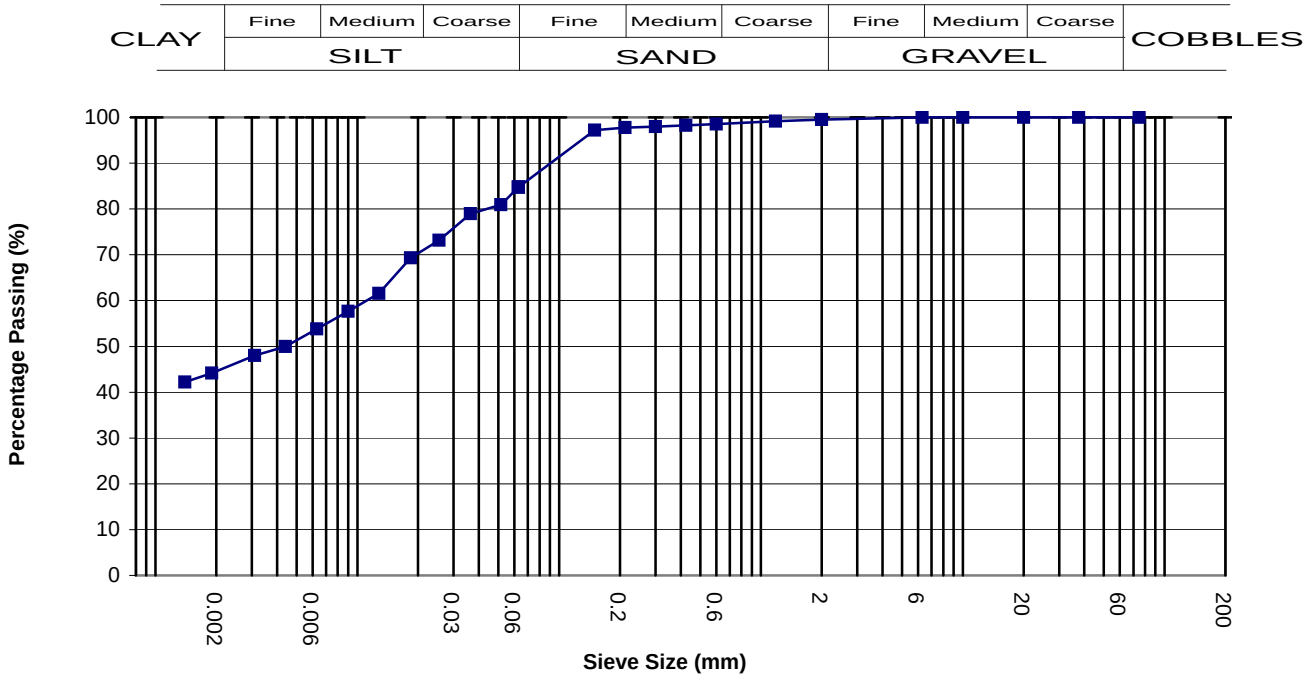
Checked

Approved

Particle Size Distribution Analysis

cjassociates

Site	**Trowbridge STW**
Client	**BWB Consulting**
Job Number	AA0125
Lab Number	L9481
Hole	BH1
Sample	D
Depth (m)	2.50



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	85
37.5	100	0.063	85
20	100	0.052	81
10	100	0.036	79
6.3	100	0.025	73
2	100	0.018	69
1.18	99	0.013	62
0.6	99	0.009	58
0.425	98	0.006	54
0.3	98	0.004	50
0.212	98	0.003	48
0.15	97	0.002	44
0.063	85	0.001	42

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.5
Sand	15.7
Silt	39.3
Clay	44.5

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site **Trowbridge STW**

Client **BWB Consulting**

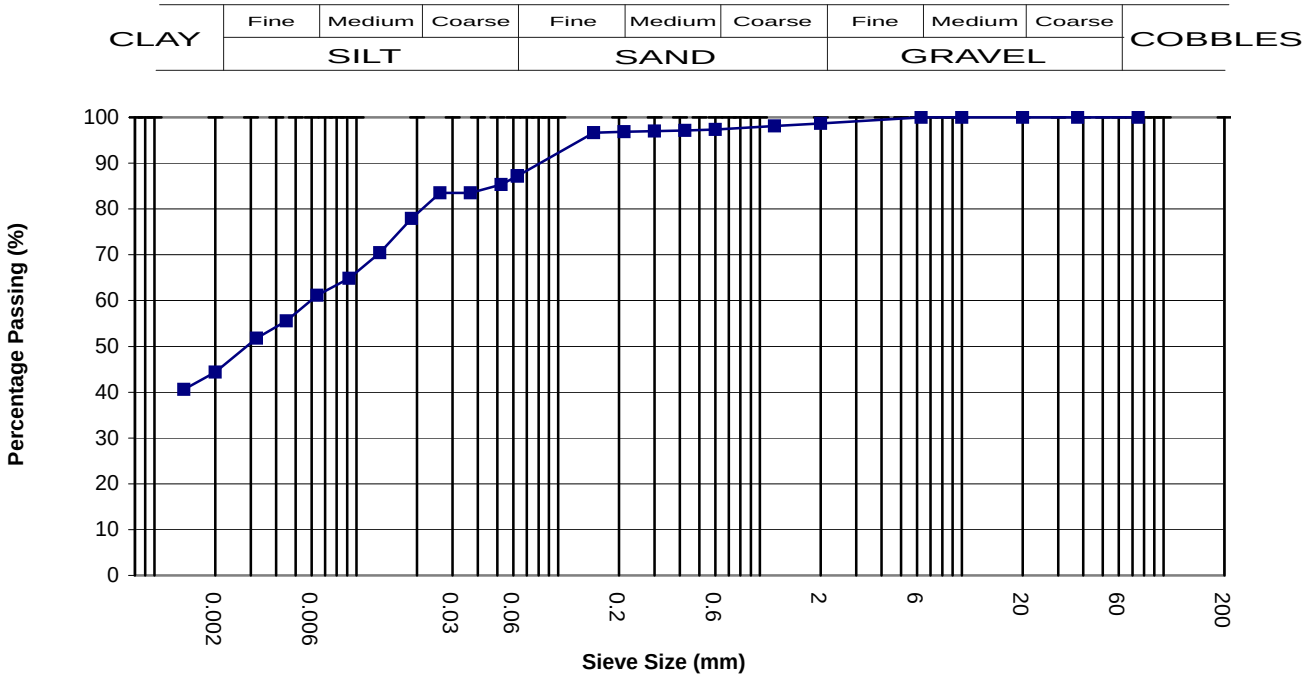
Job Number AA0125

Lab Number L9481

Hole BH1

Sample D

Depth (m) 7.50



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	87
37.5	100	0.063	87
20	100	0.052	85
10	100	0.037	83
6.3	100	0.026	83
2	99	0.019	78
1.18	98	0.013	70
0.6	97	0.009	65
0.425	97	0.006	61
0.3	97	0.005	56
0.212	97	0.003	52
0.15	97	0.002	44
0.063	87	0.001	41

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	1.3
Sand	12.0
Silt	42.3
Clay	44.4

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site **Trowbridge STW**

Client **BWB Consulting**

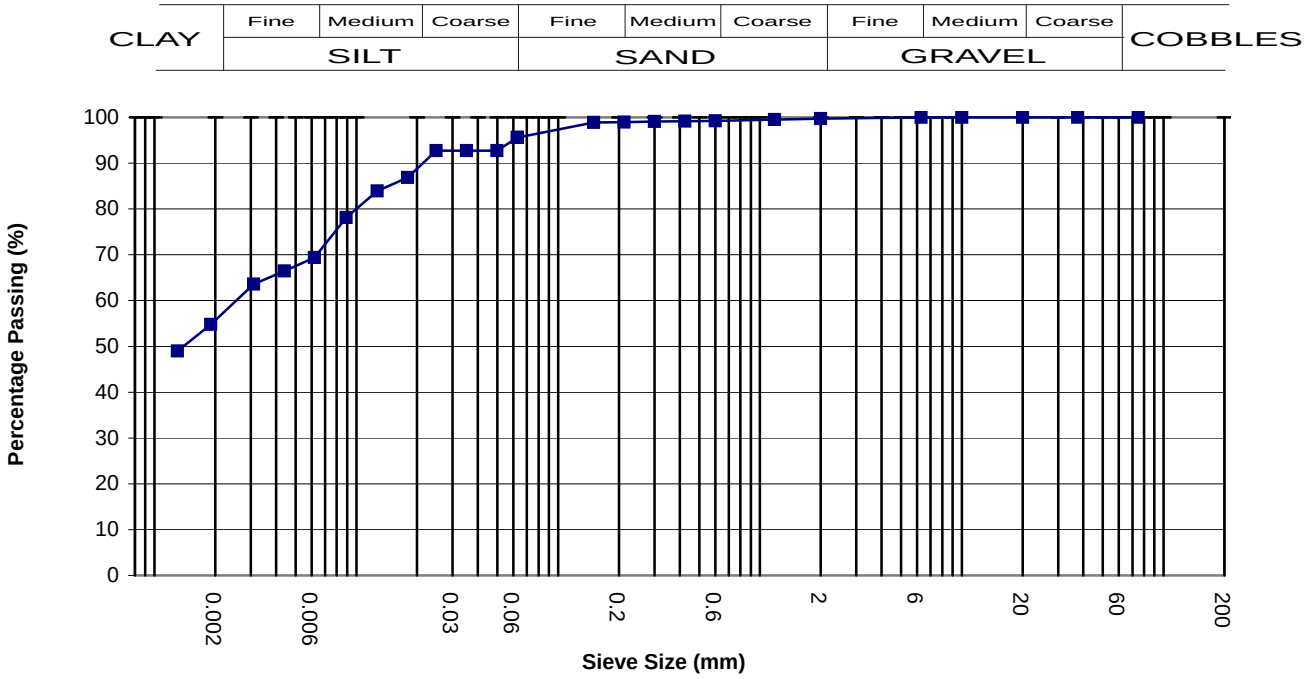
Job Number AA0125

Lab Number L9481

Hole BH1

Sample D

Depth (m) 10.50



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	96
37.5	100	0.063	96
20	100	0.050	93
10	100	0.035	93
6.3	100	0.025	93
2	100	0.018	87
1.18	100	0.013	84
0.6	99	0.009	78
0.425	99	0.006	69
0.3	99	0.004	66
0.212	99	0.003	64
0.15	99	0.002	55
0.063	96	0.001	49

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

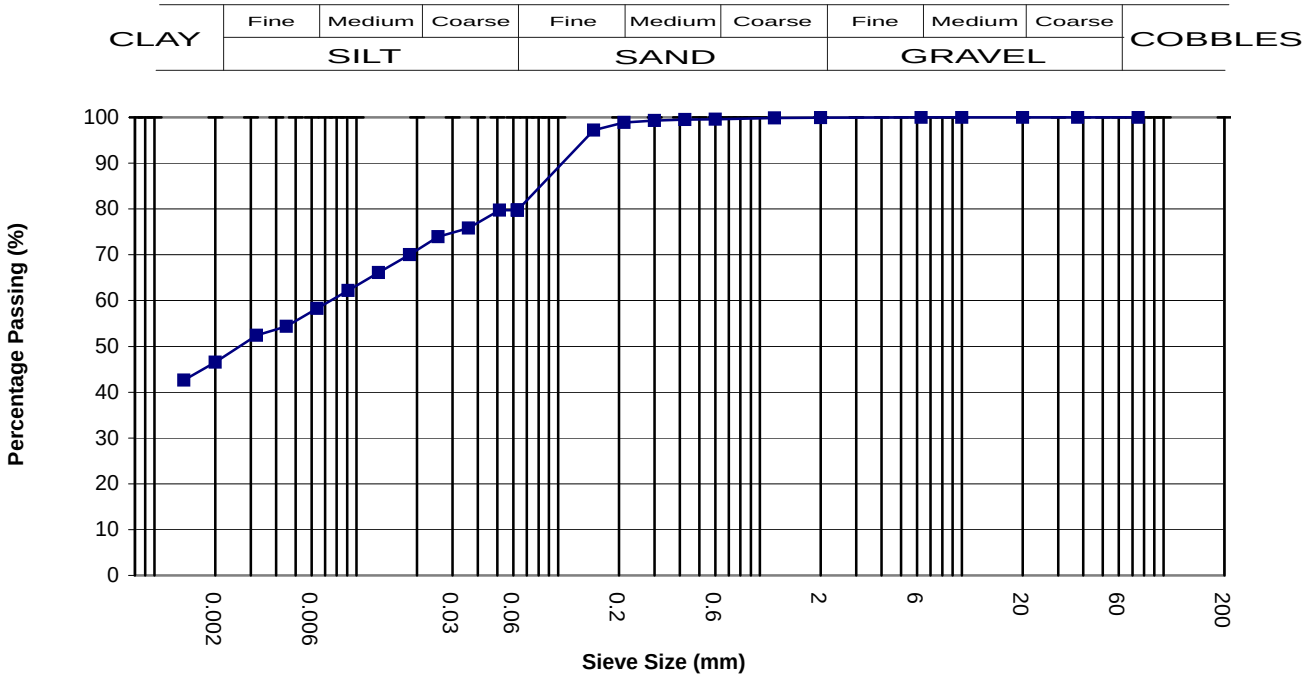
Sample Proportions	
Cobbles	0.0
Gravel	0.2
Sand	4.8
Silt	39.4
Clay	55.5

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site	**Trowbridge STW**
Client	**BWB Consulting**
Job Number	AA0125
Lab Number	L9481
Hole	BH2
Sample	B
Depth (m)	0.50



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	80
37.5	100	0.063	80
20	100	0.051	80
10	100	0.036	76
6.3	100	0.025	74
2	100	0.018	70
1.18	100	0.013	66
0.6	100	0.009	62
0.425	99	0.006	58
0.3	99	0.005	54
0.212	99	0.003	52
0.15	97	0.002	47
0.063	80	0.001	43

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

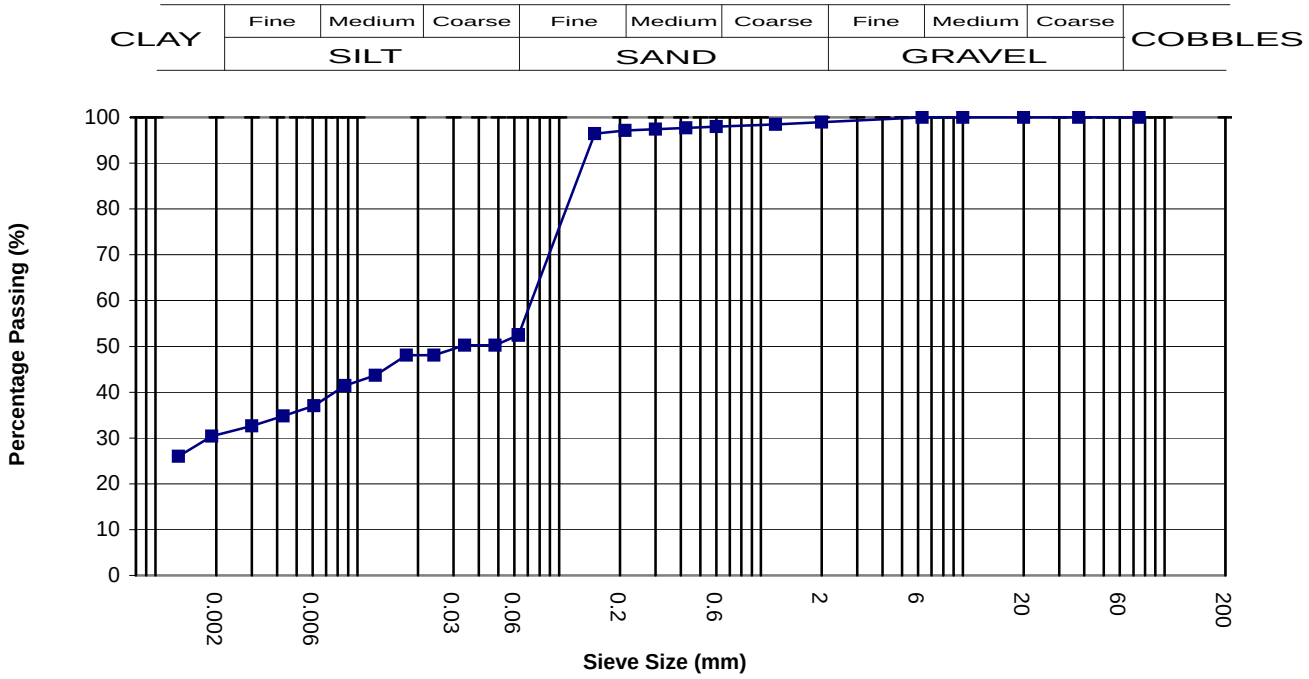
Sample Proportions	
Cobbles	0.0
Gravel	0.1
Sand	20.2
Silt	33.2
Clay	46.5

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site	**Trowbridge STW**
Client	**BWB Consulting**
Job Number	AA0125
Lab Number	L9481
Hole	BH2
Sample	D
Depth (m)	4.50



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	52
37.5	100	0.063	52
20	100	0.048	50
10	100	0.034	50
6.3	100	0.024	48
2	99	0.018	48
1.18	98	0.012	44
0.6	98	0.009	41
0.425	98	0.006	37
0.3	97	0.004	35
0.212	97	0.003	33
0.15	96	0.002	30
0.063	52	0.001	26

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	1.1
Sand	46.9
Silt	21.4
Clay	30.6

Grading Analysis	
D100	6.3
D60	0.1
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site	**Trowbridge STW**
Client	**BWB Consulting**
Job Number	AA0125
Lab Number	L9481
Hole	BH2
Sample	D
Depth (m)	2.50

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	59
37.5	100	0.063	59
20	100	0.052	57
10	100	0.037	57
6.3	100	0.026	55
2	98	0.019	52
1.18	98	0.013	47
0.6	97	0.009	44
0.425	97	0.006	39
0.3	96	0.005	36
0.212	95	0.003	34
0.15	93	0.002	30
0.063	59	0.001	29

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	2.2
Sand	39.6
Silt	28.1
Clay	30.1

Grading Analysis	
D100	6.3
D60	0.1
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site **Trowbridge STW**

Client **BWB Consulting**

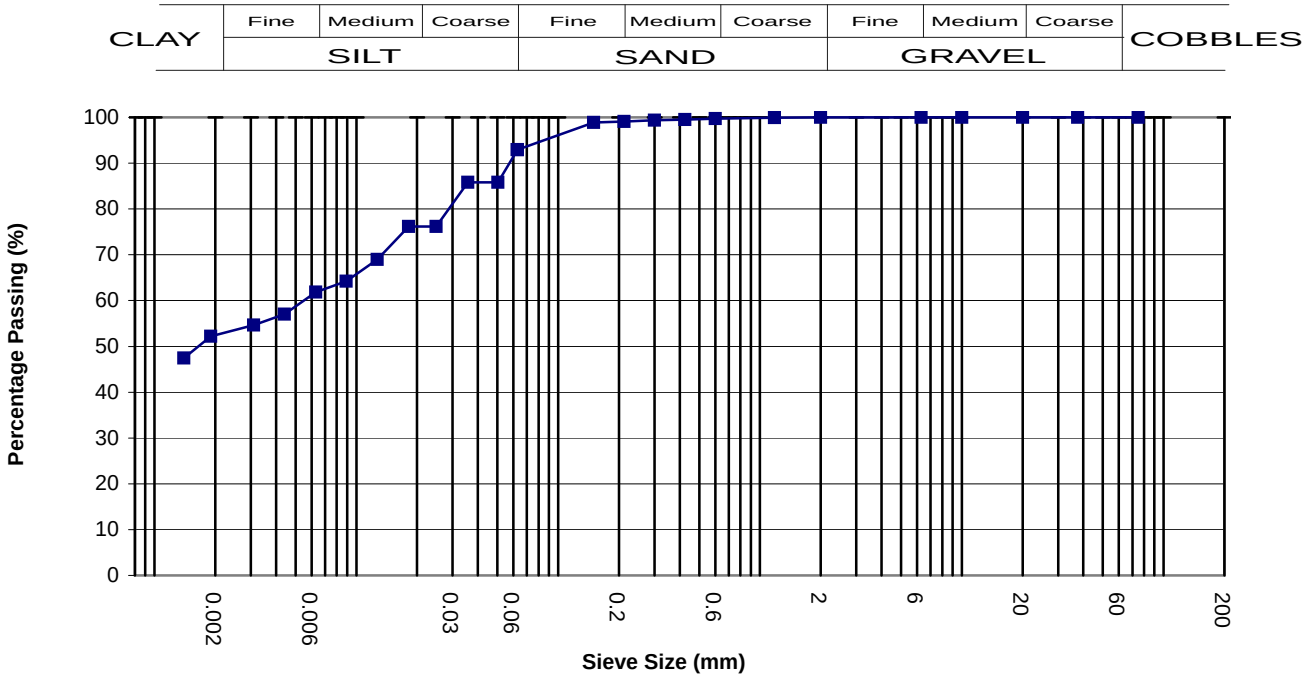
Job Number AA0125

Lab Number L9481

Hole TP2

Sample B

Depth (m) 2.40



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	93
37.5	100	0.063	93
20	100	0.050	86
10	100	0.036	86
6.3	100	0.025	76
2	100	0.018	76
1.18	100	0.013	69
0.6	100	0.009	64
0.425	100	0.006	62
0.3	99	0.004	57
0.212	99	0.003	55
0.15	99	0.002	52
0.063	93	0.001	47

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

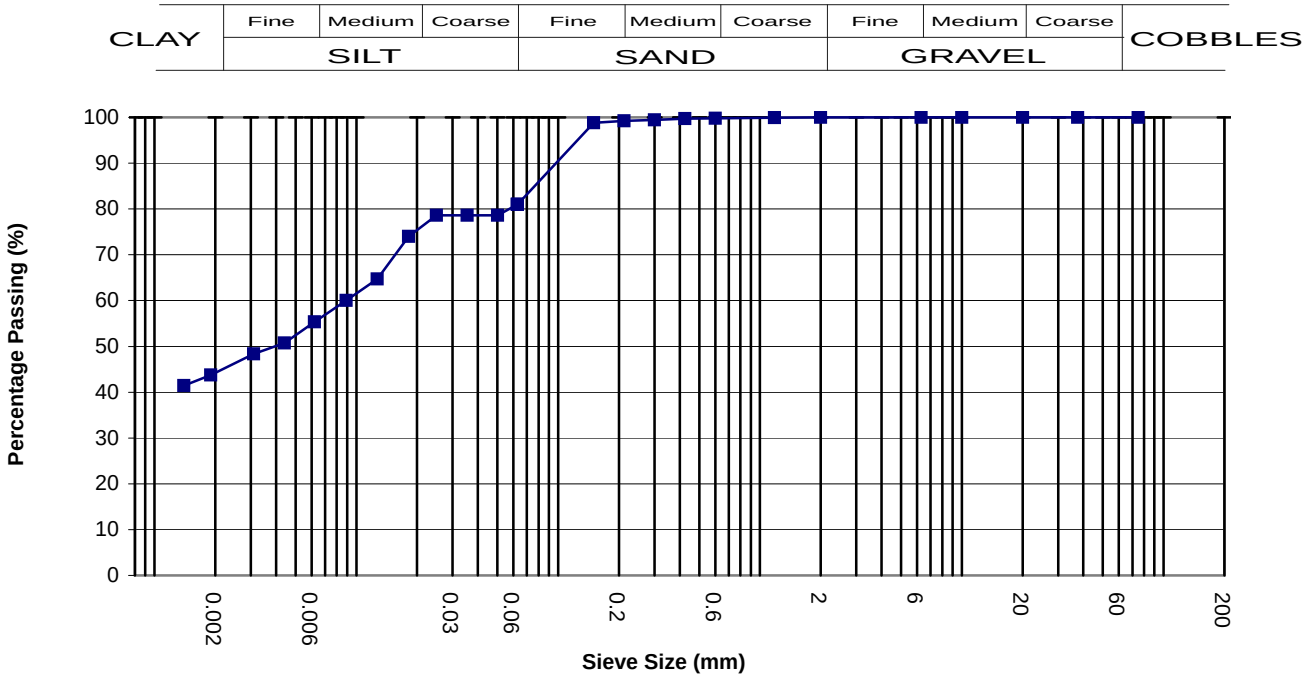
Sample Proportions	
Cobbles	0.0
Gravel	0.0
Sand	8.7
Silt	38.8
Clay	52.4

Grading Analysis	
D100	2.0
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site	**Trowbridge STW**
Client	**BWB Consulting**
Job Number	AA0125
Lab Number	L9481
Hole	TP3
Sample	B
Depth (m)	1.50



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	81
37.5	100	0.063	81
20	100	0.050	79
10	100	0.035	79
6.3	100	0.025	79
2	100	0.018	74
1.18	100	0.013	65
0.6	100	0.009	60
0.425	100	0.006	55
0.3	99	0.004	51
0.212	99	0.003	48
0.15	99	0.002	44
0.063	81	0.001	41

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.0
Sand	19.6
Silt	36.3
Clay	44.1

Grading Analysis	
D100	2.0
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site **Trowbridge STW**

Client **BWB Consulting**

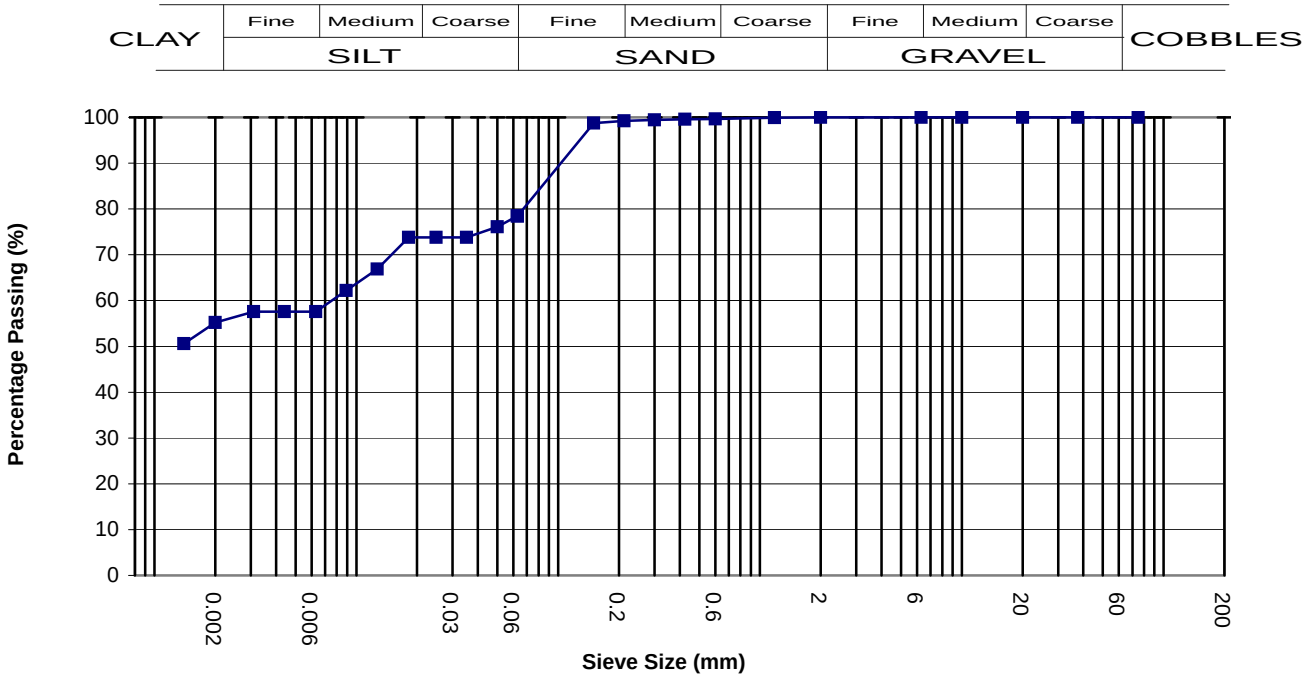
Job Number AA0125

Lab Number L9481

Hole TP4

Sample B

Depth (m) 0.40



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	78
37.5	100	0.063	78
20	100	0.050	76
10	100	0.035	74
6.3	100	0.025	74
2	100	0.018	74
1.18	100	0.013	67
0.6	100	0.009	62
0.425	100	0.006	58
0.3	99	0.004	58
0.212	99	0.003	58
0.15	99	0.002	55
0.063	78	0.001	51

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.0
Sand	22.1
Silt	22.7
Clay	55.2

Grading Analysis	
D100	2.0
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site **Trowbridge STW**

Client **BWB Consulting**

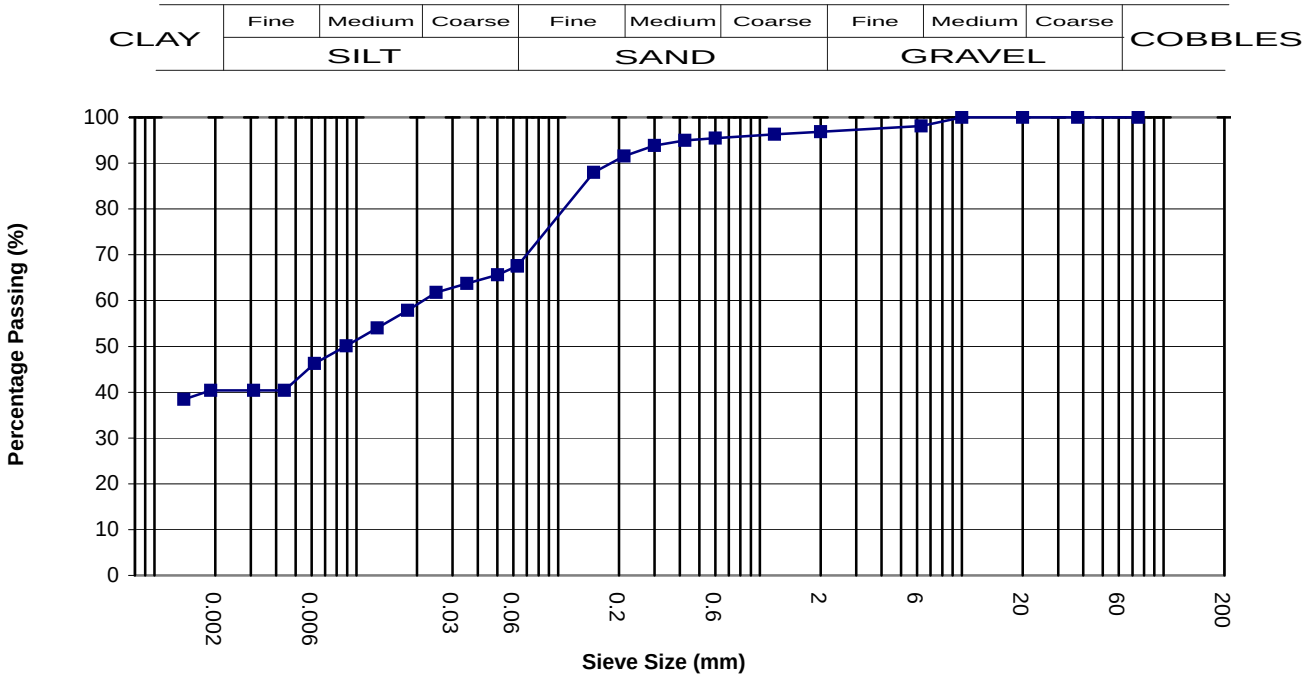
Job Number AA0125

Lab Number L9481

Hole TP5

Sample B

Depth (m) 2.50



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	68
37.5	100	0.063	68
20	100	0.050	66
10	100	0.035	64
6.3	98	0.025	62
2	97	0.018	58
1.18	96	0.013	54
0.6	95	0.009	50
0.425	95	0.006	46
0.3	94	0.004	40
0.212	92	0.003	40
0.15	88	0.002	40
0.063	68	0.001	38

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	3.1
Sand	29.7
Silt	26.7
Clay	40.4

Grading Analysis	
D100	10.0
D60	0.0
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

cjassociates

Site **Trowbridge STW**

Client **BWB Consulting**

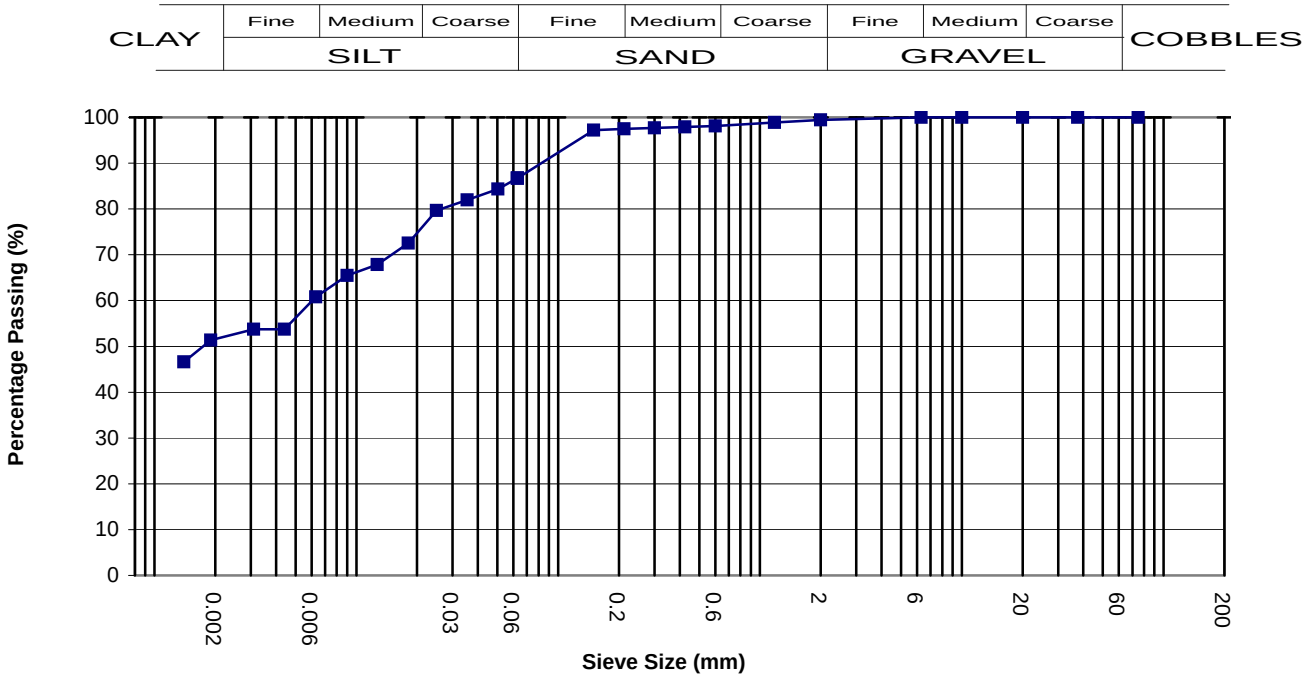
Job Number AA0125

Lab Number L9481

Hole TP6

Sample B

Depth (m) 1.90



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.063	87
37.5	100	0.063	87
20	100	0.050	84
10	100	0.036	82
6.3	100	0.025	80
2	99	0.018	73
1.18	99	0.013	68
0.6	98	0.009	65
0.425	98	0.006	61
0.3	98	0.004	54
0.212	97	0.003	54
0.15	97	0.002	51
0.063	87	0.001	47

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

Sample Proportions	
Cobbles	0.0
Gravel	0.6
Sand	13.3
Silt	34.6
Clay	51.6

Grading Analysis	
D100	6.3
D60	0.0
D10	
Uniformity Coefficient	N/A

APPENDIX 8

GAS AND GROUNDWATER MONITORING RESULTS

BWB WATER MONITORING

SITE	Trowbridge STW
CLIENT	Wessex Water
JOB No	BME2019
DATE	22/02/2012
START TIME/FINISH TIME	12:00/13:00
ENGINEER	GA
INSTALLATION DEPTH	19.00m
MONITORING EQUIPMENT	HI 9828 Multiparameter, dip metre, bailers, low flow eqipment

WEATHER CONDITIONS	START	FINISH
Dry/raining etc	Dry	Dry
Cloud Cover	2/8	2/8
Wind strength (m/s)	2.0	3.0
Wind Direction (from)	South	South
Temperature (oC)	11.5	11.5
Barometric Pressure (mb)	1021	1021

BH Ref	Conductivity (µS/cm)	Oxidisation Reduction Potential (ORP)	Dissolved Oxygen (mg/l)	pH	Temperature (˚C)	Pressure (mbar)	Water Level (mbgl)	Base of Response Zone (mbgl)
BH1	1762	-169.3	9.70%	7.93	11.66	1021	15.07	19
BH2	1700	-158.4	9.70	7.86	11.54	1021.0	1.75	19.00

BWB GAS AND GROUNDWATER MONITORING

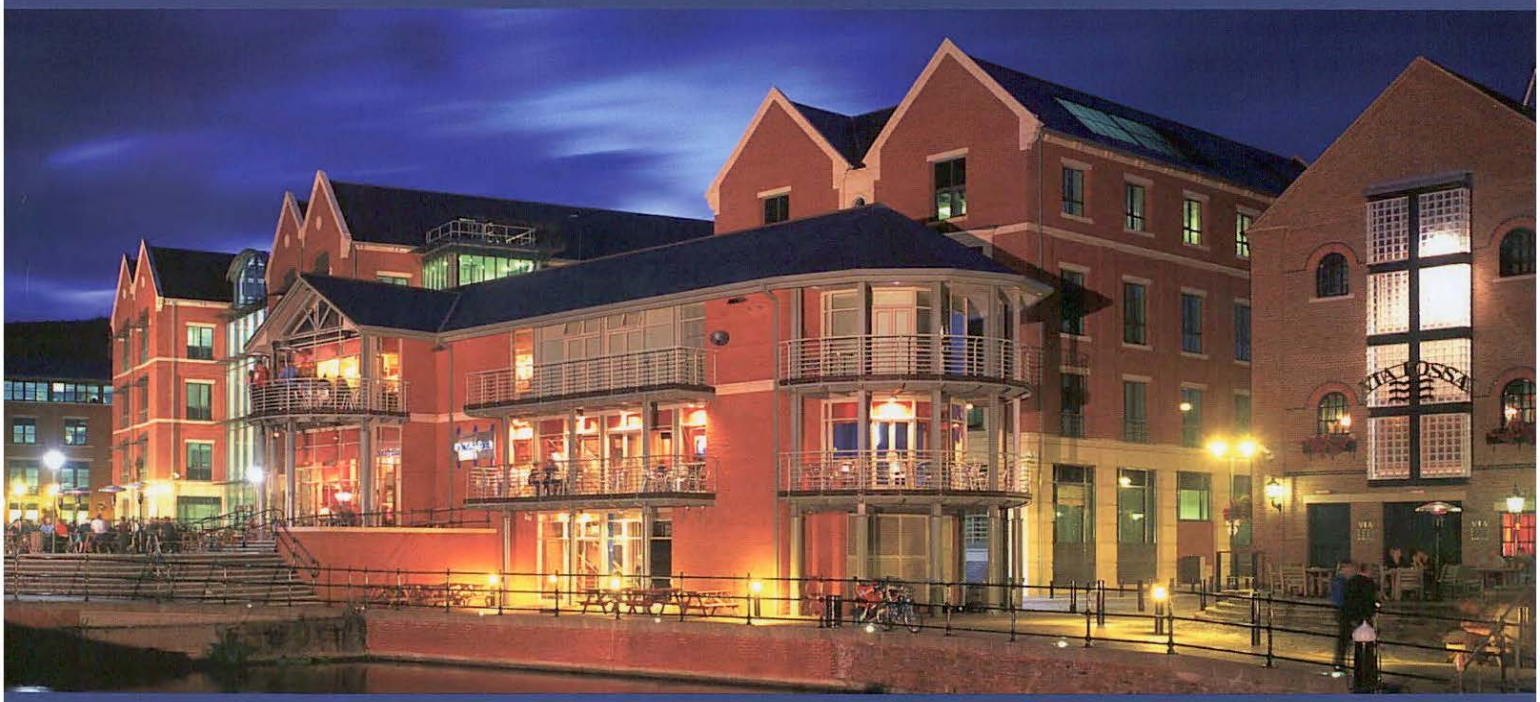
Site:	Trowbridge STW
Client:	Wessex Water
Job No.:	BME2019
Date:	22 February 2012
Start / End Time:	12:00/13:00
Engineer:	GA
Installation Details:	50mm HDPE Standpipe and Gas Valve
Monitoring Equipment:	GA2000 Gas Analyser, GF60 Flow Monitor, MiniRAE PID & Dip Meter

Weather Conditions	**Start**	**End**
(Dry / Raining)	Dry	Dry
Cloud Cover	2/8	2/8
Wind strength (m/s)	2.0	3.0
Wind Direction (from)	South	South
Temperature (°C)	11.5	11.5
Barometric Pressure (mb)	1021	1021
(Rising / Falling)	Falling	Falling

Ref.	**Flow**	**Methane**		**Carbon Dioxide**	**Oxygen**	**Hydrogen Sulphide**	**Carbon Monoxide**	**PID**	**Depth to water**	**Base of Response Zone**	**Groundwater elevation**	**Notes**
	(l/hr)	**(%v/v)**	**(%LEL)**	**(%v/v)**	**(%v/v)**	**(ppm)**	**(ppm)**	**(ppm)**	**(m)**	**(m)**	**(mAOD)**	
BH1	0.1	<0.1	<0.1	0.1	20.1	0	3	NR	15.07	19.00	#VALUE!	
BH2	0.1	<0.1	<0.1	<0.1	19.8	<0.1	<0.1	NR	1.75	19.00	#VALUE!	

LEL Lower Explosive limit (100% LEL = 5% Flammable gas)
NR Not recorded
Dry No Groundwater Detected

Date	Version	Author	Checked	Authorisat	Notes
01/06/2010	1	SS	TJH	TJH	Issue to division
05/01/2012	2	SS	TJH	TJH	Number formatting amended and borehole specific classification added



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ENVIRONMENT

Wessex Water Services Ltd
Trowbridge WRC
Trowbridge

Ground Investigation Factual Report

ENVIRONMENT

Wessex Water Services Ltd
Trowbridge WRC
Trowbridge
Ground Investigation Factual Report

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December 2020

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				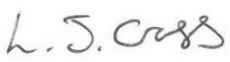	

Notice

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FIGURES

Figure 2.1: Site Location Plan

DRAWINGS

Drawing 1: Exploratory Hole Location Plan

APPENDICES

Appendix 1: Exploratory Hole Records
Appendix 2: Driller's Logs
Appendix 3: SPT Calibration Certificates
Appendix 4: Permeability Testing
Appendix 5: Ground Gas and Groundwater Monitoring Results
Appendix 6: TRL DCP Testing Results
Appendix 7: Soil Chemical Testing Results
Appendix 8: Geotechnical Testing Results
Appendix 9: Water Chemical Testing Results

1. INTRODUCTION

Instruction

1.1 BWB Consulting (BWB) was instructed by Wessex Water Services Ltd (the Client) to carry out a ground investigation and produce a factual report for Trowbridge Water Recycling Centre (WRC), Trowbridge.

1.2 The purpose of this investigation is to provide information on the ground and groundwater conditions at the site in order to enable the detailed design of proposed new structures for the existing WRC. No proposed development plan has been provided to BWB at the time of writing this report.

Objectives

1.3 The objectives of the project are to:

- Confirm the prevailing ground and groundwater conditions at exploratory hole locations as selected by the Client.
- Undertake environmental and geotechnical testing as specified by the Client.
- Undertake in-situ geotechnical testing, comprising standard penetration testing (SPTs).
- Install monitoring wells for subsequent monitoring of groundwater levels beneath the site as specified by the Client.
- Provide a factual account of the ground investigation (this report).

1.4 The report has been completed in accordance with BS10175:2011(+A2:2017) 'Investigation of Potentially Contaminated Sites, Code of Practice' and EA Guidance on Land Contamination Risk Management (LCRM, 2020).

Scope of Works

1.5 The ground investigation scope of works was completed between the 10th and 12th November 2020 and comprised the following:

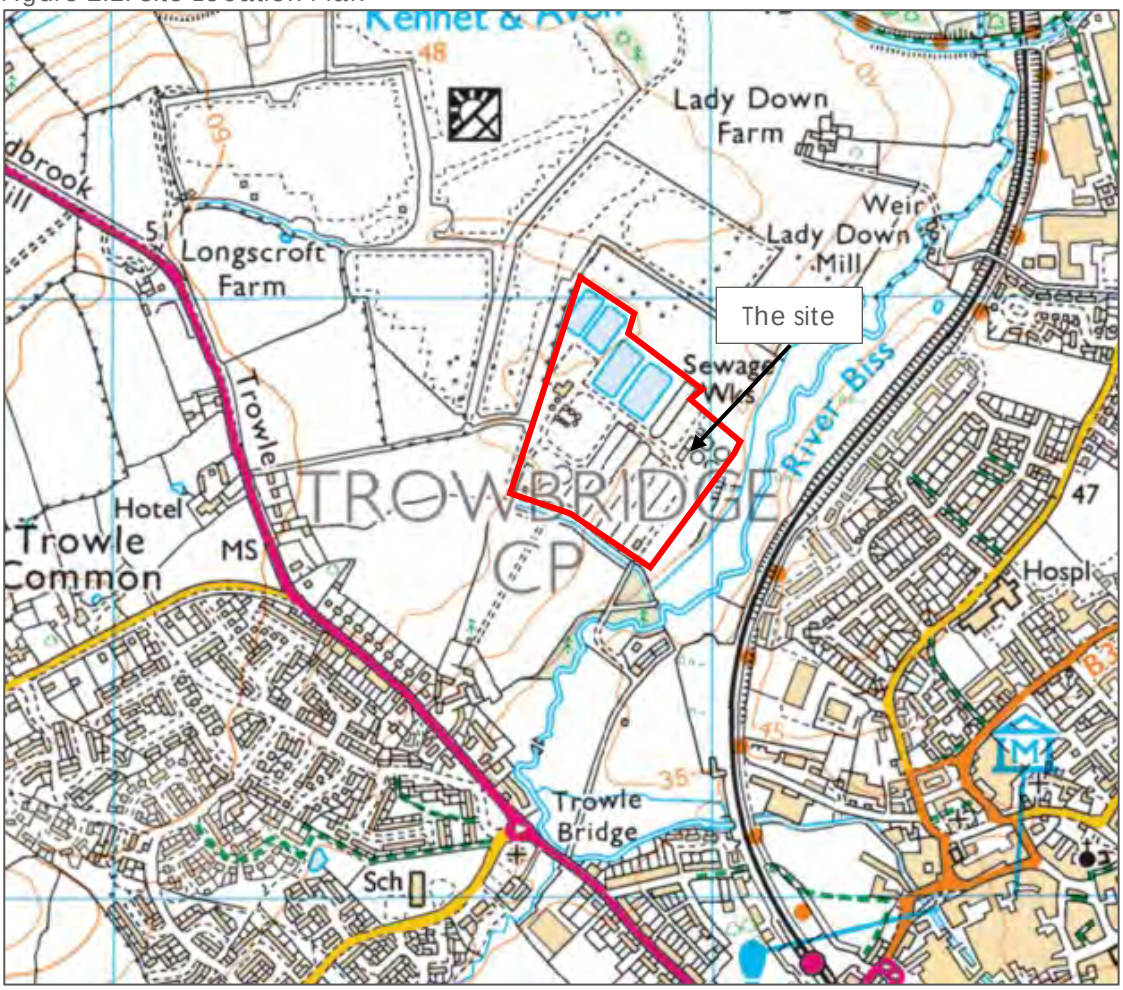
- Non-intrusive survey of excavation locations for underground utilities.
- Three cable percussive boreholes, two with rotary core follow-on.
- Excavation of seven hand pits.
- Six dynamic cone penetration tests.
- Rising and falling head permeability testing.
- Chemical analysis of soils and groundwater.
- Geotechnical testing of soils.
- Four gas and groundwater monitoring visits.

2. THE SITE

Site Location

2.1 The site is located at Trowbridge Water Recycling Centre (WRC), approximately 1km north-west of the centre of Trowbridge at approximate National Grid Reference 384865, 158726. The location of the site is shown in Figure 2.1 below.

Figure 2.1: Site Location Plan



Site Description

2.2 The site comprises an area within the existing operational Trowbridge WRC, covering an area of approximately 400m x 250m.

2.3 Access to the site is via an unnamed road off the A363 (Trowle) to the west of the site.

2.4 The site is generally flat, with a slight fall in levels from west to east and a typical elevation of approximately 45m above ordnance datum (AOD).

2.5 The site is bound to the south-west by agricultural land, to the north and west by a solar farm and to the east by the River Biss and its floodplain.

3. ENVIRONMENTAL AND GEOTECHNICAL GROUND INVESTIGATION

3.1 Intrusive ground investigation works were completed between the 10th and 12th November 2020 and comprised the following:

- Clearance of investigation locations by a specialist buried services tracing company.
- Collection of coordinates and elevations of exploratory hole locations.
- The advancement of three cable percussive boreholes (BH01 to BH03) to a maximum depth of 16.50m below ground level (bgl), with rotary core follow-on to a maximum depth of 25.00 bgl within BH01 and BH02. Completion of standard penetration testing (SPTs), in-situ permeability testing and the installation of gas and groundwater monitoring wells.
- The advancement of seven hand excavated trial pits (HP01 to HP07) to a maximum depth of 1.20m bgl
- Six TRL dynamic cone penetrometer (TRL DCP) tests undertaken in order to infer CBR values.
- Collection of environmental soil and groundwater samples for chemical analysis at a UKAS and MCERTS accredited laboratory.
- Collection of undisturbed and disturbed soil and rock samples for geotechnical analysis at a UKAS accredited laboratory.
- Four gas and groundwater monitoring visits.

3.2 An exploratory hole location plan is presented as Drawing 1. BWB exploratory hole records are presented as Appendix 1, drillers' logs are presented as Appendix 2, the SPT calibration certificate is presented in Appendix 3, the permeability worksheets are presented as Appendix 4, the ground gas and groundwater monitoring data is presented as Appendix 5 and the DCP data sheets are presented as Appendix 6.

3.3 The site investigation works were carried out in general accordance with BS5930:2015 'Code of Practice for Site Investigations' and BS10175:2017 'Investigation of Potentially Contaminated Sites'.

Chemical Analytical Strategy

3.4 Draft logs and chain of custody forms were sent to the projects appointed consultants (Sweco) for scheduling following completion of the ground investigation.

Soil Strategy

3.5 Selected soil samples collected from exploratory hole locations were sent to i2 Analytical (UKAS and MCERTS accredited) for chemical analysis. The following chemical analytical testing was undertaken:

- Nineteen soil samples tested in line with Wessex Water Suite 1 comprising pH, Total Organic Carbon, asbestos screen and ID, TPH CWG (aliphatic and aromatic) (<C40), PAH (speciated – 16 USEPA), BTEX & MTBE, arsenic, antimony, barium,

cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, vanadium and zinc.

- Four soil samples tested for asbestos quantification analysis (gravimetric).
- Eleven soil samples tested for a leachable component analysis soil Suite F (ICE UK Specification for Ground Investigation) comprising arsenic, boron, cadmium, chromium (total), hexavalent chromium, copper, lead, mercury, nickel, sulphate, selenium, zinc, pH, phenol (total), TPH (C10-40), PAH (speciated – 16 USAEPA), cyanide (total), TPH CWG (inc BTEX) and ammoniacal nitrogen.

3.6 The results of the soil chemical testing are presented as Appendix 7.

Geotechnical Strategy

3.7 In-situ soil strength testing comprising SPTs were undertaken within the cable percussive boreholes. SPT 'N' values are included on the exploratory hole logs presented as Appendix 1.

3.8 Selected undisturbed and disturbed samples were collected from the investigation locations and sent to i2 Analytical Limited (UKAS accredited). The following geotechnical testing was undertaken;

- Seventeen samples tested for moisture content.
- Ten samples tested for Atterberg (liquid and plastic) limits.
- Six samples tested for particle size distribution by sieve wet/dry and sedimentation.
- Two samples submitted for California Bearing Ratio (CBR) testing.
- One sample submitted for one-dimensional consolidation testing.
- Six samples submitted for multistage triaxial testing.
- Fourteen samples submitted for point load testing.
- Two samples submitted for unconfined compressive strength (UCS) testing
- Four samples tested for BRE Suite D analysis.
- Six samples tested for organic content.

3.9 The results of the geotechnical testing are included as Appendix 8.

Groundwater Sampling Strategy

3.10 Water samples were collected from BH101 (S), BH102 (D) & BH102 (D) and sent to i2 Analytical (UKAS and MCERTS accredited) for chemical analysis. The following chemical analytical testing was undertaken:

- 3 water samples tested for a suite in line with Suite F water suite (ICE UK Specification for Ground Investigation) comprising arsenic, cadmium, chromium III, chromium hexavalent, lead, mercury, selenium, boron, copper, nickel, zinc, cyanide (total, complex & free), thiocyanate, phenols, sulphate, sulphur, pH, PAH (speciated – 16 USAEPA), antimony, barium, beryllium, vanadium chloride, chloride, ammoniacal nitrogen, nitrate, nitrogen, chemical oxygen demand, biochemical oxygen

demand, total organic carbon, volatile fatty acids, iron, manganese, calcium, sodium, magnesium and potassium.

3.11 The results of the water chemical testing are included as Appendix 9.

Limitations and Uncertainty

3.12 Several hand pits were terminated at shallow depths including HP02 and HP07 at 0.50m on limestone cobbles, and HP05 at 0.70m bgl and HP06 at 1.00m on concrete obstructions.

4. REFERENCES

1. British Standards Institution, (BSI), BS 10175:2011+A2:2017, Investigation of Contaminated Sites – Code of Practice

2. British Standards Institution, (BSI), BS5930:2015) Code of practice for ground investigations

3. British Standards Institution, (BSI), BS EN 1997-1:2004 Incorporating corrigendum February 2009, Eurocode 7 – Geotechnical Design – Part 1: General rules.

4. British Standards Institution, (BSI), BS EN 1997-2:2007 Incorporating corrigendum June 2010, Eurocode 7 – Geotechnical Design – Part 2: Ground Investigation and testing.

5. Construction Industry Research and Information Association (CIRIA), Report 132, A Guide to Safe working on Contaminated Sites (1996).

6. Construction Industry Research and Information Association (CIRIA). 2001, C522 Contaminated land risk assessment, A guide to good practice.

7. Department for Communities and Local Government (DCLG), 2012, National Planning Policy Framework.

8. Department for Environment Food and Rural Affairs (DEFRA), 2012, Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance.

9. Environment Agency report CLR11 'Model Procedures for the Management of Land Contamination'.

10. Environment Agency 2008, Human health toxicological assessment of contaminants in soil Science Report – SC050021/SR2

11. Environment Agency 2009, CLEA Software (Version 1.05) Handbook Better Regulation Science Programme Science report: SC050021/SR4

12. Health and Safety Executive (HSE) 'Protection of workers and the general public during the Development of Contaminated Land (1991).

13. NHBC Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66: 2008.

DRAWINGS

Drawing 1: Exploratory Hole Location Plan

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key Plan

Legend

- BH01 — Borehole Location
- DCP01 — DCP TRL Test Location
- HP01 — Hand Pit Location

Rev	Date	Details of issue / revision	Drw	Rev
P1	17.12.20	FINAL	IW	LC

Issues & Revisions

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Client
WESSEX WATER SERVICES LTD

Project Title
TROWBRIDGE WRC

Drawing Title
EXPLORATORY HOLE LOCATION PLAN

Drawn:	I. WORT		Reviewed:	L. CROSS	
BWB Ref:	BMG2109	Date:	17.12.20	Scale@A3:	NTS

Drawing Status
FINAL

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
TBWRC-BWB-ZZ-XX-DR-YE-0001	S1	R1

C:\Users\imogen.wort\Desktop\Trowbridge EHLP.dwg

APPENDICES

Appendix 1: Exploratory Hole Records

BOREHOLE LOG

Scale 1:50 Sheet 1 of 3

LOCATION ID					
BH01	**Project Name:** Trowbridge WRC			**Ground Level (m AOD):**	36.19
	Project Number: BMG2109			**Eastings:**	385008.60
	Client: Wessex Water Services Ltd			**Northings:**	158786.11
Hole Type: CP+RC	**Rig:** Dando 3000 and Comacchio GEO205	**Start & End Date:**	10/11/2020 - 11/11/2020	**Engineer:** IW	**Checker:** LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & (Thickness (m))	Description	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
		[0.20]	Dark greyish brown slightly clayey GRAVEL of angular coarse limestone and mudstone. Plastic net membrane at base. (Made Ground)	0.20						B1	0.20 - 0.50m		
		35.99 [0.30]								D1	0.50 - 0.50m		
		35.69 [2.00]	Soft greyish brown slightly gravelly CLAY. Gravel is angular to subangular fine to coarse brick, concrete and limestone. (Made Ground)	0.50						ES1	0.70 - 0.70m		
			Loose dark greyish brown gravelly silty fine to coarse SAND with a moderate cobble content. Gravel is angular to subangular fine to coarse brick, concrete, mudstone and ash with frequent glass and ceramic inclusions. Cobbles are angular to subangular concrete. (Made Ground)							S	1.20	N=5 (1,1/2,1,1,1)	
										D2	1.20 - 1.65m		
										D3	1.70 - 1.70m		
										S	2.00	N=0 (1,1/0,0,0,0)	1.70m (NR)
										D4	2.00 - 2.45m		
		33.69 [1.00]	Very soft orangish brown and dark brown silty CLAY. (Kellaways Formation)	2.50						D5	2.50 - 2.50m		
										S	3.00	N=2 (1,0/0,0,1,1)	3.00m (NR)
										B2	3.00 - 3.00m		
										D6	3.00 - 3.45m		
		32.69 [1.20]	Very soft to soft orangish brown mottled grey silty CLAY with frequent fine sandy lenses. (Kellaways Formation)	3.50						ES2	3.00 - 3.50m		
										D7	3.50 - 3.50m		
										UT1 (17)	4.00 - 4.45m		
										D8	4.50 - 4.50m		
		31.49 [0.80]	Soft greyish brown sandy CLAY. Sand is fine and medium. (Kellaways Formation)	4.70						D9	4.70 - 4.70m		
										S	5.00	N=6 (0,1/1,1,2,2)	4.70m (NR)
										D10	5.00 - 5.45m		
		30.69 [11.00]	Firm dark grey mottled light grey thinly laminated slightly sandy CLAY. Sand is fine and medium. (Kellaways Formation)	5.50						D11	5.50 - 5.50m		
										UT2 (29)	6.00 - 6.45m		
										D12	6.50 - 6.50m		
										B3	7.00 - 7.00m		
										D13	7.00 - 7.50m		
										S	7.50	N=16 (2,2/2,4,4,6)	6.00m (NR)
										D14	7.50 - 7.95m		
										D15	8.50 - 8.50m		
										UT3 (37)	9.00 - 9.45m		
										D16	9.50 - 9.50m		

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole backfilled with bentonite and arisings upon completion. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 16.50m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 6.00m bgl using 150mm casing and to 16.50m using rotary casing.

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BOREHOLE LOG

LOCATION ID	Project Name:	Trowbridge WRC			Ground Level (m AOD):	36.19	
BH01	Project Number:	BMG2109			Eastings:	385008.60	
	Client:	Wessex Water Services Ltd			Northings:	158786.11	
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date:	10/11/2020 - 11/11/2020	Engineer:	IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Firm dark grey mottled light grey thinly laminated slightly sandy CLAY. Sand is fine and medium. (Kellaways Formation)								D17	10.00 - 10.00m		
											S D18	10.50 10.50 - 10.95m	N=36 (1,4/8,9,9,10)	6.00m (NR)
											D19	11.50 - 11.50m		
											UT4	12.00 - 12.45m		
											D20	12.40 - 12.40m		
											D21	13.00 - 13.00m		
											S D22	13.50 13.50 - 13.95m	N=36 (3,4/6,8,10,12)	6.00m (NR)
											D23	14.00 - 14.00m		
											S D24	15.00 15.00 - 15.45m	N=44 (4,7/9,10,10,15)	6.00m (NR)
											D25	16.00 - 16.00m		
		19.69 [1.80]	Strong thinly laminated grey sandy MUDSTONE with frequent fine and medium shell fragments. Sand is fine and medium. Medium and coarse sand along fractures. (Kellaways Formation)		16.50	16.50 - 18.00	87	80	80	2	S D26 C1	16.50 16.50 - 16.95m 16.57 - 17.20m	50 (7,11/50 for 150mm)	6.00m (NR)
											C2	17.20 - 17.61m		
		17.89 [2.10]	Moderately strong light and dark grey fine grained SANDSTONE with very frequent shell fragments. Clayey along fractures with thin weak grey mudstone beds.		18.30	18.00 - 19.50	99	73	63	12	C3	18.18 - 18.40m		
											C4	18.45 - 18.61m		
											C5	18.88 - 19.20m		

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole backfilled with bentonite and arisings upon completion. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 16.50m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 6.00m bgl using 150mm casing and to 16.50m using rotary casing.

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BOREHOLE LOG

Scale 1:50 Sheet 3 of 3

LOCATION ID	Project Name:	Trowbridge WRC	Ground Level (m AOD):	36.19
BH01	Project Number:	BMG2109	Eastings:	385008.60
	Client:	Wessex Water Services Ltd	Northings:	158786.11
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date: 10/11/2020 - 11/11/2020	Engineer: IW / Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Moderately strong light and dark grey fine grained SANDSTONE with very frequent shell fragments. Clayey along fractures with thin weak grey mudstone beds. (Kellaways Formation)							C6	19.20 - 19.46m		
					19.50 - 21.00	99	85	76	10	C7	19.58 - 19.72m		
										C8	19.85 - 20.10m		
		15.79 [1.10]	Very weak light greenish grey MUDSTONE recovered as very stiff clay. (Kellaways Formation)	20.40						C9	20.27 - 20.39m		
			20.70m - 21.00m: Becoming dark grey.							C10	20.39m		
										C11	20.40 - 20.55m		
											20.55 - 20.90m		
		14.69 [3.50]	Strong thinly laminated greenish grey MUDSTONE mottled reddish brown along fractures. Fractures filled with clay and gravel. (Kellaways Formation)	21.50	21.00 - 22.50	99	34	85	10	C12	21.07 - 21.20m		
										C13	21.23 - 21.43m		
										C14	21.50 - 22.22m		
										C15	22.23 - 22.63m		
			23.00m - 24.00m: Becoming slightly sandy.		22.50 - 24.00	89	83	83	6	C16	22.70 - 22.82m		
					24.00 - 25.00	60	47	35	9	C17	24.16 - 24.39m		
										C18	24.40 - 24.45m		
										C19	24.52 - 24.56m		
		11.19	Hole Terminated at 25.00m bgl.	25.00									

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole backfilled with bentonite and arisings upon completion. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 16.50m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 6.00m bgl using 150mm casing and to 16.50m using rotary casing.

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BOREHOLE LOG

Scale 1:50 Sheet 1 of 3

LOCATION ID	Project Name:	Trowbridge WRC			Ground Level (m AOD):	36.10	
BH02	Project Number:	BMG2109			Eastings:	385021.58	
	Client:	Wessex Water Services Ltd			Northings:	158787.55	
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date:	11/11/2020 - 12/11/2020	Engineer:	IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & (Thickness (m))	Description	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
		[0.20]	Dark greyish brown slightly clayey GRAVEL of angular coarse limestone and mudstone. Plastic net membrane at base. (Made Ground)	0.20						B1	0.30 - 0.30m		
		35.90 [0.50]								ES1	0.30m		
										D1	0.30 - 0.50m		
		35.40 [2.30]	Dark greyish brown sandy clayey GRAVEL of angular to subangular fine to coarse brick, concrete, mudstone, limestone with rare glass and ceramic inclusions. (Made Ground)	0.70						ES2	0.50 - 0.50m		
											1.00 - 1.00m		
										S		N=4 (1,0/1,1,1,1)	
										D2	1.20		
											1.20 - 1.65m		
			Soft friable dark greyish black gravelly very sandy CLAY. Gravel is angular to subangular fine to coarse brick, ash and concrete with rare glass, ceramic and wood inclusions. Sand is fine to coarse. (Made Ground)							S	2.00	N=3 (1,2/1,1,0,1)	1.70m (NR)
										B2	2.00 - 2.45m		
										D3	2.00 - 3.00m		
		33.10 [1.50]	Soft dark greyish brown and reddish brown slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse brick, ash and concrete with rare glass, ceramic and wood inclusions. Sand is fine to coarse. (Made Ground)	3.00						S	3.00	N=2 (1,0/1,0,1,0)	3.00m (NR)
										D4	3.00 - 3.45m		
										D5	3.50 - 3.50m		
										S	4.00	N=4 (0,0/1,1,1,1)	3.00m (NR)
										B3	4.00 - 4.00m		
										D6			
										ES3	4.00 - 4.45m		
		31.60 [1.00]	Soft to firm orangish brown mottled light grey silty CLAY with frequent orangish brown fine sandy lenses. (Kellaways Formation)	4.50						D7	4.00 - 4.45m		
										UT1 (22)	4.50 - 4.50m		
											5.00 - 5.45m		
		30.60 [3.50]	Firm dark grey silty CLAY with rare orangish brown mottling and fine sandy lenses. (Kellaways Formation)	5.50						D8	5.50 - 5.50m		
										D9	5.70 - 5.70m		
										S	6.00	N=18 (1,2/3,4,5,6)	4.70m (NR)
										D10	6.00 - 6.45m		
										D11	6.50 - 6.50m		
										B4	7.00 - 7.50m		
										UT2 (23)	7.50 - 7.95m		
										D12	8.00 - 8.00m		
										D13	8.50 - 8.50m		
		27.10 [6.00]	Firm to stiff dark grey silty CLAY with frequent fine and medium shell fragments and dark and light grey	9.00						S	9.00	N=21 (2,3/4,5,6,6)	4.70m (NR)
										D14	9.00 - 9.45m		

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 15.00m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 4.70m bgl using 150mm casing.

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BOREHOLE LOG

Scale 1:50 Sheet 2 of 3

LOCATION ID	Project Name:	Trowbridge WRC			Ground Level (m AOD):	36.10	
BH02	Project Number:	BMG2109			Eastings:	385021.58	
	Client:	Wessex Water Services Ltd			Northings:	158787.55	
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date:	11/11/2020 - 12/11/2020	Engineer:	IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Firm to stiff dark grey silty CLAY with frequent fine and medium shell fragments and dark and light grey fine sandy lenses. (Kellaways Formation)								D15	10.00 - 10.00m		
											UT3 (48)	10.50 - 10.95m		
											D16	11.00 - 11.00m		
											D17	11.50 - 11.50m		
											S D18	12.00 12.00 - 12.45m	N=32 (2,4/6,8,8,10)	4.70m (NR)
											D19	13.00 - 13.00m		
											S D20	13.50 13.50 - 13.95m	N=42 (3,6/6,9,12,15)	4.70m (NR)
											D21	14.00 - 14.00m		
		21.10 [1.65]	Very stiff dark grey silty CLAY. Weathered reddish brown along fractures. (Kellaways Formation)		15.00	15.00 - 16.50	97	93	91	1	S D22	15.00 15.00 - 15.45m	50 (8,9/50 for 150mm)	4.70m (NR)
		19.45 [2.05]	Strong thinly laminated grey sandy MUDSTONE with frequent fine and medium shell fragments. Sand is fine and medium. Medium and coarse sand along fractures. (Kellaways Formation)		16.65	16.50 - 18.00	89	89	89	2	C1 C2	16.63 - 16.81m 16.81 - 17.14m		
		17.40 [2.15]	Moderately strong light and dark grey fine grained		18.70	18.00 - 19.50	97	86	82	11	C3 C4 C5	18.00 - 18.27m 18.29 - 18.53m 18.72 - 18.96m		

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 15.00m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 4.70m bgl using 150mm casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

BOREHOLE LOG

Scale 1:50 Sheet 3 of 3

LOCATION ID	Project Name:	Trowbridge WRC	Ground Level (m AOD):	36.10
BH02	Project Number:	BMG2109	Eastings:	385021.58
	Client:	Wessex Water Services Ltd	Northings:	158787.55
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date: 11/11/2020 - 12/11/2020	Engineer: IW / Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend / Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Moderately strong light and dark grey fine grained SANDSTONE with very frequent shell fragments. Clayey along fractures with thin weak grey mudstone beds. (Kellaways Formation)							C6	19.20 - 19.45m		
					19.50 - 21.00	98	85	80	10	C7	19.83 - 21.04m		
		15.25 [3.15]	Very weak light greenish grey MUDSTONE recovered as very stiff clay. (Kellaways Formation)	20.85						C8	21.20 - 21.67m		
					21.00 - 22.50	93	87	87	7	C9	21.82 - 22.05m		
										C10	22.05 - 22.27m		
					22.50 - 24.00	95	79	88	11	C11	23.30 - 23.62m		
		12.10 [1.00]	Strong thinly laminated greenish grey MUDSTONE mottled reddish brown along fractures. Fractures filled with clay and gravel. (Kellaways Formation)	24.00						C12	24.00 - 24.33m		
					24.00 - 25.00	100	70	46	15	C13	24.57 - 24.70m		
										C14	24.84 - 24.93m		
		11.10	Hole Terminated at 25.00m bgl.	25.00									

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 15.00m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 4.70m bgl using 150mm casing.

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BOREHOLE LOG

Scale 1:50 Sheet 1 of 2

LOCATION ID					
BH03	**Project Name:** Trowbridge WRC			**Ground Level (m AOD):**	35.73
	Project Number: BMG2109			**Eastings:**	385014.77
	Client: Wessex Water Services Ltd			**Northings:**	158701.01
Hole Type: CP	**Rig:** Dando 3000	**Start & End Date:**	12/11/2020	**Engineer:** IW	**Checker:** LC

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (Ublows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		[0.50]	Dark greyish brown slightly clayey GRAVEL of angular coarse limestone and mudstone. Plastic net membrane at base. (Made Ground)									
		35.23 [0.50]			0.50	1	0.50	0.50				
			Soft brown, orangish brown and reddish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, brick, mudstone, concrete and quartzite. (Made Ground)			1	0.50	1.00				
		34.73 [3.50]			1.00	1	0.70	0.70				
			Very soft dark greyish black slightly gravelly slightly sandy silty CLAY with rare rootlets. Gravel is angular fine to coarse brick and concrete. Sand is fine to coarse. (Made Ground)			2	1.20	1.65	SPT	1.20	N=3 (1,0/0,1,1,1)	
						3	1.70	1.70				
						4	2.00	2.45	SPT	2.00	N=3 (0,0/3,0,0,0)	1.70m (NR)
						5	2.50	2.50				
						2	3.00	3.45	SPT	3.00	N=4 (1,0/1,1,1,1)	3.00m (NR)
						6	3.00	3.50				
						2	3.50	3.50				
						7	3.50					
						8	4.00	4.45	SPT	4.00	N=5 (1,1/1,1,1,2)	3.00m (NR)
		31.23 [3.00]			4.50	9	4.50	4.50				
			Soft light greyish brown mottled orangish brown and black sandy silty CLAY. Sand is fine and medium. (Made Ground)			1	5.00	5.45				
						(9)						
			5.50m: Clay pipe fragment.			10	5.50	5.50				
						3	5.50	6.00				
						3	5.50					
						11	6.00	6.45	SPT	6.00	N=16 (3,5/4,4,4,4)	6.00m (NR)
			6.50m: Metal fragment.			12	6.50	6.50				
						13	6.80	6.80				
		28.23 [4.95]			7.50	2	7.50	7.45				
			Stiff dark grey silty CLAY with fine and medium shell fragments. (Kellaways Formation)			4	7.50	7.50				
						4	7.50	8.00				
						(29)						
						14	8.50	8.50				
						15	9.00	9.45	SPT	9.00	N=27 (3,3/8,8,5,6)	7.50m (NR)

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth, as specified by consultant engineer.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole cased to 7.5m bgl using 150mm casing and to 15.00m bgl using rotary casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

BOREHOLE LOG

Scale 1:50 Sheet 2 of 2

LOCATION ID					
BH03	**Project Name:** Trowbridge WRC			**Ground Level (m AOD):**	35.73
	Project Number: BMG2109			**Eastings:**	385014.77
	Client: Wessex Water Services Ltd			**Northings:**	158701.01
Hole Type: CP	**Rig:** Dando 3000	**Start & End Date:**	12/11/2020	**Engineer:** IW	**Checker:** LC

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (Ublows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
			Stiff dark grey silty CLAY with fine and medium shell fragments. (Kellaways Formation)			16	10.00	10.00				
						3 (39)	10.50	10.95				
						17	11.00	11.00				
						18	11.50	11.50				
						19	12.00	12.45	SPT	12.00	N=30 (2,4/6,7,7,10)	7.50m (NR)
		23.28	Hole Terminated at 12.45m bgl.		12.45							

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth, as specified by consultant engineer.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole cased to 7.5m bgl using 150mm casing and to 15.00m bgl using rotary casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	Project Name:	Trowbridge WRC		0.50
HP01	Project Number:	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	Start & End Date:	10/11/2020	Stability: Fair
Ground Level (m AOD):	43.04	Eastings & Northings:	384716E 158696N	Engineer: IW / Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		42.84	Grass covered soft dark brown silty CLAY. Rootlets present throughout. (Topsoil)			D1	0.10	0.10			
		0.20m				ES1	0.10	0.10			
		42.84	Soft to firm brown and orangish brown slightly gravelly silty CLAY. Gravel is angular medium and coarse concrete and limestone. (Made Ground)		0.20	D2	0.30	0.30			
		0.30m				ES2	0.30	0.30			
		42.54	Soft light orangish brown mottled greyish brown silty CLAY. Frequent orangish brown sandy lenses throughout. (Kellaways Formation)		0.50	D3	0.60	0.60			
						ES3	0.60	0.60			
						B1	0.80	0.80			
		0.70m									
		41.84	Hole Terminated at 1.20m bgl.		1.20						

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	Project Name:	Trowbridge WRC		
HP02	Project Number:	BMG2109		
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	Start & End Date:	10/11/2020	
Ground Level (m AOD):	42.49	Eastings & Northings:	384758E 158724N	

0.50

0.50 Pit Dimensions (m) Degrees

Stability: Fair

Engineer: IW Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m 42.29	Grass covered soft dark brown silty CLAY. Rootlets present throughout. (Topsoil)			D1 ES1	0.10 0.10	0.10 0.10			
		0.30m 41.99	Soft to firm brown and orangish brown slightly gravelly silty CLAY. Gravel is angular medium and coarse concrete and limestone. Limestone cobble at base. (Made Ground) *0.30m - 0.50m: Becoming very gravelly.* Hole Terminated at 0.50m bgl.		0.20 0.50	D2 ES2	0.30 0.30	0.30 0.30			

Remarks

Reason for Termination:

Terminated on limestone cobble.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	Project Name:	Trowbridge WRC		0.50
HP03	Project Number:	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	Start & End Date:	10/11/2020	Stability: Fair
Ground Level (m AOD):	41.94	Eastings & Northings:	384846E 158813N	Engineer: IW / Checker: LC

Strata					Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend / Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m 41.74	Grass covered soft dark brown silty CLAY. Rootlets present throughout. (Topsoil)	0.20	D1 ES1	0.10 0.10	0.10 0.10			
		1.00m	Soft light orangish brown mottled greyish brown silty CLAY. Frequent orangish brown sandy lenses throughout. (Kellaways Formation)		D2 ES2	0.50 0.50	0.50 0.50			
					B1	1.00	1.00			
		40.74	Hole Terminated at 1.20m bgl.	1.20						

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	**Project Name:**	Trowbridge WRC		0.50
HP04	**Project Number:**	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	**Start & End Date:**	10/11/2020	Stability: Fair
Ground Level (m AOD):	38.10	**Eastings & Northings:**	384919E 158761N	Engineer: IW / Checker: LC

Strata					Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend / Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m 37.90	Grass covered soft friable dark brown very gravelly CLAY with a moderate cobble content. Gravel is angular to rounded fine to coarse mudstone, quartzite and concrete. Cobbles are subangular concrete. Woven plastic membrane at base. Rootlets present throughout. (Made Ground)	0.20	D1 ES1	0.10 0.10	0.10 0.10			
		1.00m	Soft friable orangish brown slightly gravelly silty CLAY. Gravel is angular fine to coarse brick and flint. Frequent orange sandy lenses throughout. (Made Ground)		D2 ES2	0.50 0.50	0.50 0.50			
					B1	1.00	1.00			
		36.90	Hole Terminated at 1.20m bgl.	1.20						

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	**Project Name:**	Trowbridge WRC		0.50
HP05	**Project Number:**	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	**Start & End Date:**	10/11/2020	Stability: Fair
Ground Level (m AOD):	37.20	**Eastings & Northings:**	384970E 158822N	Engineer: IW / Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.30m 36.90	Grass covered soft friable dark greyish brown sandy gravelly CLAY with a moderate cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse asphalt, brick, concrete, quartzite and mudstone with frequent glass and ceramic inclusions. Cobbles are angular to subangular brick and concrete. Rootlets present throughout.			ES1	0.10	0.10			
		0.15m 36.75	(Made Ground) Dark greyish brown slightly clayey GRAVEL of angular coarse limestone.		0.30	B1 D1 ES2 D2 ES3	0.20 0.20 0.20 0.35 0.35	0.20 0.20 0.20 0.35 0.35			
		0.25m 36.50	(Made Ground) Soft friable orangish brown mottled brown slightly gravelly silty CLAY. Gravel is angular to subangular fine and medium brick, mudstone and rare ash.		0.45	B2 D3 ES4	0.50 0.50 0.50	0.50 0.50 0.50			
		36.50 0.00m	(Made Ground) Concrete. (Made Ground)		0.70 0.70						
			Hole Terminated at 0.70m bgl.								

Remarks

Reason for Termination:

Terminated on concrete obstruction.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	**Project Name:**	Trowbridge WRC		0.50
HP06	**Project Number:**	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	**Start & End Date:**	10/11/2020	Stability: Fair
Ground Level (m AOD):	35.72	**Eastings & Northings:**	385033E 158747N	Engineer: IW / Checker: LC

Strata					Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend / Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.15m 35.57	Grass covered soft dark brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse brick, mudstone, ash and rare asphalt. Woven plastic membrane at base. Rootlets present throughout. (Made Ground)	0.15	D1 ES1 D2 ES2	0.10 0.10 0.20 0.20	0.10 0.10 0.20 0.20			
		0.35m 35.22	Soft orangish brown mottled brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse flint and mudstone. Rootlets present throughout. (Made Ground) *0.40m: Plastic pipe, approximately 30mm diameter.*	0.50				HSV	0.40	(91, 73, 70)kPa
		0.50m	Soft dark brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse brick and flint with rare glass and metal inclusions. (Made Ground)		B1 D3 ES3	0.60 0.60 0.60	0.60 0.60 0.60			
		34.72 34.72 0.00m	Obstruction. (Made Ground) Hole Terminated at 1.00m bgl.	1.00 1.00						

Remarks

Reason for Termination:

Terminated on obstruction.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

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TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	**Project Name:**	Trowbridge WRC	0.50	
HP07	**Project Number:**	BMG2109	0.50 Pit Dimensions (m)	Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools.	**Start & End Date:** 10/11/2020	Stability: Fair	
Ground Level (m AOD): 36.32	**Eastings & Northings:**	384962E 158727N	Engineer: IW	Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.30m 36.02	Light orangish brown clayey sandy GRAVEL of angular to subrounded fine to coarse flint, mudstone and concrete. Sand is fine to coarse. (Made Ground)			ES1 D1 ES2	0.10 0.20 0.20	0.10 0.20 0.20			
		0.20m 35.82	Soft to firm friable dark blackish grey with rare lightly grey and orangish brown mottling gravelly silty CLAY. Gravel is angular to subangular fine to coarse brick, concrete and mudstone with frequent wood, metal and glass inclusions. Concrete at base. (Made Ground)		0.30 0.50	B1 D2 ES3	0.40 0.40 0.40	0.40 0.40 0.40			
			Hole Terminated at 0.50m bgl.								

Remarks

Reason for Termination:

Terminated on limestone cobble.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

Appendix 2: **Driller's Logs**

JACKSON DRILLING LTD.

Email: info@jacksondrilling.co.uk • Telephone: 01458 851276 • Fax: 01458 850544

DRILLER'S LOG

Site Name: Trowbridge BMG 2109 | Job No: | Date: 10.11.20 | Sheet of | Borehole No. 1

Depth (m)	Soil Description	Sample/Test Type	Sample/Test No.	Depth (m) From	Depth (m) To	U100s Blows	U100s Length
	Start of Shift						
GL		B	1	.2	.5		
.2	Hardcore.	D	2	.5			
		S	3	1.2			
.2	Clay Stone Ash	D	4	1.7			
		S	5	2			
2.5	Brick Fill.	D	6	2.5			
		S	7	3			
2.5	Very Soft Brown Grey	B	8	3	3.5		
		D	9	3.5			
3.5	Silt.	UT	10	4		17	
		D	11	4.5			
3.5	V. Soft Brown Grey	D	12	4.7			
		S	13	5			
4.7	Clay.	D	14	5.5			
		UT	15	6		29	
4.7	Brown Grey	D	16	6.5			
	Sandy	D	17	7			
5.5	Clay.	B	18	7	7.5		
		S	19	7.5			
5.5	Firm Grey Clay.	D	20	8.5			
9							
	End of Shift - Borehole Complete/Incomplete						

Standard Penetration Tests 1	2	3	4	5	6	Pen	Casing Depth (m)	Water Level (m)
1	1	2	1	1	1			
1	1	-	-	-	-		1.7	Dry
1	-	-	-	1	1		3	"
Shoe								
-	1	1	1	2	2		4.7	Dry
Shoe								
2	2	2	4	4	6		6	Dry

Chiselling

Depth (m) From	Depth (m) To	Time From	Time To	Hours

	1	2	3
Water Entries			
Depth Struck			
Casing Depth			
Depth 5 mins			
Depth 10 mins			
Depth 20 mins			
Cut off at			

Water Added	From	To
Water Added		
Borehole kept Full		

Piezometer/Standpipe	From	To
Plain Pipe		
Slotted Pipe		
Filter		
Bentonite Seal		
Grout/Backfill		

Borehole Diameter (mm): 150

Piezo / Standpipe

Remarks: (Standing time, day works, visitors, weather etc.)

08.00 to 09.45 Induction/wait Per BM Pos.

INF Pit.

Driller: D. Smart

Crew: J. Jones.

Rig: Dando 3000

Additional Equipment: R002

Excavation: | Backfill:

Total Number of Samples

SPT	U	D	B	W	P
5	2	10	3		

BH No.

Driller's Name | Driller's Signature | Client's Signature | Received: | Approved:

JACKSON DRILLING LTD.

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DRILLER'S LOG

Site Name: ~~Troiwbridge~~ BHG 2109 | Job No: | Date: 10.11.20 | Sheet of | Borehole No. 1

Depth (m)	Soil Description	Sample/Test Type	Sample/Test No.	Depth (m) From	Depth (m) To	U100s Blows	U100s Length	Standard Penetration Tests 1	2	3	4	5	6	Pen	Casing Depth (m)	Water Level (m)
	Start of Shift															
9	Firm/Stiff	UT	21	9		37										
	Grey	D	22	9.5				Shoe								
		D	23	10												
16.8	Clay.	S	24	10.5				1	4	8	9	9	10		6	Dry
		D	25	11.5												
		UT	26	12		50=40										
	—	D	27	12.4				Shoe								
		D	28	13												
		S	29	13.5				3	4	6	8	10	12		"	"
		D	30	14.												
		S	31	15				4	7	9	10	10	15		"	"
		D	32	16												
		S	33	16.5				7	11	21	29				"	"

End of Shift - Borehole Complete/Incomplete

Chiselling

Depth (m) From	Depth (m) To	Time From	Time To	Hours

Water Entries	1	2	3
Depth Struck			
Casing Depth			
Depth 5 mins			
Depth 10 mins			
Depth 20 mins			
Cut off at			

Water Added	From	To
Water Added		
Borehole kept Full		

Piezometer/Standpipe	From	To
Plain Pipe		
Slotted Pipe		
Filter		
Bentonite Seal		
Grout/Backfill		
Borehole Diameter (mm)	150	

Piezo / Standpipe

Remarks: (Standing time, day works, visitors, weather etc.)

Run in Rotary casing 3/4hr

Driller: D. Short

Crew: I. Sones

Rig: Dando 3000

Additional Equipment: R002

Excavation: | Backfill:

Total Number of Samples

SPT	U	D	B	W	P
4	2	7			

BH No.

Driller's Name | Driller's Signature | Client's Signature | Received: | Approved:

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DRILLER'S LOG

Site Name: Trowbridge BMG 2109 | Job No: | Date: 11.11.20 | Sheet of | Borehole No. 2

Depth (m)	Soil Description	Sample/Test Type	Sample/Test No.	Depth (m) From	Depth (m) To	U100s Blows	U100s Length	Standard Penetration Tests 1	2	3	4	5	6	Pen	Casing Depth (m)	Water Level (m)
	Start of Shift															
GL		B	1	.3	.5											
	Hardcore	D	2	.5												
.3		S	3	1.2				1	-	1	1	1	1	NR		
		S	4	2				1	2	1	1	-	1		1.7	Dry
3	Clay, Soil, Stone Brick Ash Wood	B	5	2	3											
		S	6	3				1	-	1	-	1	-		3	"
4m	Fill.	D	7	3.5												
		S	8	4				-	-	1	1	1	1		"	"
4m	Grey Brown Black	B	9	4	4.5											
	V. Soft	D	10	4.5												
4.5	Clay	UT	11	5		22										
		D	12	5.5				Shoe								
4.5	V. Soft Grey Brown	D	13	5.7												
		S	14	6				1	2	3	4	5	6		4.7	Dry
5.5	Clay	D	15	6.5												
		B	16	7	7.5											
5.5	Soft / Firm Grey	UT	17	7.5		23										
		D	18	8				Shoe								
9	Clay	D	19	8.5												
		S	20	9				2	3	4	5	6	6		"	"

End of Shift - Borehole Complete/Incomplete

Chiselling

Depth (m) From	Depth (m) To	Time From	Time To	Hours

	1	2	3
Water Entries			
Depth Struck			
Casing Depth			
Depth 5 mins			
Depth 10 mins			
Depth 20 mins			
Cut off at			

Water Added	From	To
Water Added		
Borehole kept Full		

Piezometer/Standpipe	From	To
Plain Pipe		
Slotted Pipe		
Filter		
Bentonite Seal		
Grout/Backfill		

Piezo / Standpipe

Borehole Diameter (mm): 150

Remarks: (Standing time, day works, visitors, weather etc.)

1Hr Pit.

Driller: D. Smart

Crew: J. Jones.

Rig: Dando 3000

Additional Equipment: R002

Excavation:

Backfill:

Total Number of Samples

SPT	U	D	B	W	P
6	2	8	4		

BH No.

Driller's Name

Driller's Signature

Client's Signature

Received:

Approved:

QMF 17B

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DRILLER'S LOG

Site Name: Trowbridge BMG 2109 | Job No: | Date: 11.11.20 | Sheet of | Borehole No. 2

Depth (m)	Soil Description
	Start of Shift
9	Stiff / V Stiff Grey
15	Clay
	———

Sample/Test Type	Sample/Test No.	Depth (m) From	Depth (m) To	U100s Blows	U100s Length
D	21	10			
UT	22	10.5		48	
D	23	11			
D	24	11.5			
S	25	12			
D	26	13			
S	27	13.5			
D	28	14			
S	29	15			

Standard Penetration Tests	1	2	3	4	5	6	Pen	Casing Depth (m)	Water Level (m)
Shoe									
	2	4	6	8	8	10		4.7	Dry
	3	6	6	9	12	15		–	–
	8	9	16	25	9	= NP		–	–

Chiselling	Depth (m) From	Depth (m) To	Time From	Time To	Hours

	1	2	3
Water Entries			
Depth Struck			
Casing Depth			
Depth 5 mins			
Depth 10 mins			
Depth 20 mins			
Cut off at			

Water Added	From	To
Water Added		
Borehole kept Full		

Piezometer/Standpipe	From	To
Plain Pipe		
Slotted Pipe		
Filter		
Bentonite Seal		
Grout/Backfill		

Piezo / Standpipe

Borehole Diameter (mm): 150

End of Shift - Borehole Complete/Incomplete

Remarks: (Standing time, day works, visitors, weather etc.)

Run in Rotary Casing 3/4Hr.

Driller: D Swart

Crew: J. Jones

Rig: Dando 3000

Additional Equipment: RO 02

Excavation: | Backfill:

Total Number of Samples

SPT	U	D	B	W	P
3	1	5			

BH No.

Driller's Name | Driller's Signature | Client's Signature | Received: | Approved:

JACKSON DRILLING LTD.

Email: info@jacksondrilling.co.uk • Telephone: 01458 851276 • Fax: 01458 850544

DRILLER'S LOG

Site Name: Trowbridge BMG 2109 | Job No: | Date: 12.11.20 | Sheet of | Borehole No. 3

Depth (m)	Soil Description	Sample/Test Type	Sample/Test No.	Depth (m) From	Depth (m) To	U100s Blows	U100s Length	Standard Penetration Tests 1	2	3	4	5	6	Pen	Casing Depth (m)	Water Level (m)
	Start of Shift															
GL		D	1	.5												
	Hardcore.	B	2	.5	1											
.5		S	3	1.2				1	-	-	1	1	1			
		D	4	1.7												
.5	Clay, Stone, Brick Metal	S	5	2				-	-	3	-	-	-		1.7	Dry
	Silty Clay Fill.	D	6	2.5												
		S	7	3				1	-	1	1	1	1		3	"
6.8		B	8	3	3.5											
		D	9	3.5												
6.8	Firm Grey Clay.	S	10	4				1	1	1	1	1	2		-	-
		D	11	4.5												
9.5		UT	12	5		9	blows									
		D	13	5.5				Shoe								
		B	14	5.5	6.											
		S	15	6				3	5	4	4	4	4		6	"
		D	16	6.5												
		D	17	6.8												
		UT	18	7.5		29	blows	NR.								
		B	19	7.5	8											
		D	20	8.5												

End of Shift - Borehole Complete/Incomplete

Chiselling

Depth (m) From	Depth (m) To	Time From	Time To	Hours

	1	2	3
Water Entries			
Depth Struck			
Casing Depth			
Depth 5 mins			
Depth 10 mins			
Depth 20 mins			
Cut off at			

Water Added	From	To
Water Added		
Borehole kept Full		

Piezometer/Standpipe	From	To
Plain Pipe		
Slotted Pipe		
Filter		
Bentonite Seal		
Grout/Backfill		

Piezo / Standpipe

Borehole Diameter (mm): 150

Remarks: (Standing time, day works, visitors, weather etc.)

1Hr P.t.

Driller: D. Smart

Crew: J. Jones.

Rig: Dando 3000

Additional Equipment: R002.

Excavation: | Backfill:

Total Number of Samples

SPT	U	D	B	W	P
5	2	9	4		

BH No.

Driller's Name | Driller's Signature: D. | Client's Signature | Received: | Approved:

JACKSON DRILLING LTD.

Email: info@jacksondrilling.co.uk • Telephone: 01458 851276 • Fax: 01458 850544

DRILLER'S LOG

Site Name: ~~Trowbridge~~ BMG 2109 | Job No: | Date: 12.11.20 | Sheet of | Borehole No. 3

Depth (m)	Soil Description	Sample/Test Type	Sample/Test No.	Depth (m) From	Depth (m) To	U100s Blows	U100s Length	Standard Penetration Tests 1	2	3	4	5	6	Pen	Casing Depth (m)	Water Level (m)
	Start of Shift															
9.5	Rm Grey Clay.	S	21	9				3	3	8	8	5	6		7.5	Dry
		D	22	10												
12.5		UT	23	10.5		39	DIS.									
		D	24	11				Shoe								
		D	25	11.5												
		S	26	12				2	4	6	7	7	10		"	"

19mm pipe to 12m

9m plain
3m Slotted.

50mm Pipe to 6m

3m plain
3m Slotted.

End of Shift - Borehole Complete/Incomplete

Chiselling Depth (m) From	To	Time From	To	Hours

Water Entries	1	2	3
Depth Struck			
Casing Depth			
Depth 5 mins			
Depth 10 mins			
Depth 20 mins			
Cut off at			

Water Added	From	To
Water Added		
Borehole kept Full		

Piezometer/Standpipe	From	To
Plain Pipe		
Slotted Pipe		
Filter		
Bentonite Seal		
Grout/Backfill		
Borehole Diameter (mm)	150	

Piezo / Standpipe

Remarks: (Standing time, day works, visitors, weather etc.)

3/4" HV collar Gravel/Cement.

Driller: D. Swart

Crew: J. Jones.

Rig: Dando 3000

Additional Equipment: RO 02

Excavation: | Backfill:

Total Number of Samples					
SPT	U	D	B	W	P
2	1	3			

BH No.

Driller's Name | Driller's Signature | Client's Signature

Received: | Approved:

QMF 17B

JACKSON DRILLING LTD.

Email: info@jacksondrilling.co.uk • Telephone: 01458 851276 • Fax: 01458 850544

DRILLER'S LOG

Strata Record

Depth	Description
16.50	Clearing out casing
18.00	Mudstone (PWF)
19.50	" "
21.00	" "
22.50	" "
24.00	" "
25.00	" "

Borehole Complete / Incomplete

Drill Run Record

Depth from	Depth to	OH/Core	Time o'clock	Run (mins)	Core Length	Core Recov'	Flush return	Casing Depth	Water Level
15.00	16.50	OH	10:00	15	–	–	–	16.50	
16.50	18.00	CORE		20	1.50	1.50	100%	"	
18.00	19.50	"		15	"	"	"	"	
19.50	21.00	"		20	"	"	"	"	
21.00	22.50	"		20	"	"	"	"	
22.50	24.00	"		15	"	"	"	"	
24.00	25.00	"		30	1.00	0.90	"	"	

Penetration Testing and Sampling

Depth from	Depth to	Type	1	2	3	4	5	6	N Blows U	Sample Length	Casing Depth	Water Level

Groundwater Records

WATER ENCOUNTERED	1	2	3
Depth Struck			
Casing Depth			
Inflow			
Depth 5 mins			
Depth 10 mins			
Depth 15 mins			
Depth 20 mins			
Cut off at			

PIEZOMETER / STANDPIPE

WATER LEVELS

	Depth	Casing	Time
Morning	10.50	16.50	08:30
Evening			
Other			

FIELD RECORDS

Piezometer/Standpipe	From	To
Plain Pipe		
Slotted Pipe		
Filter		
Bentonite Seal		
~~Grout~~/Backfill	0.20	25.00
Borehole Dia.		

FLUSH

	From	To
Flush Type: AIRMIST	16.50	25.00
Loss of Flush		

Excavation Dimensions:

Backfill:

Remarks: Visitors, Instructions, Weather, etc.

1 hour set up
45 mins filling water bowser.
30 mins pulling casing
30 mins backfilling hole.

S/C	Core	O/Hole	Case	W

Move	Drill	Stand	Break	Work

Crew: D. Cut, P. Marlow

Driller's Signature:

SITE: TROWBRIDGE WWTW

JOB No.:

RIG TYPE: COMACCHIO 205 COMP & BOWSER

DAY: WEDNESDAY

DATE: 11/11/20

Move From:

BH No.: BH01

Jackson Drilling Limited

Rotary Drilling Daily Record

JACKSON DRILLING LTD.

Email: info@jacksondrilling.co.uk • Telephone: 01458 851276 • Fax: 01458 850544

DRILLER'S LOG

Strata Record

Depth	Description
15.00	Clearing out casing
16.50	Mudstone (PWF)
18.00	" "
19.50	" "
21.00	" "
22.50	" "
24.00	" "
25.00	" "

Gas bungs and end caps on both 19mm pipe and 50mm pipe with flush cover.

Borehole Complete / Incomplete

Drill Run Record

Depth from	Depth to	OH/Core	Time o'clock	Run (mins)	Core Length	Core Recov'	Flush return	Casing Depth	Water Level
13.50	15.00	OH	09:00	10	–	–	–	15.00	
15.00	16.50	CORE		20	1.50	1.50	100%	"	
16.50	18.00	"		15	"	"	"	"	
18.00	19.50	"		20	"	"	"	"	
19.50	21.00	"		20	"	"	"	"	
21.00	22.50	"		20	"	"	"	"	
22.50	24.00	"		15	"	"	"	"	
24.00	25.00	"		10	"	"	"	"	

Penetration Testing and Sampling

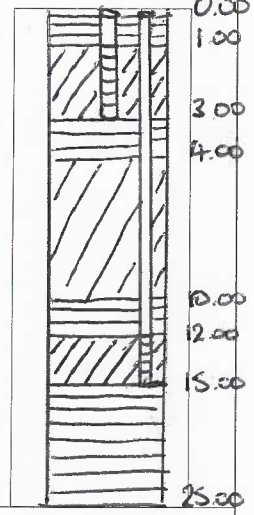
Depth from	Depth to	Type	1	2	3	4	5	6	N Blows U	Sample Length	Casing Depth	Water Level

Groundwater Records

WATER ENCOUNTERED	1	2	3
Depth Struck			
Casing Depth			
Inflow			
Depth 5 mins			
Depth 10 mins			
Depth 15 mins			
Depth 20 mins			
Cut off at			

WATER LEVELS	Depth	Casing	Time
Morning			
Evening			
Other			

19mm 50mm
PIEZOMETER / STANDPIPE



FIELD RECORDS

Piezometer/Standpipe	From	To
Plain Pipe	0.00	1.00
	10.00	12.00
Slotted Pipe	1.00	3.00
	12.00	15.00
Filter	1.00	3.00
	12.00	15.00
Bentonite Seal	0.10	1.00
	3.00	4.00
~~Grout/Backfill~~	10.00	12.00
~~Borehole Dia.~~	15.00	25.00

FLUSH	From	To
Flush Type: AIR MIST	15.00	25.00
Loss of Flush		

Excavation Dimensions:

Backfill:

Remarks: Visitors, Instructions, Weather, etc.

1 hour set up
45 mins installing

S/C	Core	O/Hole	Case	W

Move	Drill	Stand	Break	Work

Crew D. Coy
P. Marlow

Driller's Signature

SITE: TROWBRIDGE WWTW

JOB No.

RIG TYPE: COMPACCHIO 20S
COMP & BOWSER

DAY: THURSDAY

DATE: 12/11/20

Move From:

BH No.: BH02

Jackson Drilling Limited

Rotary Drilling Daily Record

Appendix 3: SPT Calibration Certificates

SPT Calibration Report

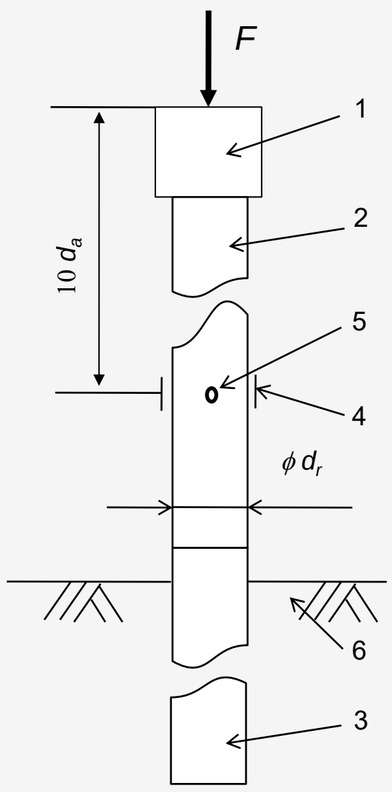
Hammer Energy Measurement Report

Type of Hammer	SPT HAMMER
Test No	EQU2430
Client	RD DRILLING

Test Depth (m)		8.00
Mass of hammer	*m* =	63.5kg
Falling height	*h* =	0.76m
E_{theor} =	*m x g x h* =	473J

Characteristics of the instrumented rod

Diameter	d_r =	0.052 m
Length of instrumented rod		0.558 m
Area	A =	11.61 cm²
Modulus	E_a =	206843 MPa



Key

1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

F Force
d_r Diameter of rod

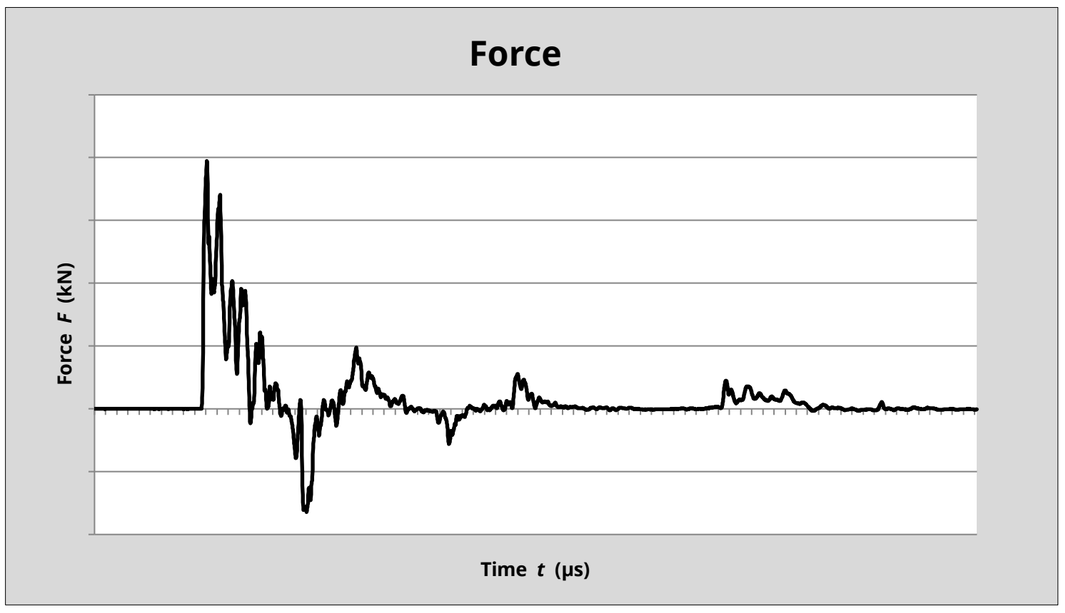
Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

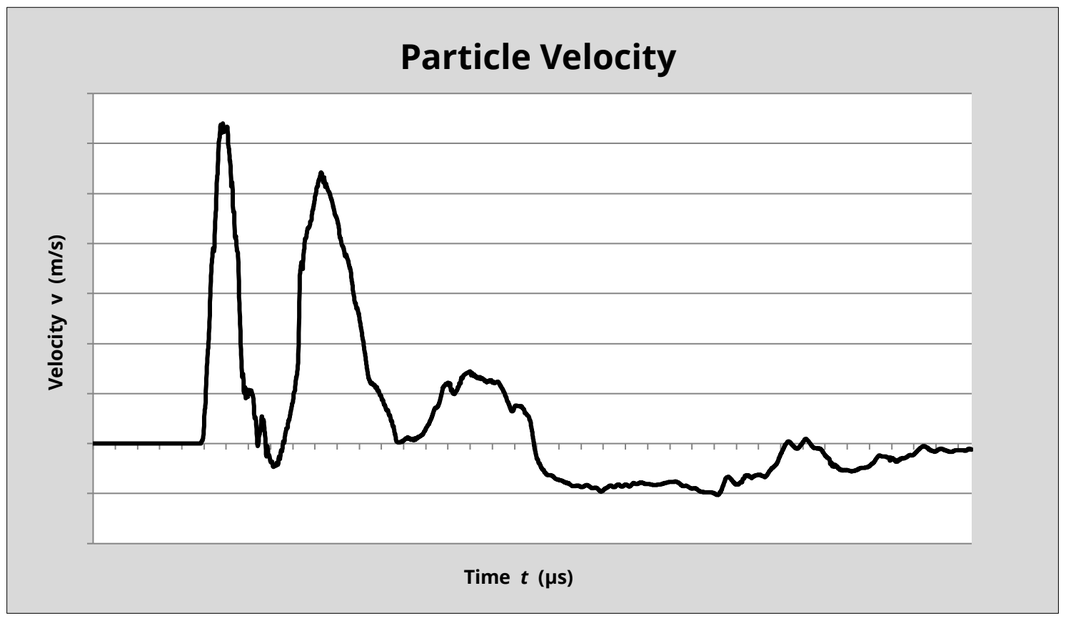
DATE OF TEST	VALID UNTIL	HAMMER ID
20/12/2019	19/12/2020	RD02

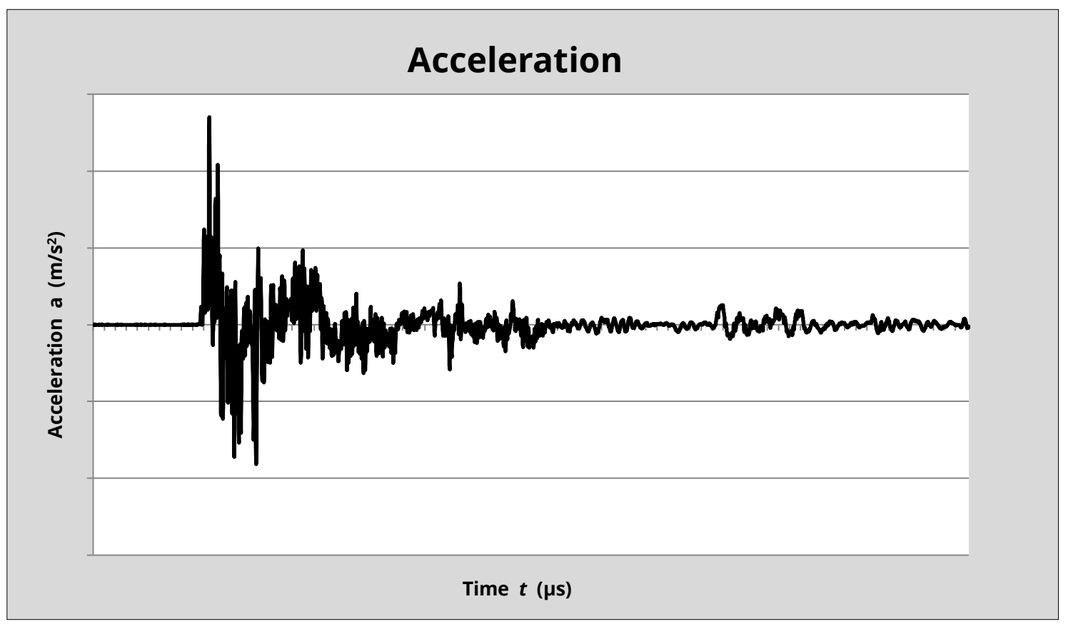
E_{meas} = **0.352** kN-m

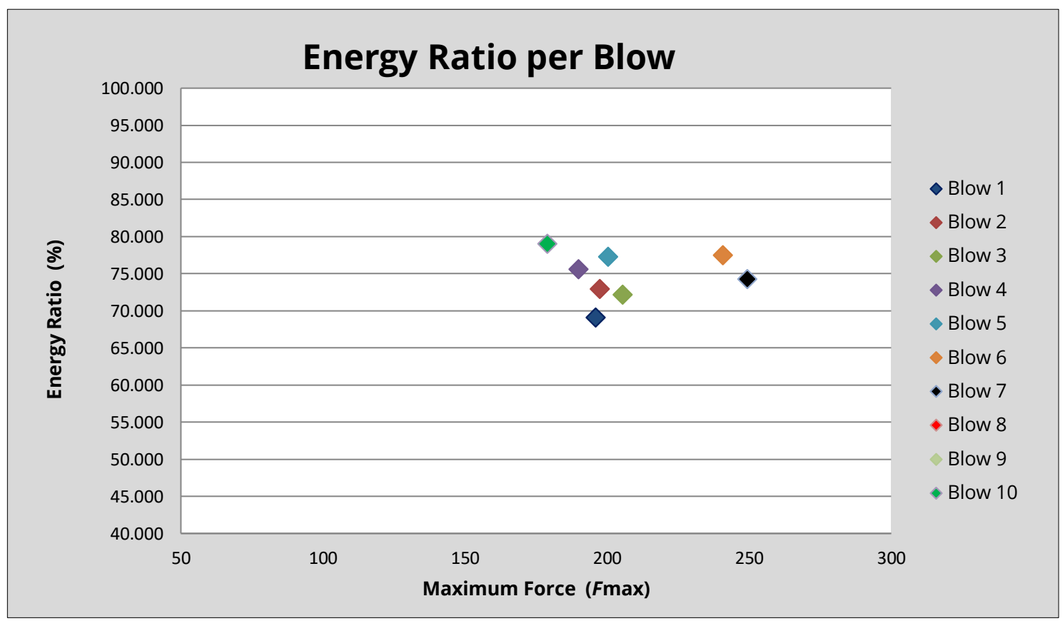
E_{theor} = **0.473** kN-m

Comments









Energy Ratio (Er) = $\frac{E_{meas}}{E_{theor}}$ = **74.43%**

Equipe SPT Analyzer Operator	Certificate prepared by	Certificate checked by	Certificate date
AF	03/01/2020	03/01/2020	03/01/2020

 Equipe Group, The Paddocks, Home Farm Offices, The Upton Estate, Banbury, Oxfordshire, OX15 6HU
Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

Appendix 4: Permeability Testing

PIEZOMETER FALLING HEAD PERMEABILITY TEST

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

Project Name:	Trowbridge WRC
Project Number:	BMG2109
Borehole Ref:	BH03
Date:	13-Nov-20
Borehole Diameter (mm):	50
Resting Water Level (m bd):	3.35
Length (L) of Response Zone (m):	3.00

Base of Standpipe (m):	6.00
Geology:	Made Ground
Borehole Diameter (D) (m):	5.00E-02
Scenario (F):	d2
F Value	4.50E+00
Area (A) of Borehole (m^2)	1.96E-03

Time (mins)	Hi(mbd)	H(head)	H/Ho
0.00	1.300	2.050	1.000
1.00	1.380	1.970	0.961
3.00	1.500	1.850	0.902
5.00	1.610	1.740	0.849
7.50	1.910	1.440	0.702
10.00	2.210	1.140	0.556
15.00	2.620	0.730	0.356
20.00	2.900	0.450	0.220
25.00	3.070	0.280	0.137
30.00	3.140	0.210	0.102
35.00	3.180	0.170	0.083
40.00	3.220	0.130	0.063
45.00	3.250	0.100	0.049
50.00	3.270	0.080	0.0390
55.00	3.290	0.060	0.029
60.00	3.300	0.050	0.024
65.00	3.310	0.040	0.020
70.00	3.310	0.040	0.020
90.00	3.330	0.020	0.010
120.00	3.350	0.000	0.000

Basic Time Lag Method (after BS5930:1999)

K= A/(F*T)

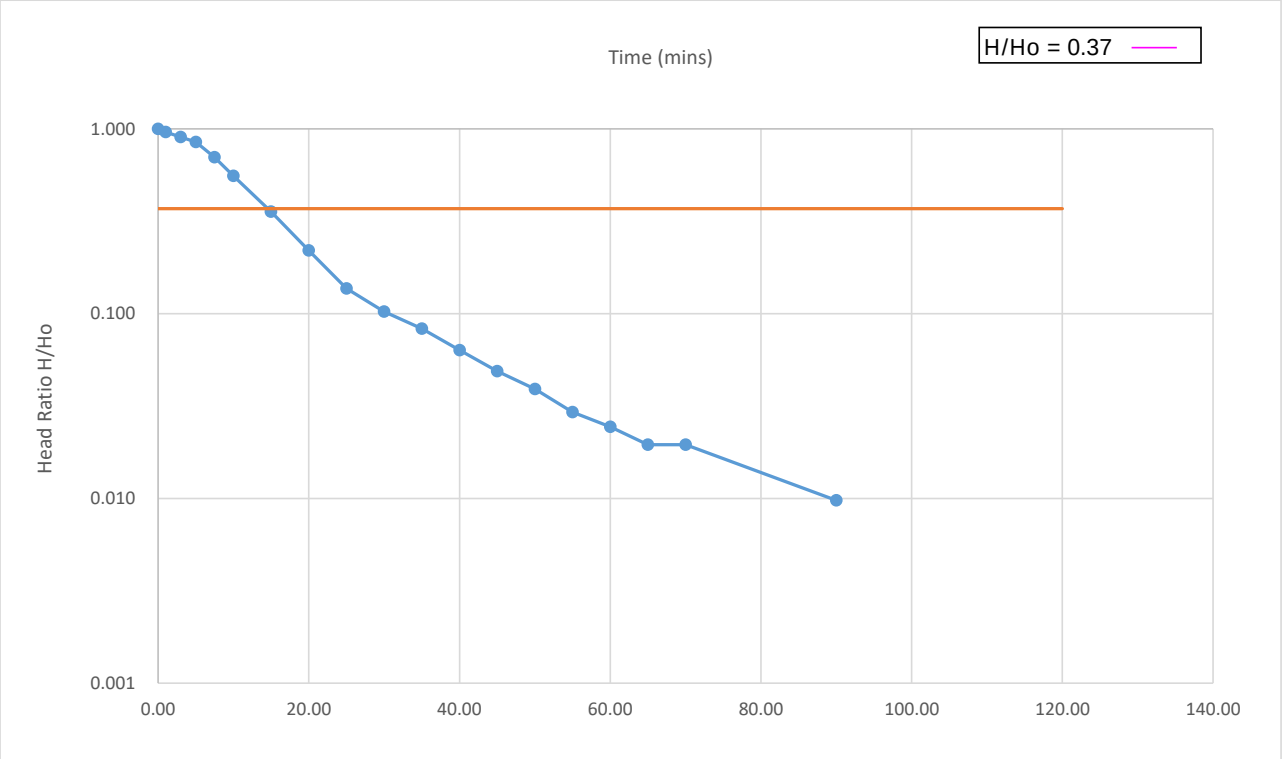
T= TIME FOR H/Ho:0.37

T=	15.00	(min)
T=	900.00	(sec)
K=	4.85E-07	(m/s)
K=	0.042	(m/d)

General Method (after BS5930:1999)

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

t1=	25.00	(min)
t2=	65.00	(min)
H(head)1=	0.28	(m)
H(head)2=	0.04	(m)
K=	3.54E-07	(m/s)
K=	0.031	(m/d)



PIEZOMETER RISING HEAD PERMEABILITY TEST

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

Project Name:	Trowbridge WRC
Project Number:	BMG2109
Borehole Ref:	BH03
Date:	13-Nov-20
Borehole Diameter (mm):	50
Resting Water Level (m bd):	3.35
Length (L) of Response Zone (m):	3.00

Base of Standpipe (m):	6.00
Geology:	Made Ground
Borehole Diameter (D) (m):	5.00E-02
Scenario (F):	d2
F Value	4.50E+00
Area (A) of Borehole (m^2)	1.96E-03

Time (mins)	Hi(mbd)	H(head)	H/Ho
0.00	4.750	-1.400	1.000
0.50	4.735	-1.385	0.989
1.00	4.710	-1.360	0.971
1.50	4.690	-1.340	0.957
2.00	4.660	-1.310	0.936
3.00	4.620	-1.270	0.907
4.00	4.570	-1.220	0.871
5.00	4.520	-1.170	0.836
7.00	4.450	-1.100	0.786
8.00	4.405	-1.055	0.754
9.00	4.370	-1.020	0.729
10.00	4.330	-0.980	0.700
12.00	4.275	-0.925	0.661
15.00	4.190	-0.840	0.6000
20.00	4.065	-0.715	0.511
25.00	3.960	-0.610	0.436
30.00	3.857	-0.507	0.362
35.00	3.790	-0.440	0.314
40.00	3.715	-0.365	0.261
60.00	3.555	-0.205	0.146

Basic Time Lag Method (after BS5930:1999)

K= A/(F*T)

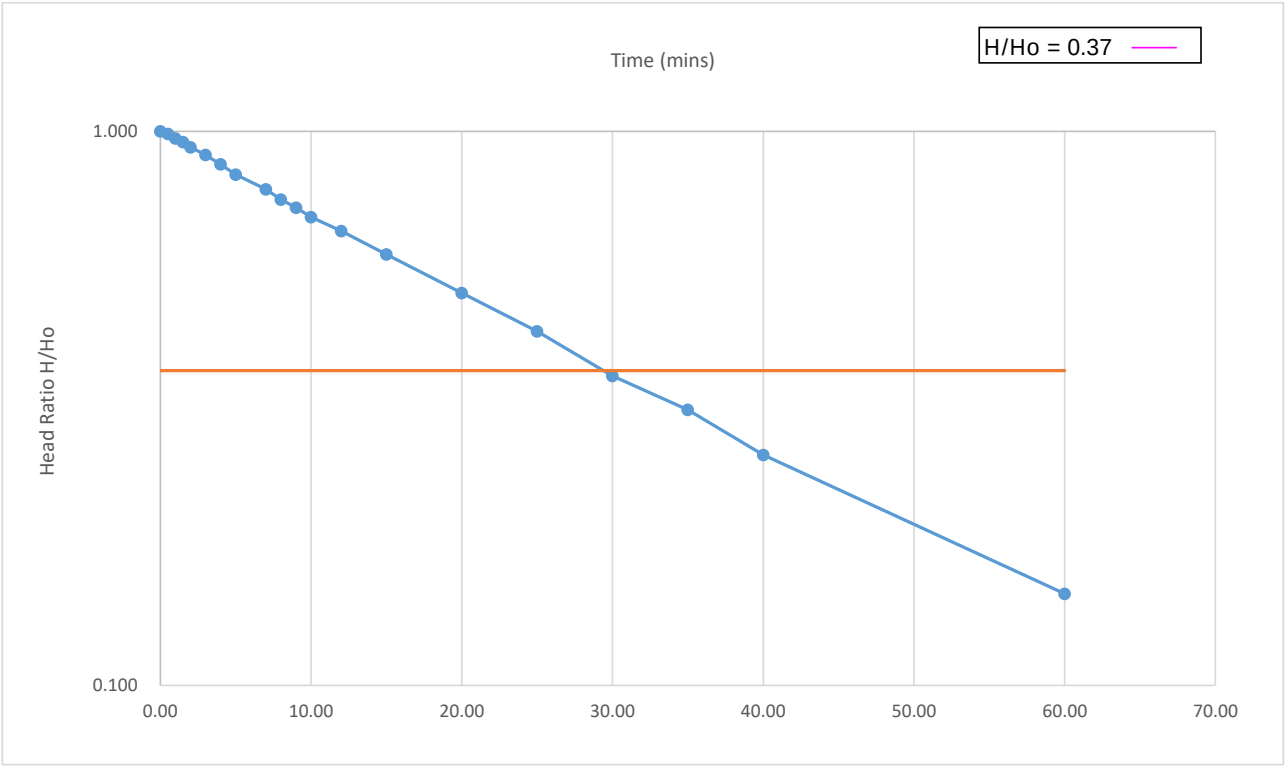
T= TIME FOR H/Ho:0.37

T=	30.00	(min)
T=	1800.00	(sec)
K=	2.42E-07	(m/s)
K=	0.021	(m/d)

General Method (after BS5930:1999)

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

t1=	0.00	(min)
t2=	60.00	(min)
H(head)1=	-1.40	(m)
H(head)2=	-0.25	(m)
K=	2.09E-07	(m/s)
K=	0.018	(m/d)



Appendix 5: Ground Gas and Groundwater Monitoring Results

BWB GAS AND GROUNDWATER MONITORING

Site:		Trowbridge WRC
Client:		Wessex Water Services Ltd
Job No.:		BMG2109
Date:		13th November 2020
Start / End Time:		8.30/9.00
Engineer:		IW
Monitoring Equipment:	Gas Meter ID	BWB00960
	PID ID	BWB00946
	Dip Tape	BWB00978
	Other	

NR = Not Recorded
Dry = No Groundwater

CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Weather Conditions	Start	End
(Dry / Raining)	DRY	DRY
Wind Strength (m/s)	4.0	4.0
Wind Direction (from)	W	W
Temperature (°C)	8.0	8.0
Barometric Pressure (h Pa / mB)	1007.0	1006.0
App 12 Hour Pressure (h Pa / mB)	1008.0	
12 Hour Pressure Trend	FALLING	
PID - Air		
PID - Calibration Gas		

Location Reference	Relative Pressure (Pa)	Flow (l/hr)		Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	PID (ppm)	Depth to water (m)	Base of Response Zone (m)	Free-Phase Product Level Top (m)	Groundwater Elevation (m AOD)	Notes
		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
Ambient Air Start (Calibration)	<0.1		<0.1		<0.1		<0.1		18.4	<1	<1	<0.1					
Ambient Air Finish (Calibration)	<0.1		<0.1		<0.1		<0.1		18.5	<1	10	<0.1					
BH02 (S)	<0.1		<0.1		<0.1		2.4		14.0	<1	<1	0.4	1.97	3.07		34.13	
BH02 (D)	<0.1		<0.1		<0.1		0.1		17.2	<1	110.0	<0.1	NR	NR			Could not get dip tape in to measure groundwater level.
BH03 (S)	<0.1		<0.1		<0.1		1.1		17.5	<1	39.0	0.8	3.35	6.08		32.38	
BH03 (D)	<0.1		<0.1		<0.1		0.3		17.7	<1	20.0	0.3	3.60	12.08		32.13	

BWB GAS AND GROUNDWATER MONITORING

Site:		Trowbridge WRC
Client:		Wessex Water Services Ltd
Job No.:		BMG2109
Date:		20th November 2020
Start / End Time:		
Engineer:		JD
Monitoring Equipment:	Gas Meter ID	
	PID ID	
	Dip Tape	
	Other	

NR = Not Recorded
Dry = No Groundwater

CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Weather Conditions	Start	End
(Dry / Raining)	DRY	DRY
Wind Strength (m/s)	5.4	5.4
Wind Direction (from)	SW	SW
Temperature (°C)	9.0	9.0
Barometric Pressure (h Pa / mB)	1029.0	1029.0
App 12 Hour Pressure (h Pa / mB)	1034.0	
12 Hour Pressure Trend	FALLING	
PID - Air		
PID - Calibration Gas		

Location Reference	Relative Pressure (Pa)	Flow (l/hr)		Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	PID (ppm)	Depth to water (m)	Base of Response Zone (m)	Free-Phase Product Level Top (m)	Groundwater Elevation (m AOD)	Notes
		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
Ambient Air Start (Calibration)																	
Ambient Air Finish (Calibration)																	
BH02 (S)	-0.0500		<0.1		<0.1		4.1		14.1	<1	1	NR	2.53	2.99		33.57	
BH02 (D)																	Borehole flooded, unable to monitor.
BH03 (S)	0.0200		-0.8		0.2		0.6		19.6	<1	8	NR	3.07	6.01		32.67	
BH03 (D)	0.0300		-0.1		<0.1	1.4	0.3	19.7	20.7	<1	<1	NR	3.26	12.04		32.47	

BWB GAS AND GROUNDWATER MONITORING

Site:		Trowbridge WRC
Client:		Wessex Water Services Ltd
Job No.:		BMG2109
Date:		26th November 2020
Start / End Time:		
Engineer:		JD
Monitoring Equipment:	Gas Meter ID	
	PID ID	
	Dip Tape	
	Other	

NR = Not Recorded
Dry = No Groundwater

CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Weather Conditions	Start	End
(Dry / Raining)	DRY	DRY
Wind Strength (m/s)	1.3	1.3
Wind Direction (from)	NE	ME
Temperature (°C)	8.0	8.0
Barometric Pressure (h Pa / mB)	1018.0	1018.0
App 12 Hour Pressure (h Pa / mB)	1020.0	
12 Hour Pressure Trend	FALLING	
PID - Air		
PID - Calibration Gas		

Location Reference	Relative Pressure (Pa)	Flow (l/hr)		Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	PID (ppm)	Depth to water (m)	Base of Response Zone (m)	Free-Phase Product Level Top (m)	Groundwater Elevation (m AOD)	Notes
		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
Ambient Air Start (Calibration)																	
Ambient Air Finish (Calibration)																	
BH02 (S)	<0.1		<0.1		<0.1		5.9		12.4	<1	4		1.57	2.96		34.53	
BH02 (D)	0.0200		<0.1		<0.1		0.6		20.8	<1	2		1.26	13.97		34.84	
BH03 (S)	0.0200		<0.1	0.1	<0.1		3.4		12.7	<1	<1		3.33	6.01		32.40	
BH03 (D)	<0.1		<0.1		<0.1	0.5	0.4	19.9	20.6	<!	1						

BWB GAS AND GROUNDWATER MONITORING

Site:		Trowbridge WRC
Client:		Wessex Water Services Ltd
Job No.:		BMG2109
Date:		7th December 2020
Start / End Time:		
Engineer:		JD
Monitoring Equipment:	Gas Meter ID	
	PID ID	
	Dip Tape	
	Other	

NR = Not Recorded
Dry = No Groundwater

CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Weather Conditions	Start	End
(Dry / Raining)	DRY	DRY
Wind Strength (m/s)	2.5	2.5
Wind Direction (from)	NE	NE
Temperature (°C)	3.0	3.0
Barometric Pressure (h Pa / mB)	996.0	996.0
App 12 Hour Pressure (h Pa / mB)	999.0	
12 Hour Pressure Trend	FALLING	
PID - Air		
PID - Calibration Gas		

Location Reference	Relative Pressure (Pa)	Flow (l/hr)		Methane (%v/v)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	PID (ppm)	Depth to water (m)	Base of Response Zone (m)	Free-Phase Product Level Top (m)	Groundwater Elevation (m AOD)	Notes
		Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady								
Ambient Air Start (Calibration)																	
Ambient Air Finish (Calibration)																	
BH02 (S)	0.0300		<0.1		<0.1		5.4		8.3	<1	<1		2.36	2.98		33.74	
BH02 (D)	0.0500		<0.1		<0.1		0.2	20.1	21.9	<1	<1		3.36	13.96		32.74	
BH03 (S)	0.0200		<0.1		<0.1		2.3		18.9	<1	12			6.01			
BH03 (D)	<0.1		<0.1		<0.1	0.2	0.1	21.1	22.1	<!	4		2.90	12.06		32.83	

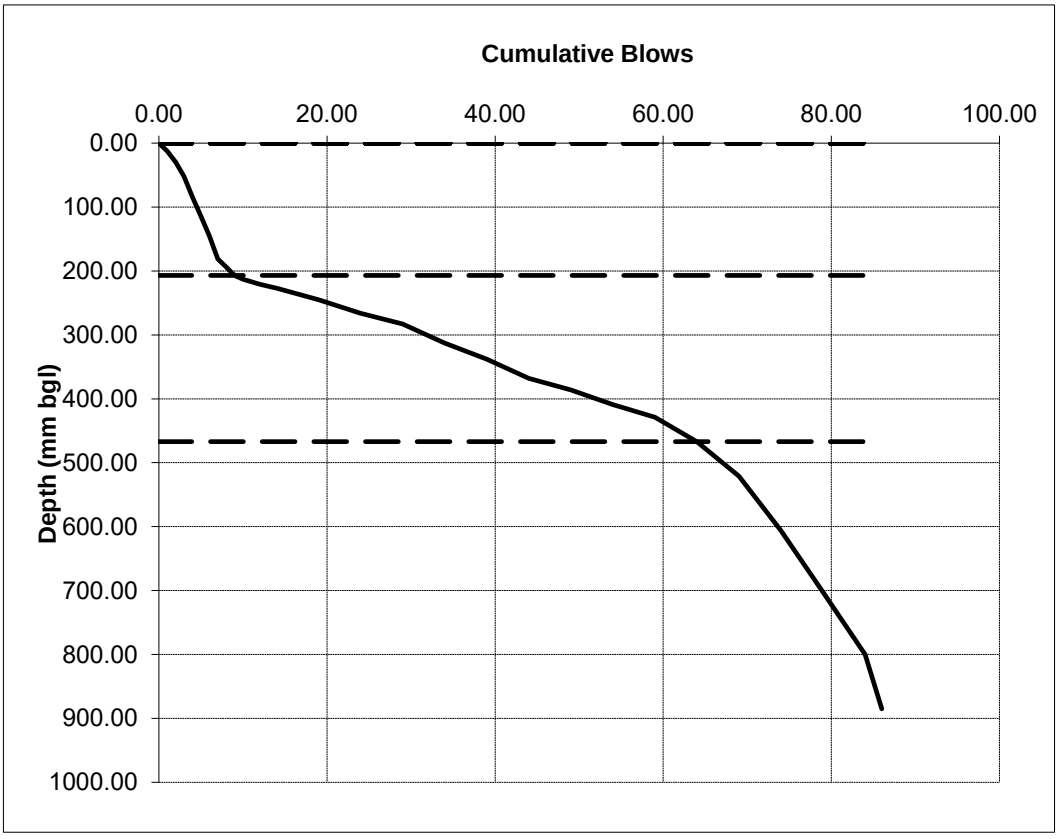
Appendix 6: TRL DCP Testing Results

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109
PROJECT TITLE	Trowbridge WRC
TEST REFERENCE	DCP01
DATE	10-Nov-20
MATERIAL/ STRATA TYPE	Made Ground
START DEPTH (mm bgl)	0
WEATHER/ GROUND CONDITION	Dry

BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	9	9	207	207	11.0
2	55	64	260	467	58.5
3	22	86	418	885	13.4



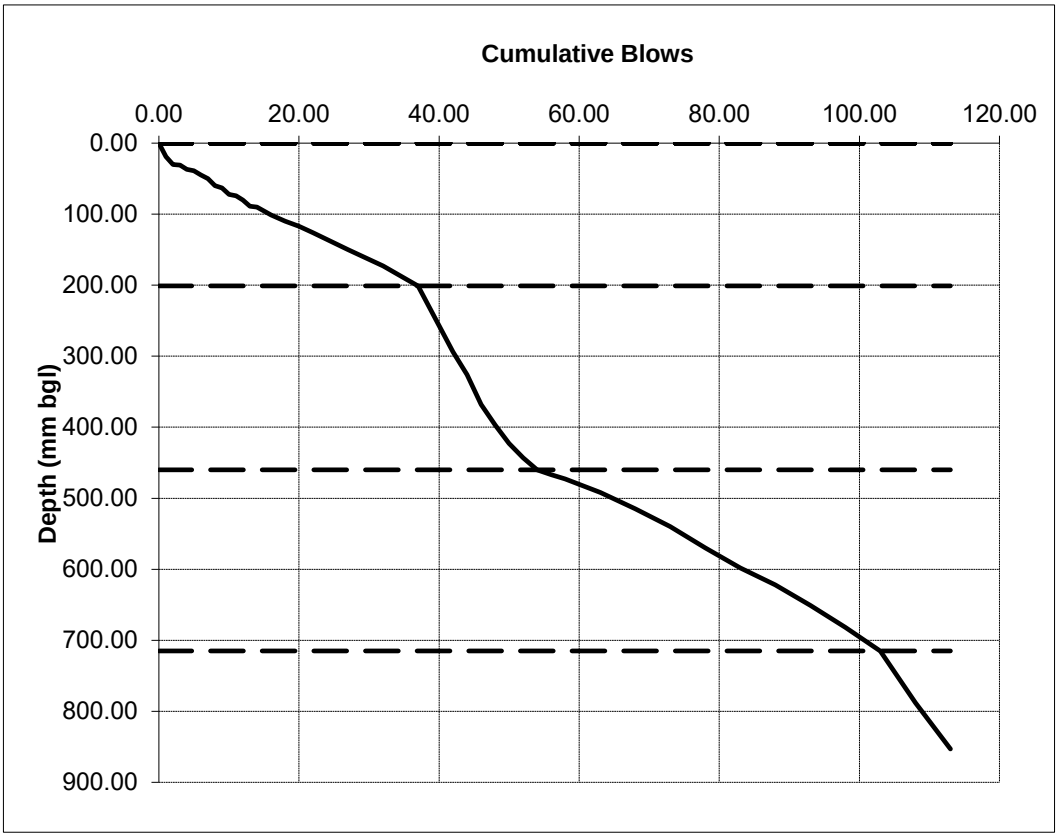
CBR Interpretation based on the TRL Equation: Log10(CBR) = 2.480 - [1.057 x Log 10(DCP Strength)]

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109
PROJECT TITLE	Trowbridge WRC
TEST REFERENCE	DCP02
DATE	10-Nov-20
MATERIAL/ STRATA TYPE	Made Ground
START DEPTH (mm bgl)	0
WEATHER/ GROUND CONDITION	Dry

BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	37	37	201	201	50.5
2	17	54	259	460	17.0
3	49	103	255	715	52.8
4	10	113	138	853	18.8



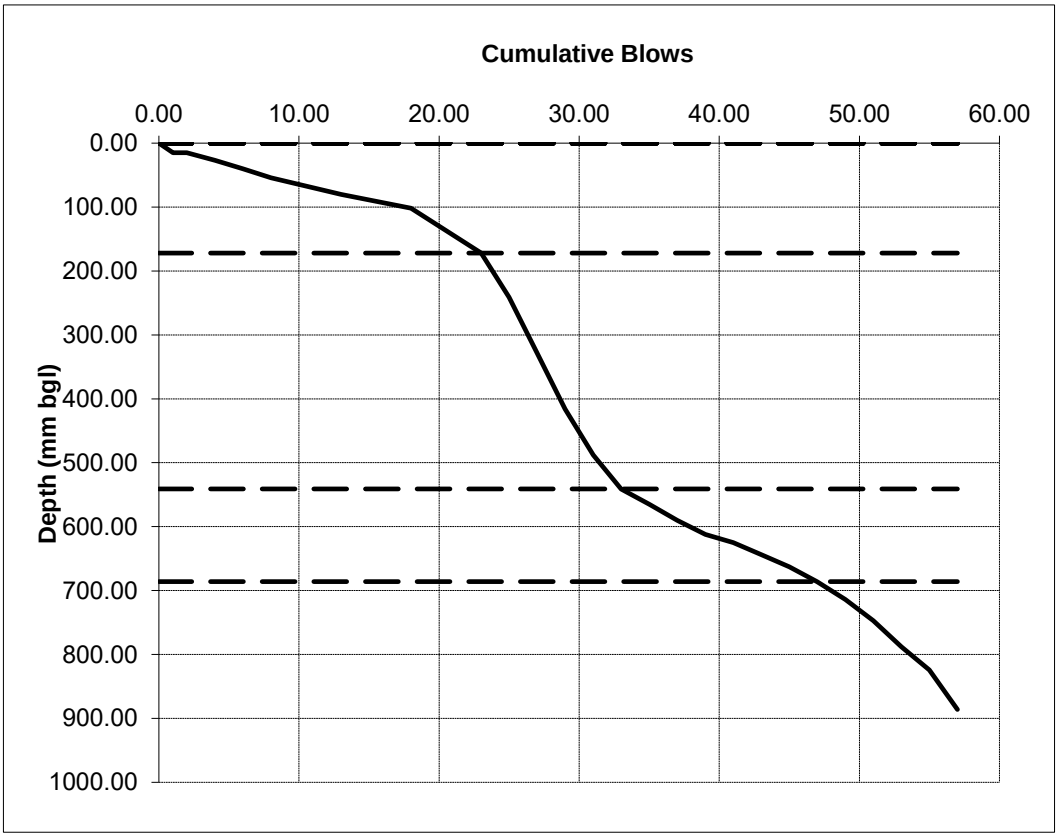
CBR Interpretation based on the TRL Equation: Log10(CBR) = 2.480 - [1.057 x Log 10(DCP Strength)]

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109
PROJECT TITLE	Trowbridge WRC
TEST REFERENCE	DCP02
DATE	10-Nov-20
MATERIAL/ STRATA TYPE	Made Ground
START DEPTH (mm bgl)	0
WEATHER/ GROUND CONDITION	Dry

BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	23	23	172	172	36.0
2	10	33	369	541	6.7
3	14	47	145	686	25.5
4	10	57	200	886	12.7



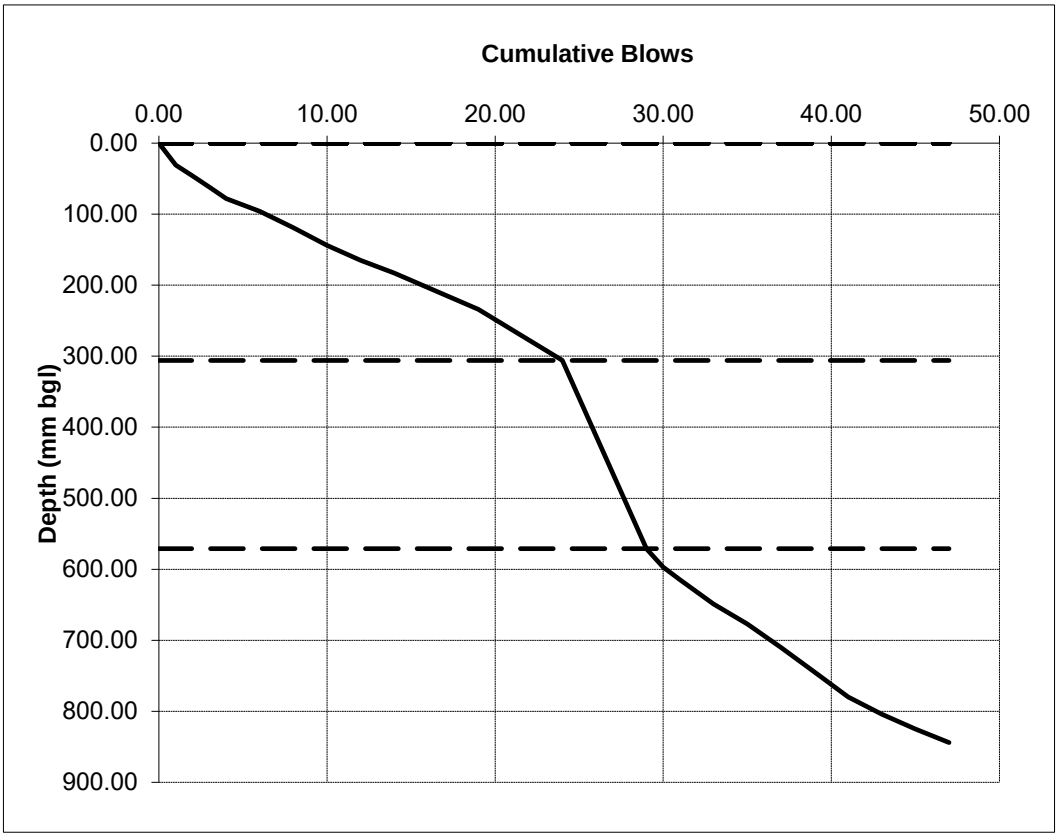
CBR Interpretation based on the TRL Equation: Log10(CBR) = 2.480 - [1.057 x Log 10(DCP Strength)]

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109
PROJECT TITLE	Trowbridge WRC
TEST REFERENCE	DCP04
DATE	10-Nov-20
MATERIAL/ STRATA TYPE	Made Ground
START DEPTH (mm bgl)	0
WEATHER/ GROUND CONDITION	Dry

BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	24	24	306	306	20.5
2	5	29	265	571	4.5
3	18	47	273	844	17.1



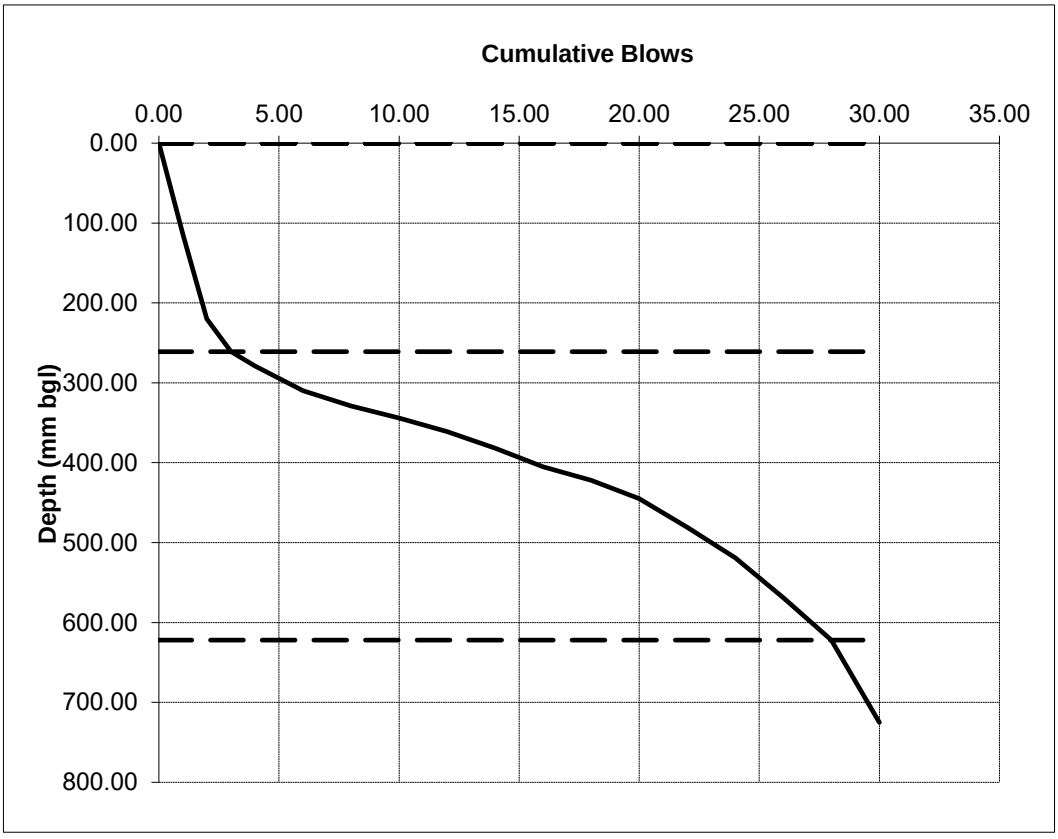
CBR Interpretation based on the TRL Equation: Log10(CBR) = 2.480 - [1.057 x Log 10(DCP Strength)]

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109
PROJECT TITLE	Trowbridge WRC
TEST REFERENCE	DCP05
DATE	10-Nov-20
MATERIAL/ STRATA TYPE	Made Ground
START DEPTH (mm bgl)	0
WEATHER/ GROUND CONDITION	Dry

BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	3	3	261	261	2.7
2	25	28	361	622	18.0
3	2	30	103	725	4.7



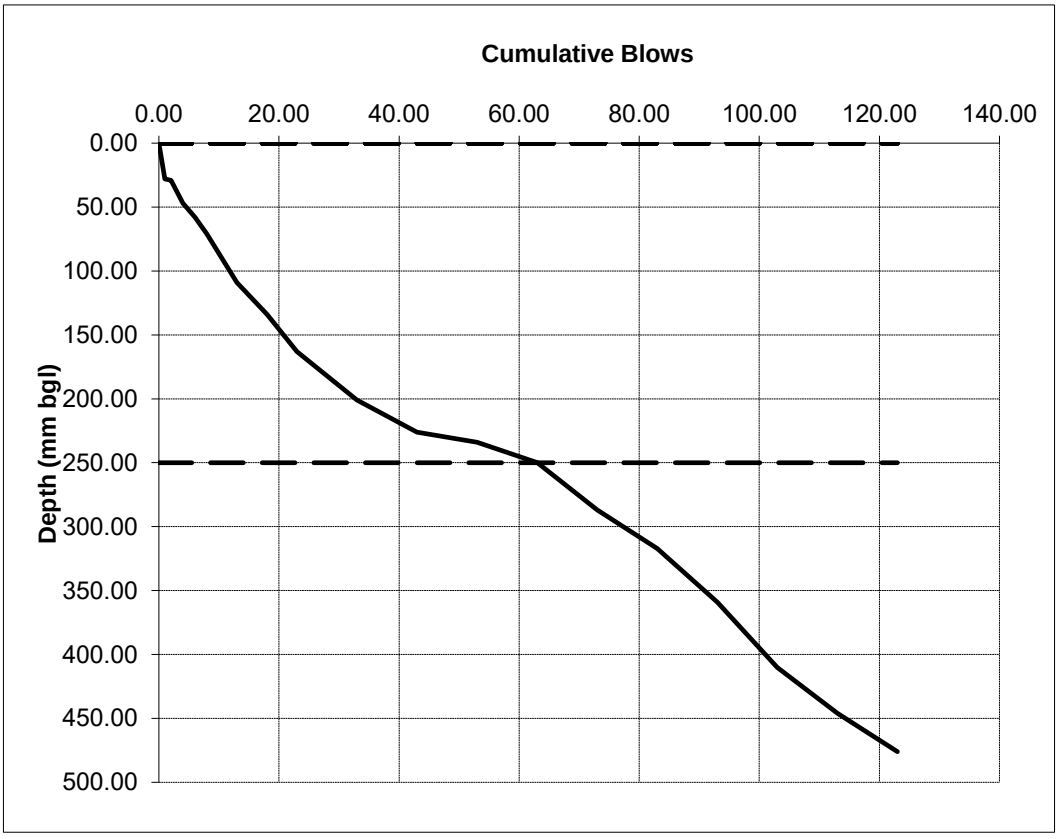
CBR Interpretation based on the TRL Equation: Log10(CBR) = 2.480 - [1.057 x Log 10(DCP Strength)]

Dynamic Cone Penetrometer

PROJECT NUMBER	BMG2109
PROJECT TITLE	Trowbridge WRC
TEST REFERENCE	DCP06
DATE	10-Nov-20
MATERIAL/ STRATA TYPE	Made Ground
START DEPTH (mm bgl)	0
WEATHER/ GROUND CONDITION	Dry

BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Layer	Blows	Cumulative Blows	Layer Thickness (mm)	Total Depth (mm bgl)	CBR (%)
1	63	63	250	250	70.4
2	60	123	226	476	74.3



CBR Interpretation based on the TRL Equation: Log10(CBR) = 2.480 - [1.057 x Log 10(DCP Strength)]

Appendix 7: Soil Chemical Testing Results

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BWB Consulting Limited
5th Floor
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Nottingham
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Analytical Report Number : 20-42335

Replaces Analytical Report Number: 20-42335, issue no. 1
Additional analysis undertaken.

Project / Site name:	Towbridge WRC	**Samples received on:**	13/11/2020
Your job number:	BMG2109	**Samples instructed on/ Analysis started on:**	19/11/2020
Your order number:	POR032908	**Analysis completed by:**	18/12/2020
Report Issue Number:	2	**Report issued on:**	18/12/2020
Samples Analysed:	1 leachate sample - 4 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-42335
Project / Site name: Towbridge WRC
Your Order No: POR032908

Lab Sample Number				1689562	1689563	1689564	1689565
Sample Reference				BH02	BH02	BH03	BH03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00-1.00	4.00-4.00	3.50-3.50	7.50-7.50
Date Sampled				11/11/2020	11/11/2020	12/11/2020	12/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	7	20	24	19
Total mass of sample received	kg	0.001	NONE	2	2	2	2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	< 0.001	-
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	9.6	7.9	8	8.4
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.1	0.6	2.3	1.4
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.5	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.58	< 0.05	0.69	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.6	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	5.6	< 0.05	8.5	0.28
Anthracene	mg/kg	0.05	MCERTS	1.3	< 0.05	3.7	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	9.3	< 0.05	20	0.61
Pyrene	mg/kg	0.05	MCERTS	8.2	< 0.05	16	0.52
Benzo(a)anthracene	mg/kg	0.05	MCERTS	6.9	< 0.05	13	0.4
Chrysene	mg/kg	0.05	MCERTS	4.5	< 0.05	8.2	0.28
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	5.6	< 0.05	11	0.4
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	3.8	< 0.05	6	0.22
Benzo(a)pyrene	mg/kg	0.05	MCERTS	5.4	< 0.05	10	0.37
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.8	< 0.05	5	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.85	< 0.05	1.4	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.1	< 0.05	5.2	< 0.05
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	57.9	< 0.80	115	3.08
Heavy Metals / Metalloids							
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	12	4.5	27	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	23	21	32	12
Barium (aqua regia extractable)	mg/kg	1	MCERTS	400	74	940	66
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	3	< 0.2	2.1	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	200	36	140	38
Copper (aqua regia extractable)	mg/kg	1	MCERTS	270	30	91	22
Lead (aqua regia extractable)	mg/kg	1	MCERTS	350	44	770	46
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	0.9	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	5.1	1.7	1.5	0.91
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	87	40	28	32
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	87	59	38	36
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	710	160	1900	180
Monoaromatics & Oxygenates							

Analytical Report Number: 20-42335
Project / Site name: Towbridge WRC
Your Order No: POR032908

Lab Sample Number				1689562	1689563	1689564	1689565
Sample Reference				BH02	BH02	BH03	BH03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00-1.00	4.00-4.00	3.50-3.50	7.50-7.50
Date Sampled				11/11/2020	11/11/2020	12/11/2020	12/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons							
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	1.8	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	15	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	30	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	24	< 8.0	130	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	32	< 10	170	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	9.4	< 2.0	6	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	37	< 10	59	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	73	< 10	110	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	120	< 10	170	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-42335
Project / Site name: Towbridge WRC
Your Order No: POR032908

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1689562	BH02	1.00-1.00	133	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
1689564	BH03	3.50-3.50	118	Loose Fibres & Bitumen	**Chrysotile**	< 0.001	**< 0.001**

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

Analytical Report Number: 20-42335
Project / Site name: Towbridge WRC

Your Order No: POR032908

Lab Sample Number				1689566
Sample Reference				BH02
Sample Number				None Supplied
Depth (m)				4.00-4.00
Date Sampled				11/11/2020
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
General Inorganics				
pH	pH Units	N/A	ISO 17025	7.7
Total Cyanide	µg/l	10	ISO 17025	< 10
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1
Sulphate as SO4	mg/l	0.1	ISO 17025	170
Ammoniacal Nitrogen as N	µg/l	15	NONE	990
Total Phenols				
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10
Speciated PAHs				
Naphthalene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01
Total PAH				
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2
Heavy Metals / Metalloids				
Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0
Boron (dissolved)	µg/l	10	ISO 17025	630
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
Chromium (III)	µg/l	1	NONE	< 1.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.6
Copper (dissolved)	µg/l	0.7	ISO 17025	9.2
Lead (dissolved)	µg/l	1	ISO 17025	5.7
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	4
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	16

Analytical Report Number: 20-42335
Project / Site name: Towbridge WRC

Your Order No: POR032908

Lab Sample Number				1689566
Sample Reference				BH02
Sample Number				None Supplied
Depth (m)				4.00-4.00
Date Sampled				11/11/2020
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Monoaromatics & Oxygenates				
Benzene	µg/l	1	ISO 17025	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 20-42335
Project / Site name: Towbridge WRC

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1689562	BH02	None Supplied	1.00-1.00	Brown loam and sand with gravel.
1689563	BH02	None Supplied	4.00-4.00	Brown clay with gravel.
1689564	BH03	None Supplied	3.50-3.50	Brown clay with gravel.
1689565	BH03	None Supplied	7.50-7.50	Grey clay.

Analytical Report Number : 20-42335
Project / Site name: Towbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025

Analytical Report Number : 20-42335
Project / Site name: Towbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammoniacal Nitrogen as N in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Cr (III) in leachate	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report

Analytical Report Number : 20-42335
Project / Site name: Towbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH02	None Supplied	S	1689562	c	Free cyanide in soil	L080-PL	c
BH02	None Supplied	S	1689563	c	Free cyanide in soil	L080-PL	c
BH03	None Supplied	S	1689564	c	Free cyanide in soil	L080-PL	c
BH03	None Supplied	S	1689565	c	Free cyanide in soil	L080-PL	c

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Analytical Report Number : 20-42481

Replaces Analytical Report Number: 20-42481, issue no. 1
Additional analysis undertaken.

Project / Site name:	Trowbridge WRC	**Samples received on:**	12/11/2020
Your job number:	BMG2109	**Samples instructed on/ Analysis started on:**	19/11/2020
Your order number:	PORO32913	**Analysis completed by:**	18/12/2020
Report Issue Number:	2	**Report issued on:**	18/12/2020
Samples Analysed:	10 leachate samples - 16 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: PORO32913

Lab Sample Number				1690323	1690324	1690325	1690326	1690327
Sample Reference				BH01	BH01	HP01	HP01	HP01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-0.70	3.00-3.00	0.10-0.10	0.30-0.30	0.60-0.60
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	18	21	18	17
Total mass of sample received	kg	0.001	NONE	1.7	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.8	7.8	7.9	7.8	8.1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.8	0.5	3.1	1.7	0.7
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.47	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.96	< 0.05	0.66	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.88	< 0.05	0.56	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.74	< 0.05	0.4	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.56	< 0.05	0.25	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.98	< 0.05	0.38	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.29	< 0.05	0.16	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.57	< 0.05	0.26	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.47	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.57	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	6.49	< 0.80	2.67	< 0.80	< 0.80
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	23	2.6	< 1.0	2.5	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	64	14	11	9.3	9.1
Barium (aqua regia extractable)	mg/kg	1	MCERTS	840	63	94	54	39
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	4.3	< 0.2	0.5	0.3	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	53	28	27	19	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	1100	31	29	13	13
Lead (aqua regia extractable)	mg/kg	1	MCERTS	910	33	63	33	19
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	5	0.4	< 0.3	0.4	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	9.7	1.4	1.4	1.2	1.2
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	83	25	13	10	12
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	72	43	34	31	31
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	1300	84	160	63	57

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: PORO32913

Lab Sample Number				1690323	1690324	1690325	1690326	1690327
Sample Reference				BH01	BH01	HP01	HP01	HP01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-0.70	3.00-3.00	0.10-0.10	0.30-0.30	0.60-0.60
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	6.5	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	9.8	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	16	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	100	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	140	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	14	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	32	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	47	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: PORO32913

Lab Sample Number				1690328	1690329	1690330	1690331	1690332
Sample Reference				HP03	HP03	HP04	HP04	HP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10-0.10	0.50-0.50	0.10-0.10	0.50-0.50	0.10-0.10
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	16	10	17	15
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2	1.7
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.1	8	8.1	7.9	8
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.2	0.5	2	0.4	1.9
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.26
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.47
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	3.7
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	1.3
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.48	< 0.05	7.8
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.49	< 0.05	6.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.42	< 0.05	1.9
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.28	< 0.05	3.7
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.47	< 0.05	3
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.21	< 0.05	1.6
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.31	< 0.05	2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.24	< 0.05	1.2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.29	< 0.05	1.6
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	3.19	< 0.80	35
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	2.8	< 1.0	< 1.0	3.3	6.1
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	9	12	14	19
Barium (aqua regia extractable)	mg/kg	1	MCERTS	81	36	360	43	250
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	0.6	< 0.2	1.4
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	22	42	29	42
Copper (aqua regia extractable)	mg/kg	1	MCERTS	79	18	56	16	95
Lead (aqua regia extractable)	mg/kg	1	MCERTS	67	20	63	17	130
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	0.7
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	1.1	0.55	1.3	0.95	1.8
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	15	26	16	37
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	32	29	43	43	37
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	65	200	64	250

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: PORO32913

Lab Sample Number				1690328	1690329	1690330	1690331	1690332
Sample Reference				HP03	HP03	HP04	HP04	HP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10-0.10	0.50-0.50	0.10-0.10	0.50-0.50	0.10-0.10
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	13	< 10	22
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	30	< 10	50
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	43	< 10	71

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: PORO32913

Lab Sample Number				1690333	1690334	1690335	1690336	1690337
Sample Reference				HP05	HP05	HP06	HP06	HP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.20	0.50-0.50	0.10-0.10	0.60-0.60	0.20-0.20
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	8.9	16	7.9	21	10
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.7	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	< 0.001
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.7	7.4	8	8	8.2
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.3	0.8	2	3.6	1.7
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.3	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.6	< 0.05	0.98	2.2	3.6
Anthracene	mg/kg	0.05	MCERTS	0.56	< 0.05	0.41	0.92	1.2
Fluoranthene	mg/kg	0.05	MCERTS	4.1	< 0.05	3	5.1	5.8
Pyrene	mg/kg	0.05	MCERTS	3.8	< 0.05	2.6	5.9	4.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.9	< 0.05	1.5	3.3	1.7
Chrysene	mg/kg	0.05	MCERTS	1.5	< 0.05	1.2	2.4	2.5
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.1	< 0.05	1.6	3.7	1.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	< 0.05	0.83	2	1.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.7	< 0.05	1	4.3	1.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.4	< 0.05	0.91	2.8	1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.6	< 0.05	0.97	3.3	1.2
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	21.4	< 0.80	15.1	37.4	26.1
Heavy Metals / Metalloids								
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	7.6	3.1	2.8	11	6.4
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	25	14	17	28	27
Barium (aqua regia extractable)	mg/kg	1	MCERTS	450	81	300	420	400
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.7	< 0.2	0.9	2.5	2.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	55	37	39	130	62
Copper (aqua regia extractable)	mg/kg	1	MCERTS	150	24	63	260	150
Lead (aqua regia extractable)	mg/kg	1	MCERTS	260	32	110	450	260
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	1.7	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	3.1	1.7	2.5	3.8	2.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	39	24	21	40	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	38	42	22	41	28
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	420	77	200	760	470

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: PORO32913

Lab Sample Number				1690333	1690334	1690335	1690336	1690337
Sample Reference				HP05	HP05	HP06	HP06	HP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.20	0.50-0.50	0.10-0.10	0.60-0.60	0.20-0.20
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	13	5
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	84	18
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	600	83
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	700	110
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	4.2	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	12	< 10	13	46	19
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	34	< 10	42	380	52
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	46	< 10	55	430	71

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: PORO32913

Lab Sample Number				1690338
Sample Reference				HP07
Sample Number				None Supplied
Depth (m)				0.40-0.40
Date Sampled				10/11/2020
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	18
Total mass of sample received	kg	0.001	NONE	1.7

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.6
Free Cyanide	mg/kg	1	MCERTS	< 1
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.4

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.5
Anthracene	mg/kg	0.05	MCERTS	0.8
Fluoranthene	mg/kg	0.05	MCERTS	4.4
Pyrene	mg/kg	0.05	MCERTS	4.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.4
Chrysene	mg/kg	0.05	MCERTS	2.4
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	3.1
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.7
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.53
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	26.8

Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	17
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	41
Barium (aqua regia extractable)	mg/kg	1	MCERTS	540
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	2.7
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	130
Copper (aqua regia extractable)	mg/kg	1	MCERTS	340
Lead (aqua regia extractable)	mg/kg	1	MCERTS	490
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	2
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	5.9
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	57
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	51
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	860

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: PORO32913

Lab Sample Number				1690338
Sample Reference				HP07
Sample Number				None Supplied
Depth (m)				0.40-0.40
Date Sampled				10/11/2020
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Monoaromatics & Oxygenates				
Benzene	µg/kg	1	MCERTS	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	27
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	72
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	260
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	360

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	6.7
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	40
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	120
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	170

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC
Your Order No: PORO32913

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1690337	HP07	0.20-0.20	162	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
1690338	HP07	0.40-0.40	145	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

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

Analytical Report Number: 20-42481
Project / Site name: Trowbridge WRC

Your Order No: PORO32913

Lab Sample Number				1690339	1690340	1690341	1690342	1690343
Sample Reference				BH01	BH01	HP01	HP03	HP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-0.70	3.00-3.00	0.60-0.60	0.10-0.10	0.50-0.50
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	8.1	8	7.8	8	7.9
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1	< 1	< 1	< 1	< 1
Sulphate as SO4	mg/l	0.1	ISO 17025	50.7	109	12.2	2.6	11.7
Ammoniacal Nitrogen as N	µg/l	15	NONE	300	3100	< 15	16	35
Total Phenols								
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total PAH								
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	1	ISO 17025	2.1	2.9	3.9	< 1.0	< 1.0
Boron (dissolved)	µg/l	10	ISO 17025	120	710	52	29	40
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	U/S*	< 5.0	< 5.0
Chromium (III)	µg/l	1	NONE	5.1	< 1.0	U/S*	1.3	< 1.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	5.1	< 0.4	1.1	1.3	0.9
Copper (dissolved)	µg/l	0.7	ISO 17025	16	7.8	12	13	6.8
Lead (dissolved)	µg/l	1	ISO 17025	8.8	7.3	< 1.0	3.4	2.5
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.4	2.2	1.9	1	0.9
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	38	8.4	33	18	13

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Project / Site name: Trowbridge WRC

Your Order No: PORO32913

Lab Sample Number				1690339	1690340	1690341	1690342	1690343
Sample Reference				BH01	BH01	HP01	HP03	HP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-0.70	3.00-3.00	0.60-0.60	0.10-0.10	0.50-0.50
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

*U/S due to high variances between chromium (hexavalent) and chromium (dissolved) caused by method differences.

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Your Order No: PORO32913

Lab Sample Number				1690344	1690345	1690346	1690347	1690348
Sample Reference				HP05	HP05	HP06	HP06	HP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10-0.10	0.50-0.50	0.10-0.10	0.60-0.60	0.40-0.40
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
General Inorganics								
pH	pH Units	N/A	ISO 17025	8	7.9	8	7.8	7.6
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1	< 1	< 1	< 1	< 1
Sulphate as SO4	mg/l	0.1	ISO 17025	15.4	33.1	3.9	41.1	426
Ammoniacal Nitrogen as N	µg/l	15	NONE	38	38	29	34	43
Total Phenols								
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	19	16
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total PAH								
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0	< 1.0	6	9.7	< 1.0
Boron (dissolved)	µg/l	10	ISO 17025	120	64	20	63	590
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	0.09
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	1	NONE	1.7	1.9	3.5	4.6	1.7
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.7	1.9	3.5	4.6	1.7
Copper (dissolved)	µg/l	0.7	ISO 17025	17	8.3	17	14	14
Lead (dissolved)	µg/l	1	ISO 17025	5.7	4.2	5.2	9.7	6
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.3	1.2	0.8	1.4	2.6
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	14	19	26	47	70

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Your Order No: PORO32913

Lab Sample Number				1690344	1690345	1690346	1690347	1690348
Sample Reference				HP05	HP05	HP06	HP06	HP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10-0.10	0.50-0.50	0.10-0.10	0.60-0.60	0.40-0.40
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

*U/S due to high variances between chromium (hexavalent) and chromium (dissolved) caused by method differences.

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1690323	BH01	None Supplied	0.70-0.70	Brown loam and sand with gravel.
1690324	BH01	None Supplied	3.00-3.00	Light brown sandy clay.
1690325	HP01	None Supplied	0.10-0.10	Brown loam and clay with vegetation.
1690326	HP01	None Supplied	0.30-0.30	Light brown sandy clay.
1690327	HP01	None Supplied	0.60-0.60	Light brown clay.
1690328	HP03	None Supplied	0.10-0.10	Brown loam and clay with vegetation.
1690329	HP03	None Supplied	0.50-0.50	Light brown clay with vegetation.
1690330	HP04	None Supplied	0.10-0.10	Light brown loam and clay with gravel and vegetation.
1690331	HP04	None Supplied	0.50-0.50	Light brown clay.
1690332	HP05	None Supplied	0.10-0.10	Grey loam and clay.
1690333	HP05	None Supplied	0.20-0.20	Grey loam and clay with gravel.
1690334	HP05	None Supplied	0.50-0.50	Light brown loam and clay with gravel.
1690335	HP06	None Supplied	0.10-0.10	Light brown loam and clay with gravel.
1690336	HP06	None Supplied	0.60-0.60	Brown loam and clay with gravel and vegetation.
1690337	HP07	None Supplied	0.20-0.20	Light brown loam and clay with gravel.
1690338	HP07	None Supplied	0.40-0.40	Light brown loam and clay with gravel.

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Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025

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Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammoniacal Nitrogen as N in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Cr (III) in leachate	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report

Analytical Report Number : 20-42481
Project / Site name: Trowbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01	None Supplied	S	1690323	c	Free cyanide in soil	L080-PL	c
BH01	None Supplied	S	1690324	c	Free cyanide in soil	L080-PL	c
HP01	None Supplied	S	1690325	c	Free cyanide in soil	L080-PL	c
HP01	None Supplied	S	1690326	c	Free cyanide in soil	L080-PL	c
HP01	None Supplied	S	1690327	c	Free cyanide in soil	L080-PL	c
HP03	None Supplied	S	1690328	c	Free cyanide in soil	L080-PL	c
HP03	None Supplied	S	1690329	c	Free cyanide in soil	L080-PL	c
HP04	None Supplied	S	1690330	c	Free cyanide in soil	L080-PL	c
HP04	None Supplied	S	1690331	c	Free cyanide in soil	L080-PL	c
HP05	None Supplied	S	1690332	c	Free cyanide in soil	L080-PL	c
HP05	None Supplied	S	1690333	c	Free cyanide in soil	L080-PL	c
HP05	None Supplied	S	1690334	c	Free cyanide in soil	L080-PL	c
HP06	None Supplied	S	1690335	c	Free cyanide in soil	L080-PL	c
HP06	None Supplied	S	1690336	c	Free cyanide in soil	L080-PL	c
HP07	None Supplied	S	1690337	c	Free cyanide in soil	L080-PL	c
HP07	None Supplied	S	1690338	c	Free cyanide in soil	L080-PL	c

Appendix 8: Geotechnical Testing Results

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

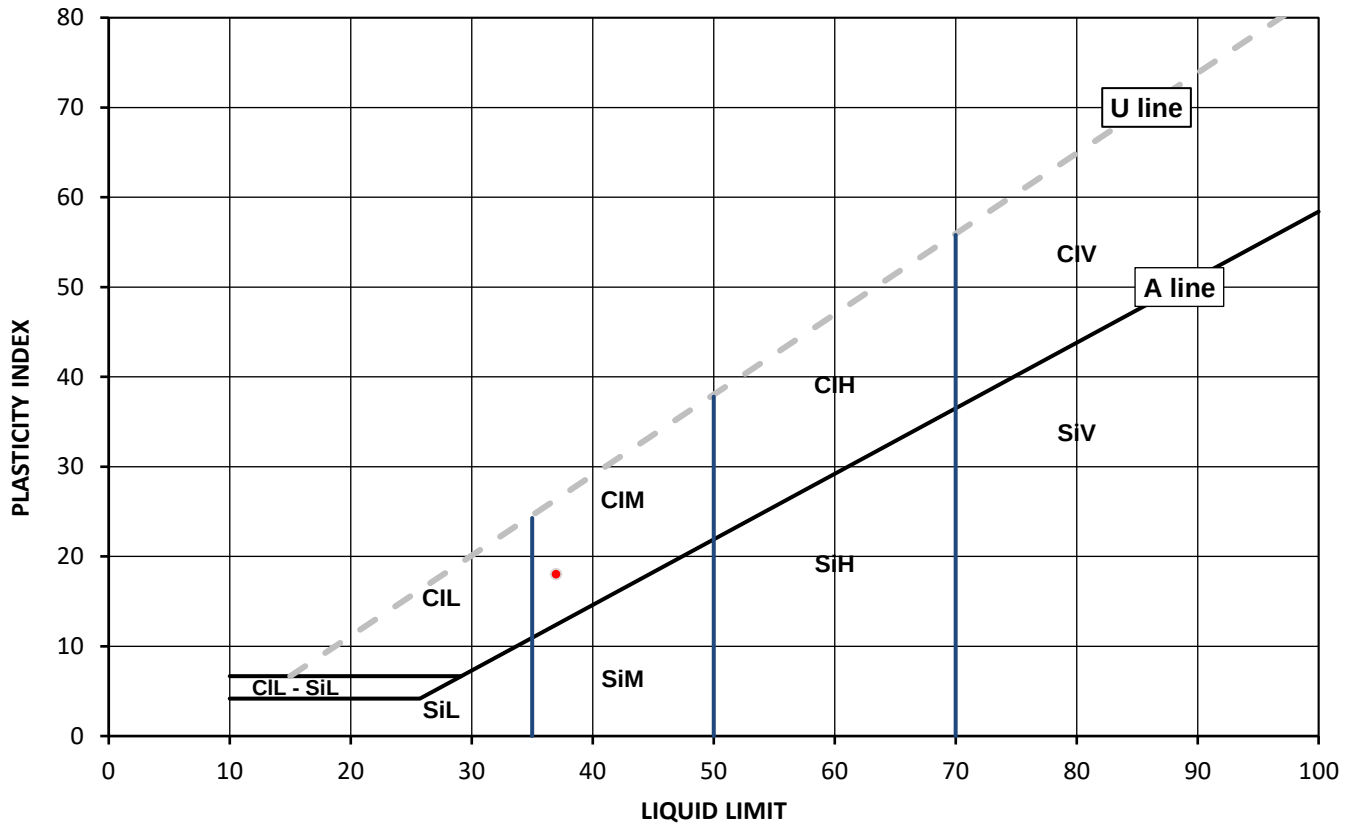
Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699727	Depth Top [m]:	3.00
Hole No.:	BH01	Depth Base [m]:	3.45
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	37	19	18	95



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

			Plasticity	Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

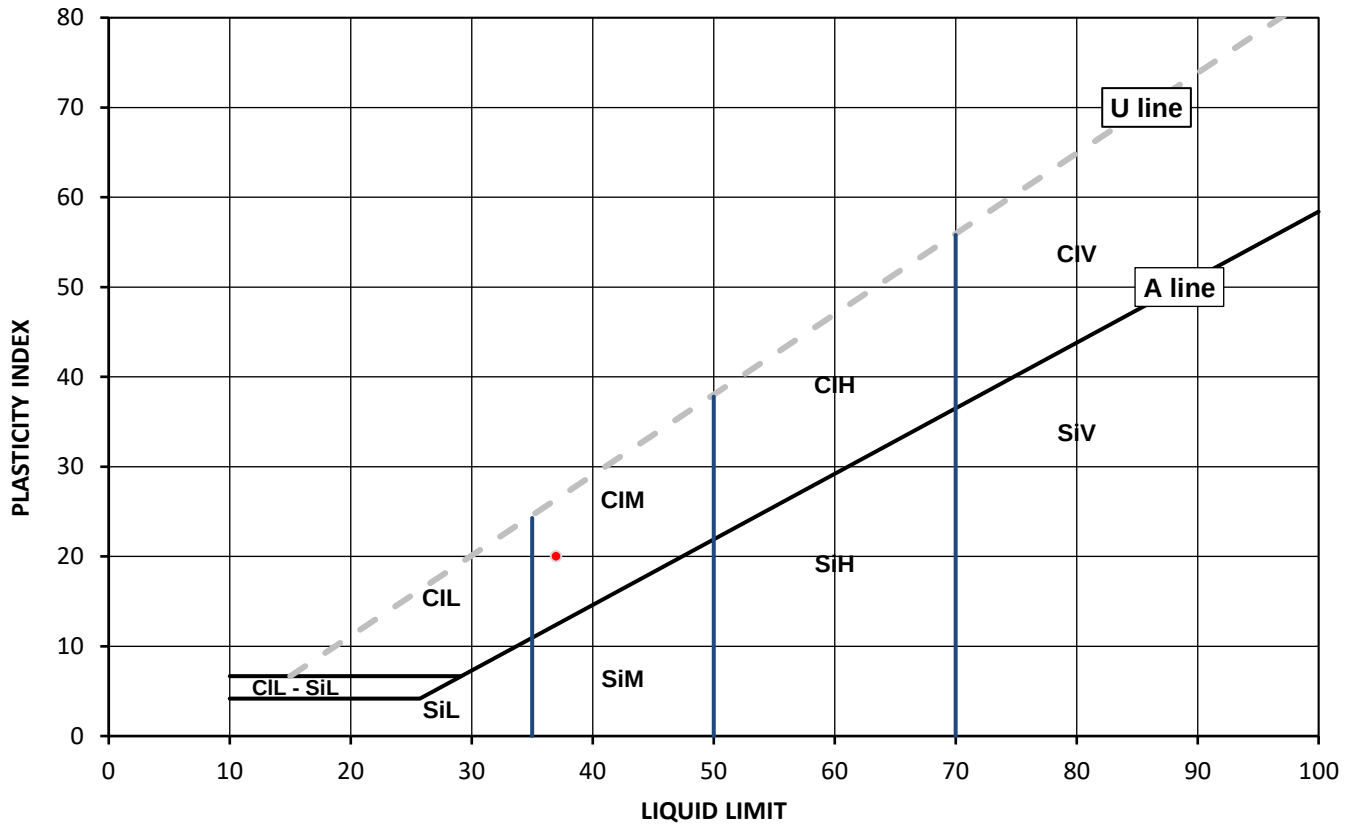
Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699733	Depth Top [m]:	7.00
Hole No.:	BH01	Depth Base [m]:	7.00
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark grey slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	37	17	20	90



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

			Plasticity	Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

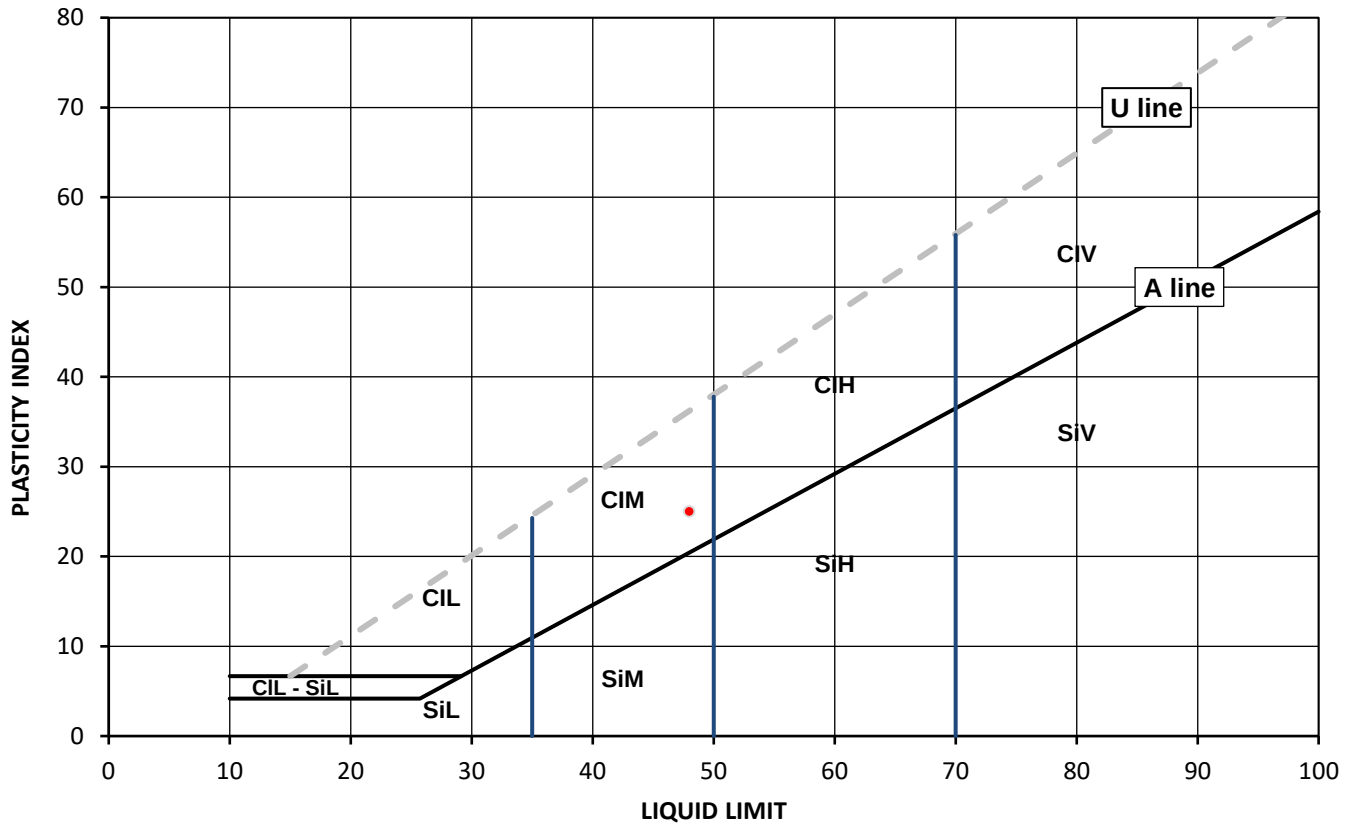
Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699737	Depth Top [m]:	14.00
Hole No.:	BH01	Depth Base [m]:	14.00
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark brown slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	48	23	25	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

			Plasticity	Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

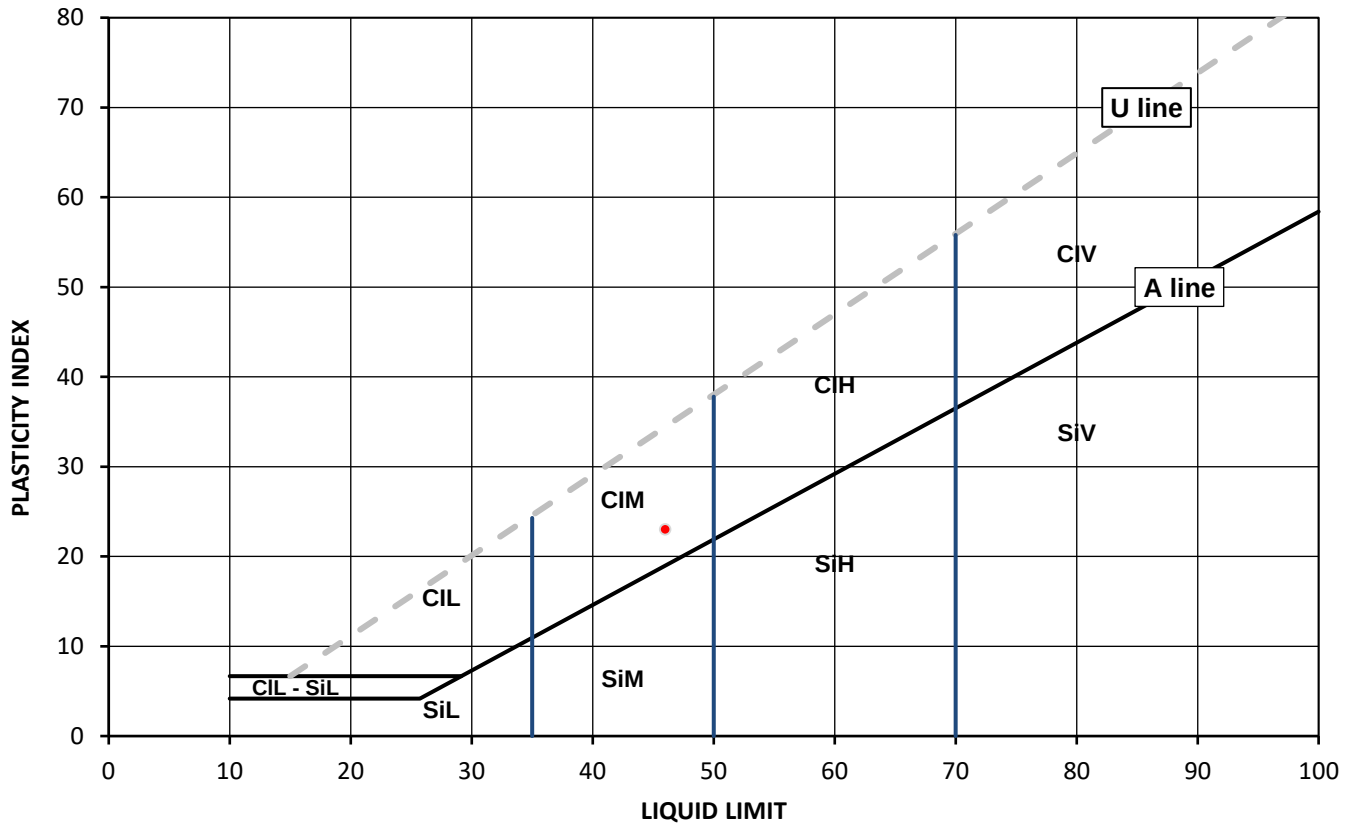
Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699755	Depth Top [m]:	4.00
Hole No.:	BH02	Depth Base [m]:	4.45
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
28	46	23	23	87



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

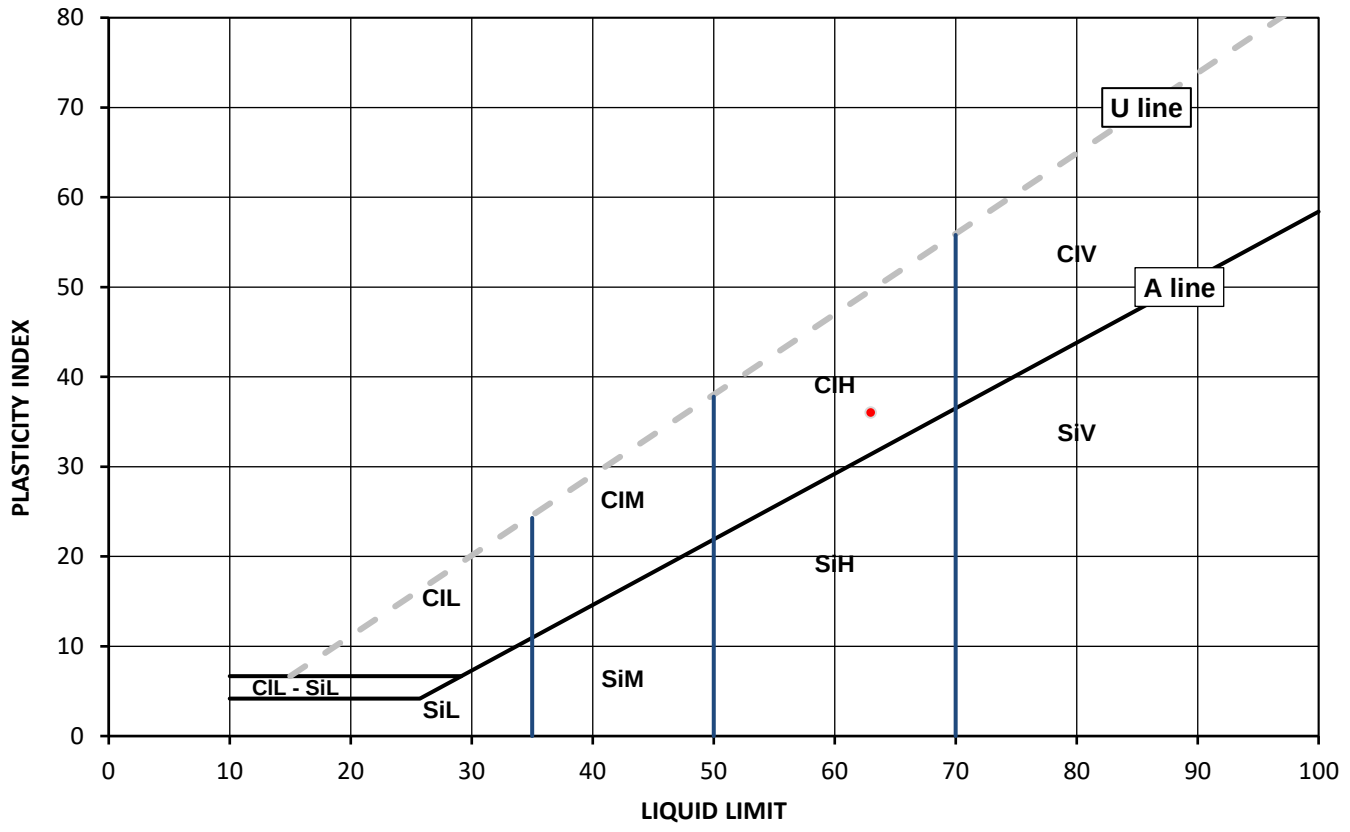
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699758	Depth Top [m]:	5.50
Hole No.:	BH02	Depth Base [m]:	5.50
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
33	63	27	36	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

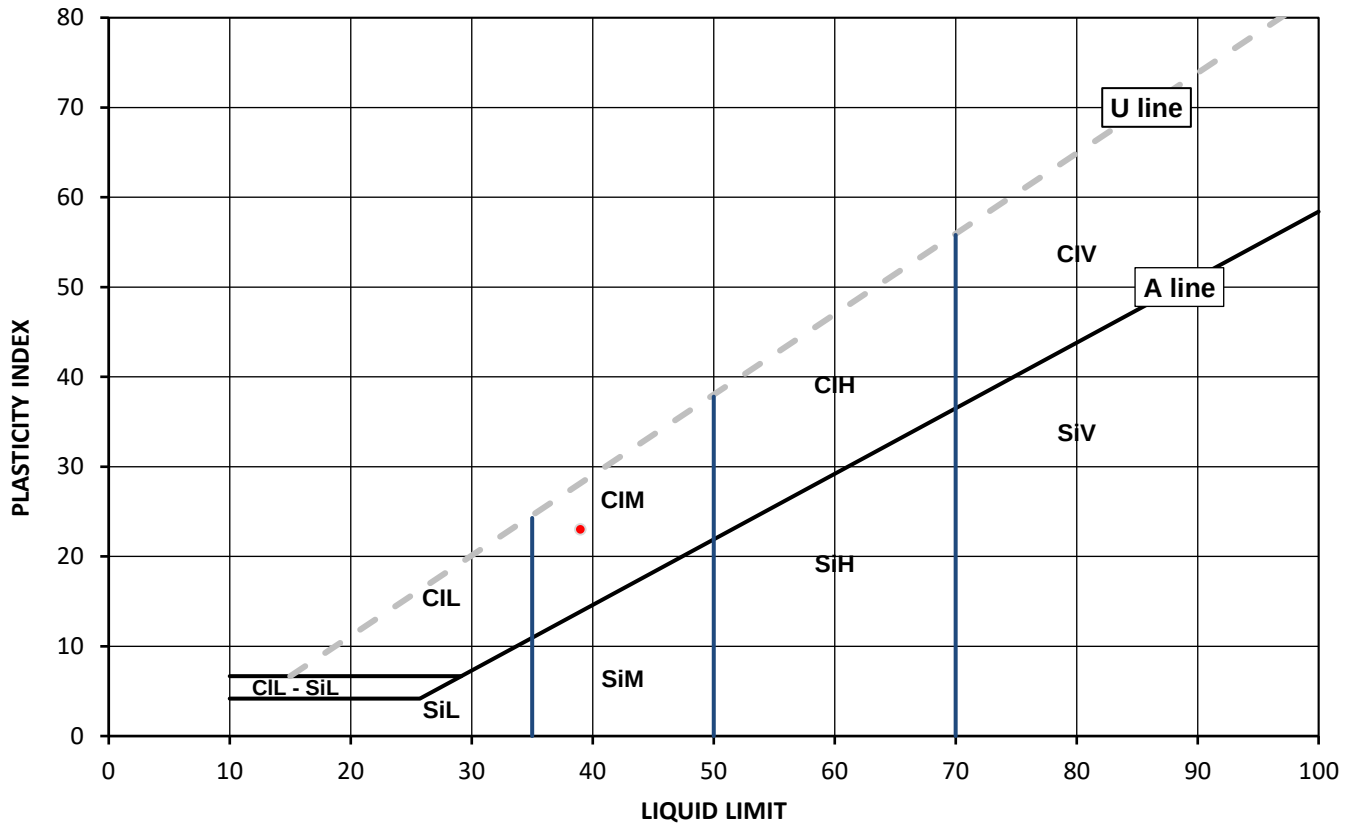
Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699762	Depth Top [m]:	8.00
Hole No.:	BH02	Depth Base [m]:	8.00
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	39	16	23	80



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

			Plasticity	Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

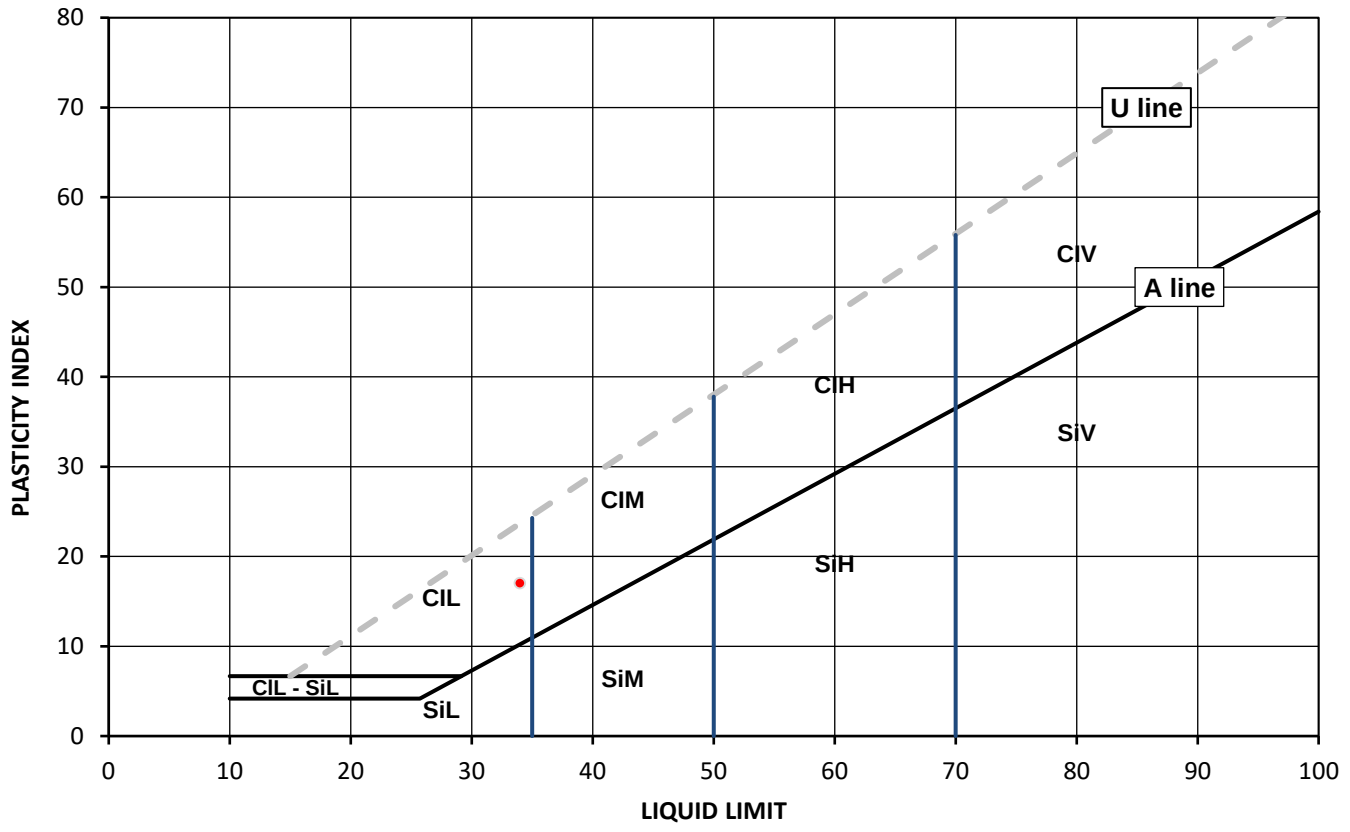
Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699766	Depth Top [m]:	12.00
Hole No.:	BH02	Depth Base [m]:	12.45
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	34	17	17	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

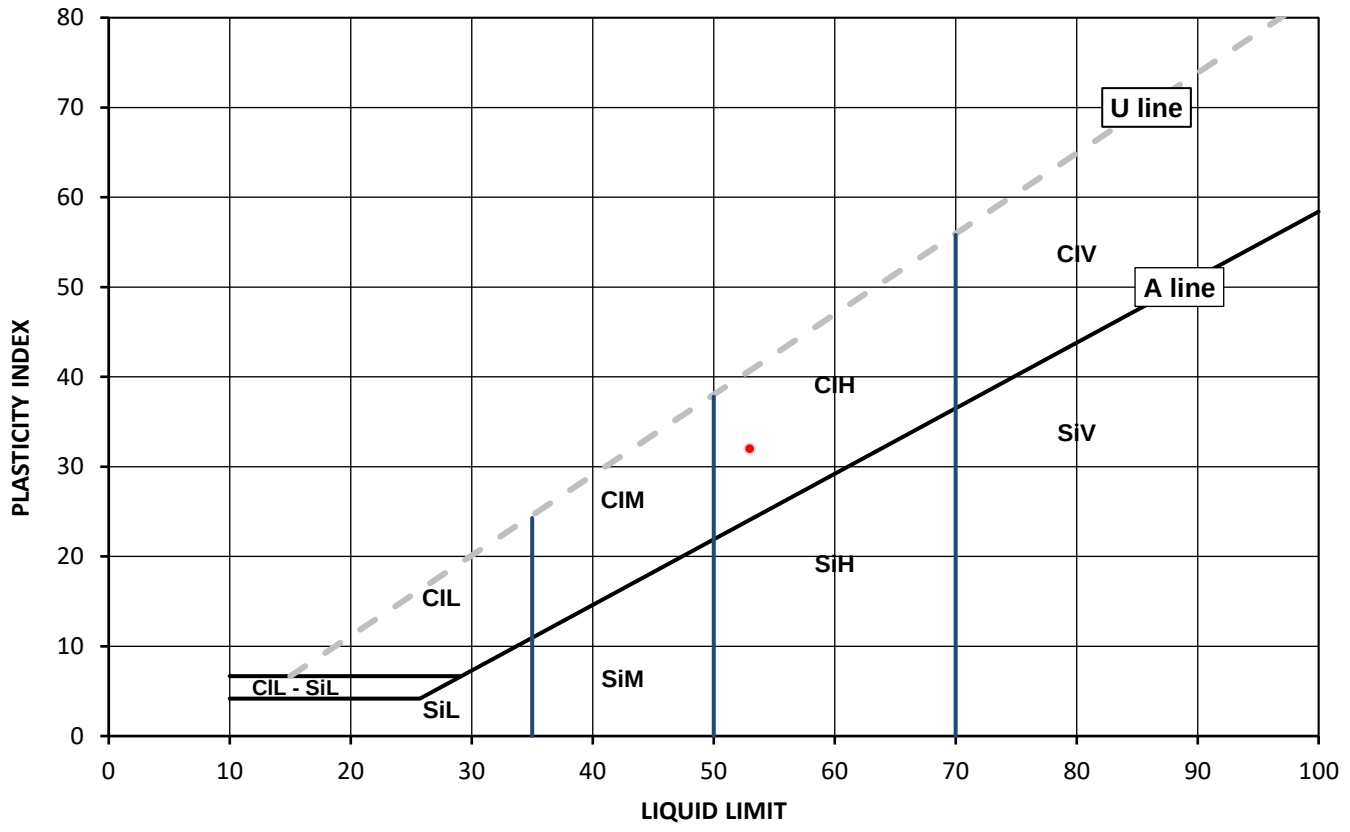
Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699769	Depth Top [m]:	6.00
Hole No.:	BH03	Depth Base [m]:	6.45
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
36	53	21	32	91



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

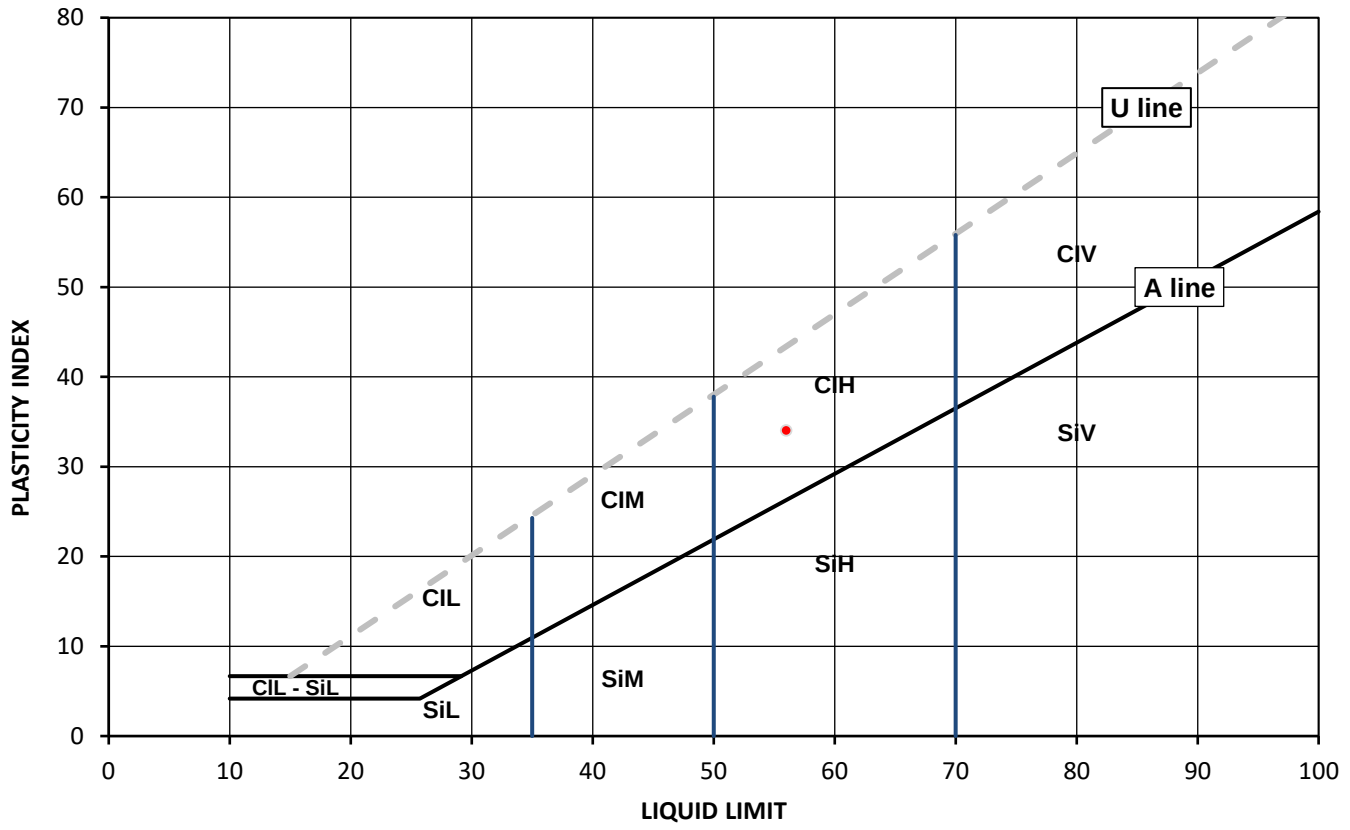
Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699770	Depth Top [m]:	6.80
Hole No.:	BH03	Depth Base [m]:	6.80
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark grey slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
25	56	22	34	98



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

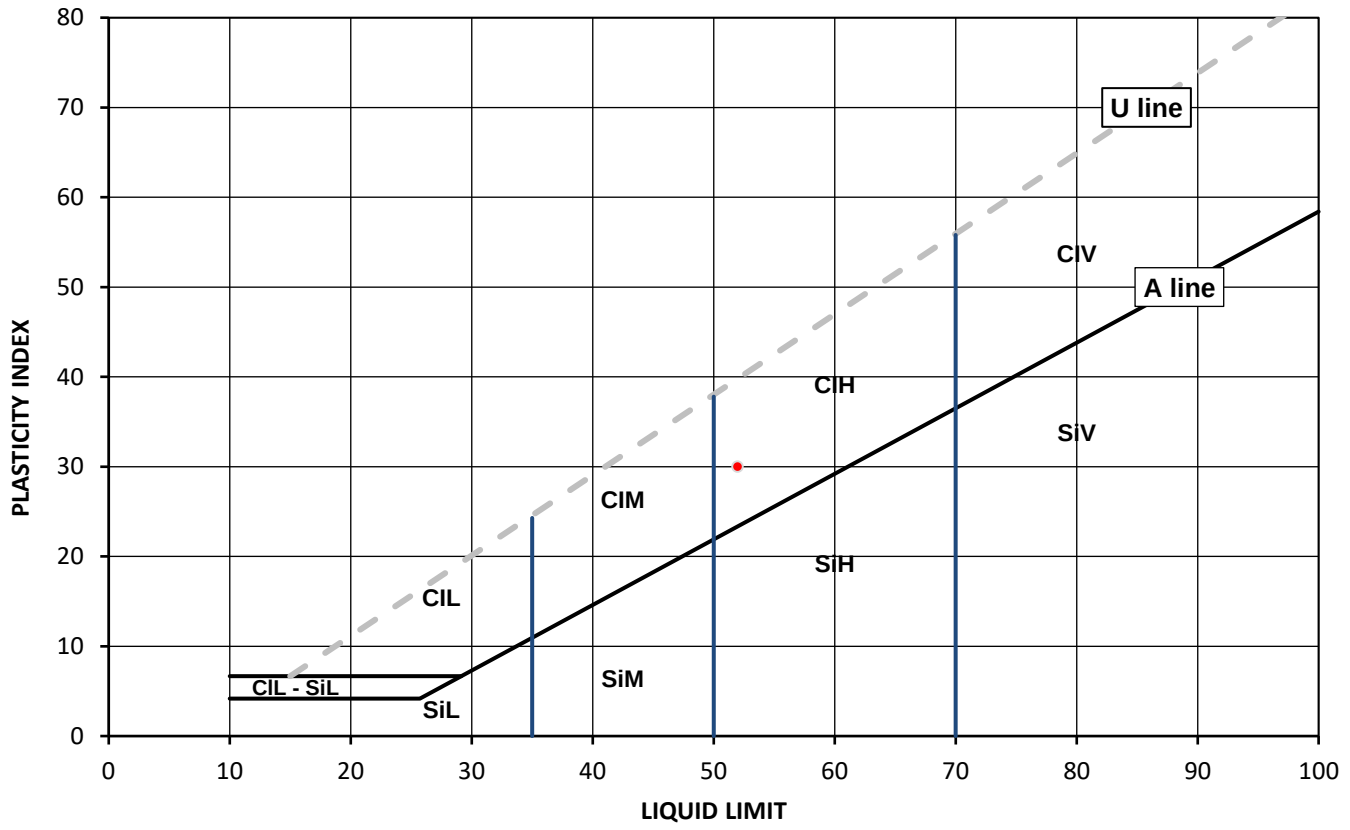
Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699772	Depth Top [m]:	8.50
Hole No.:	BH03	Depth Base [m]:	8.50
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
29	52	22	30	98



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 236.10

SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House, Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11 - 11/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top m	Depth Base m	Type			%	%	% Passing 425um %	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3	%		
1699725	BH01	Not Given	2.00	2.45	D	Dark brown slightly gravelly CLAY		38											
1699727	BH01	Not Given	3.00	3.45	D	Brown slightly gravelly sandy CLAY	Atterberg 4 Point	27		95	37	19	18						
1699729	BH01	Not Given	4.50	4.50	D	Brown to grey CLAY		24											
1699731	BH01	Not Given	6.50	6.50	D	Dark brown CLAY		18											
1699733	BH01	Not Given	7.00	7.00	D	Dark grey slightly gravelly sandy CLAY	Atterberg 4 Point	16		90	37	17	20						
1699735	BH01	Not Given	9.50	9.50	D	Dark grey CLAY		21											
1699736	BH01	Not Given	13.50	13.95	D	Dark grey CLAY		19											
1699737	BH01	Not Given	14.00	14.00	D	Dark brown slightly sandy CLAY	Atterberg 4 Point	22		100	48	23	25						
1699743	BH01	Not Given	19.20	19.46	C	Dark grey LIMESTONE		6.6											
1699745	BH01	Not Given	19.85	20.10	C	Grey LIMESTONE with fragments of shell		4.8											

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 238.12

SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House, Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 11/11/2020
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top m	Depth Base m	Type			%	%	% Passing 425um %	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3	%		
1699748	BH01	Not Given	22.23	22.63	C	Dark brown LIMESTONE		10											
1699750	BH01	Not Given	24.16	24.39	C	Grey LIMESTONE		1.1											
1699752	BH01	Not Given	24.52	24.56	C	Greenish grey LIMESTONE		8.7											
1699754	BH02	Not Given	2.00	2.45	D	Dark brown slightly gravelly CLAY		24											
1699755	BH02	Not Given	4.00	4.45	D	Dark brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	28		87	46	23	23						
1699758	BH02	Not Given	5.50	5.50	D	Brown CLAY	Atterberg 4 Point	33		100	63	27	36						
1699759	BH02	Not Given	5.70	5.70	D	Dark brown CLAY		28											
1699762	BH02	Not Given	8.00	8.00	D	Dark brown slightly gravelly sandy CLAY	Atterberg 4 Point	18		80	39	16	23						
1699763	BH02	Not Given	9.00	9.45	D	Brown CLAY		22											
1699765	BH02	Not Given	11.50	11.50	D	Brown to grey CLAY		24											

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 238.12

SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House, Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 04/12/2020
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top m	Depth Base m	Type			%	%	% Passing 425um %	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3	%		
1699766	BH02	Not Given	12.00	12.45	D	Dark brown slightly gravelly very sandy CLAY	Atterberg 4 Point	18		99	34	17	17						
1699767	BH02	Not Given	15.00	15.45	D	Brown CLAY		23											
1699769	BH03	Not Given	6.00	6.45	D	Brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	36		91	53	21	32						
1699770	BH03	Not Given	6.80	6.80	D	Dark grey slightly gravelly slightly sandy CLAY	Atterberg 4 Point	25		98	56	22	34						
1699772	BH03	Not Given	8.50	8.50	D	Brown slightly gravelly slightly sandy CLAY	Atterberg 4 Point	29		98	52	22	30						
1699773	BH03	Not Given	10.00	10.00	D	Brown slightly gravelly CLAY		22											
1699775	BH03	Not Given	12.00	12.45	D	Brown CLAY		23											

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 238.12

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

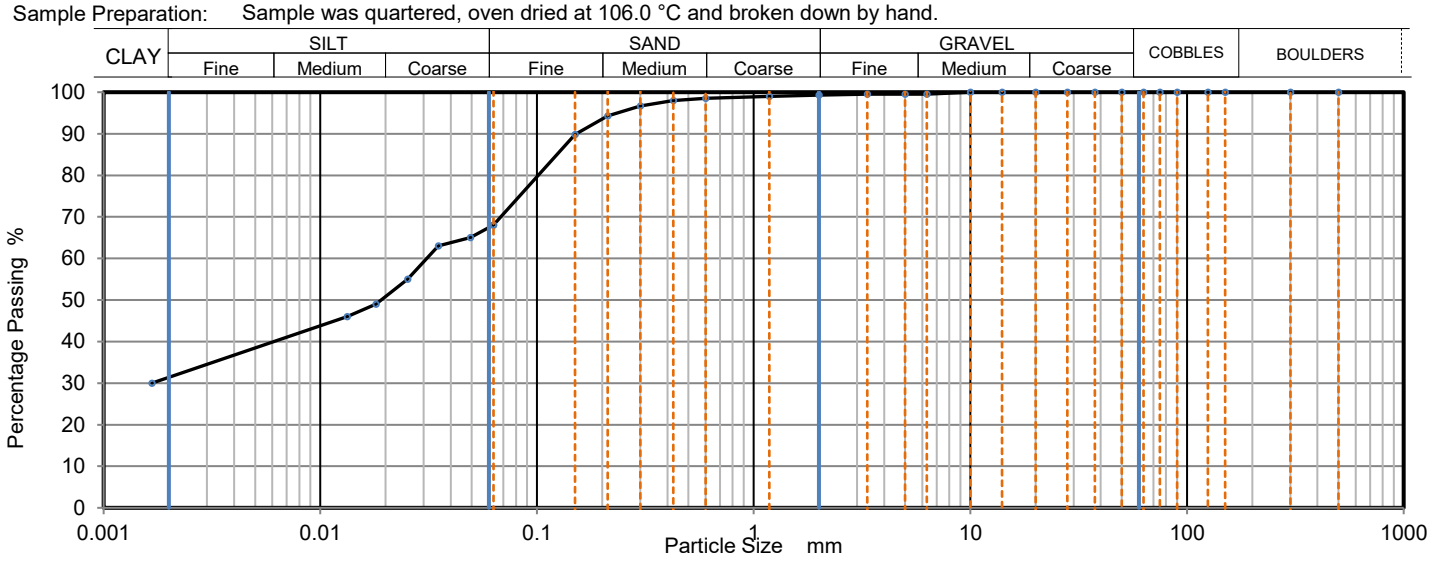
Environmental Science

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699726	Depth Top [m]:	3.00
Hole No.:	BH01	Depth Base [m]:	3.50
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown very clayey very sandy SILT		
Sample Preparation:	Sample was quartered, oven dried at 106.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	68
300	100	0.0492	65
150	100	0.0350	63
125	100	0.0253	55
90	100	0.0181	49
75	100	0.0133	46
63	100	0.0017	30
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100	Particle density	(assumed)
2	99	2.65	Mg/m3
1.18	99		
0.6	99		
0.425	98		
0.3	97		
0.212	94		
0.15	90		
0.063	68		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.70
Sand	31.10
Silt	36.80
Clay	31.40

Grading Analysis		
D100	mm	10
D60	mm	0.0314
D30	mm	
D10	mm	
Uniformity Coefficient		> 19
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

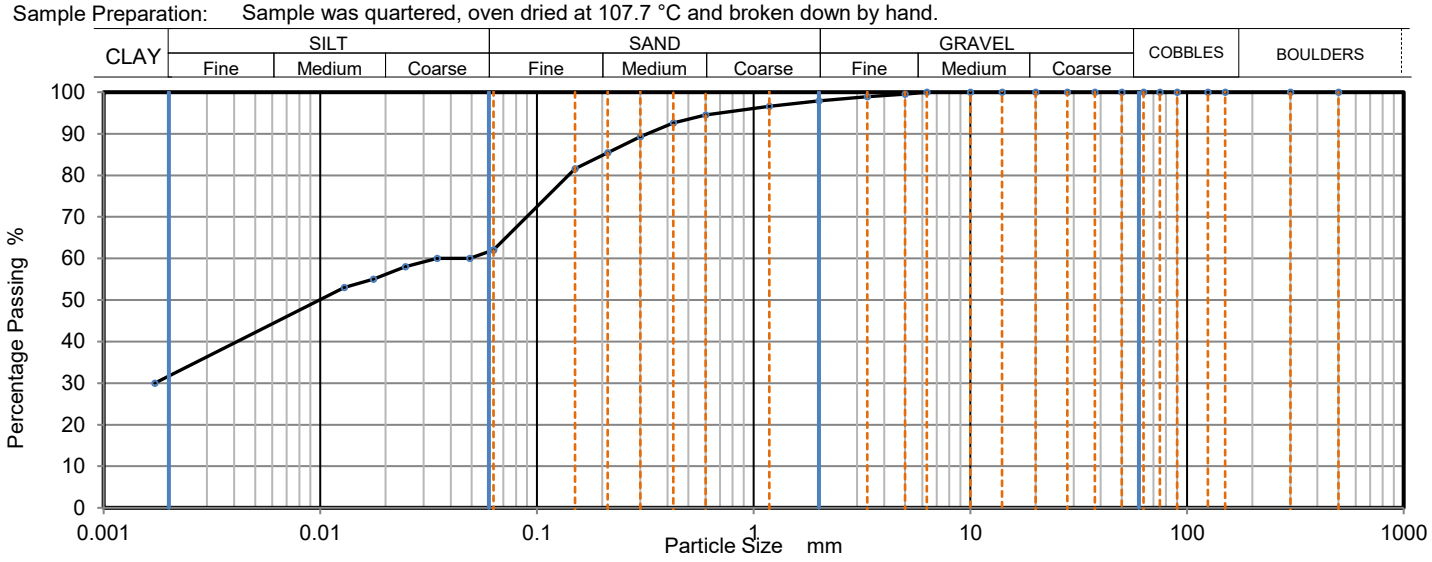
Environmental Science

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699732	Depth Top [m]:	7.00
Hole No.:	BH01	Depth Base [m]:	7.50
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown slightly gravelly very sandy silty CLAY		
Sample Preparation:	Sample was quartered, oven dried at 107.7 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	62
300	100	0.0490	60
150	100	0.0346	60
125	100	0.0247	58
90	100	0.0176	55
75	100	0.0129	53
63	100	0.0017	30
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99	Particle density	(assumed)
2	98	2.65	Mg/m3
1.18	97		
0.6	95		
0.425	93		
0.3	89		
0.212	85		
0.15	82		
0.063	62		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	2.10
Sand	35.80
Silt	30.50
Clay	31.60

Grading Analysis		
D100	mm	6.3
D60	mm	0.0501
D30	mm	0.00174
D10	mm	
Uniformity Coefficient		> 29
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

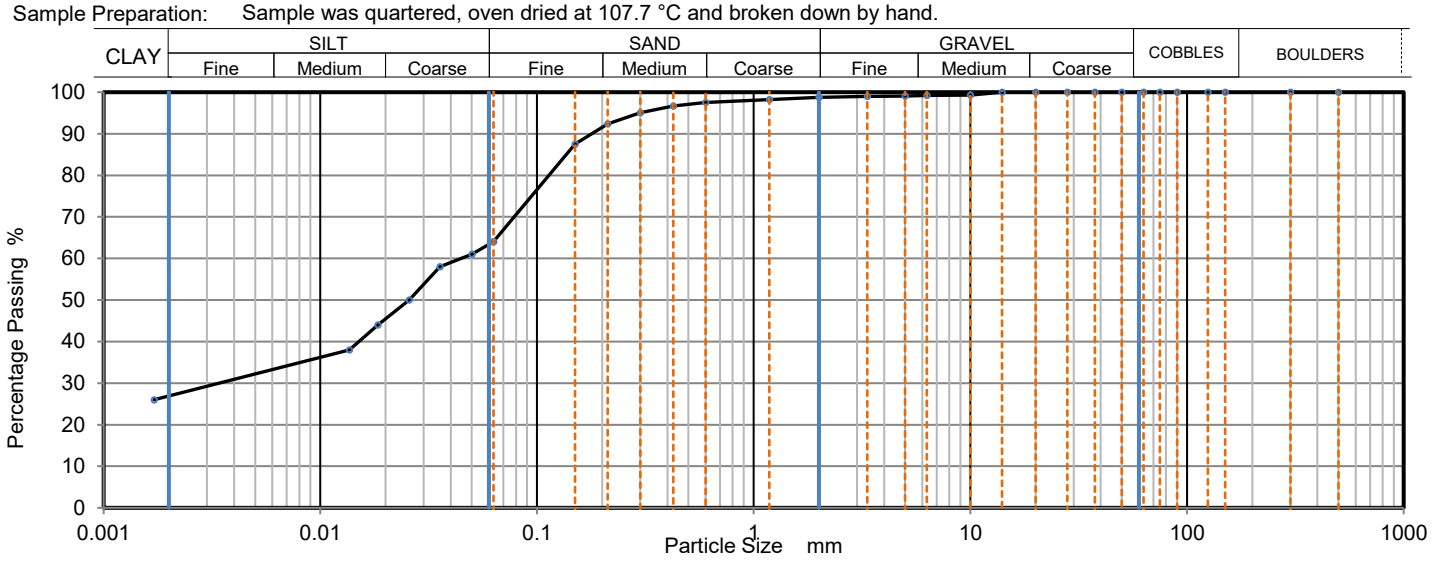
Environmental Science

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699756	Depth Top [m]:	4.00
Hole No.:	BH02	Depth Base [m]:	4.45
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown very clayey very sandy SILT		
Sample Preparation:	Sample was quartered, oven dried at 107.7 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	64
300	100	0.0502	61
150	100	0.0357	58
125	100	0.0257	50
90	100	0.0184	44
75	100	0.0136	38
63	100	0.0017	26
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	99		
3.35	99	Particle density	(assumed)
2	99	2.65	Mg/m3
1.18	98		
0.6	98		
0.425	97		
0.3	95		
0.212	92		
0.15	88		
0.063	64		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	1.20
Sand	34.50
Silt	37.10
Clay	27.20

Grading Analysis		
D100	mm	14
D60	mm	0.0432
D30	mm	0.00332
D10	mm	
Uniformity Coefficient		> 25
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

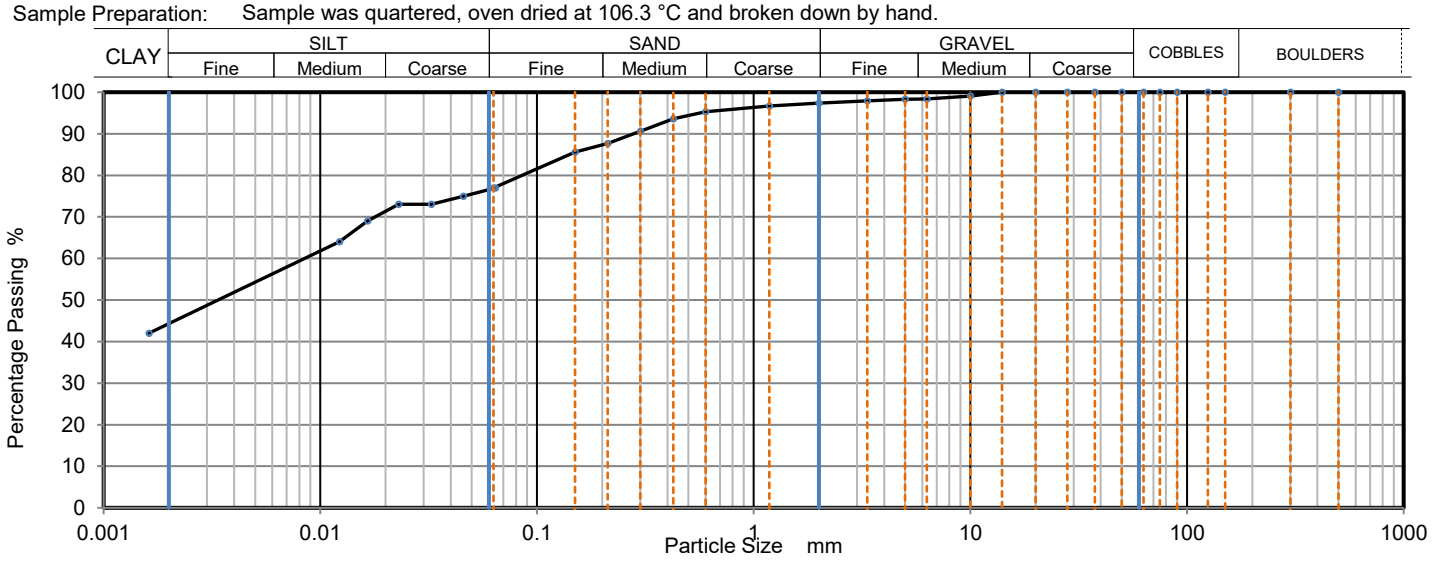
Environmental Science

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699760	Depth Top [m]:	7.00
Hole No.:	BH02	Depth Base [m]:	7.50
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown slightly gravelly sandy very silty CLAY		
Sample Preparation:	Sample was quartered, oven dried at 106.3 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0641	77
300	100	0.0457	75
150	100	0.0326	73
125	100	0.0230	73
90	100	0.0165	69
75	100	0.0122	64
63	100	0.0016	42
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	98		
5	98		
3.35	98	Particle density	(assumed)
2	97	2.65	Mg/m3
1.18	97		
0.6	95		
0.425	94		
0.3	91		
0.212	88		
0.15	86		
0.063	77		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	2.60
Sand	20.50
Silt	32.90
Clay	44.00

Grading Analysis		
D100	mm	14
D60	mm	0.00827
D30	mm	
D10	mm	
Uniformity Coefficient		> 5.1
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

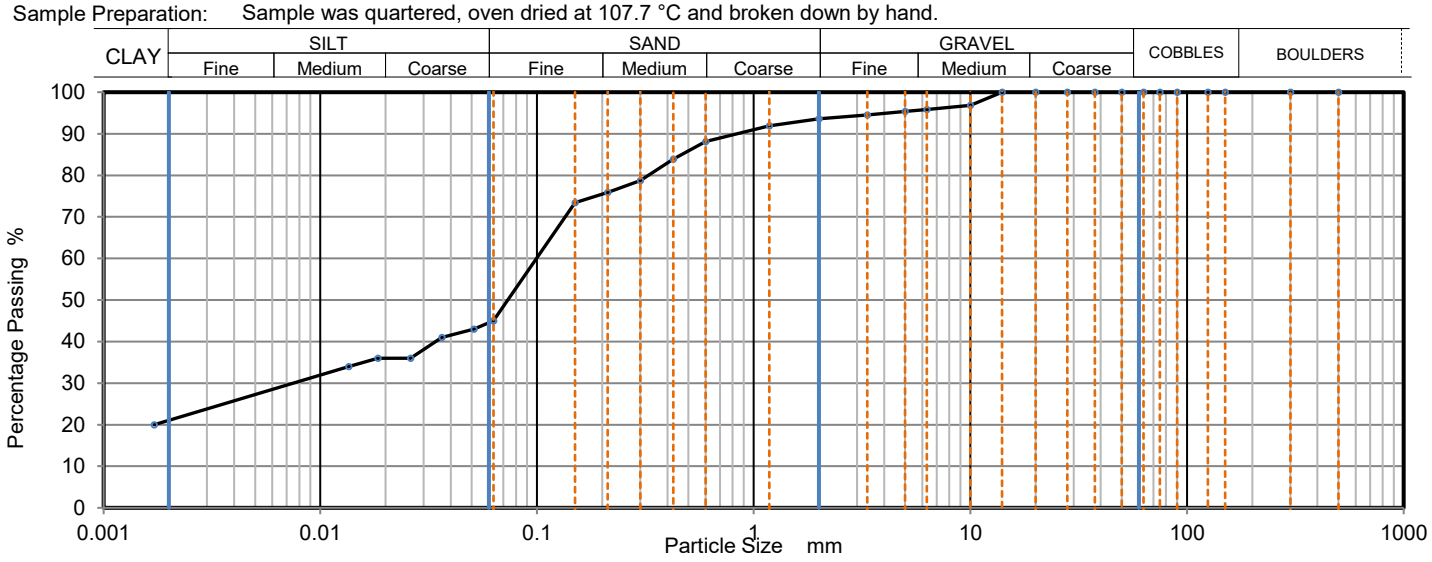
Environmental Science

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699768	Depth Top [m]:	5.50
Hole No.:	BH03	Depth Base [m]:	6.00
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brown slightly gravelly clayey silty SAND		
Sample Preparation:	Sample was quartered, oven dried at 107.7 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	45
300	100	0.0512	43
150	100	0.0364	41
125	100	0.0261	36
90	100	0.0184	36
75	100	0.0135	34
63	100	0.0017	20
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	97		
6.3	96		
5	95		
3.35	95	Particle density	(assumed)
2	94	2.65	Mg/m3
1.18	92		
0.6	88		
0.425	84		
0.3	79		
0.212	76		
0.15	73		
0.063	45		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	6.40
Sand	48.20
Silt	23.90
Clay	21.50

Grading Analysis		
D100	mm	14
D60	mm	0.099
D30	mm	0.00732
D10	mm	
Uniformity Coefficient		> 58
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

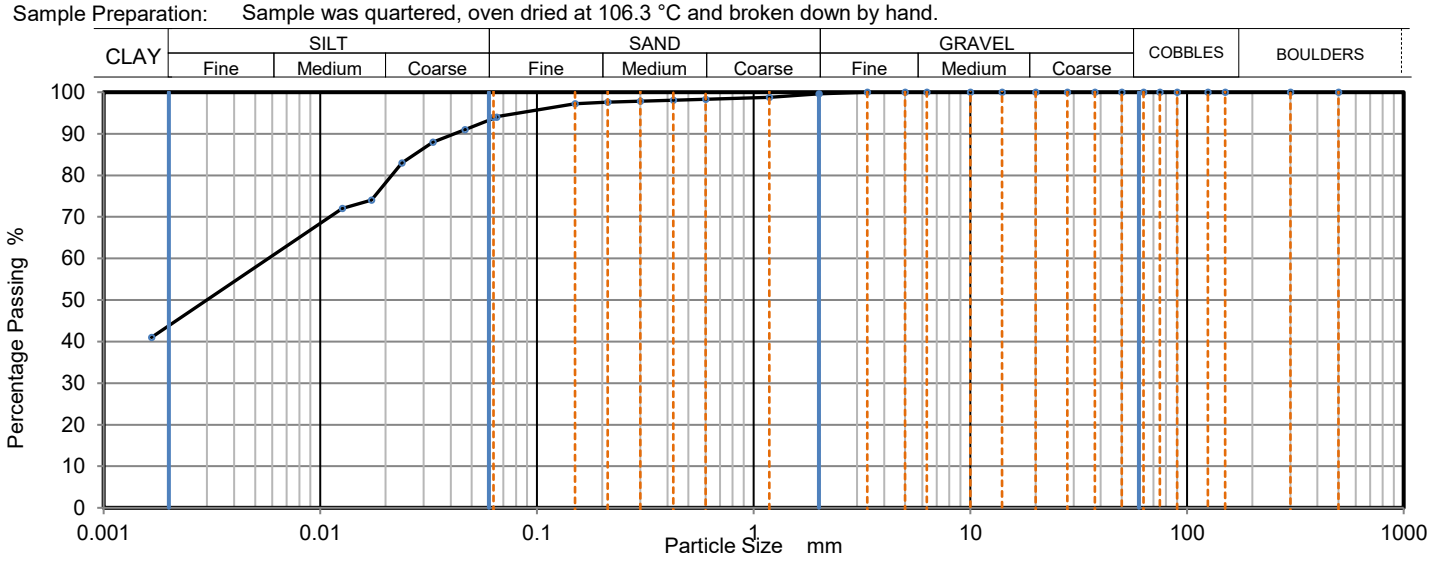
Environmental Science

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699771	Depth Top [m]:	7.50
Hole No.:	BH03	Depth Base [m]:	8.00
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey slightly sandy very clayey SILT		
Sample Preparation:	Sample was quartered, oven dried at 106.3 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0652	94
300	100	0.0465	91
150	100	0.0331	88
125	100	0.0238	83
90	100	0.0172	74
75	100	0.0126	72
63	100	0.0017	41
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100	Particle density	(assumed)
2	100	2.65	Mg/m3
1.18	99		
0.6	98		
0.425	98		
0.3	98		
0.212	98		
0.15	97		
0.063	94		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.40
Sand	5.70
Silt	49.80
Clay	44.10

Grading Analysis		
D100	mm	5
D60	mm	0.00577
D30	mm	
D10	mm	
Uniformity Coefficient		> 3.5
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 100.19

TEST CERTIFICATE

Determination of California Bearing Ratio

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-4: 1990: Clause 7

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	08/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

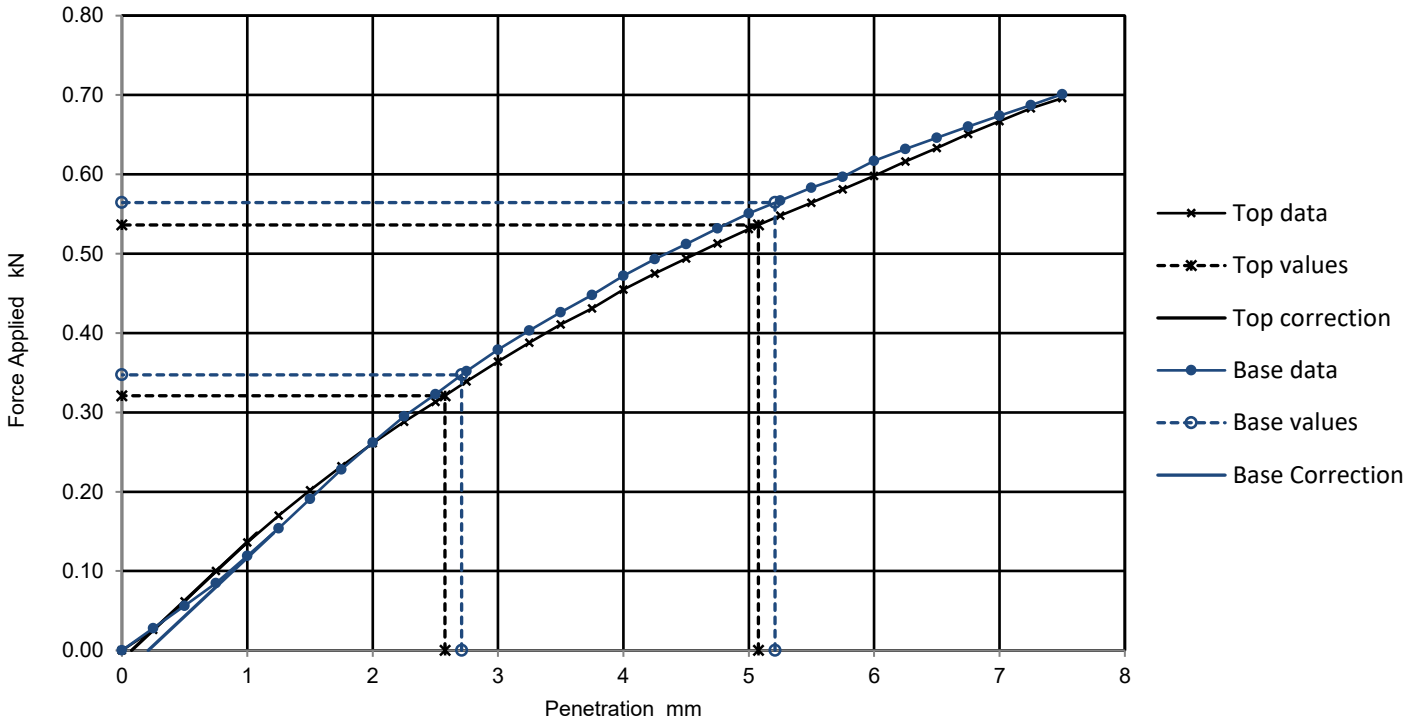
Laboratory Reference:	1699724	Depth Top [m]:	0.20
Hole No.:	BH01	Depth Base [m]:	0.50
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey gravelly CLAY		

Specimen Preparation:

Condition	Remoulded	Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer	Period of soaking	days
		Time to surface	days
		Amount of swell recorded	mm
Material retained on 20mm sieve removed	15 %	Dry density after soaking	Mg/m3

Initial Specimen details	Bulk density	2.06	Mg/m3	Surcharge applied	8 kg
	Dry density	1.75	Mg/m3		4.8 kPa
	Moisture content	18	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	Yes	2.4	2.7	2.7	2.8	19
BASE	Yes	2.6	2.8	2.8		18

Remarks:

Test/ Specimen specific remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 108.15

TEST CERTIFICATE

Determination of California Bearing Ratio

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-4: 1990: Clause 7

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	08/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

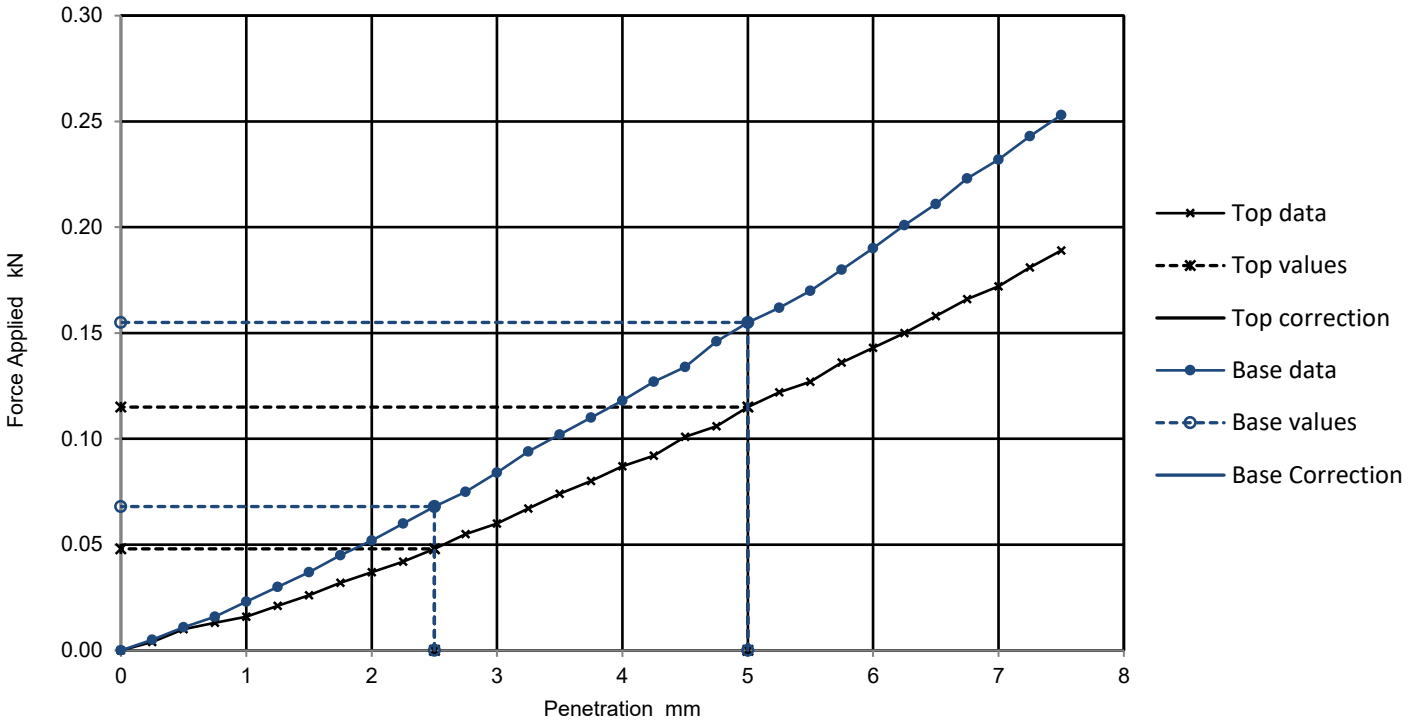
Laboratory Reference:	1699753	Depth Top [m]:	2.00
Hole No.:	BH02	Depth Base [m]:	3.00
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Dark brown slightly gravelly sandy CLAY		

Specimen Preparation:

Condition	Remoulded	Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer	Period of soaking	days
		Time to surface	days
		Amount of swell recorded	mm
Material retained on 20mm sieve removed	12 %	Dry density after soaking	Mg/m3

Initial Specimen details	Bulk density	1.87	Mg/m3	Surcharge applied	8 kg
	Dry density	1.45	Mg/m3		4.9 kPa
	Moisture content	29	%		

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	No	0.4	0.6	0.6		28
BASE	No	0.5	0.8	0.8		29

Remarks:

Test/ Specimen specific remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 108.15

SUMMARY REPORT

Summary of Point Load Strength Index Tests Results

Tested in Accordance with: ISRM: 2007, pages 125-132

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 10/11 - 11/11/2020
Date Received: 18/11/2020
Date Tested: 07/12/2020
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top	Depth Base	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)
			m	m								mm	mm	mm	mm	kN	mm	MPa	MPa
1699738	BH01	Not Given	16.50	16.95	D	Dark grey CLAY	WC = 13.5%	1	D	U	YES	37.4	40.2	40.0	29.0	0.3	34.1	0.26	0.22
1699739	BH01	Not Given	16.57	17.20	C	Dark grey silty sandy CLAY	WC = 11.5%	1	D	U	YES	51.5	88.5	88.0	70.0	0.8	78.7	0.13	0.16
1699740	BH01	Not Given	17.20	17.61	C	Dark grey LIMESTONE	WC = 2.5%	1	D	U	YES	59.3	87.0	86.0	81.0	3.4	83.9	0.48	0.60
1699741	BH01	Not Given	18.45	18.61	C	Dark grey silty CLAY	WC = 11.9%	1	D	U	YES	84.3	87.4	87.0	72.0	0.5	79.3	0.07	0.09
1699742	BH01	Not Given	18.88	19.20	C	Dark grey LIMESTONE	WC = 0.7%	1	D	U	YES	67.4	87.0	87.0	76.0	28.1	81.3	4.25	5.29
1699744	BH01	Not Given	19.58	19.72	C	Dark grey LIMESTONE	WC = 5.3%	1	D	U	YES	62.5	87.6	88.0	82.0	3.8	84.8	0.53	0.67
1699746	BH01	Not Given	20.27	20.39	C	Dark grey LIMESTONE	WC = 5.3%	1	D	U	YES	60.4	87.4	87.0	80.0	9.2	83.6	1.31	1.65
1699749	BH01	Not Given	22.70	22.82	C	Dark grey LIMESTONE	WC = 6.1%	1	A	U	YES	-	86.7	54.0	39.0	2.7	65.6	0.62	0.70
1699751	BH01	Not Given	24.40	24.45	C	Dark grey LIMESTONE	WC = 10.8%	1	A	U	YES	-	86.4	51.0	46.0	2.4	71.1	0.46	0.54
1699777	BH02	Not Given	18.00	18.26	C	Dark grey LIMESTONE	WC = 0.8%	1	D	U	YES	75.3	88.4	88.0	81.0	25.1	84.6	3.51	4.44

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random;
Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P;
Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Comments:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 134.12

SUMMARY REPORT

Summary of Point Load Strength Index Tests Results

Tested in Accordance with: ISRM: 2007, pages 125-132

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 07/12/2020
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top	Depth Base	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)
			m	m								mm	mm	mm	mm	kN	mm	MPa	MPa
1699778	BH02	Not Given	19.20	19.45	C	Dark grey LIMESTONE	WC = 6.0%	1	D	U	YES	115.3	88.3	88.0	78.0	2.7	83.0	0.39	0.49
1699779	BH02	Not Given	24.00	24.33	C	Dark grey LIMESTONE	WC = 11.2%	1	A	U	YES	-	85.3	63.0	57.0	0.6	78.7	0.10	0.12
1699780	BH02	Not Given	24.57	24.70	C	Dark grey LIMESTONE	WC = 7.2%	1	D	U	YES	70.0	86.5	86.0	80.0	1.3	83.2	0.18	0.23
1699781	BH02	Not Given	24.84	24.93	C	Dark grey LIMESTONE	WC = 5.5%	1	D	U	YES	50.3	84.6	83.0	81.0	0.3	82.8	0.04	0.05

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random;
Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P;
Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Comments:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 134.12

SUMMARY REPORT

Summary of Uniaxial Compression Test on Rock Test Results

Tested in Accordance with: ISRM, 2007, p153, part 1

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-44142
Date Sampled: 11/11/2020
Date Received: 18/11/2020
Date Tested: 07/12/2020
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Specimen Dimensions (2)				Bulk density (2)	Water Content (1)	Uniaxial Compression (3)			
		Reference	Depth Top m	Depth Base m	Type			Diameter mm	Length mm	H/D	Orientation of sample	Mg/m3	%	Condition	Stress Rate Mpa/s	Mode of failure	UCS Mpa
1699747	BH01	Not Given	21.50	22.22	C	Grey LIMESTONE	Sample is below recommended length to diameter ratio.*	86.3	143.3	1.7	Vertical	2.27	11.6	oven dried	0.0513	MS + AC	14.9
1699776	BH02	Not Given	16.81	17.14	C	Dark grey LIMESTONE	Sample is below recommended length to diameter ratio.	86.5	204.6	2.4	Vertical	2.31	11.0	as received	0.0340	MS + AC	13.8

Note: 1 - ISRM p87 test 1, water content at 105 ± 3 oC, specimen as tested for UCS, 2 - ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density, 3 - ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials, above notes apply unless annotated otherwise in the remarks. Compaction machine: VJ Tech AUTOCON - VJT 51-3011; Mode of failure legend: S - Single shear, MS - multiple shear, AC - Axial cleavage, F - Fragmented

Comments: *Duration of test, fell below time specified in ISRM method, 2007, p153, part1

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 223.13

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

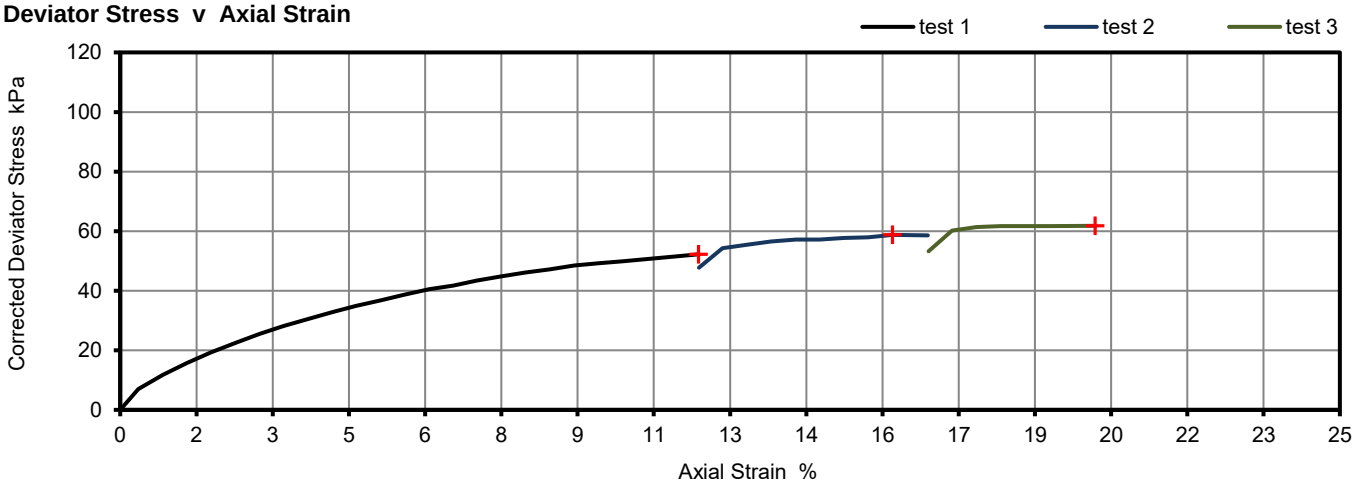
Test Results:

Laboratory Reference:	1699728	Depth Top [m]:	4.00
Hole No.:	BH01	Depth Base [m]:	4.45
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brown mottled grey slightly silty CLAY		

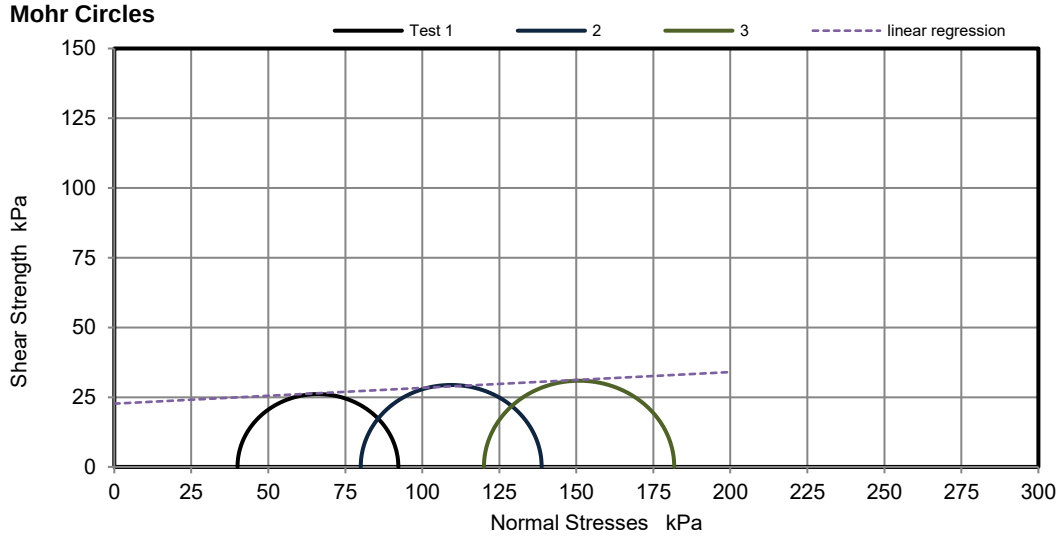
Length	201.64	mm
Diameter	101.42	mm
Bulk Density	2.13	Mg/m3
Moisture Content	25	%
Dry Density	1.71	Mg/m3
Membrane thickness	0.24	mm

Rate of Strain	1.98			%/min
Stage Number	1	2	3	
Cell Pressure	40	80	120	kPa
Axial Strain at failure	11.9	15.8	20.0	%
Deviator Stress, (σ1 - σ3)f	52	59	62	kPa
Shear strength, cu	26	29	31	kPa
Mode of failure	Compound			
Membrane Correction	0.60	0.75	0.91	kPa

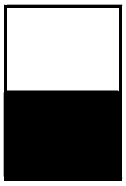
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	3.2	°
cu	23	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 40kPa=18N, 80kPa=35N, 120kPa=54N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 186.11

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

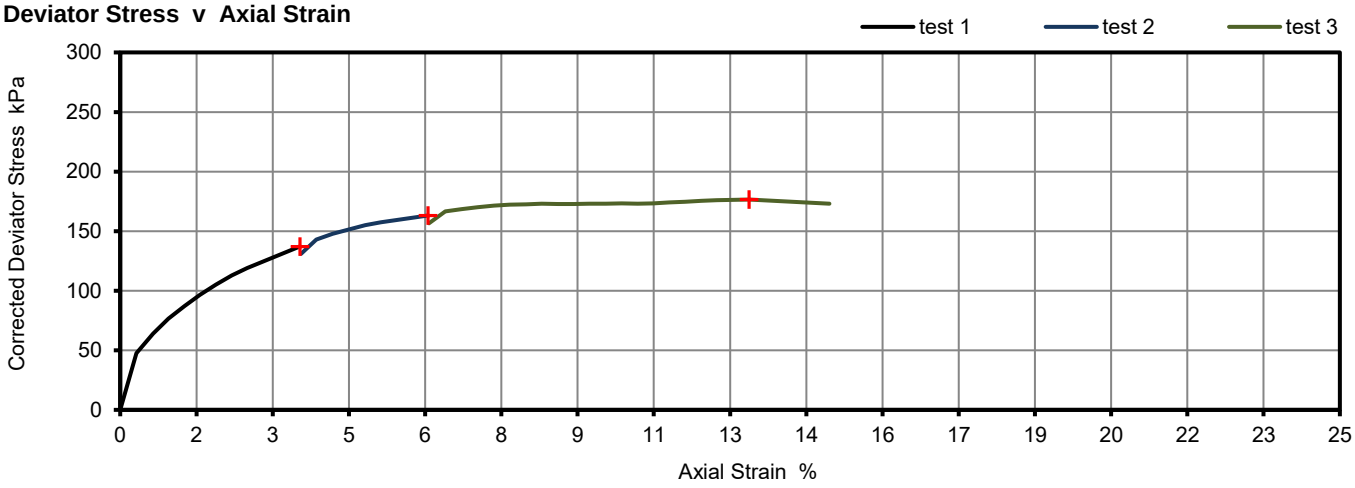
Test Results:

Laboratory Reference:	1699730	Depth Top [m]:	6.00
Hole No.:	BH01	Depth Base [m]:	6.45
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Brownish grey CLAY		

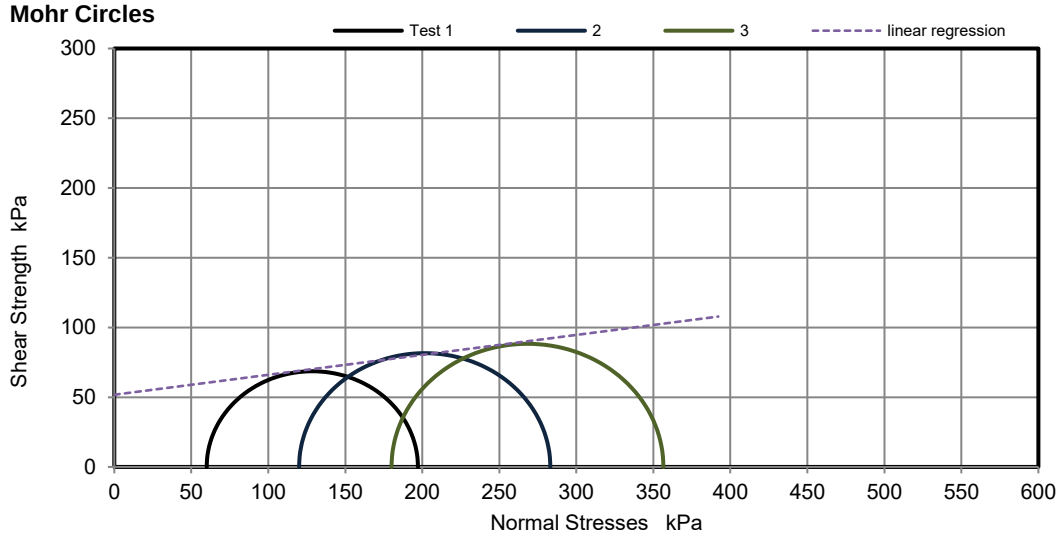
Length	201.62	mm
Diameter	101.36	mm
Bulk Density	2.09	Mg/m3
Moisture Content	24	%
Dry Density	1.68	Mg/m3
Membrane thickness	0.24	mm

Rate of Strain	1.98			%/min
Stage Number	1	2	3	
Cell Pressure	60	120	180	kPa
Axial Strain at failure	3.7	6.3	12.9	%
Deviator Stress, (σ1 - σ3)f	137	163	177	kPa
Shear strength, cu	69	82	88	kPa
Mode of failure	Compound			
Membrane Correction	0.24	0.39	0.64	kPa

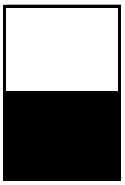
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	8.1	°
cu	52	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 60kPa=30N, 120kPa=62N, 180kPa=94N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 186.11

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

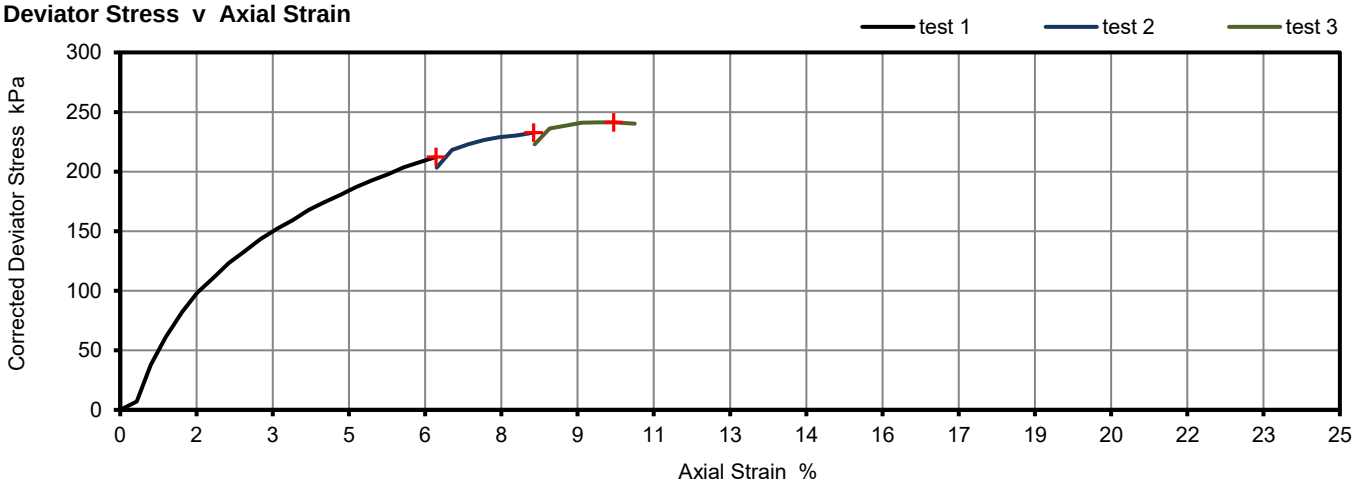
Test Results:

Laboratory Reference:	1699734	Depth Top [m]:	9.00
Hole No.:	BH01	Depth Base [m]:	9.45
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Grey CLAY		

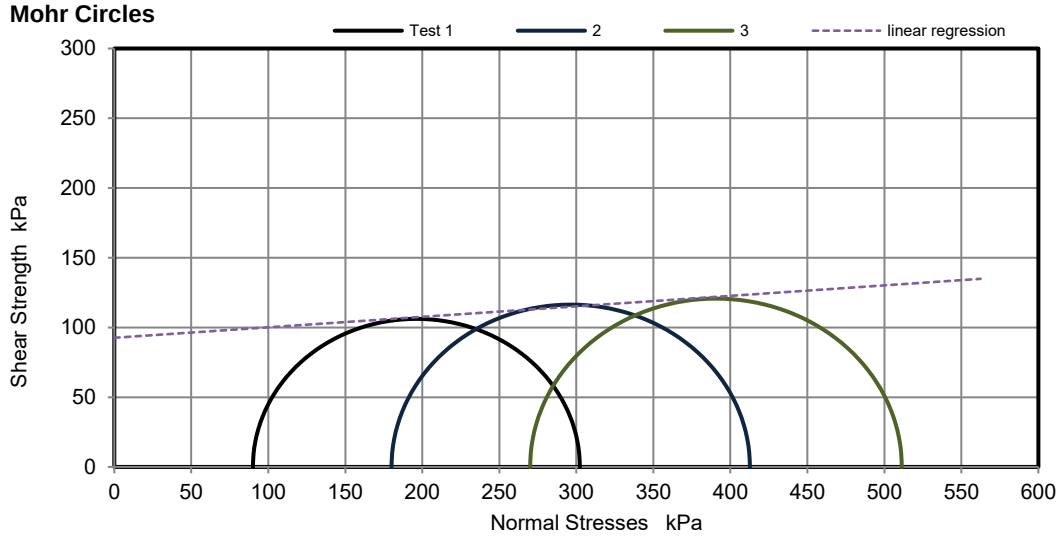
Length	201.78	mm
Diameter	103.43	mm
Bulk Density	2.16	Mg/m3
Moisture Content	23	%
Dry Density	1.76	Mg/m3
Membrane thickness	0.22	mm

Rate of Strain	1.98			%/min
Stage Number	1	2	3	
Cell Pressure	90	180	270	kPa
Axial Strain at failure	6.5	8.5	10.1	%
Deviator Stress, (σ1 - σ3)f	212	233	241	kPa
Shear strength, cu	106	116	121	kPa
Mode of failure	Compound			
Membrane Correction	0.35	0.42	0.48	kPa

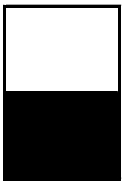
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	4.3	°
cu	93	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 90kPa=44N, 180kPa=96N, 270kPa=140N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 186.11

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

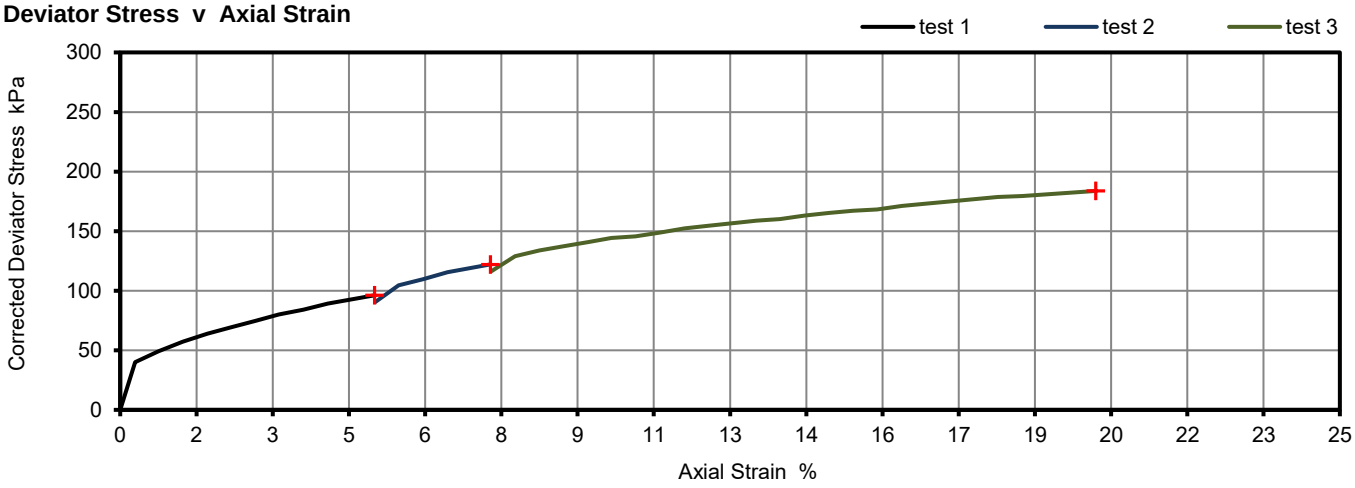
Test Results:

Laboratory Reference:	1699761	Depth Top [m]:	7.50
Hole No.:	BH02	Depth Base [m]:	7.95
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Grey mottled brown CLAY		

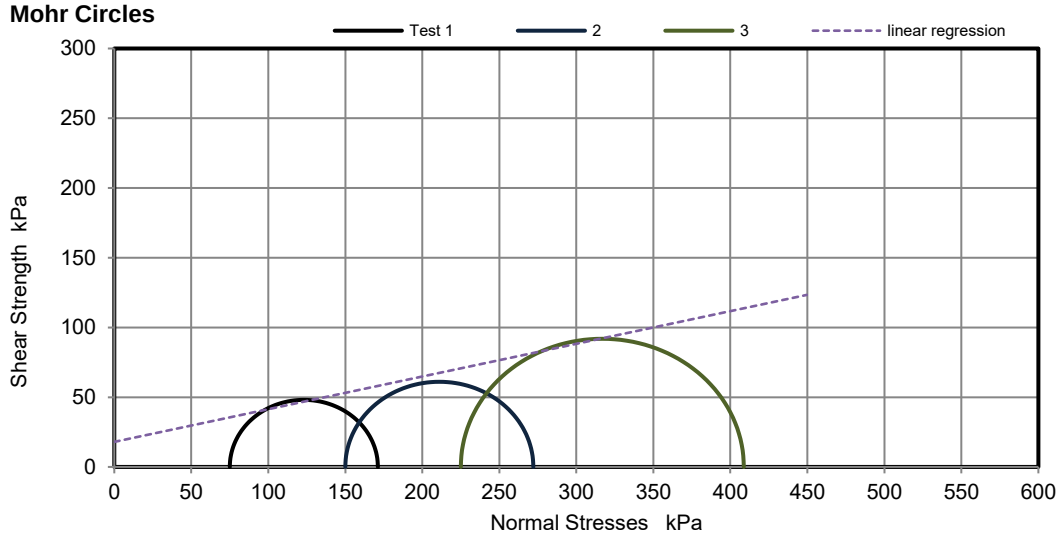
Length	200.09	mm
Diameter	103.71	mm
Bulk Density	2.13	Mg/m3
Moisture Content	15	%
Dry Density	1.85	Mg/m3
Membrane thickness	0.25	mm

Rate of Strain	2.00			%/min
Stage Number	1	2	3	
Cell Pressure	75	150	225	kPa
Axial Strain at failure	5.2	7.6	20.0	%
Deviator Stress, (σ1 - σ3)f	96	122	184	kPa
Shear strength, cu	48	61	92	kPa
Mode of failure	Compound			
Membrane Correction	0.35	0.44	0.93	kPa

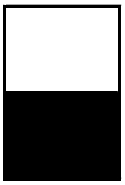
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	13.2	°
cu	18	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 75kPa=37N, 150kPa=74N, 225kPa=113N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 186.11

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

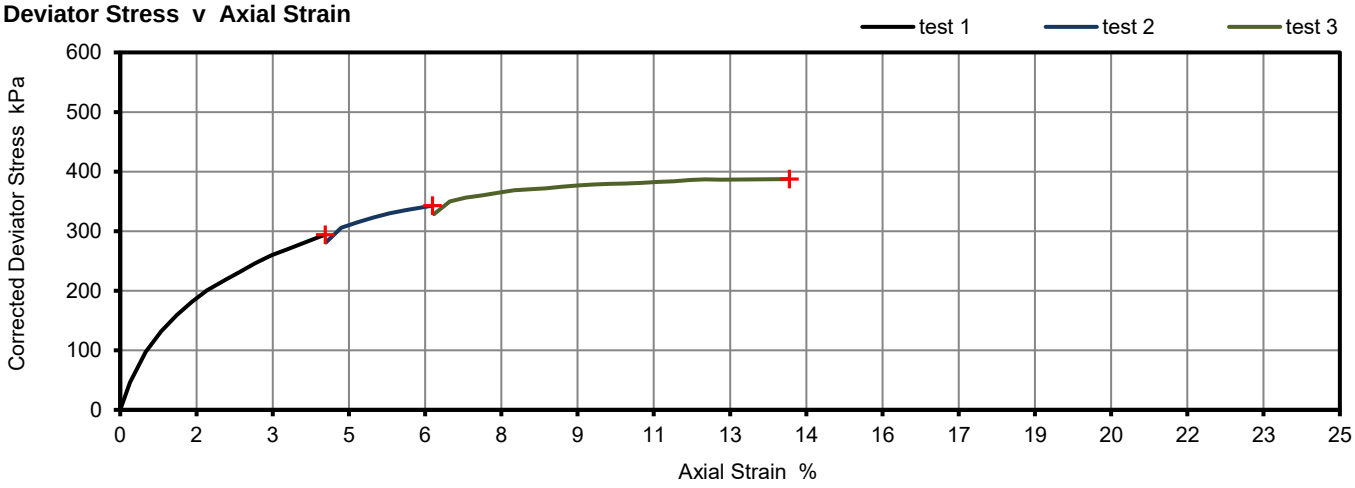
Test Results:

Laboratory Reference:	1699764	Depth Top [m]:	10.50
Hole No.:	BH02	Depth Base [m]:	10.95
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Grey CLAY		

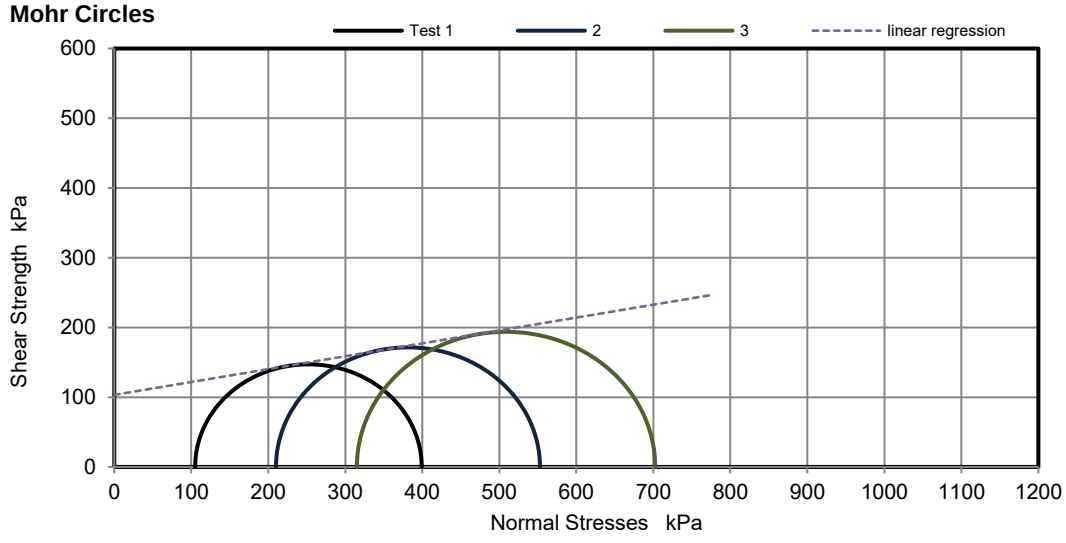
Length	201.83	mm
Diameter	103.75	mm
Bulk Density	2.14	Mg/m3
Moisture Content	20	%
Dry Density	1.78	Mg/m3
Membrane thickness	0.27	mm

Rate of Strain	1.98			%/min
Stage Number	1	2	3	
Cell Pressure	105	210	315	kPa
Axial Strain at failure	4.2	6.4	13.7	%
Deviator Stress, (σ1 - σ3)f	294	343	387	kPa
Shear strength, cu	147	171	194	kPa
Mode of failure	Compound			
Membrane Correction	0.30	0.43	0.74	kPa

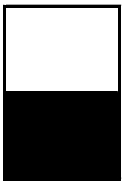
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	10.5	°
cu	103	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 75kPa=37N, 150kPa=74N, 225kPa=113N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 186.11

TEST CERTIFICATE

Unconsolidated Undrained Triaxial Compression

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-7: 1990: Clause 9

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	10/11/2020
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	04/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

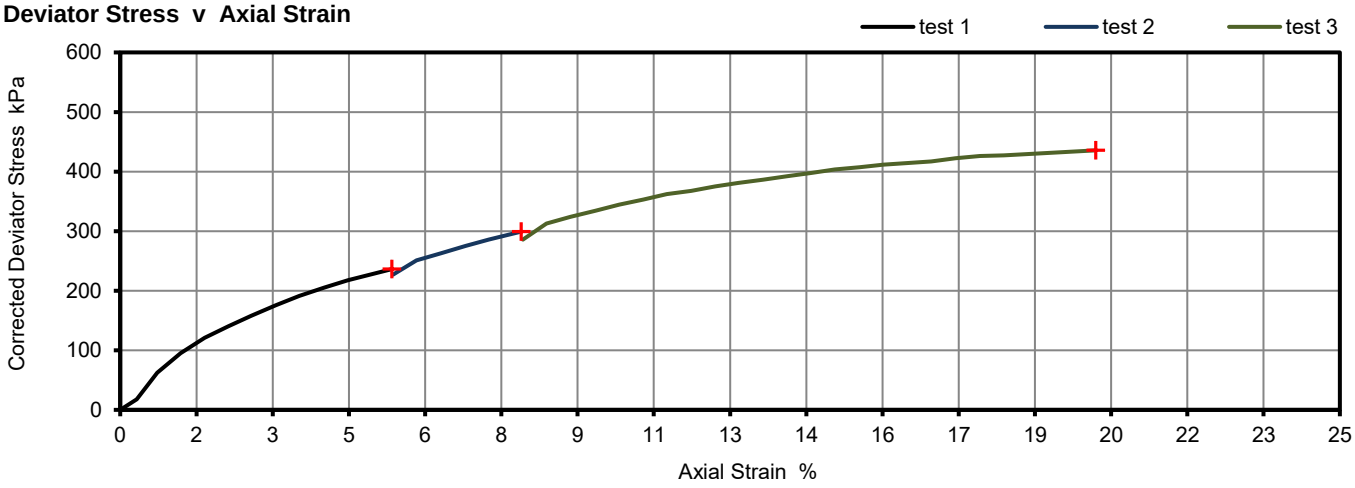
Test Results:

Laboratory Reference:	1699774	Depth Top [m]:	10.50
Hole No.:	BH03	Depth Base [m]:	10.95
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Grey CLAY		

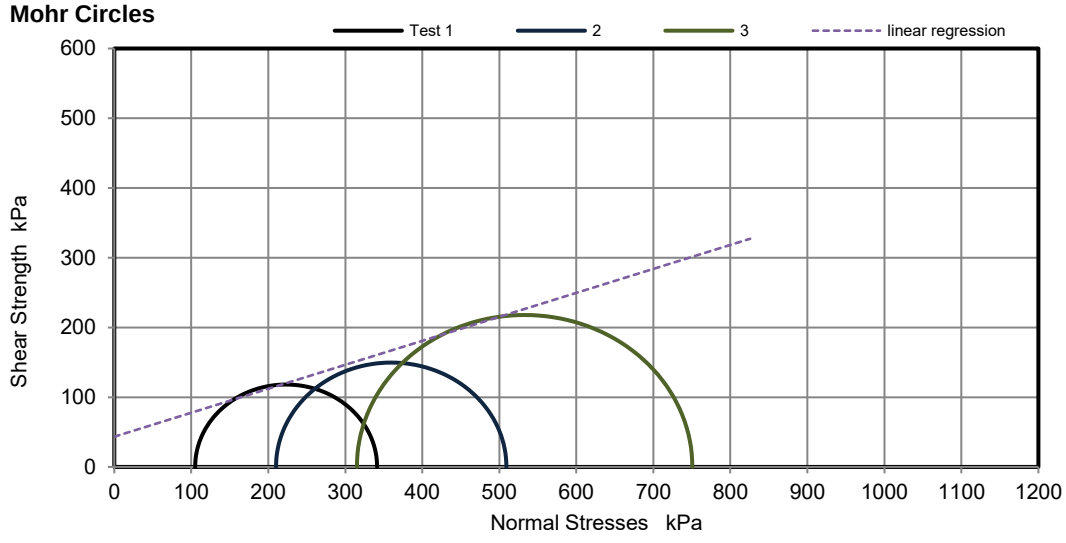
Length	200.76	mm
Diameter	102.79	mm
Bulk Density	2.16	Mg/m3
Moisture Content	20	%
Dry Density	1.81	Mg/m3
Membrane thickness	0.28	mm

Rate of Strain	1.99			%/min
Stage Number	1	2	3	
Cell Pressure	105	210	315	kPa
Axial Strain at failure	5.6	8.2	20.0	%
Deviator Stress, (σ1 - σ3)f	236	299	436	kPa
Shear strength, cu	118	150	218	kPa
Mode of failure	Compound			
Membrane Correction	0.41	0.53	1.05	kPa

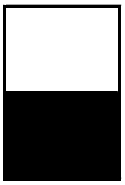
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Linear Regression

ϕu	19.0	°
cu	43	kPa

Note: Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks: Correction values: 105kPa=53N, 210kPa=105N, 315kPa=159N

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 186.11

TEST CERTIFICATE

One Dimensional Consolidation Test

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

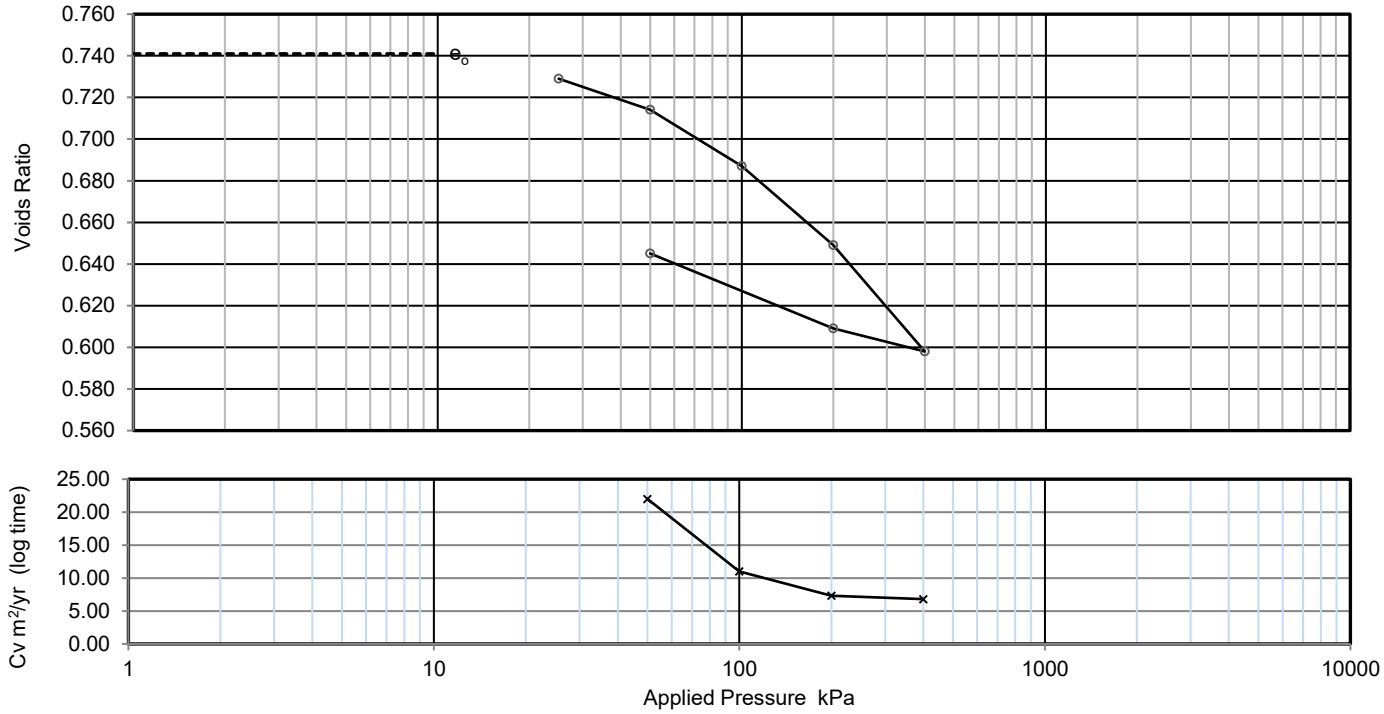
Tested in Accordance with: BS 1377-5: 1990: Clause 3

Client:	BWB Consulting Limited	Client Reference:	BMG2109
Client Address:	5th Floor, Waterfront House, Nottingham, NG2 3DQ	Job Number:	20-44142
		Date Sampled:	Not Given
		Date Received:	18/11/2020
Contact:	Imogen Wort	Date Tested:	07/12/2020
Site Address:	Trowbridge WRC	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1699757	Depth Top [m]:	5.00
Hole No.:	BH02	Depth Base [m]:	5.45
Sample Reference:	Not Given	Sample Type:	U
Sample Description:	Mottled brown CLAY		



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root m2/yr	Csec
0	0.741	-	-	-	-
25	0.729	0.28	N/A	N/A	N/A
50	0.714	0.34	22	51	0.00043
100	0.687	0.32	11	21	0.0013
200	0.649	0.23	7.3	18	0.0013
400	0.598	0.15	6.8	20	0.0019
200	0.609	0.034			
50	0.645	0.15			

Preparation

Index tests

Orientation of the sample	Vertical		
Particle density	assumed	2.65	Mg/m3
Liquid limit	N/A		%
Plastic limit	N/A		%

Specimen details	Initial	Final	
Diameter	50.07	-	mm
Height	20.02	18.92	mm
Moisture Content	27	26	%
Bulk density	1.93	2.03	Mg/m3
Dry density	1.52	1.61	Mg/m3
Voids Ratio	0.741	0.645	
Saturation	95	107	%
Avg. temperature for test	22.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%

Note: Cv corrected to 20°C

Remarks: Stage 1 - swelling

Signed: Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 15/12/2020

GF 172.15

SUMMARY REPORT

Summary of Point Load Strength Index Tests Results

Tested in Accordance with: ISRM: 2007, pages 125-132

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-46686
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 21/12/2020
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top	Depth Base	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)
			m	m								mm	mm	mm	mm	kN	mm	MPa	MPa
1713318	BH02	Not Given	18.29	18.53	C	Grey LIMESTONE	WC = 1.5%	1	D	U	YES	57.4	89.0	88.0	82.0	22.2	85.4	3.04	3.87

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random;
Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P;
Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Comments: Re-issue 1: Hole number amendment as per client request

Signed:

Szczepan Bielatowicz
PL Deputy of Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 02/02/2020

GF 134.12

SUMMARY REPORT

Summary of Uniaxial Compression Test on Rock Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Tested in Accordance with: ISRM, 2007, p153, part 1

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House,
Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

Client Reference: BMG2109
Job Number: 20-46686
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 21/12/2020
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Specimen Dimensions (2)				Bulk density (2)	Water Content (1)	Uniaxial Compression (3)			
		Reference	Depth Top m	Depth Base m	Type			Diameter mm	Length mm	H/D	Orientation of sample	Mg/m3	%	Condition	Stress Rate Mpa/s	Mode of failure	UCS Mpa
1713319	BH02	Not Given	18.72	18.96	C	Grey LIMESTONE	Sample is below recommended length:diameter ratio.*	88.8	126.2	1.4	Vertical	2.18	7.6	as received	0.0323	MS + AC	4.23

Note: 1 - ISRM p87 test 1, water content at 105 ± 3 oC, specimen as tested for UCS, 2 - ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density, 3 - ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials, above notes apply unless annotated otherwise in the remarks. Compaction machine: VJ Tech AUTOCON - VJT 51-3011; Mode of failure legend: S - Single shear, MS - multiple shear, AC - Axial cleavage, F - Fragmented

Comments: *Testing completed above time specified in ISRM method, 2007, p153, part1. Re-issue 1: Hole number amendment as per client request

Signed:

Szczepan Bielatowicz
PL Deputy of Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 02/02/2020

GF 223.13

TEST CERTIFICATE

One Dimensional Consolidation Test

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-5: 1990: Clause 3

Client: BWB Consulting Limited

Client Address: 5th Floor, Waterfront House, Nottingham, NG2 3DQ

Contact: Imogen Wort

Site Address: Trowbridge WRC

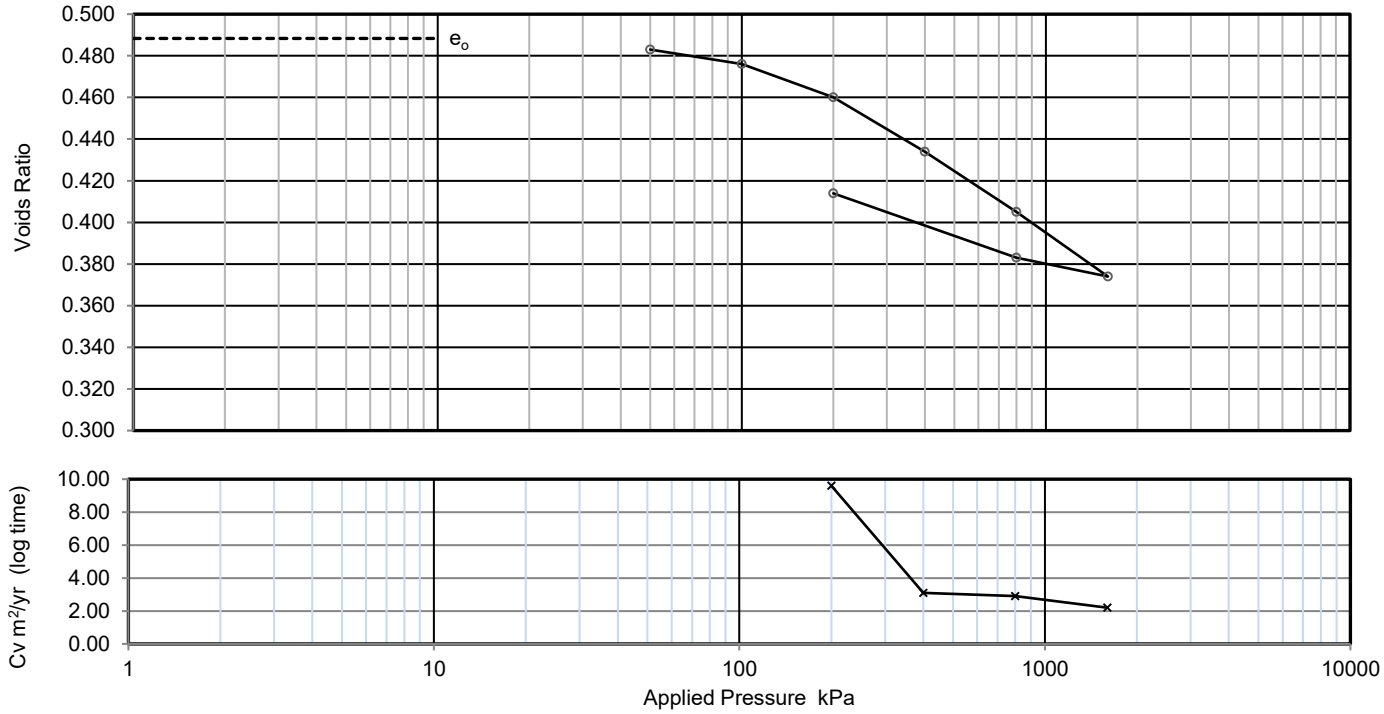
Client Reference: BMG2109
Job Number: 20-46686
Date Sampled: Not Given
Date Received: 18/11/2020
Date Tested: 15/12/2020
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 1713317
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Grey CLAY

Depth Top [m]: 12.00
Depth Base [m]: Not Given
Sample Type: B



Applied Pressure kPa	Voids ratio	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root m2/yr	Csec
0	0.488	-	-	-	-
50	0.483	0.074	N/A	N/A	N/A
100	0.476	0.091	N/A	N/A	N/A
200	0.460	0.11	9.6	23	0.00064
400	0.434	0.089	3.1	15	0.0013
800	0.405	0.051	2.9	16	0.0013
1 600	0.374	0.028	2.2	6.6	0.0013
800	0.383	0.0088			
200	0.414	0.037			

Preparation

Index tests

Orientation of the sample	Vertical		
Particle density	assumed	2.65	Mg/m3
Liquid limit	N/A		%
Plastic limit	N/A		%

Specimen details	Initial	Final	
Diameter	50.00	-	mm
Height	20.05	19.05	mm
Moisture Content	18	18	%
Bulk density	2.09	2.22	Mg/m3
Dry density	1.78	1.87	Mg/m3
Voids Ratio	0.488	0.414	
Saturation	95	118	%
Avg. temperature for test	22.0		°C
Swelling Pressure	Not measured		kPa
Settlement on saturation			%

Note: Cv corrected to 20°C

Remarks: Stage 1,2 - swelling. Re-issue 1: Hole number amendment as per client request

Signed: Szczepan Bielatowicz
PL Deputy of Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 02/02/2020

GF 172.15

Imogen Wort
BWB Consulting Limited
5th Floor
Waterfront House
Nottingham
NG2 3DQ

e: imogen.wort@bwbconsulting.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-44149

Project / Site name:	Trowbridge WRC	**Samples received on:**	18/11/2020
Your job number:	BMG2109	**Samples instructed on/ Analysis started on:**	26/11/2020
Your order number:	POR032992	**Analysis completed by:**	09/12/2020
Report Issue Number:	1	**Report issued on:**	09/12/2020
Samples Analysed:	10 soil samples		

Signed:

Rachel Bradley
Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-44149
Project / Site name: Trowbridge WRC
Your Order No: POR032992

Lab Sample Number				1699830	1699831	1699832	1699833
Sample Reference				BH01	BH01	BH01	BH01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.70-1.70	3.50-3.50	7.50-7.95	15.00-15.45
Date Sampled				10/11/2020	10/11/2020	10/11/2020	10/11/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	17	15	14
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5	0.5
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	-	-	8.4	9.1
Total Sulphate as SO4	%	0.005	MCERTS	-	-	0.199	0.151
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	0.83	0.52
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	834	521
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	54	160
Total Sulphur	%	0.005	MCERTS	-	-	1.77	2.11
Organic Matter	%	0.1	MCERTS	12	0.2	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	< 2.0	< 2.0
Heavy Metals / Metalloids							
Magnesium (water soluble)	mg/kg	5	NONE	-	-	65	45
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	32	22

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-44149
Project / Site name: Trowbridge WRC
Your Order No: POR032992

Lab Sample Number				1699834	1699835	1699836	1699837
Sample Reference				BH02	BH02	BH02	BH03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				3.50-3.50	4.50-4.50	8.50-8.50	5.50-5.50
Date Sampled				Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	16	12	21
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5	0.5
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	-	8.2	-	8.3
Total Sulphate as SO4	%	0.005	MCERTS	-	0.096	-	0.053
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.35	-	0.11
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	352	-	112
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	13	-	13
Total Sulphur	%	0.005	MCERTS	-	0.045	-	0.038
Organic Matter	%	0.1	MCERTS	6.4	-	1.4	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	< 2.0	-	< 2.0
Heavy Metals / Metalloids							
Magnesium (water soluble)	mg/kg	5	NONE	-	37	-	12
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	19	-	5.8

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 20-44149
Project / Site name: Trowbridge WRC
Your Order No: POR032992

Lab Sample Number				1699838	1699839
Sample Reference				BH03	BH03
Sample Number				None Supplied	None Supplied
Depth (m)				6.50-6.50	9.00-9.45
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	13
Total mass of sample received	kg	0.001	NONE	0.3	0.3
General Inorganics					
pH - Automated	pH Units	N/A	MCERTS	-	-
Total Sulphate as SO4	%	0.005	MCERTS	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-
Total Sulphur	%	0.005	MCERTS	-	-
Organic Matter	%	0.1	MCERTS	3.4	1.9
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-
Heavy Metals / Metalloids					
Magnesium (water soluble)	mg/kg	5	NONE	-	-
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 20-44149
Project / Site name: Trowbridge WRC

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1699830	BH01	None Supplied	1.70-1.70	Brown loam and clay with gravel and vegetation.
1699831	BH01	None Supplied	3.50-3.50	Brown clay and sand.
1699832	BH01	None Supplied	7.50-7.95	Brown clay.
1699833	BH01	None Supplied	15.00-15.45	Brown clay.
1699834	BH02	None Supplied	3.50-3.50	Brown clay and sand with gravel.
1699835	BH02	None Supplied	4.50-4.50	Brown clay and sand.
1699836	BH02	None Supplied	8.50-8.50	Brown clay and sand.
1699837	BH03	None Supplied	5.50-5.50	Brown clay and sand.
1699838	BH03	None Supplied	6.50-6.50	Brown clay and sand.
1699839	BH03	None Supplied	9.00-9.45	Brown clay and sand.

Analytical Report Number : 20-44149
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report

Analytical Report Number : 20-44149
Project / Site name: Trowbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH02	None Supplied	S	1699834	a	None Supplied	None Supplied	None Supplied
BH02	None Supplied	S	1699835	a	None Supplied	None Supplied	None Supplied
BH02	None Supplied	S	1699836	a	None Supplied	None Supplied	None Supplied
BH03	None Supplied	S	1699837	a	None Supplied	None Supplied	None Supplied
BH03	None Supplied	S	1699838	a	None Supplied	None Supplied	None Supplied
BH03	None Supplied	S	1699839	a	None Supplied	None Supplied	None Supplied

Appendix 9: Water Chemical Testing Results

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Nottingham
NG2 3DQ

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i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
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Analytical Report Number : 20-43438

Project / Site name:	Trowbridge WRC	**Samples received on:**	24/11/2020
Your job number:	BMG2109	**Samples instructed on/ Analysis started on:**	26/11/2020
Your order number:	POR032916	**Analysis completed by:**	02/12/2020
Report Issue Number:	1	**Report issued on:**	02/12/2020
Samples Analysed:	1 water sample		

Signed:

Rachel Bradley
Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-43438
Project / Site name: Trowbridge WRC

Your Order No: POR032916

Lab Sample Number				1695692
Sample Reference				BH03 (S)
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
General Inorganics				
pH	pH Units	N/A	ISO 17025	7.3
Total Cyanide	µg/l	10	ISO 17025	< 10
Complex Cyanide	µg/l	10	ISO 17025	< 10
Free Cyanide	µg/l	10	ISO 17025	< 10
Thiocyanate as SCN	µg/l	200	ISO 17025	270
Sulphate as SO4	µg/l	45	ISO 17025	104000
Sulphate as SO4	mg/l	0.045	ISO 17025	104
Elemental Sulphur	mg/l	0.02	NONE	< 0.02
Sulphide	µg/l	5	NONE	120
Chloride	mg/l	0.15	ISO 17025	22
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	4800
Total Nitrogen (Kjeldahl)	mg/l	0.1	NONE	6.6
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	11.3
Nitrate as N	mg/l	0.01	ISO 17025	0.09
Nitrate as NO3	mg/l	0.05	ISO 17025	0.41
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	1900
BOD (Biochemical Oxygen Demand) (Total) - PL	mg/l	1	ISO 17025	7.1
Total Phenols				
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10
Speciated PAHs				
Naphthalene	µg/l	0.01	ISO 17025	9.07
Acenaphthylene	µg/l	0.01	ISO 17025	4.83
Acenaphthene	µg/l	0.01	ISO 17025	6.53
Fluorene	µg/l	0.01	ISO 17025	5.93
Phenanthrene	µg/l	0.01	ISO 17025	25.9
Anthracene	µg/l	0.01	ISO 17025	9.81
Fluoranthene	µg/l	0.01	ISO 17025	52.6
Pyrene	µg/l	0.01	ISO 17025	40.1
Benzo(a)anthracene	µg/l	0.01	ISO 17025	28.7
Chrysene	µg/l	0.01	ISO 17025	22.7
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	30.1
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	14.2
Benzo(a)pyrene	µg/l	0.01	ISO 17025	29.3
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	15.8
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	5.69
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	16.4
Total PAH				
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	318

Analytical Report Number: 20-43438
Project / Site name: Trowbridge WRC

Your Order No: POR032916

Lab Sample Number				1695692
Sample Reference				BH03 (S)
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Heavy Metals / Metalloids				
Boron (dissolved)	µg/l	10	ISO 17025	420
Calcium (dissolved)	mg/l	0.012	ISO 17025	110
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.038
Magnesium (dissolved)	mg/l	0.005	ISO 17025	7.3
Potassium (dissolved)	mg/l	0.025	ISO 17025	12
Sodium (dissolved)	mg/l	0.01	ISO 17025	100
Chromium (total)	µg/l	0.2	ISO 17025	6.8
Lead (total)	µg/l	0.2	ISO 17025	7
Mercury (total)	µg/l	0.05	ISO 17025	< 0.05
Nickel (total)	µg/l	0.5	ISO 17025	80
Selenium (total)	µg/l	0.6	ISO 17025	4
Zinc (total)	µg/l	0.5	ISO 17025	6800
Antimony (dissolved)	µg/l	0.4	ISO 17025	4
Arsenic (dissolved)	µg/l	0.15	ISO 17025	2.98
Barium (dissolved)	µg/l	0.06	ISO 17025	68
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02
Manganese (dissolved)	µg/l	0.05	ISO 17025	1800
Vanadium (dissolved)	µg/l	0.2	ISO 17025	1.9
Copper (total)	µg/l	0.5	ISO 17025	11

Analytical Report Number: 20-43438
Project / Site name: Trowbridge WRC

Your Order No: POR032916

Lab Sample Number				1695692
Sample Reference				BH03 (S)
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Monoaromatics & Oxygenates				
Benzene	µg/l	1	ISO 17025	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	16
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	45
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	330
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	390
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	31
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	79
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	330
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	960
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	1400
Volatile free fatty acids				
Formic Acid	mg/l	10	NONE	< 10
Acetic Acid	mg/l	10	NONE	< 10
Propanoic Acid	mg/l	10	NONE	< 10
Isobutyric Acid	mg/l	10	NONE	< 10
Butyric Acid	mg/l	10	NONE	< 10
Isovaleric Acid	mg/l	10	NONE	< 10
Valeric Acid	mg/l	10	NONE	< 10
Hexanoic Acid	mg/l	10	NONE	< 10
Heptanoic Acid	mg/l	10	NONE	< 10
4-methyvaleric Acid	mg/l	10	NONE	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 20-43438
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (total)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Complex cyanide in water	Determination of complex cyanide by calculation. Accredited matrices SW, PW, GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry.Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Thiocyanate in water	Determination of thiocyanate in water by discreet analyser (colorimetry). Accredited matrices SW, GW, PW.	In house method based on SMWW 4500-CN-M. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025

Analytical Report Number : 20-43438
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Kjeldahl nitrogen in water	Determination of total nitrogen using the Kjeldahl-digestion method and colorimetric determination.	In house method based on BS 7755-3.7:1995 & ISO 11261:1995.	L087-PL	W	NONE
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Volatile free fatty acids in Water	Determination of volatile free fatty acids in water by HPLC.	In-house method	L105B-PL		NONE
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K2Cr2O7 followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Elemental sulphur in water	Determination of elemental sulphur in water by extraction in dichloromethane followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	W	NONE
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report

Analytical Report Number : 20-43438
Project / Site name: Trowbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH03 (S)	None Supplied	W	1695692	a	None Supplied	None Supplied	None Supplied

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Analytical Report Number : 20-44136

Project / Site name:	Trwbridge WRC	**Samples received on:**	30/11/2020
Your job number:	BMG2109	**Samples instructed on/ Analysis started on:**	30/11/2020
Your order number:	POR033029	**Analysis completed by:**	07/12/2020
Report Issue Number:	1	**Report issued on:**	07/12/2020
Samples Analysed:	2 water samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-44136
Project / Site name: Trwbridge WRC

Your Order No: POR033029

Lab Sample Number				1699714	1699715
Sample Reference				BH03 (D)	BH02 (D)
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
General Inorganics					
pH	pH Units	N/A	ISO 17025	7.5	7.7
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10
Complex Cyanide	µg/l	10	ISO 17025	< 10	< 10
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10
Thiocyanate as SCN	µg/l	200	ISO 17025	330	240
Sulphate as SO4	µg/l	45	ISO 17025	497000	803000
Sulphate as SO4	mg/l	0.045	ISO 17025	497	803
Elemental Sulphur	mg/l	0.02	NONE	< 0.02	< 0.02
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Chloride	mg/l	0.15	ISO 17025	99	840
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	190	2600
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	33.7	13.5
Nitrate as N	mg/l	0.01	ISO 17025	0.07	0.05
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	350	120
BOD (Biochemical Oxygen Demand) (Total) - PL	mg/l	1	ISO 17025	34	56
Total Phenols					
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
Speciated PAHs					
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16

Analytical Report Number: 20-44136
Project / Site name: Trwbridge WRC

Your Order No: POR033029

Lab Sample Number				1699714	1699715
Sample Reference				BH03 (D)	BH02 (D)
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Boron (dissolved)	µg/l	10	ISO 17025	1800	3900
Calcium (dissolved)	mg/l	0.012	ISO 17025	130	78
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.11	0.17
Magnesium (dissolved)	mg/l	0.005	ISO 17025	8.8	21
Potassium (dissolved)	mg/l	0.025	ISO 17025	13	23
Sodium (dissolved)	mg/l	0.01	ISO 17025	380	920
Chromium (total)	µg/l	0.2	ISO 17025	8.4	6.8
Lead (total)	µg/l	0.2	ISO 17025	37	43
Mercury (total)	µg/l	0.05	ISO 17025	< 0.05	0.15
Nickel (total)	µg/l	0.5	ISO 17025	46	27
Selenium (total)	µg/l	0.6	ISO 17025	7.8	8.7
Zinc (total)	µg/l	0.5	ISO 17025	380	220
Antimony (dissolved)	µg/l	0.4	ISO 17025	3	1.3
Arsenic (dissolved)	µg/l	0.15	ISO 17025	3.98	5.56
Barium (dissolved)	µg/l	0.06	ISO 17025	46	37
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02
Manganese (dissolved)	µg/l	0.05	ISO 17025	220	120
Vanadium (dissolved)	µg/l	0.2	ISO 17025	1.2	5.5
Copper (total)	µg/l	0.5	ISO 17025	28	63
Volatile free fatty acids					
Formic Acid	mg/l	10	NONE	< 10	210
Acetic Acid	mg/l	10	NONE	< 10	< 10
Propanoic Acid	mg/l	10	NONE	< 10	< 10
Isobutyric Acid	mg/l	10	NONE	< 10	< 10
Butyric Acid	mg/l	10	NONE	< 10	< 10
Isovaleric Acid	mg/l	10	NONE	< 10	< 10
Valeric Acid	mg/l	10	NONE	< 10	< 10
Hexanoic Acid	mg/l	10	NONE	< 10	< 10
Heptanoic Acid	mg/l	10	NONE	< 10	< 10
4-methyvaleric Acid	mg/l	10	NONE	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 20-44136
Project / Site name: Trwbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (total)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Complex cyanide in water	Determination of complex cyanide by calculation. Accredited matrices SW, PW, GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry.Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Thiocyanate in water	Determination of thiocyanate in water by discreet analyser (colorimetry). Accredited matrices SW, GW, PW.	In house method based on SMWW 4500-CN-M. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025

Analytical Report Number : 20-44136
Project / Site name: Trwbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Volatile free fatty acids in Water	Determination of volatile free fatty acids in water by HPLC.	In-house method	L105B-PL		NONE
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K2Cr2O7 followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Elemental sulphur in water	Determination of elemental sulphur in water by extraction in dichloromethane followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	W	NONE
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report

Analytical Report Number : 20-44136
Project / Site name: Trwbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH02 (D)	None Supplied	W	1699715	a	None Supplied	None Supplied	None Supplied
BH03 (D)	None Supplied	W	1699714	a	None Supplied	None Supplied	None Supplied

Key: **a** - No sampling date **b** - Incorrect container
c - Holding time **d** - Headspace **e** - Temperature

Appendix 5: BAT Assessment (including Waste Management Plan)

A review of Best Available Techniques (BAT) requirements contained in Best Available Techniques (BAT) Reference Document for Waste Treatment, 2018 has been undertaken. For those BAT requirements that are applicable to Trowbridge BC operations, an assessment of compliance has been undertaken. A description of how WW meets each requirement, or proposes to meet the requirement, is provided below. Alternatively, reference is made to the location elsewhere in this application document where this detail is provided.

Requirement	Relevant sections for reference / notes on applicability
Overall Environmental performance	
BAT 1. In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:	
1. Commitment of the management, including senior management; 2. Definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation; 3. Planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment; 4. Implementation of procedures paying particular attention to: (a) structure and responsibility, (b) recruitment, training, awareness and competence, (c) communication, (d) employee involvement, (e) documentation, (f) effective process control, (g) maintenance programmes, (h) emergency preparedness and response, (i) safeguarding compliance with environmental legislation; 5. Checking performance and taking corrective action, paying particular attention to: (a) monitoring and measurement, (b) corrective and preventive action, (c) maintenance of records, (d) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; 6. Review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness; 7. Following the development of cleaner technologies; 8. Consideration for the environmental impacts from the eventual decommissioning of the plant at the stage of designing a new plant, and throughout its operating life; 9. Application of sectoral benchmarking on a regular basis; 10. Waste stream management (see BAT 2); 11. An inventory of wastewater and waste gas streams (see BAT 3); 12. Residues management plan; 13. Accident management plan; 14. Odour management plan (see BAT 12); 15. Noise and vibration management plan (see BAT 17).	**BAT compliant in respect to the following:** Refer to Section III: Supporting Information, Form C2, Question 3d Management systems – Section V, Appendix 3 – Summary EMS. For item 8 see Section V: Appendix 4 - Site Condition Report. For item 11 see Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land. For item 12 see Section III: Supporting Information, Form C3, Question 6e Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste For item 13 see Section III: Form C2, Q6-6 Accident Management Plan. See Section V: Appendix 11 – Accident Management Plan

Requirement	Relevant sections for reference / notes on applicability
	For item 14 see Section V: Appendix 8 - Odour Management Plan. For item 15 see Section V: Appendix 9 - Noise impact assessment.
BAT 2. In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.	
a. Set up and implement waste characterisation and pre-acceptance procedures. These procedures aim to ensure the technical (and legal) suitability of waste treatment operations for a particular waste prior to the arrival of the waste at the plant. They include procedures to collect information about the waste input and may include waste sampling and characterisation to achieve sufficient knowledge of the waste composition. Waste pre-acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). b. Set up and implement waste acceptance procedures. Acceptance procedures aim to confirm the characteristics of the waste, as identified in the pre-acceptance stage. These procedures define the elements to be verified upon the arrival of the waste at the plant as well as the waste acceptance and rejection criteria. They may include waste sampling, inspection and analysis. Waste acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). c. Set up and implement a waste tracking system and inventory. A waste tracking system and inventory aim to track the location and quantity of waste in the plant. It holds all the information generated during waste pre-acceptance procedures (e.g. date of arrival at the plant and unique reference number of the waste, information on the previous waste holder(s), pre-acceptance and acceptance analysis results, intended treatment route, nature and quantity of the waste held on site including all identified hazards), acceptance, storage, treatment and/or transfer off site. The waste tracking system is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). d. Set up and implement an output quality management system. This technique involves setting up and implementing an output quality management system, so as to ensure that the output of the waste treatment is in line with the expectations, using for example existing EN standards. This management system also allows the performance of the waste treatment to be monitored and optimised, and for this purpose may include a material flow analysis of relevant components throughout the waste treatment. The use of a material flow analysis is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). e. Ensure waste segregation. Waste is kept separated depending on its properties in order to enable easier and environmentally safer storage and treatment. Waste segregation relies on the physical separation of waste and on procedures that identify when and where wastes are stored.	**BAT in place in respect for requirements 2a, b, c and d.** Refer to Section II: Technical Description and Section III: Supporting Information, Form C2, Question 3d Management systems. Trowbridge BC operates a Waste Management Plan (WMP) that covers waste acceptance, storage, treatment and the recycling process at Trowbridge Bioresources Centre. The WMP can be made available on request. **Requirements 2e, f and g not applicable**. Waste received on site comprises only sewage sludge. Waste segregation, sorting and waste compatibility considerations are not relevant. Refer to Section II: Technical Description for more details of sludge reception, treatment and handling processes

Requirement	Relevant sections for reference / notes on applicability
f. Ensure waste compatibility prior to mixing or blending of waste. Compatibility is ensured by a set of verification measures and tests in order to detect any unwanted and/or potentially dangerous chemical reactions between wastes (e.g. polymerisation, gas evolution, exothermal reaction, decomposition, crystallisation, precipitation) when mixing, blending or carrying out other treatment operations. The compatibility tests are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). g. Sort incoming solid waste. Sorting of incoming solid waste (1) aims to prevent unwanted material from entering subsequent waste treatment process(es). It may include: — manual separation by means of visual examinations; — ferrous metals, non-ferrous metals or all-metals separation; — optical separation, e.g. by near-infrared spectroscopy or X-ray systems; — density separation, e.g. by air classification, sink-float tanks, vibration tables; — size separation by screening/sieving.	
BAT 3. In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:	
1. Information about the characteristics of the waste to be treated and the waste treatment processes, including: (a) simplified process flow sheets that show the origin of the emissions; (b) descriptions of process integrated techniques and wastewater/waste gas treatment at source including their performances; 2. Information about the characteristics of the wastewater streams, such as: (a) average values and variability of flow, pH, temperature, and conductivity; (b) average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances/micropollutants); (c) data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)) (see BAT 52); 3. Information about the characteristics of the waste gas streams, such as: (a) average values and variability of flow and temperature; (b) average concentration and load values of relevant substances and their variability (e.g. organic compounds, POPs such as PCBs); (c) flammability, lower and higher explosive limits, reactivity; (d) presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, nitrogen, water vapour, dust).	**BAT in place.** Refer to Section II: Technical Description; Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land; and Section IV – Figure 4 – Point Source Emissions.
BAT 4. In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.	
a. Optimised storage location. This includes techniques such as: — the storage is located as far as technically and economically possible from sensitive receptors, watercourses, etc.; — the storage is located in such a way so as to eliminate or minimise the unnecessary handling of wastes within the plant (e.g. the same wastes are handled twice or more or the transport distances on site are unnecessarily long). b. Adequate storage capacity. Measures are taken to avoid accumulation of waste, such as: — the maximum waste storage capacity is clearly established and not exceeded taking into account the characteristics of the wastes (e.g. regarding the risk of fire) and the treatment capacity;	**BAT in place.** Refer to Section II: Technical Description and Section III: Supporting Information, Form C3, Question 6e Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste

Requirement	Relevant sections for reference / notes on applicability
— the quantity of waste stored is regularly monitored against the maximum allowed storage capacity; — the maximum residence time of waste is clearly established. c. Safe storage operation. This includes measures such as: — equipment used for loading, unloading and storing waste is clearly documented and labelled; — wastes known to be sensitive to heat, light, air, water, etc. are protected from such ambient conditions; — containers and drums are fit for purpose and stored securely. d. Separate area for storage and handling of packaged hazardous waste. When relevant, a dedicated area is used for storage and handling of packaged hazardous waste.	
BAT 5. In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.	
Handling and transfer procedures aim to ensure that wastes are safely handled and transferred to the respective storage or treatment. They include the following elements: — handling and transfer of waste are carried out by competent staff; — handling and transfer of waste are duly documented, validated prior to execution and verified after execution; — measures are taken to prevent, detect and mitigate spills; — operation and design precautions are taken when mixing or blending wastes (e.g. vacuuming dusty/powdery wastes). Handling and transfer procedures are risk-based considering the likelihood of accidents and incidents and their environmental impact.	**BAT in place.** Refer to Section II: Technical Description and Section III: Supporting Information, Form C2, Question 3b – Technical Ability and Section III: Supporting Information, Form C3, Question 6e Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste
Monitoring	
BAT 6. For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation).	
BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation).	Not applicable. There are no direct emissions to water.
BAT 7. BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	
BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	Not applicable. There are no direct emissions to water.
BAT 8. BAT is to monitor channelled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	
BAT is to monitor channelled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality. Dust - once every 6 months H_2S – once every 6 months	Of the parameters listed in BAT 8, only H_2S, NH_3 and odour emissions are applicable to the biological treatment activities carried out within this installation. Dust is

Requirement	Relevant sections for reference / notes on applicability
NH_3 - once every 6 months Odour concentration - once every 6 months	not considered as a risk for this installation (See Section V: Appendix 7 - Environmental Risk Assessment). The site does not operate odour control units and therefore the odour concentrations are not monitored. Odour monitoring programmes are established within the Odour Management Plan. See Section V: Appendix 8 Odour Management Plan.
BAT 9. BAT is to monitor diffuse emissions of organic compounds to air from the regeneration of spent solvents, the decontamination of equipment containing POPs with solvents, and the physico-chemical treatment of solvents for the recovery of their calorific value, at least once per year using one or a combination of the techniques given below.	
a. Measurement b. Emissions factors c. Mass balance	Not applicable. Relevant activities are not carried out at this site.
BAT 10. BAT is to periodically monitor odour emissions.	
Odour emissions can be monitored using: — EN standards (e.g. dynamic olfactometry according to EN 13725 in order to determine the odour concentration or EN 16841-1 or -2 in order to determine the odour exposure); — when applying alternative methods for which no EN standards are available (e.g. estimation of odour impact), ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality. The monitoring frequency is determined in the odour management plan (see BAT 12).	**BAT in place.** Refer to Section V: Appendix 8: Odour Management Plan
BAT 11. BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and wastewater, with a frequency of at least once per year.	
Monitoring includes direct measurements, calculation or recording, e.g. using suitable meters or invoices. The monitoring is broken down at the most appropriate level (e.g. at process or plant/installation level) and considers any significant changes in the plant/installation.	**BAT in place** Refer to Section II: Technical Description and Section III: Supporting Information, Form C2, Question 3d Management systems and Form C3, Questions 6a, b, c, d and e. See Section V: Appendix 10: Energy Management Plan.
Emissions to air	
BAT 12. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:	

Requirement	Relevant sections for reference / notes on applicability
— a protocol containing actions and timelines; — a protocol for conducting odour monitoring as set out in BAT 10; — a protocol for response to identified odour incidents, e.g. complaints; — an odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures.	**BAT in place**. Refer to Section V: Appendix 8: Odour Management Plan
BAT 13. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below.	
a. Minimising residence times. Minimising the residence time of (potentially) odorous waste in storage or in handling systems (e.g. pipes, tanks, containers), in particular under anaerobic conditions. When relevant, adequate provisions are made for the acceptance of seasonal peak volumes of waste. b. Using chemical treatment. Using chemicals to destroy or to reduce the formation of odorous compounds (e.g. to oxidise or to precipitate hydrogen sulphide). c. Optimising aerobic treatment. In the case of aerobic treatment of water-based liquid waste, it may include: — use of pure oxygen; — removal of scum in tanks; — frequent maintenance of the aeration system. In the case of aerobic treatment of waste other than water-based liquid waste, see BAT 36.	**BAT in place.** Refer to Section V: Appendix 8: Odour Management Plan
BAT 14. In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below.	
Depending on the risk posed by the waste in terms of diffuse emissions to air, BAT 14d is especially relevant. a. Minimising the number of potential diffuse emission sources. This includes techniques such as: — appropriate design of piping layout (e.g. minimising pipe run length, reducing the number of flanges and valves, using welded fittings and pipes); — favouring the use of gravity transfer rather than using pumps; — limiting the drop height of material; — limiting traffic speed; — using wind barriers. b. Selection and use of high integrity equipment. This includes techniques such as: — valves with double packing seals or equally efficient equipment; — high integrity gaskets (such as spiral wound, ring joints) for critical applications; — pumps/compressors/agitators fitted with mechanical seals instead of packing; — magnetically driven pumps/compressors/agitators; — appropriate service hose access ports, piercing pliers, drill heads, e.g. when degassing WEEE containing VFCs and/or VHCs. " c. Corrosion prevention. This includes techniques such as: — appropriate selection of construction materials; — lining or coating of equipment and painting of pipes with corrosion inhibitors. d. Containment, collection and treatment of diffuse emissions. This includes techniques such as: — storing, treating and handling waste and material that may generate diffuse emissions in enclosed buildings and/or enclosed equipment (e.g. conveyor belts);	**BAT in place** Refer to Section II: Technical Description, Section III Supporting Information, Form C3, Question 3b General Requirements – LDAR programme, Section V: Appendix 8: Odour Management Plan, Appendix 7 - Environmental Risk Assessment (Bioaerosol Risk Assessment)

Requirement	Relevant sections for reference / notes on applicability
— maintaining the enclosed equipment or buildings under an adequate pressure; — collecting and directing the emissions to an appropriate abatement system via an air extraction system and/or air suction systems close to the emission sources. e. Dampening. Dampening potential sources of diffuse dust emissions (e.g. waste storage, traffic areas, and open handling processes) with water or fog. f. Maintenance. This includes techniques such as: — ensuring access to potentially leaky equipment; — regularly controlling protective equipment such as lamellar curtains, fast-action doors. g. Cleaning of waste treatment and storage areas. This includes techniques such as regularly cleaning the whole waste treatment area (halls, traffic areas, storage areas, etc.), conveyor belts, equipment and containers. h. Leak detection and repair (LDAR) programme. See Section 6.2. When emissions of organic compounds are expected, a LDAR programme is set up and implemented using a risk-based approach, considering in particular the design of the plant and the amount and nature of the organic compounds concerned.	
BAT 15. BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques given below.	
a. Correct plant design. This includes the provision of a gas recovery system with sufficient capacity and the use of high integrity relief valves. b. Plant management. This includes balancing the gas system and using advanced process control.	**BAT in place** Refer to Section II: Technical Description
BAT 16. In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below.	
a. Correct design of flaring devices. Optimisation of height and pressure, assistance by steam, air or gas, type of flare tips, etc., to enable smokeless and reliable operation and to ensure the efficient combustion of excess gases. b. Monitoring and recording as part of flare management. This includes continuous monitoring of the quantity of gas sent to flaring. It may include estimations of other parameters (e.g. composition of gas flow, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions (e.g. NOX, CO, hydrocarbons), noise). The recording of flaring events usually includes the duration and number of events and allows for the quantification of emissions and the potential prevention of future flaring events.	**BAT in place** Refer to Section II: Technical Description
Noise and vibration	
BAT 17. In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:	
1. A protocol containing appropriate actions and timelines; 2. A protocol for conducting noise and vibration monitoring; 3. A protocol for response to identified noise and vibration events, e.g. complaints; 4. A noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures.	Noise or vibration nuisance at sensitive receptors is not expected and no substantiated noise and vibration nuisance complaints have been received. Noise and vibration management plan not required. Refer to Section V: Appendix 9 - Noise impact assessment.

Requirement	Relevant sections for reference / notes on applicability
	Form C2, Question 3d Management systems
BAT 18. In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below.	
a. Appropriate location of equipment and buildings. Noise levels can be reduced by increasing the distance between the emitter and the receiver, by using buildings as noise screens and by relocating building exits or entrances. b. Operational measures. This includes techniques such as: (i) inspection and maintenance of equipment; (ii) closing of doors and windows of enclosed areas, if possible; (iii) equipment operation by experienced staff; (iv) avoidance of noisy activities at night, if possible; (v) provisions for noise control during maintenance, traffic, handling and treatment activities. c. Low-noise equipment. This may include direct drive motors, compressors, pumps and flares. d. Noise and vibration control equipment. This includes techniques such as: (i) noise reducers; (ii) acoustic and vibrational insulation of equipment; (iii) enclosure of noisy equipment; (iv) soundproofing of buildings. " e. Noise attenuation. Noise propagation can be reduced by inserting obstacles between emitters and receivers (e.g. protection walls, embankments and buildings).	**BAT in place.** Refer to Section V: Appendix 9 Noise impact assessment.
Emissions to water	
BAT 19. In order to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below.	
a. Water management. Water consumption is optimised by using measures which may include: — water saving plans (e.g. establishment of water efficiency objectives, flow diagrams and water mass balances); — optimising the use of washing water (e.g. dry cleaning instead of hosing down, using trigger control on all washing equipment); — reducing the use of water for vacuum generation (e.g. use of liquid ring pumps with high boiling point liquids). b. Water recirculation. Water streams are recirculated within the plant, if necessary, after treatment. The degree of recirculation is limited by the water balance of the plant, the content of impurities (e.g. odorous compounds) and/or the characteristics of the water streams (e.g. nutrient content). c. Impermeable surface. Depending on the risks posed by the waste in terms of soil and/or water contamination, the surface of the whole waste treatment area (e.g. waste reception, handling, storage, treatment and dispatch areas) is made impermeable to the liquids concerned. d. Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels. Depending on the risks posed by the liquids contained in tanks and vessels in terms of soil and/or water contamination, this includes techniques such as: — overflow detectors; — overflow pipes that are directed to a contained drainage system (i.e. the relevant secondary containment or another vessel); — tanks for liquids that are located in a suitable secondary containment; the volume is normally sized to accommodate the loss of containment of the largest tank within the secondary containment;	**BAT in place** For details of water use refer to Section III: Supporting Information, Form C3, Question 6d Explain and justify the raw and other materials, other substances and water that you will use For details of techniques to minimise accidental/unplanned discharges to the environment from surfacing, storage areas, tanks, vessels, drainage systems etc refer to the Accident Management Plan (Form C2, Q6-6, Appendix 4: Site Condition Report and Appendix 6: Environmental Quantitative Risk Assessment. For details of wastewater generation and management

Requirement	Relevant sections for reference / notes on applicability
— isolation of tanks, vessels and secondary containment (e.g. closing of valves). e. Roofing of waste storage and treatment areas. Depending on the risks posed by the waste in terms of soil and/or water contamination, waste is stored and treated in covered areas to prevent contact with rainwater and thus minimise the volume of contaminated run-off water. f. Segregation of water streams. Each water stream (e.g. surface run-off water, process water) is collected and treated separately, based on the pollutant content and on the combination of treatment techniques. In particular, uncontaminated wastewater streams are segregated from wastewater streams that require treatment. g. Adequate drainage infrastructure. The waste treatment area is connected to drainage infrastructure. Rainwater falling on the treatment and storage areas is collected in the drainage infrastructure along with washing water, occasional spillages, etc. and, depending on the pollutant content, recirculated or sent for further treatment. h. Design and maintenance provisions to allow detection and repair of leaks. Regular monitoring for potential leakages is risk-based, and, when necessary, equipment is repaired. The use of underground components is minimised. When underground components are used and depending on the risks posed by the waste contained in those components in terms of soil and/or water contamination, secondary containment of underground components is put in place. i. Appropriate buffer storage capacity. Appropriate buffer storage capacity is provided for waste water generated during other than normal operating conditions using a risk-based approach (e.g. taking into account the nature of the pollutants, the effects of downstream waste water treatment, and the receiving environment). The discharge of wastewater from this buffer storage is only possible after appropriate measures are taken (e.g. monitor, treat, re-use).	refer to Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land.
BAT 20. In order to reduce emissions to water, BAT is to treat wastewater using an appropriate combination of the techniques given below.	
a. Equalisation b. Neutralisation c. Physical separation, e.g. screens, sieves, grit separators, grease separators, oil-water separation or primary settlement tanks d. Adsorption e. Distillation/rectification f. Precipitation g. Chemical oxidation h. Chemical reduction i. Evaporation j. Ion exchange k. Stripping l. Activated sludge process m. Membrane bioreactor n. Nitrification/denitrification when the treatment includes a biological treatment o. Coagulation and flocculation p. Sedimentation q. Filtration (e.g. sand filtration, microfiltration, ultrafiltration) r. Flotation	**BAT in place.** All process liquors including surface water runoff is directed to WRC for full treatment prior to discharge to the River Biss. Refer to Section II: Technical Description. For details of process liquor generation and management refer to Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land.
Emissions from accidents and incidents	
BAT 21. In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below, as part of the accident management plan (see BAT 1).	
a. Protection measures. These include measures such as:	**BAT in place.**

Requirement	Relevant sections for reference / notes on applicability
— protection of the plant against malevolent acts; — fire and explosion protection system, containing equipment for prevention, detection, and extinction; — accessibility and operability of relevant control equipment in emergency situations. " b. Management of incidental/accidental emissions. Procedures are established and technical provisions are in place to manage (in terms of possible containment) emissions from accidents and incidents such as emissions from spillages, firefighting water, or safety valves. c. Incident/accident registration and assessment system. This includes techniques such as: — a log/diary to record all accidents, incidents, changes to procedures and the findings of inspections; — procedures to identify, respond to and learn from such incidents and accidents."	Refer to Section V: Appendix 11 - Accident Management Plan
Material efficiency	
BAT 22. In order to use materials efficiently, BAT is to substitute materials with waste.	
Waste is used instead of other materials for the treatment of wastes (e.g. waste alkalis or waste acids are used for pH adjustment, fly ashes are used as binders).	**BAT in place.** Opportunities to substitute materials with waste are very limited. However, final treated effluent is used in preference to mains water supply wherever feasible. Refer also to Section III: Supporting Information, Form C3, Question 6e
Energy efficiency	
BAT 23. In order to use energy efficiently, BAT is to use both of the techniques given below.	
a. Energy efficiency plan. An energy efficiency plan entails defining and calculating the specific energy consumption of the activity (or activities), setting key performance indicators on an annual basis (for example, specific energy consumption expressed in kWh/tonne of waste processed) and planning periodic improvement targets and related actions. The plan is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc. b. Energy balance record. An energy balance record provides a breakdown of the energy consumption and generation (including exportation) by the type of source (i.e. electricity, gas, conventional liquid fuels, conventional solid fuels, and waste). This includes: (i) information on energy consumption in terms of delivered energy; (ii) information on energy exported from the installation; (iii) energy flow information (e.g. Sankey diagrams or energy balances) showing how the energy is used throughout the process. The energy balance record is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc. "	**BAT in place.** Refer to Section III: Supporting Information, Form C3, Question 6a and 6b; and Section V: Appendix 10 – Energy Management Plan.
Reuse of packaging	
BAT 24. In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the residues management plan (see BAT 1).	
Packaging (drums, containers, IBCs, pallets, etc.) is reused for containing waste, when it is in good condition and sufficiently clean, depending on a compatibility check between the substances contained (in consecutive uses).	**BAT in place.**

Requirement	Relevant sections for reference / notes on applicability
If necessary, packaging is sent for appropriate treatment prior to reuse (e.g. reconditioning, cleaning).	Limited opportunities exist as packaging waste arisings are very low. Refer to Section III: Supporting Information, Form C3, Question 6e for further information about residues management
BAT conclusions for the mechanical treatment of waste – NOT APPLICABLE	
General BAT conclusions for the biological treatment of waste	
BAT 33. In order to reduce odour emissions and to improve the overall environmental performance, BAT is to select the waste input.	
The technique consists of carrying out the pre-acceptance, acceptance and sorting of the waste input (see BAT 2) so as to ensure the suitability of the waste input for the waste treatment, e.g. in terms of nutrient balance, moisture or toxic compounds which may reduce the biological activity.	**BAT in place.** Refer to Section II: Technical Description and Section III: Supporting Information, Form C2, Question 3d Management systems.
BAT 34. In order to reduce channelled emissions to air of dust, organic compounds and odorous compounds, including H2S and NH3, BAT is to use one or a combination of the techniques given below.	
a. Adsorption. b. Biofilter. c. Fabric filter. d. Thermal oxidation. e. Wet scrubbing.	Odour monitoring programmes are established within the Odour Management Plan. See Section V: Appendix 8 Odour Management Plan. Refer to Section II: Technical Description and Section III Supporting Information referencing the siloxane plant that utilises regenerative Siloxane filters.
BAT 35. In order to reduce the generation of wastewater and to reduce water usage, BAT is to use all of the techniques given below.	
a. Segregation of water streams. Leachate seeping from compost piles and windrows is segregated from surface run-off water (see BAT 19f). b. Water recirculation. Recirculating process water streams (e.g. from dewatering of liquid digestate in anaerobic processes) or using as much as possible other water streams (e.g. water condensate, rinsing water, surface run-off water). The degree of recirculation is limited by the water balance of the plant, the content of impurities (e.g. heavy metals, salts, pathogens, odorous compounds) and/or the characteristics of the water streams (e.g. nutrient content). c. Minimisation of the generation of leachate. Optimising the moisture content of the waste in order to minimise the generation of leachate.	**BAT in place.** Final treated effluent is used in preference to mains water supply wherever feasible. Surface water runoff is limited and is all directed to WRC for full treatment prior to discharge to the River Biss – refer to Section II: Technical Description
BAT conclusions for the aerobic treatment of waste – NOT APPLICABLE	

Requirement	Relevant sections for reference / notes on applicability
BAT conclusions for the anaerobic treatment of waste	
BAT 38. In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.	
Implementation of a manual and/or automatic monitoring system to: — ensure a stable digester operation; — minimise operational difficulties, such as foaming, which may lead to odour emissions; — provide sufficient early warning of system failures which may lead to a loss of containment and explosions. This includes monitoring and/or control of key waste and process parameters, e.g.: — pH and alkalinity of the digester feed; — digester operating temperature; — hydraulic and organic loading rates of the digester feed; — concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate; — biogas quantity, composition (e.g. H2S) and pressure; — liquid and foam levels in the digester.	**BAT in place.** Refer to Section II: Technical Description
BAT conclusions for the physico-chemical treatment of waste – NOT APPLICABLE	
BAT conclusions for the treatment of water-based liquid waste – NOT APPLICABLE	
BAT 52. In order to improve the overall environmental performance, BAT is to monitor the waste input as part of the waste pre-acceptance and acceptance procedures (see BAT 2).	
Monitoring the waste input, e.g. in terms of: — bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)); — feasibility of emulsion breaking, e.g. by means of laboratory-scale tests. The technique consists of carrying out the pre-acceptance, acceptance and sorting of the waste input (see BAT 2) so as to ensure the suitability of the waste input for the waste treatment, e.g. in terms of nutrient balance, moisture or toxic compounds which may reduce the biological activity.	**BAT in place** See BAT 2 above.
BAT 53. – NOT APPLICABLE	

Appendix 6: Environmental Quantitative Risk Assessment (EQRA)

Industrial Emissions Directive Compliance Action Plan

Environmental Quantitative Risk Assessment

Trowbridge Bioresources Centre

Site ID 11799

Client: **Wessex Water Services Ltd.**

Document Title: **Industrial Emissions Directive Compliance Action Plan: Trowbridge Bioresources Centre Environmental Quantitative Risk Assessment**

Stantec Project Code: 331101341			Document No: EQRA331101341		
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0.1	07/July/21	Draft Report	Luke Gimblett / Elizabeth Wilson	Rob Gordon	Peter Duncan

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1.0 INTRODUCTION

1.1 Background

The purpose of this report is to present the risk assessment, known as the Environmental Quantitative Risk Assessment (EQRA), undertaken for the Trowbridge Bioresources Centre. The EQRA is based on a source-pathway-receptor model and follows the principles of the following guidance:

- The Anaerobic Digestion and Bioresources Association (ADBA) report: Secondary Containment at AD Plants: An Industry Guide, 2016
- The Construction Industry Research and Information Association (CIRIA) report: Containment Systems for the Prevention of Pollution, 2014

The EQRA will provide a Compliance Action Plan (CAP) detailing the site specific actions required at Trowbridge Bioresources Centre to ensure IED compliance with respect to BAT 19, as defined in the European Commission (EC), 2018, *Directive 2018/1147/EU of 10 August 2018 on establishing best available techniques (BAT) conclusions for waste treatment* (EC, 2018). The EQRA will be used to identify the mitigation measures that are required to reduce the risk of pollution to ground or local water environment to comply with the IED. To support the EQRA process, a desk-top preliminary hydrogeological study for Trowbridge Bioresources Centre has been undertaken and is presented in this report.

1.2 Scope of work

The current objective is to produce a Compliance Action Plan (CAP) detailing the actions required at the Trowbridge Bioresources Centre to ensure IED compliance. As part of the CAP an Environmental Quantitative Risk Assessment (EQRA) has been completed for the Bioresources Centre including all sub-surface pipework and storage measures including sumps, storage tanks and vessels and their associated pipework (excluding installation drains) in relation to their potential to cause fugitive emissions to surface and / or groundwater. To support the EQRA, a desk-based hydrogeological study for the Bioresources Centre has been conducted for the purposes of developing a preliminary conceptual site model to identify and to describe relevant source-pathway-receptor linkages relating to the water environment.

The EQRA will be used to identify any measures that are required to reduce the risk of pollution to ground or the local water environment and therefore demonstrate BAT or BAT equivalent measures for each respective asset with reference to the following:

- Prevailing Environment Agency BAT guidance (UK Government, 2020).
- European Commission (EC), 2018. Directive 2018/1147/EU of 10 August 2018 on establishing best available techniques (BAT) conclusions for waste treatment.
- European Union (EU), 2010. Industrial Emissions (Integrated Pollution Prevention and Control) Directive (Recast) (IE(IPPC)D) (Directive 2010/75/EU).

The hydrogeological study considered information relating to the following elements:

- specification and condition of the sludge treatment assets / infrastructure;
- composition of raw sewage sludge and how this alters during the sludge treatment process;

- the superficial and solid geology below the sludge treatment assets based on existing literature, field observations and the results of previous site investigations;
- the hydrology of the site including the physical setting and location of streams, rivers and other water courses;
- the hydrogeology of the site, including nearby water abstractions and springs;
- groundwater levels and flow directions;
- aquifer properties including hydraulic conductivity and porosity; and
- the nature and proximity of potential receptors.

1.3 Information sources

The following information sources have been used for the study presented in this report:

- General and site-specific information provided by the Operator relating to the sludge treatment process; infrastructure details / records and other relevant operational information.

- Environmental data report and mapping provided by GroundSure (included in Appendix A) based on various publicly available information sources.

- Information provided by the Environment Agency following a specific data request which included license abstraction, rainfall data, groundwater level data, river stage data, river flow data and water quality data.

- Wiltshire Council was approached for information regarding private water abstractions within the local area. However, the Council confirmed that they do not hold private water abstraction records for the local area but properties located on a river with riparian rights can abstract water (and as long as it was below Environment Agency volume thresholds).

- Additional publicly accessible information from the UK Government and the British Geological Survey (BGS).

1.4 Site visit

A site visit was conducted by a Stantec engineer on 28th January 2021. The purpose of this visit was to obtain additional information from the Operator and to undertake a visual inspection of the Bioresources Centre assets and infrastructure and the immediate surrounding area to provide contemporary information for the purposes of this and related studies.

2.0 SITE DETAILS

2.1 Location

Trowbridge Bioresources Centre is co-located with a Water Recycling Centre (WRC) which is collectively referred to as 'the Trowbridge site' or 'the Site' in this report. Both the Bioresources Centre and the WRC are operated by WW (the Operator).

The Trowbridge site is located at the north-westerly extent of Trowbridge town and is approximately 12 km to the south-east of central Bath (NGR: 384760, 158790). The Bioresources Centre covers an area of approximately 1.28 ha which includes the main sludge assets at the WRC and the road to the south-eastern area where the skip storage is located. Figure 2.1 shows the regional setting of the Site.

The Bioresources Centre is comprised of both the anaerobic digestion and associated activities (as operated by Wessex Water Services Limited (WWSL) and which are within the 'installation boundary') and the Combined Heat Plant (CHP) and Gas to Grid activities as operated by Wessex Water Enterprises Limited (WWEL) (and which are within the 'EPA/HB3602TR boundary') as shown on Figure 3.3.

2.2 Site setting

The Site is in a rural area but close to the suburbs of Trowbridge and Trowle Common. A solar farm lies adjacent to the western boundary and extends to the north beyond four lagoons which lie adjacent to the northern boundary of the Site (see Figure 2.2). Drains lie adjacent to the eastern and southern boundary of the Site. To the east lies the River Biss at approximately 100 m away and flows in a northerly direction. A railway line lies to the east of the river at approximately 160 m east of the Site. The Kennet and Avon canal (Canal) lies 660 m north of the Site (at the closest point). The River Avon lies just north of the Canal at 720 m north of the Site. Figure 2.2 shows the local setting of the Site.

The Site is on the southern edge of a fairly flat area of higher ground. This is defined by a south-west to north-east orientated valley to the south-east of the Site (that contains the River Biss) and an east to west orientated valley to the north of the Site which contains the Canal and River Avon. The high ground is at approximately 50 m AOD with the Site at 42 m AOD and the ground dropping steeply to the south-east down the side of the valley to approximately 30 m AOD at the River Biss.

2.3 Historical development

Historical mapping provided in Appendix B and Appendix C indicates that the Site was established as Sewage Works at some point between 1901 and 1922 in what is currently the eastern part of the Site only. Following this, the land along the eastern edge of the Site (i.e. along the side of the valley containing the River Biss) was built up between 1924 and 1956-1960 as displayed by earthwork markings on the maps. This was extended further south along the south-east edge of the Site between 1956-1960 and 1985-1987. During this time the sewage works were extended to the west between 1968-1971 and 1974-1977 in the south-west corner of the Site and again between 1979 and 1985-1987 to cover the entire current Site area with the initial eastern area remaining as filter beds. Prior to this time the area appears to have been predominately agricultural.

A refuse tip was located in the north-east corner of the Site from between 1936-1939 to 1974-1977, to the north of the filter beds. A further refuse tip was also present (to the north of where the current lagoons are) from between 1956-1960 to 1968-1971.

The drain that lies along the eastern boundary of the Site is identified in 1924 (and may have been constructed as part of the work that raised the land along the eastern edge of the Site at this time); there is an outfall (this is now the final effluent outfall see Section 3.4) from the Site to this drain (as shown on Figure 2.2). This was first detailed on mapping from 1968 – 1971. The drain along the southern boundary of the Site is first identified in 1979; prior to this an area of vegetation was in this location.

The four lagoons that are currently located to the north of the Site were initially constructed between 1979 and 1985-87 as five ponds, however between 2010 and 2020 the three western ponds were altered into two ponds.

Figure 2.1 Site setting – regional

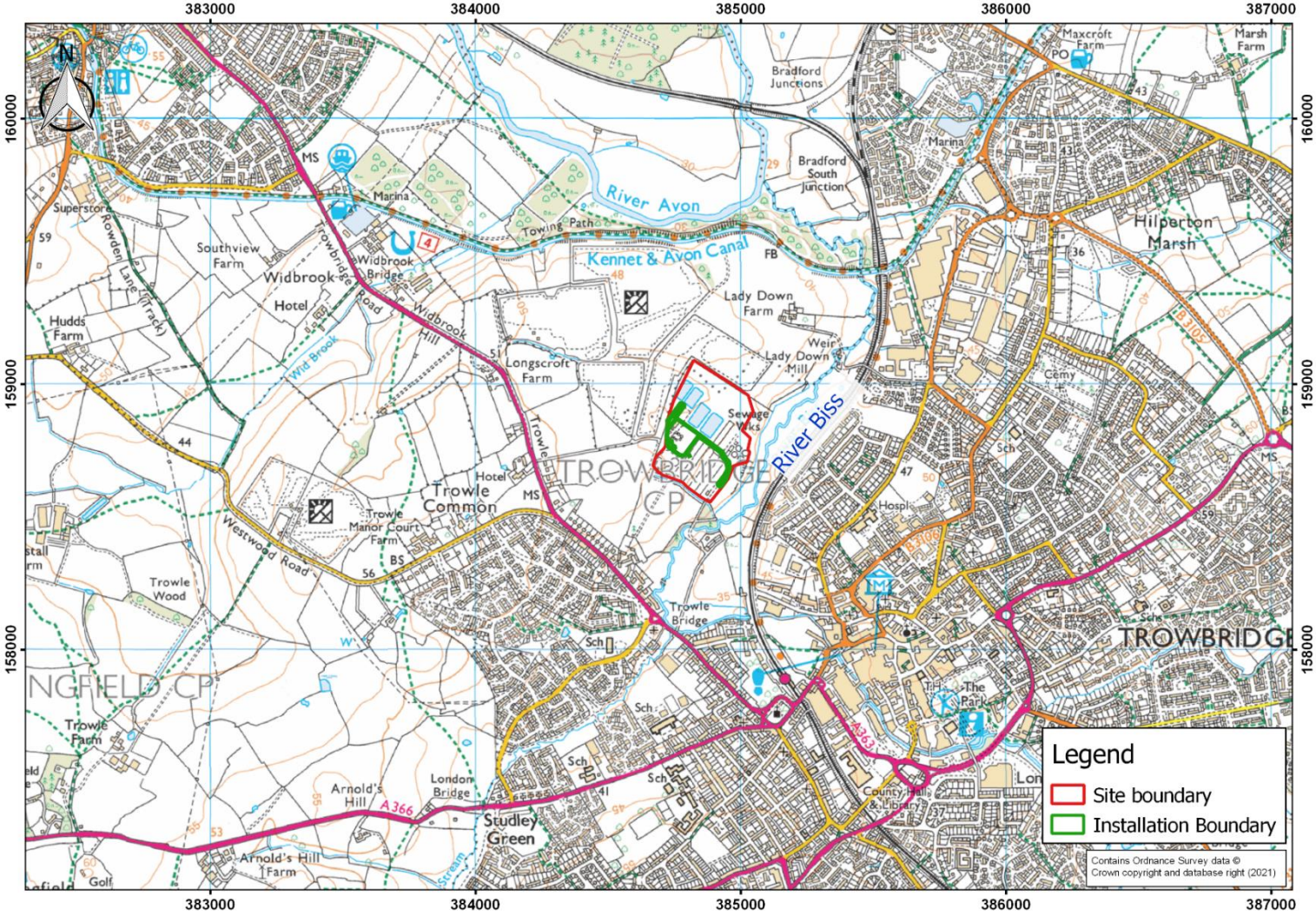
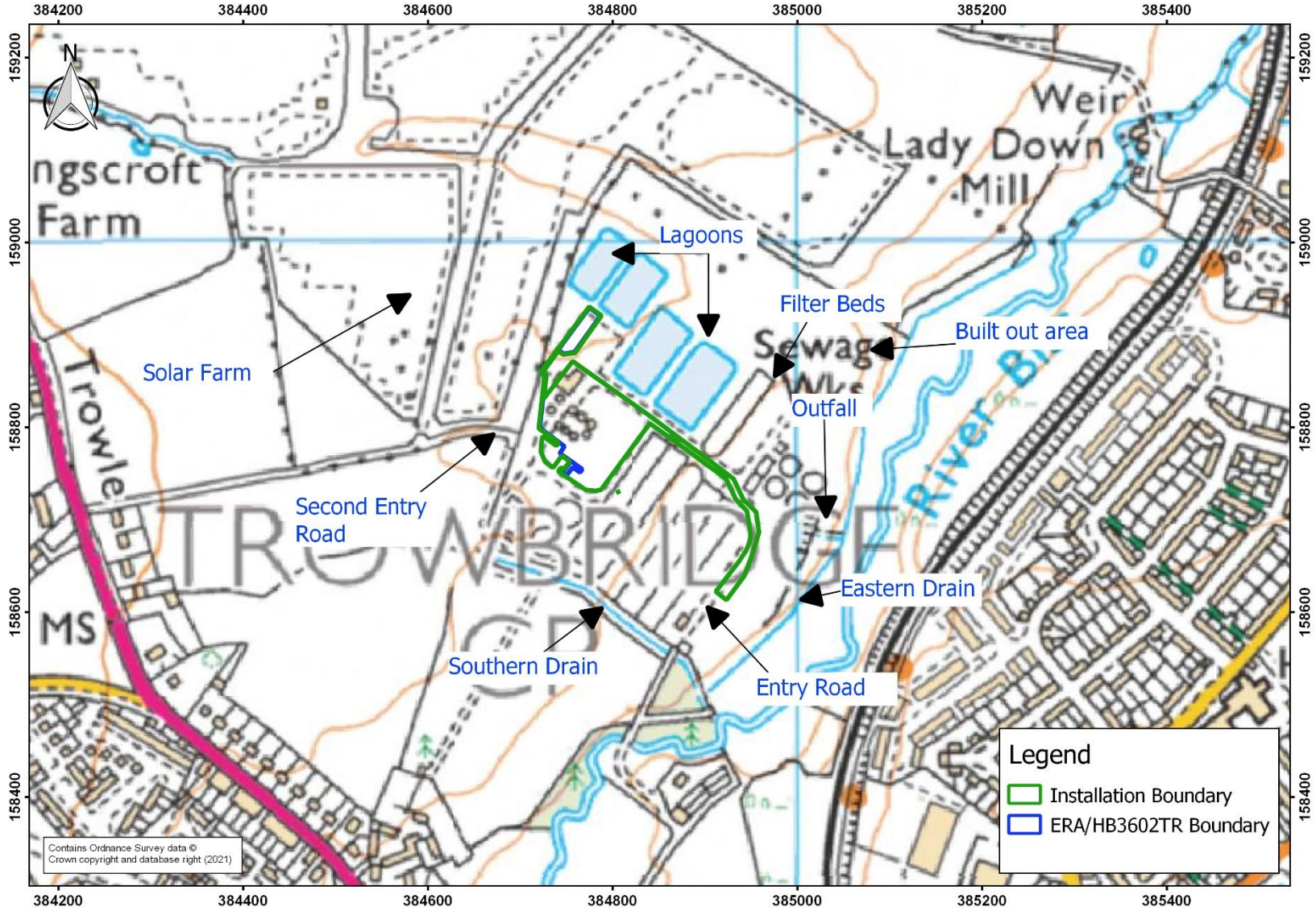


Figure 2.2 Site setting – local



3.0 BIORESOURCES CENTRE DETAILS

This section provides a summary of the sludge treatment process including the key assets and associated infrastructure at the Bioresources Centre. The process is displayed pictorially in the Process Flow Diagram (PFD) as Figure 3.1. The location of the assets and infrastructure referred to are shown in

Figure 3.2.

This information will be used to identify and assess the significance of the main sources of contamination (i.e. locations where sludges and liquors are stored / transferred) at the Water Recycling Centre that would have the potential to cause pollution of the ground and / or the local water environment.

3.1 Sludge treatment process

Trowbridge BC is a regional sludge processing centre that has capacity of 525 tonnes/day (thickened import and indigenous sludge entering the digestion treatment process. The following outlines the sludge treatment process; each asset is referenced with a number or letter to identify its location as shown in

Figure 3.2 Plan of current Water Recycling Centre assets.

- Imported sludge is transferred from tankers into a Sludge reception tank [K], as well as primary indigenous sludge. Previously a SMAX screen [3] screened the imported sludge before being discharged into the reception tank but the asset has failed and is to be decommissioned. This Storage tank is also where the site's indigenous primary sludge is discharged.

- The sludge from the reception tank flow is pumped forward to the 2no. strain presses [7].

- Strained Sludge is transferred to 2no. Gravity Belt Thickeners (GBT) feed tanks via two holding tanks (strained transfer tank [Q] and pre-thickened tank [Z]). The 2no. GBTs [L] liquors are transferred to the head of the works via the return liquor PS [H].

- The thickened sludge is pumped to the post thicken tank [P], which buffers sludge to be feed to the Acid Phase Digesters (APDs) [B1-6] in sequence. Note only the first APD tank is heated.

- Sludge from the final APD is sent to 2no. Mesophilic Digesters [C1-2].

- Digested sludge is then transferred to the 2no. Post Digested tanks [E1-2].

- Secondary digested sludge is pumped to 2no. Belt Presses held within the dewatering building [G1]. The Belt Press liquors are transferred to the liquor fixed PS [4] then to the 2no. liquor balance tanks [F1-2] before being transferred to the head of the works via the return liquor PS [H].

- The dewatered cake is conveyed into skips [5] and then held in the skip storage area [X] before being tankered to land.

- Biogas is collected from the APD tanks and the mesophilic digesters. This gas is diverted between the CHP and Gas to grid systems. The CHP system comprises of the gas holder [A1], dehumidifier [W], regenerative Siloxane filters [D], and the CHP waste gas burner [Y]. The Gas to Grid system comprises of a flare, biogas cleaning and propane addition. The CHP assets and the Gas to Grid activities are covered under EPR/HB3602TR.

- The biogas is primarily utilised by the gas to grid system. If the biogas does not meet the required standard or the gas to grid system has failed the biogas will be utilised by the CHP

and the boilers if the other system cannot take the biogas. To ensure that no biogas is vented to atmosphere the site has two waste gas burners.

Figure 3.1 Sludge treatment process flow diagram

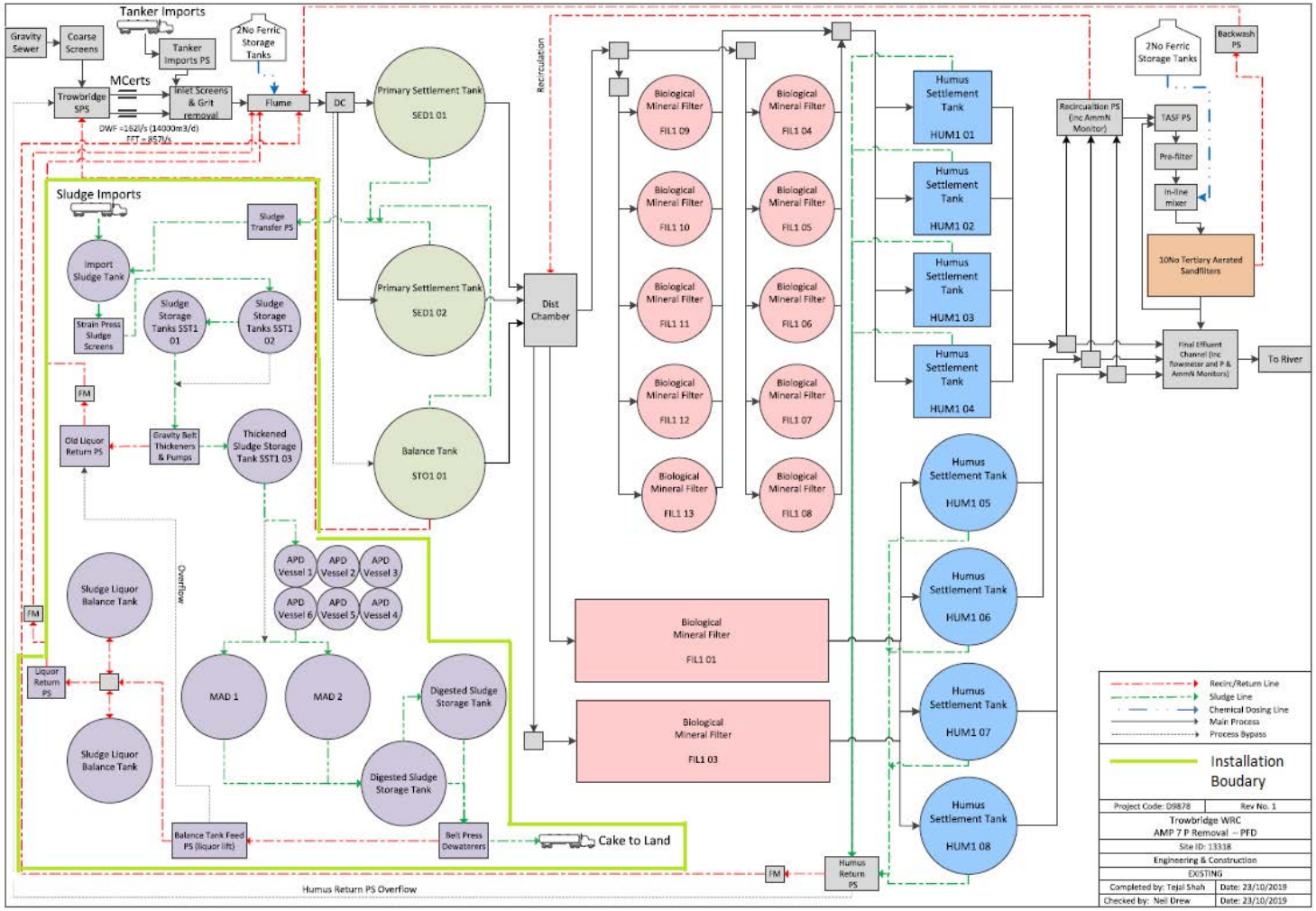
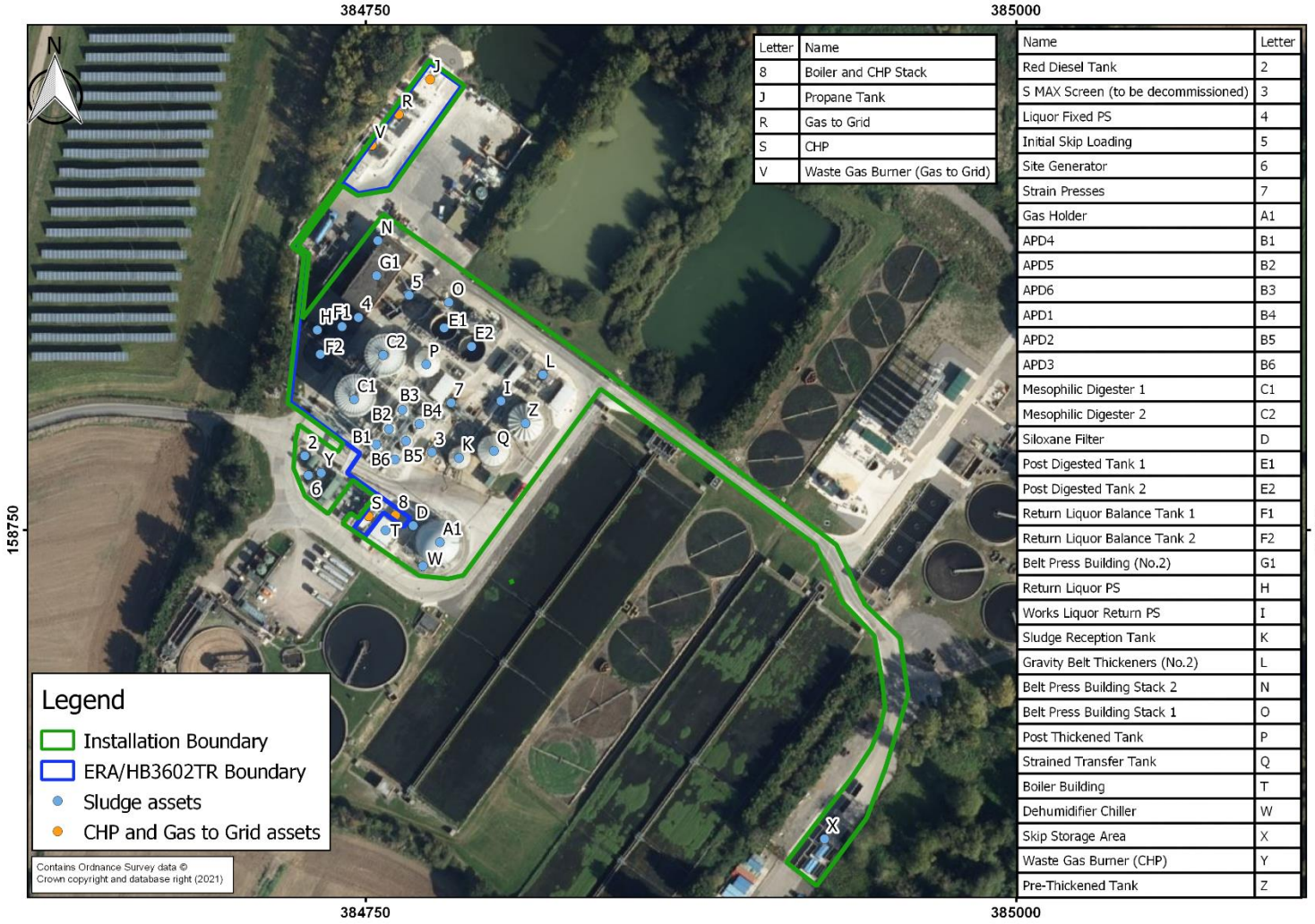


Figure 3.2 Plan of current Water Recycling Centre assets



Letter	Name
8	Boiler and CHP Stack
J	Propane Tank
R	Gas to Grid
S	CHP
V	Waste Gas Burner (Gas to Grid)

Name	Letter
Red Diesel Tank	2
S MAX Screen (to be decommissioned)	3
Liquor Fixed PS	4
Initial Skip Loading	5
Site Generator	6
Strain Presses	7
Gas Holder	A1
APD4	B1
APD5	B2
APD6	B3
APD1	B4
APD2	B5
APD3	B6
Mesophilic Digester 1	C1
Mesophilic Digester 2	C2
Siloxane Filter	D
Post Digested Tank 1	E1
Post Digested Tank 2	E2
Return Liquor Balance Tank 1	F1
Return Liquor Balance Tank 2	F2
Belt Press Building (No.2)	G1
Return Liquor PS	H
Works Liquor Return PS	I
Sludge Reception Tank	K
Gravity Belt Thickeners (No.2)	L
Belt Press Building Stack 2	N
Belt Press Building Stack 1	O
Post Thickened Tank	P
Strained Transfer Tank	Q
Boiler Building	T
Dehumidifier Chiller	W
Skip Storage Area	X
Waste Gas Burner (CHP)	Y
Pre-Thickened Tank	Z

3.2 Sludge treatment assets and infrastructure

The locations of the sludge treatment assets and infrastructure are shown in Figure 3.2. Table 3.1 presents a summary of the main sludge treatment assets and infrastructure that transport or store sludge with the treatment process.

The process pipework that links the assets identified in Table 3.1 is located predominantly above ground and is constructed of ductile iron.

Table 3.1 Main assets associated with Sludge Treatment (data from site visit)

Asset name	No.	Approximate year of construction	Construction details	Individual / total volume (m^3)	Asset partially / entirely below ground?	Is inlet / outlet pipework below ground?	Inspection / testing / maintenance arrangements	Secondary containment system present and is volume adequate for size of asset?	Automatic leak detection system present?	Automatic overspill prevention system present?	Records / knowledge of historical leaks	Visual assessment of current condition	Nature of ground cover / surface drainage in vicinity of asset
APD [B1 - B6]	6	2013	Glass Coated Steel	170 per tank	No	Both Above Ground	External inspection with the site rounds	The Ground is Concreted	No	Level Sensors	No	Good	Concrete with drainage that drains to the head of the works
Mesophilic Digester [C1 and C2]	2	2013	Glass Coated Steel	3500	No	Both Above Ground	External inspection with the site rounds	The Ground is Concreted	No	Level Sensors	No	Good	Concrete with drainage that drains to the head of the works
Post Digested Tank [E1 and E2]	2	Unknown	Glass Coated Steel	500	No	Inlet Above ground Outlet Below Ground	External inspection with the site rounds	The Ground is Concreted but has areas of gravel around the tank	No	Level Sensors	Yes	Corrosion holes near the top of the tank. This limits the use of the tank	Concrete with drainage that drains to the head of the works
Return Liquor Balance Tank [F1 and F2]	2	1970s	Concrete structure with a Glass Coated Steel roof	250	Yes	Both Below Ground	Not Inspected	Mostly Buried	No	Level Sensors	Yes	Towards end of asset life	The tanks are partially buried; surrounding area gravel and unmade ground
Belt Press Building [G1]	2	Unknown	Brick Building	N/A	No	Inlet Below Ground Outlet Above Ground	External inspection with the site rounds	Assets within a Building	None	No	Yes	Was not able to enter the building due to DSEAR and confined space risks	Within a building
Return Liquor Pumping Station [H]	1	2013	Below Ground PS	Unknown	Yes	Both Below Ground	Not Inspected	Minimal Concrete Around the asset	No	Level Sensors	Yes. Struvite blockages within the pipeline	Spillage around the asset due to the pipeline blockage	Ground area is gravel

Asset name	No.	Approximate year of construction	Construction details	Individual / total volume (m^3)	Asset partially / entirely below ground?	Is inlet / outlet pipework below ground?	Inspection / testing / maintenance arrangements	Secondary containment system present and is volume adequate for size of asset?	Automatic leak detection system present?	Automatic overspill prevention system present?	Records / knowledge of historical leaks	Visual assessment of current condition	Nature of ground cover / surface drainage in vicinity of asset
Works Liquor Return Pumping Station [I]	1	Unknown	Below Ground PS	N/A	Yes	Both Below Ground	None	None	No	Level sensors	Unknown	Not Inspected	Earth
Sludge Reception Tank [K]	1	2013	Glass Coated Steel	200	No	Both Above Ground	External inspection with the site rounds	Surrounding area Concreted	No	Level sensors	Unknown	Corrosion holes at the top of the tank	Surrounding area concreted
Gravity Belt Thickeners (No.2) [L]	2	Unknown	N/A	N/A	No	Both Above Ground	External inspection with the site rounds	Surrounding area Concreted	No	None	Yes	Not Inspected	Surrounding area concreted
Belt Press Building Stack [N and O]	2	Unknown	N/A	N/A	No	Above Ground	None	Surrounding area Concreted	No	N/A	N/A	Good	Surrounding area concreted
Post Thickened Tank [P]	1	2013	Glass Coated Steel	600	No	Both Above Ground	External inspection with the site rounds	Concrete with minimal gravel.	No	Level sensor	Unknown	Corrosion holes at the top of the tank limiting the use of the tank	Concrete with minimal gravel
Strained Transfer Tank [Q]	1	2013	Glass Coated Steel	600	No	Above Ground	External inspection with the site rounds	Surrounding area Concreted	No	Level sensor	Unknown	Corrosion holes at the top of the tank	Surrounding area concreted
Skip Storage Area [X]	1	2013	N/A	N/A	No	No Pipelines	N/A	Surrounding area Concreted and road kerbing	N/A	N/A	Yes	Good condition	Surrounding area concreted and road kerbing
Pre-Thickened Tank [Z]	1	2013	Glass Coated Steel	920	No	Above Ground	Programmed External Inspection	Surrounding area Concreted	No	Level Sensor	Unknown	Corrosion hole near the of the tank	Surrounding area concreted
Liquor Fixed Pumping Station [4]	1	unknown	N/A	N/A	Yes	Below Ground	None	None	No	Level Sensor	Yes	Unknown as the station is below ground	Gravel

Asset name	No.	Approximate year of construction	Construction details	Individual / total volume (m^3)	Asset partially / entirely below ground?	Is inlet / outlet pipework below ground?	Inspection / testing / maintenance arrangements	Secondary containment system present and is volume adequate for size of asset?	Automatic leak detection system present?	Automatic overspill prevention system present?	Records / knowledge of historical leaks	Visual assessment of current condition	Nature of ground cover / surface drainage in vicinity of asset
Initial Skip Loading [5]	1	Unknown	N/A	N/A	No	No Pipeline	External inspection with the site rounds	Concrete and road Curbing	N/A	N/A	N/A	N/A	Concrete
Other non-sludge assets													
Strain Press (2no.) [7]	2	Unknown	Steel	N/A	No	Above Ground (entirely)	External inspection with the site rounds	Concrete, with a small line of a gravel to one side.	No	No	Yes	Weathered	Concrete, with a small line of a gravel to one side.
Red Diesel Tank [2]	1	Unknown	Steel	Unknown	No	Above Ground	External inspection with the site rounds	Concrete	No	No	No	Good	Surrounded by concrete
Gas Holder [A]	1	2013	Membrane	2000	No	Above Ground	External inspection with the site rounds	Concrete	Yes	N/A	No	Good	Surrounded by concrete
Siloxane Filter [D]	1	2013	Steel	Unknown	No	Above Ground	External inspection with the site rounds	Concrete	No	N/A	No	Weathered	Surrounded by concrete
Boiler Building [T]	1	Unknown	N/A	N/A	No	Above Ground	External inspection with the site rounds	None	None	Level Sensor	No	Restricted Access to the building and therefore was not inspected.	Within building
Dehumidifier Chiller [W]	1	2013	Steel	Unknown	No	Above Ground	External inspection with the site rounds	Surrounded by Concrete	No	No	No	Weathered	Surrounded by concrete
Waste Gas Burner (CHP) [Y]	1	2013	Steel	N/A	No	Above Ground	External inspection with the site rounds	Surrounded by Concrete	No	N/A	No	Weathered	Surrounded by concrete
Generator [6]	1	Unknown	Metal	Unknown	No	Above Ground	Tested annually	Surrounded by Concrete	No	No	No	Weathered	Surrounded by concrete

3.3 Sludge composition

No sludge composition data is available for the Site.

3.4 Site drainage system

There is an engineered surface drainage system at the Bioresources Centre with ground level grates that capture run-off and any spillages from areas of hard-standing and route them through the system via gravity back to the head of works to be treated. The drainage system is currently inspected by WW. As shown on Figure 2.2, the final effluent outfall from the Site is located on the eastern boundary and discharges to the River Biss. Screened storm overflow is discharged to the River Biss from the pumping station to the south-east of the Site (c.150m from the Site).

3.5 Other assets

The following additional assets contain or use chemicals and / or other potential contaminants that could pose a risk of pollution to ground or the local water environment:

- The boilers
- The red diesel tank
- The siloxane filter
- CHP waste gas burner
- The dehumidifier chiller

Details of these assets are included in Table 3.1.

4.0 ENVIRONMENTAL SETTING

4.1 Geology

4.1.1 Regional geology

A summary of the regional geological succession, based on BGS (2021) and BGS (2000), is present in Table 4.1.

Table 4.1 Summary of regional geology (BGS, 2021)

Period	Unit	Summary description
Quaternary	Alluvium	Clay, silt, sand and gravel
Jurassic	Oxford Clay Formation	Silicate-mudstone (125m)
	Kellaways Formation	Mudstone, medium to dark grey, commonly very shelly, sandy (up to 27m – typically 20m in Wessex Basin)
	Cornbrash Formation	Limestone, shelly, sandy in middle part (3 to 6m)
	Forest Marble Formation	Mudstone, grey, with lenticular units of limestone and sandstone (21 to 40m)

The bedrock geology, superficial geology and artificial ground are displayed in Sections 14 and 15 of Appendix A. Mapping shows that bedrock at the Site is the Kellaways Formation and Oxford Clay Formation (undifferentiated). The two formations are identified as 'undifferentiated' by the BGS as they are comprised of similar geology (i.e. predominately mudstone) and so available descriptions are not always sufficient to distinguish between the two or not enough information is available to tell them apart.

The Kellaways Formation comprises mudstone which is locally sandy. According to BGS (2000) the Kellaways Formation is up to 27m and is typically around 20m in the Wessex Basin. BGS (2000) shows the Oxford Clay Formation overlying the Kellaways Formation. The Kellaways Formation is underlain by a thin layer (3 – 6 m) of Cornbrash Formation which is comprised of limestone. The Forest Marble Formation further underlies this unit which is predominantly mudstone. These two units

mainly outcrop to the north-west of the Site (c. 600 m), however an isolated outcrop to the south-east of the Site (c. 400 m) is also present.

The available mapping indicates that no superficial deposits are present at the Site, however a 125 m wide strip of alluvium follows the River Biss 30 m to the east of the Site.

Published mapping indicates no Made Ground is present at the Site.

4.1.2 Local geology

Geological information for the wider Site is available from borehole / trial pit records held by the BGS and from a series of site investigations that have been carried out at the Site (most of which are summarised in SWECO (2019)). The borehole / trial pit logs from the site investigations are included in Appendix D. The available information is summarised as follows:

- According to BWB (2012), Structural Soils drilled two boreholes (BH1 and BH2) and excavated three trial pits (TP101 – TP103) adjacent to the post digested tanks [E1 and E2 as shown on
- Figure 3.2] in 2004. However, borehole / trial pit logs are not available.
- According to BWB (2012), CJ Associates drilled three boreholes (BH1, BHR1 and BH2) and excavated one trial pit (TP1) beneath the APD3 [B6], sludge reception tank [K] and strained transfer tank [Q as shown on
- Figure 3.2] in 2008. However, borehole / trial pit logs are not available for BH1R or TP1.
- Geotechnics Ltd (2008) drilled 16 boreholes (BH1 to BH16) across the Site in 2008 with four located to the south of the Bioresources Centre and the majority along the eastern / south-eastern boundary of the Site.
- BWB (2012) drilled two boreholes (BH1 and BH2) and excavated six trial pits (TP1 to TP6) to the south-west of Mesophilic Digester 1 [C1], east of the waste gas burner (CHP) [Y] and around the sludge reception tank [K] and pre-thickened tank [Z as shown on
- Figure 3.2] in 2012.
- ESG (2017) drilled four boreholes (BH01 – BH04 including BH02A, BH04A and BH04B) by the filter beds (as shown on Figure 2.2) in 2016.
- According to Sweco (2019), ESG also drilled one borehole (BH101) and excavated three trial pits (HDP01 to HDP03) in the hardstanding area to the north of the Site (as shown on Figure 4.1) in 2017.
- BWB (2020) drilled three boreholes (BH01 to BH03) and seven trial pits (HP01 to HP07) to the east of the filter beds (as shown on Figure 2.2) in 2020.

In general, the available site investigation information is consistent with the regional bedrock mapping indicating that the Kellaways Formation / Oxford Clay Formation is present beneath Made Ground across the Site.

The Made Ground is described as sandy silty gravel and sandy slightly gravelly clay and is generally present at a thickness of between 0.65 m to 3 m across the Site (including in the main part of the

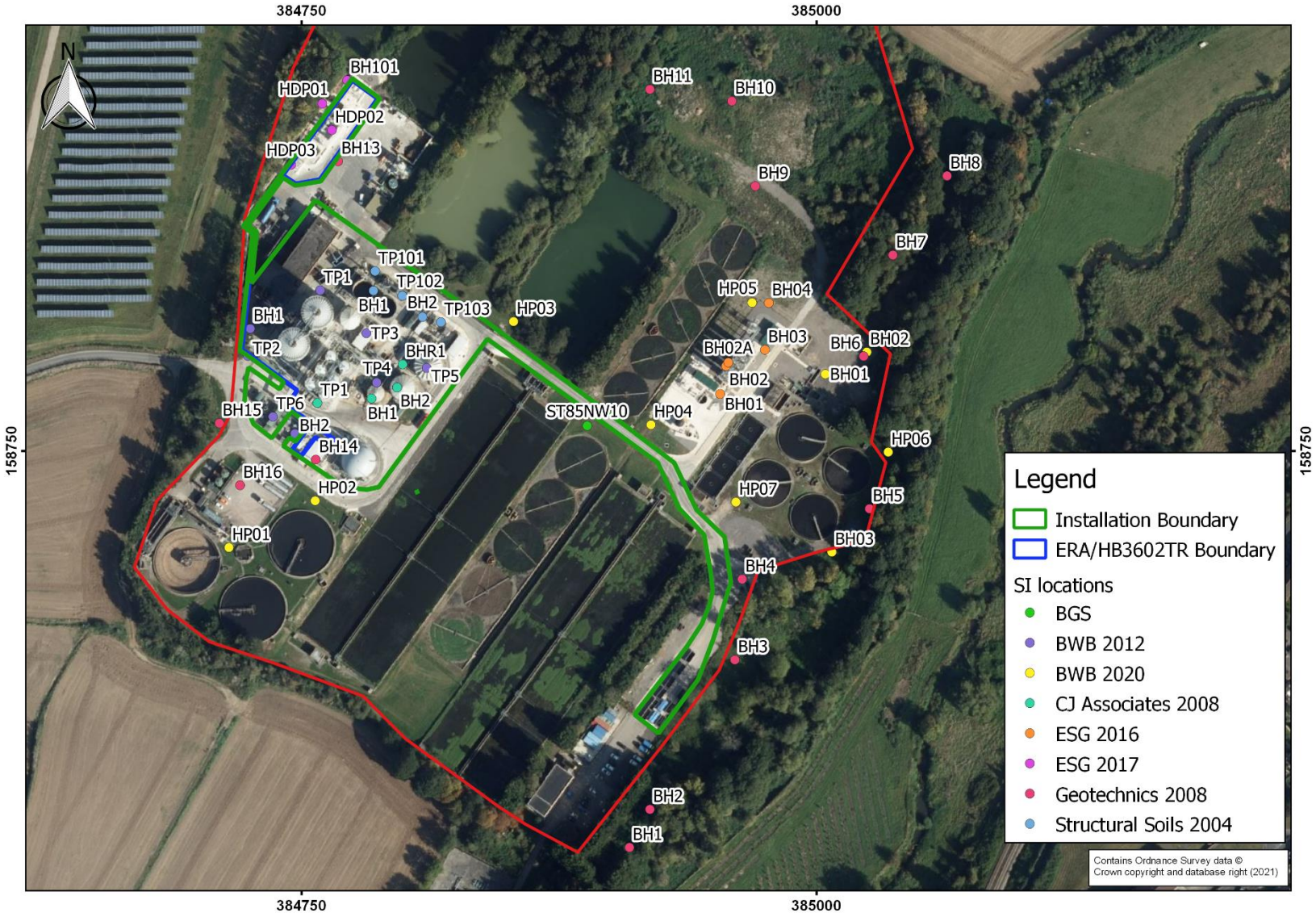
Bioresources Centre in the north-west part of the Site). However, significantly thicker Made Ground (up to 7 m) was recorded along the east / south-east boundary of the Site adjacent to the valley containing the River Biss. This is where the earthworks / former refuse tip were identified on the historical mapping and reflects how this has been built up above the original ground levels.

The Kellaways Formation / Oxford Clay Formation is described as sandy clay with occasional laminated mudstone layers at depth and is recorded at between 10 and 20 m thick beneath the Site. However, a 2 m thick sandstone unit within the Kellaways Formation was recorded by BWB (2020) at BH01 and BH02 at around 18.5 mbgl (c. 17.5 m AOD).

The Cornbrash Formation was recorded in the ESG (2017) boreholes to the east of the lagoons at depths of 17.65 mbgl (BH01) and 17.77 mbgl (BH02A) and is identified as weak thickly bedded grey fine to medium grained clayey limestone. Weathering and discontinuities are present within this unit.

Only one BGS borehole (ST85NW10) is available to a depth of 61 m located in the centre of the Site. This borehole recorded 30 m of blue/green/grey clay immediately beneath the ground (Kellaways Formation / Oxford Clay Formation). Beneath this lies 2 m of ‘very hard stone and clay’ which is potentially identified as the Cornbrash Formation. Underlying this is 19 m of ‘stone and clay with harder seams of clay’ which is potentially identified as the Forest Marble Formation.

Figure 4.1 Site investigation borehole locations



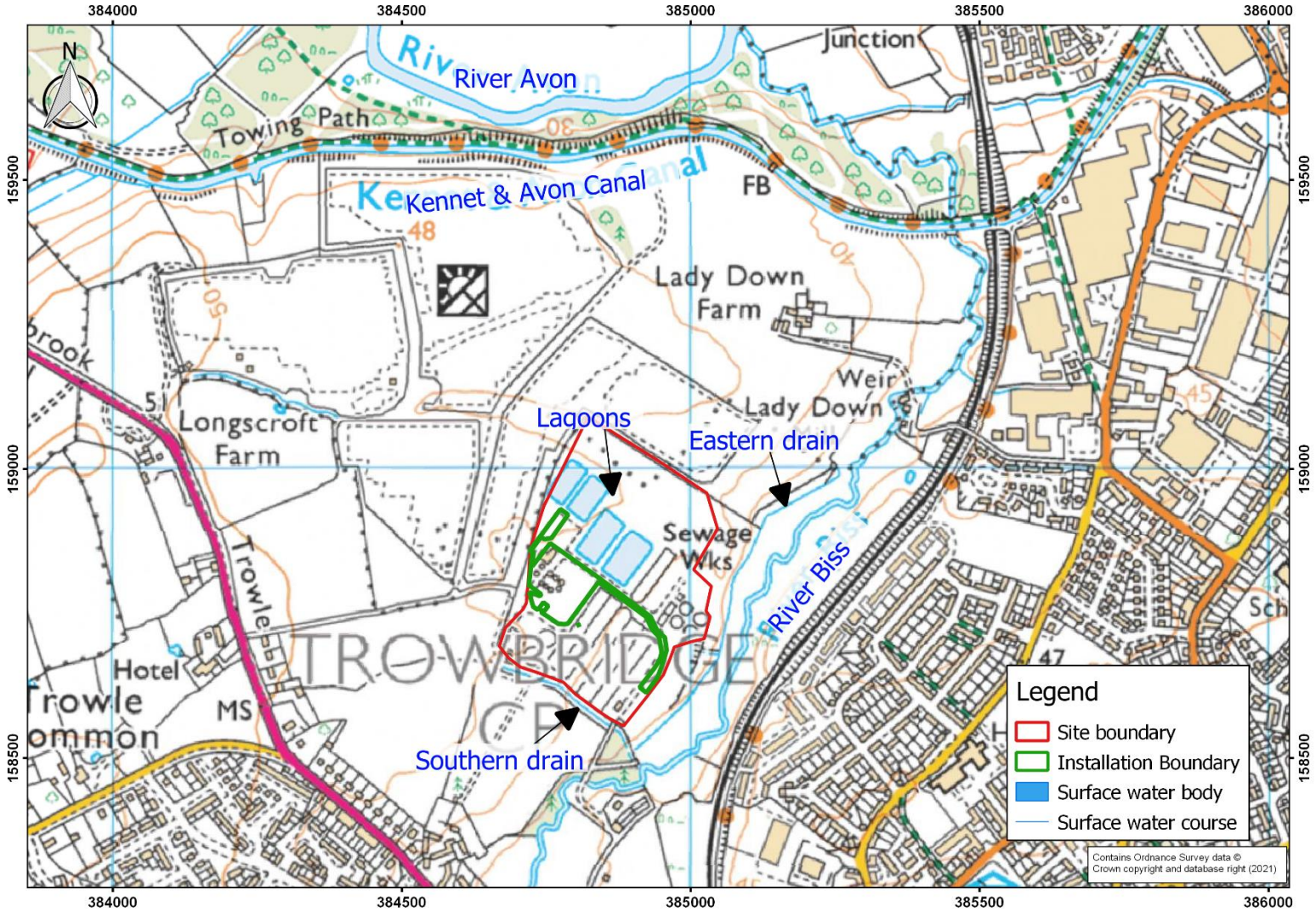
4.2 Hydrology

4.2.1 Drainage and surface water features

Surface water in the area is expected to generally drain to the south-east from the higher ground where the Site is located towards the River Biss (i.e. following the local topography). The River Biss lies approximately 100 m east of the Site and flows northwards towards the River Avon where they meet approximately 900 m north of the Site. As outlined above, drains lie along the southern and eastern boundaries of the Site. The southern boundary flows to the east towards the eastern drain / River Biss, however, during the site visit the confluence area by the Site's entry road to the south-east was too overgrown to confirm whether the southern drain converges with the eastern drain or River Biss. The eastern drain lies runs along the base of the valley (at the break in slope) parallel with the River Biss and flows towards the north-east where is discharges into the River Biss downstream of the Site.

Four surface water lagoons lie immediately to the north of the Site. The most eastern two are surrounded by an embankment (approximately 1-2m high) and hence lie at a greater elevation than the sludge assets within the Bioresources Centre. These ponds are currently not in use. The western two lagoons lie immediately adjacent to the hardstanding area in the north part of the site (as shown on Figure 4.1) and are used for fishing/wildlife.

Figure 4.2 Surface water features



4.2.2 Flood risk

The majority of the Site is at no risk to surface water flooding, however there is a small portion in the central part of the Site at the area where the mesophilic digesters [C1 and C2 on

Figure 3.2] and APD's [B1 – B6 on
Figure 3.2] are located which is has a risk of surface water flooding in a 1 in 250 year event. The Site is at a negligible risk of flooding from groundwater. There is a low risk of groundwater flooding at the River Biss which reaches to 50 m from the east of the Site. Sections 7 to 9 of Appendix A includes further details and mapping showing the flood risk at the Site.

4.2.1 Surface water abstractions

The Environment Agency has confirmed that there are no licenced surface water abstraction points within 4 km of the Site.

Wiltshire Council has confirmed that they do not hold private surface water abstraction records for the local area.

Appendix A reports three licenced surface water abstractions within 2 km of the Site all from the River Biss. Two of these are historical, 323m south of the Site (upstream) operated by Wessex Water and 1870m south-east of the Site operated by Tesco. The third licence is active and operated by the Environment Agency 592 m north-east of the Site (downstream of the Site).

4.2.2 Licenced discharges

The Environment Agency has confirmed and provided the location for 26 licenced discharge consents within 4 km of the Site. WW hold two licenced discharge consents for the Site (under one permit) to the River Biss which discharge final effluent via the outfall to the east of the Site and overflow storm discharge c. 150 m to the south-east of the Site.

Two other discharge consents are located within 500m of the Site. The closest is located 455m north-east of the Site (Ladydown Mill Combined Sewer Overflows (CSO)) and the second is 470m south of the Site (Shires Car Park CSO) both are to the River Biss.

Appendix A provides information on 17 licenced discharges to controlled waters. Note that fourteen of these are included in the 26 reported by the Environment Agency (including the WW discharges of final effluent and discharge storm water to River Biss), However, the other 3 discharges are Combined Sewer Overflows to the River Biss approximately 450m to the south of the Site, close to the Shires Car Park CSO location.

4.2.3 Surface water quality

Surface water quality was previously monitored at four locations within 1.5 km of the Site (including from the River Biss to the north and south of the Site i.e. upstream and downstream). This data has been used to classify the River Biss as moderate (Water Framework Directive). This data is included in Appendix E.

The Water Framework Directive records an overall classification of moderate for the River Biss in 2019. The ecological quality is moderate however the chemical quality is recorded as failing due to priority hazardous substances (polybrominated diphenyl ethers (PBDE) and mercury). From 2013 to

2016, the overall classification was moderate and both ecological and chemical classifications were moderate too.

4.2.4 Pollution incidents

There are two historic pollution incidents recorded with the EA within 500 m of the Site. Both incidents are associated with WW operations at the Site and relate to sewage materials impacting the River Biss to the south-east of the Site). WW and EA records for both incidents indicate sewage was discharged to the river from the WRC inlet following equipment failure in 2001 (which led to a minor impact on water) and after a lightning strike causing loss of power in 2003 (which led to a significant impact on water). Further records are included in Appendix A.

4.3 Hydrogeology

4.3.1 Aquifer properties

The alluvium to the east of the Site is classified as a Secondary A aquifer. This is due to permeable layers they contain being capable of supporting water supplies at a local scale.

The Kellaways Formation / Oxford Clay Formation is classified as unproductive strata due to the low permeability of the layers that are considered to have negligible significance for water supply. However, the underlying Cornbrash Formation and Forest Marble Formation are classified as Secondary A Aquifers. This is due to permeable layers they contain being capable of supporting water supplies at a local scale.

There are no Source Protection Zones within 500 m of the Site; the nearest is over 2 km to the north-east.

4.3.2 Groundwater abstractions and private water supplies

The Environment Agency has confirmed that there are no licenced groundwater abstraction points within 4 km of the Site. This is confirmed by the data presented in Appendix A.

Wiltshire Council has confirmed that they do not hold private groundwater abstraction records for the local area.

4.3.3 Local groundwater regime

Table 4.2 presents a summary of observations that have been made about groundwater encountered during drilling across the Site. In all other borehole and trial pit locations groundwater was not encountered during drilling. The following observations were made:

- Discernible groundwater was only encountered in Made Ground in two locations (BH6 and BH9 (Geotechnics (2008)) which are both to the east of the Site;
- Damp conditions were however also noted in BH7, BH10 and BH11 (again during the Geotechnics (2008) investigation and only in locations to the east of the Site; and
- Groundwater was encountered at depths of between 1.5 m bgl and 15 m bgl within the Kellaways Formation / Oxford Clay Formation. However, more often no groundwater was observed during drilling.

This information suggests an absence of appreciable groundwater within either the Made Ground or the Kellaways Formation / Oxford Clay Formation at the Site. This is consistent with their classification as unproductive strata.

Table 4.2 Summary of water strike observations during drilling

Borehole	Strike (rise)		Unit	Comments
	m bgl	m AOD		
CJ Associates - 2004				
BH1	11.14 (10.70)	-	Kellaways / Oxford Clay	-
Geotechnics – 2008				
BH4	6.00	30.40	Kellaways / Oxford Clay	-
BH6	3.00	33.30	Made Ground	-
BH7	4.00	34.30	Made Ground	Damp
BH9	3.00	37.35	Made Ground	-
BH10	3.00	38.30	Made Ground	Damp
BH11	4.00	38.95	Made Ground	Damp
BH13	5.90	36.60	Kellaways / Oxford Clay	-
BWB – 2012				
BH2	11.14 (10.70)	-	Kellaways / Oxford Clay	-
TP6	1.50	-	Kellaways / Oxford Clay	-
ESG – 2016				
BH01	15.00	22.15	Kellaways / Oxford Clay	-
BH03	6.18	30.85	Kellaways / Oxford Clay	-
ESG – 2017				
BH101	6.00 (5.00)	37.53 (38.53)	Kellaways / Oxford Clay	-

A number of boreholes were installed for the purpose of groundwater monitoring. Table 4.3 presents a summary of groundwater levels at the Site. It should however be noted that only limited measurements (typically 2 to 3) are available for each location; the measurements tended to be taken over a relatively short period just at the time of each investigation (hence measurements span more than a ten year period) and several of the monitoring points are installed across multiple geological strata and hence are not entirely suitable for measuring groundwater levels (i.e. this may have the effect of averaging the levels of any discrete zones of groundwater being measured.). Nevertheless, this information provides some information to assess the potential for groundwater at the Site and the following salient observations are made:

- There are four boreholes that include dual installations (one shallow installation that monitors within the Made Ground; and one deep that monitors within the Kellaways / Oxford Clay). The data suggests that groundwater levels in these units tend to be very similar (several may indicate a small downwards hydraulic gradient from the Made Ground to the Kellaways / Oxford Clay).

- There is one borehole that includes a dual installation with a shallower installation that monitors within the Kellaways / Oxford Clay and a deeper installation that monitors in the Cornbrash. The data suggests that there is downwards hydraulic gradient from the Kellaways / Oxford Clay to the Cornbrash.
- Groundwater levels measured in the Kellaways / Oxford Clay in the main part of the Bioresources area to the west of the Site are typically around 38 to 42 m AOD.
- Groundwater levels measured in the Made Ground and Kellaways / Oxford Clay in the north east of the Site are typically 34 to 36 m AOD; and
- Groundwater levels measured in the Made Ground and Kellaways / Oxford Clay along the eastern / south-eastern boundary are typically around 32 to 34 m AOD.

The groundwater strike and level data would appear to suggest that there is no Site wide shallow groundwater present within the Made Ground. It is considered likely that the groundwater levels that have been measured within the Made Ground and Kellaways / Oxford Clay reflect the general low permeability nature of these units. Isolated areas of groundwater may be present associated with more permeable areas of Made Ground.

Groundwater levels along the eastern / south-eastern boundary of the Site are several metres lower than in the main part of the Bioresources area to the west of the Site. This is where the presence of thicker Made Ground has been identified; the lower groundwater levels are to a degree assumed to reflect the lower elevation of the underlying Kellaways / Oxford Clay.

The ground levels along the River Biss to the east of the Site are around 31 to 30 m AOD; therefore given the groundwater levels observed on the Site it is considered possible that there could be a lateral pathway for shallow groundwater present within the thicker Made Ground to migrate towards the Alluvium identified to the east of the Site and then onwards towards the eastern drain and River Biss if they are in hydraulic continuity.

Table 4.3 Summary of groundwater level measurements

Borehole	Screen (m AOD)		Units	Nr	Min	Mean	Max
	Top	Bottom			(m AOD)		
Geotechnics – 2008							
BH2	34.30	27.30	MG | K / OC	3	32.37	32.64	32.78
BH4	35.40	28.40	MG | K / OC	3	33.25	33.44	33.56
BH5	34.75	27.75	MG | K / OC	2	32.80	32.83	32.85
BH6	35.30	28.30	MG | K / OC	3	32.75	32.91	32.99
BH8	37.70	30.70	MG | K / OC	3	31.55	31.78	31.90
BH9	39.35	32.35	MG | K / OC	2	36.32	36.41	36.50
BH10	40.30	33.30	MG | K / OC	3	35.73	35.98	36.12
BH13	41.50	34.50	K / OC	3	41.45	41.83	42.04

Borehole	Screen (m AOD)		Units	Nr	Min	Mean	Max
	Top	Bottom			(m AOD)		
BH14	41.20	34.20	K / OC	3	36.17	37.60	38.66
BH15	42.20	35.20	K / OC	3	38.39	40.07	41.11
BH16	41.20	34.20	K / OC	2	37.71	39.26	40.81
ESG – 2016							
BH01 (S)	36.15	34.15	MG | K / OC	7	35.07	35.42	36.68
BH01 (D)	25.15	13.15	K / OC | C	7	34.90	35.30	36.35
BH02A (S)**	35.34	34.69	K / OC	3	35.49	35.57	35.69
BH02A (D)**	19.09	16.59	C	3	34.92	35.03	35.19
BH03 (S)*	36.53	35.53	MG	3	35.23	35.30	35.33
BH03 (D)*	27.03	22.03	K / OC	3	35.20	35.25	35.33
BH04B (S)*	36.49	34.79	MG	3	35.19	35.26	35.29
BH04B (D)*	33.99	20.49	K / OC	3	35.27	35.28	35.29
BWB – 2020							
BH02 (S)*	35.10	33.10	MG	4	33.57	33.99	34.53
BH02 (D)*	24.10	21.10	K / OC	4	32.74	33.79	34.84
BH03 (S)*	32.73	29.73	MG	4	32.38	32.48	32.67
BH03 (D)*	26.73	23.73	K / OC	4	32.13	32.48	32.83

Notes

MG – Made Ground

K / OC - Kellaways Formation / Oxford Clay Formation

C – Cornbrash Formation

* - signifies installations which allow comparison of groundwater levels in Made Ground and the Kellaways / Oxford Clay

** - signifies installations which allow comparison of groundwater levels in Kellaways / Oxford Clay and the Cornbrash

4.3.4 Groundwater quality

The Site is not located within a Nitrate Vulnerable Zone for groundwater. There are no Nitrate Vulnerable Zones within 4km.

The Environment Agency was unable to provide any recent relevant groundwater quality data in the surrounding area.

4.4 Environmental designations

The only environmentally designated areas within 2 km of the Site are three ancient woodlands; the closest of which is 1.2 km to the north of the Site.

The locations of these designations are shown in Section 10 of Appendix A.

5.0 HYDROGEOLOGICAL CONCEPTUAL MODEL

The conceptual model of the source-pathway receptor linkages for asset containment failure at the Bioresources Centre is summarised in the following sections.

5.1 Sources

The sludge is the key contaminant source, which is comprised of solids and liquid, known as liquor. The liquor will contain dissolved phased constituents from the sludge. At the Bioresources Centre, the sludge undergoes treatment and so the composition of both the sludge and the liquor will be different at each stage of the process.

An important part of the sludge treatment process is dewatering. The belt presses separate the liquor from the solids, which is captured and removed during the sludge treatment process (i.e. when it is pumped to the WRC for treatment). The remaining treated solids (cake) are relatively dry and are exported from the Site. Therefore, the sources can be untreated and treated sludge (comprising solids and liquor of varying proportions), liquor on its own and cake (dry treated solids).

The sludge contains both chemical and biological contaminants. The chemical composition of the sludge will change during the digestion phase, where complex organic molecules are broken down into simpler ones and methane gas is produced. Due to the dewatering, concentrations of inorganic species in the sludge may increase throughout the treatment process.

Other identified sources include related process chemical materials / liquids such as diesel.

5.2 Pathways

The scenarios by which sludge, liquor (including other non-sludge derived liquids) or cake may be accidentally released to the environment during the sludge treatment process are as follows:

- **Spills** of sludge / liquor / cake to the ground surface whilst unloading / loading.

- **Overspilling** of sludge / liquor / cake to the ground surface (e.g. from the top of a tank or via an overflow pipe). This could be caused by overfilling, or by wind or by inundation of an asset with rainwater.

- **Chronic (long-term) leakage** of sludge / liquor from an asset to the ground surface or ground. If leaks are small and / or hidden, they could occur over a long period before they are detected and may only be detected once an impact on the receptor is identified.

- A **catastrophic (short-term) leak** of sludge / liquor to the ground surface or ground due to a material or the structural failure of an asset. This would tend to be a one-off event and would lead to leakage of a significant amount of sludge and / or liquor instantaneously.

The following possible pathway situations could occur due to the scenarios listed above:

- **Sludge on the ground surface.** Where sufficiently mobile (i.e. it has a sufficiently high liquid content) sludge would flow across the ground surface tending to follow the local ground topography. Where this is on hardstanding it may be captured by the Site's engineered drainage system (and conveyed back to the head of works). However, it could also flow directly onto soft-standing or over the edge of areas of hard-standing where the liquor component from the sludge would infiltrate directly to ground. Liquor from the sludge could also flow to ground via faults / imperfections in areas of hardstanding.

In the event of a catastrophic failure of an asset sludge and / or liquor could theoretically inundate, overwhelm and flow beyond the Site's drainage system. If this were to occur, then overland flow of sludge and / or liquor via gravity could occur across the ground surface / via local drainage following the local topography.

Whilst the topography of the Site is relatively flat it generally falls gently towards the east; hence if sludge / liquor volumes were sufficiently large then overland flows could occur through the Site and towards the eastern drain / River Biss. However, due to the 250 m distance between the main sludge assets and these surface water features, it is considered very unlikely that flows would reach them and / or there would be operational intervention by WW before this occurred.

As described above, the Site topography generally falls towards the east, hence it is also considered relatively unlikely that there would be overland flow in the direction of the southern drain (which is only 100 m from the main sludge asset area). It is also considered relatively unlikely that there would be overland flow in the direction of the two western most lagoons again due to their location. This is despite then being at a similar elevation to the main sludge asset area and them only being c. 80 m away.

The two eastern lagoons (which are only c. 20 m from the main sludge asset area) are built up and surrounded by a 1-2 m high embankment (i.e. above the main level of the Site) hence whilst there some overland flow may occur in their direction a direct discharge to them is not considered plausible.

- **Liquor on the ground surface.** As with sludge, liquor would tend to follow the local ground topography and either be captured by the Site's drainage system or infiltrate to ground when it reaches areas of soft-standing. Again, liquor could also flow to ground via faults / imperfections in areas of hard-standing; and in the event of a catastrophic failure there could theoretically be some overland flow towards the southern drain; towards the eastern drain / River Biss or the two western most lagoons but all these pathways are considered relatively unlikely for the reasons given above.

- **Cake on the ground surface.** Whilst it remains dry, cake released to the ground surface is not considered to be a significant risk to the water environment. However, if exposed to water (e.g. rainfall; or water used for clean-up purposes in the event of spills) this may once again create sludge and liquor which if in sufficient quantities could migrate by the mechanisms outlined above.

- **Liquor directly into the ground.** This could occur from assets that are on the ground, completely or partially below ground, or from assets where only the inlet / outlet pipework is below ground**.** Note that it is considered unlikely that appreciable quantities of the solid components of sludge would be released directing into the ground (e.g. following the failure at the base of a tank) due to the natural filtering effect of the ground.

The remaining key risks to the water environment are considered to relate to the migration of liquor once it enters the ground and the following associated hydrogeological pathways have been identified:

- Liquor entering the ground at or below the surface is likely to migrate downwards within the more permeable Made Ground deposits until it reaches the surface of the Kellaways Formation / Oxford Clay Formation. As outlined above, it is considered unlikely that there is a continuous shallow groundwater unit within the Made Ground and whilst liquor could mix with some isolated areas of groundwater that may be present, significant lateral migration

within the shallow Made Ground across most of the Bioresources Centre and towards the identified receptors is considered unlikely.

The possible exception to this is in the east / south-east of the Site where Made Ground is thicker (associated with the built up land) and where shallow groundwater may be more continuous; and may also be in hydraulic continuity with the groundwater within the Alluvium present to the east of the Site. If liquor were to reach and mix with shallow groundwater present within Made Ground in this area then there is the potential for there to be lateral migration towards, and then within, shallow groundwater in the Alluvium to the east of the Site. As outlined above, shallow groundwater within the Alluvium may also be in hydraulic continuity with surface waters in the eastern drain and River Biss hence there could be lateral pathways to them both.

It is noted that the only sludge asset situated in the area where made Ground is thicker and appreciable is the Skip Storage Area [X] hence significant quantities of liquor would not be expected to be generated / released to the ground from this asset.

- The Cornbrash Formation and Forest Marble Formations are both classified as Secondary A Aquifers and are present beneath the Kellaways Formation / Oxford Clay Formation (at c. 18 m below ground level) at the Site. However, it is considered very unlikely that there will be appreciable vertical migration of liquor into and through the Kellaways Formation / Oxford Clay Formation due to the clayey nature and the thickness (>10 m) of these units. Furthermore, limited groundwater has been identified within these units at the Site; it is typically associated with the occasional isolated slightly more permeable bands of siltstone / sandstone.

  The Cornbrash Formation which is present below the Kellaways Formation / Oxford Clay Formation (at c. 18 m below ground level) is classified as a Secondary A Aquifer. However, it is considered very unlikely that there would be significant vertical migration to this unit due to the presence of the overlying low permeability Kellaways Formation / Oxford Clay Formation.

5.3 Receptors

The potential environmental receptors that have been identified are as follows:

- Two western-most lagoons to the north of Site (which are used for fishing/wildlife)
- Southern drain
- Eastern drain and River Biss
- Alluvium (Secondary A Aquifer)
- Cornbrash and Forest Marble (Secondary A Aquifers)

Whilst some limited groundwater may be present within the Kellaways Formation / Oxford Clay Formation they are not considered to be a receptor since they are classified as unproductive strata.

5.4 Source-pathway-receptor linkages

The linkages between the identified sources, pathways and receptors are identified in Table 5.1, have been assessed based on a risk assessment methodology adapted from the risk classification system

detailed by CIRIA C552 (2001). As such, risk is considered to be a function of both the probability (likelihood) of contamination occurring were a leak scenario to occur and also the potential severity (consequence) of the environmental impacts associated with any such contamination. This is used to define a likely risk associated with each linkage for the identified leak scenarios for each asset.

Table 5.1 Consequence and risk associated with source-pathway-receptor linkages

Leak scenario	Assets	Pathways		Receptor	Consequence	Probability	Risk
Sludge onto the ground surface	APDs [B1 – B6] Mesophilic Digesters [C1 – C2] Post Digested Tanks [E1 – E2] Belt Press Building (No.2) [G1] Sludge Reception Tank [K] Gravity Belt Thickeners (No.2) [L] Post Thickened Tank [P] Strained Transfer Tank [Q] Pre-Thickened Tank [Z] Strain Presses [7] Above ground process pipework	Sludge and liquor captured in drainage system		Goes to WRC			
		Overland flow beyond drainage system		Lagoons to north-west of Site Southern drain Eastern drain River Biss	Medium	Unlikely	Low
		Liquor infiltrates to ground (via faults in hard-standing or in areas of soft-standing)	Migrates vertically to shallow groundwater and lateral transport	Alluvium (Secondary A Aquifer)	Medium	Unlikely	Low
				Eastern drain River Biss	Medium	Unlikely	Low
			Migrates vertically to deep groundwater	Cornbrash and Forest Marble (Secondary A Aquifer)	Medium	Unlikely	Low

Leak scenario	Assets	Pathways		Receptor	Consequence	Probability	Risk
Liquor (and other non-sludge derived liquids) onto the ground surface	APDs [B1 – B6] Mesophilic Digesters [C1 – C2] Post Digested Tanks [E1 – E2] Belt Press Building (No.2) [G1] Sludge Reception Tank [K] Gravity Belt Thickeners (No.2) [L] Post Thickened Tank [P] Strained Transfer Tank [Q] Pre-Thickened Tank [Z] Strain Presses [7] Red Diesel Tank [2] Gas Holder [A] Siloxane Filter [D] Boiler Building [T] Dehumidifier Chiller [W] Generator [6] Above ground process pipework	Liquor captured in drainage system		Goes to WRC			
		Overland flow beyond drainage system		Lagoons to north-west of Site Southern drain Eastern drain River Biss	Medium	Unlikely	Low
		Liquor infiltrates to ground (via faults in hard-standing or in areas of soft-standing)	Migrates vertically to shallow groundwater and lateral transport	Alluvium (Secondary A Aquifer)	Medium	Unlikely	Low
				Eastern drain River Biss	Medium	Unlikely	Low
			Migrates vertically to deep groundwater	Cornbrash and Forest Marble (Secondary A Aquifer)	Medium	Unlikely	Low

Leak scenario	Assets	Pathways		Receptor	Consequence	Probability	Risk
Cake onto the ground surface	Skip Storage Area [X] Initial Skip Loading [5]	Sludge and liquor derived from cake captured in drainage system		Goes to WRC			
		Liquor derived from cake infiltrates to ground (via faults in hard-standing or in areas of soft-standing)	Migrates vertically to shallow groundwater in Made Ground and lateral transport	Alluvium (Secondary A Aquifer)	Medium	Low Likelihood	Moderate / Low
				Eastern drain River Biss	Medium	Low Likelihood	Moderate / Low
			Migrates vertically to deep groundwater	Cornbrash and Forest Marble (Secondary A Aquifer)	Medium	Unlikely	Low

Leak scenario	Assets	Pathways	Receptor	Consequence	Probability	Risk
Liquor (and other non-sludge derived liquids) into ground	**On ground assets:** APD [B1 - B6] Mesophilic Digester [C1 and C2] Post Digested Tank [E1 and E2] Belt Press Building (No.2) [G1] Return Liquor Pumping Station [H] Works Liquor Return Pumping Station [I] Sludge Reception Tank [K] Gravity Belt Thickeners (No.2) [L] Belt Press Building Stack [N and O] Post Thickened Tank [P] Strained Transfer Tank [Q] Skip Storage Area [X] Pre-Thickened Tank [Z] Red Diesel Tank [2] Gas Holder [A] Siloxane Filter [D] Boiler Building [T] Dehumidifier Chiller [W] Generator [6] Above ground process pipework	Migrates vertically to shallow groundwater in Made Ground and lateral transport	Alluvium (Secondary A Aquifer)	Medium	Unlikely	Low
			Eastern drain River Biss	Medium	Unlikely	Low
		Migrates vertically to deep groundwater	Cornbrash and Forest Marble (Secondary A Aquifer)	Medium	Unlikely	Low

Leak scenario	Assets	Pathways	Receptor	Consequence	Probability	Risk
Liquor into ground	**Below ground assets:** Post Digested Tank [E1 and E2] Return Liquor Balance Tank [F1 and F2] Belt Press Building (No.2) [G1] Return Liquor Pumping Station [H] Works Liquor Return Pumping Station [I] Liquor Fixed Pumping Station [4] Below ground process pipework	Migrates vertically to shallow groundwater in Made Ground and lateral transport	Alluvium (Secondary A Aquifer)	Medium	Unlikely	Low
			Eastern drain River Biss	Medium	Unlikely	Low
		Migrates vertically to deep groundwater	Cornbrash and Forest Marble (Secondary A Aquifer)	Medium	Unlikely	Low

6.0 ENVIRONMENTAL QUANTITATIVE RISK ASSESSMENT

The EQRA was developed based upon a numerical system that assigns a score to each asset according to the perceived likelihood of fugitive emissions to cause harm to controlled waters. The overall Risk of Harm score is a function of the likelihood of the asset to leak, the potential severity of that leak should it occur, the readiness that any pathways present would transmit contaminants and the sensitivity of receptors that may be impacted upon. Details of the EQRA process are provided in Appendix G.

In broad terms the EQRA model is designed to assign a numerical score to each of the three parts of the source-pathway-receptor model and then multiply those scores to give the overall Risk of Harm score. Multiplication of each part's scores has the added benefit of resulting in a greater spread of scores allowing easier identification of those assets that require improvement works.

The results of the EQRA for the assets are presented in the Tables 6.2 to 6.4, showing assets divided into three subgroups; Pipe work, Storage and Other. Each table provides the 'Existing Risk of Harm' score for existing assets based on the information obtained from the Request for Information and the site visit completed on 28th January 2021; and the 'Risk of Harm – post additional mitigation measures' score highlights any additional actions or scope of work to ensure the asset is BAT or BAT equivalent.

As shown in Table 6.1, this assessment is determining that the Risk of Harm scores below 4.9 are indicative that a given asset is BAT or BAT equivalent. Risk of Harm scores greater than 4.9 are indicative that the given asset is not BAT or BAT equivalent and that, therefore, further investigation is required in order to determine the most appropriate measures required to reduce the score to below 4.9.

Table 6.1 Risk of Harm Scoring

Risk of Harm score	BAT status
0 – 4.9	BAT or BAT equivalent
>5	Not BAT- further investigation required

The EQRA, as detailed above, has been applied in respect to BAT 19 as referenced in Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (2018/1147, 2018), specifically in order to determine necessary pollution prevention measures, or, where that is not practicable, to reduce emissions to soil and water. BAT 19 states that the installation of secondary containment may be limited in the case of existing plants and this is acknowledged in the EQRA process. Therefore, where it has been identified that additional pollution prevention measures have been determined in order to further reduce emissions to soil and water, measures to include the provision of impermeable surfacing with sealed drainage back to the head of the works of the wider WwTWs has been determined to be the more practical approach to pollution prevention.

The EQRA has been completed for the Bioresource Centre, to include all sub-surface pipework and storage measures including sumps, storage tanks and vessels and their associated pipework (excluding installation drains) in relation to their potential to cause fugitive emissions to surface and / or groundwater. It is noted that the EQRA excludes the CHP and Gas to Grid activities as these are currently permitted under the environmental permit EPR/HB3602TR and operated by Wessex Water

Enterprises Ltd. The CHP and Gas to Grid activities are directly associated activities to the anaerobic digestion activity.

With regards to emissions that may arise from accidents and incidents, the requirements of BAT 21, as stated in 2018/1147, 2018, as referenced in Appendix 11 to this environmental permit application.

6.1 EQRA – Key Assumptions

The key assumptions used for the EQRA are set out below:

i. The precautionary principle, as described in Section 1.6 of the DETR Environmental Risk Assessment Guidelines states that "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." As such, within this model, lack of information does not reduce the risk of an asset.
Consequently, where information is not available a 'worst case scenario' is assumed.

ii. Given the location of the vast majority of installations in close proximity to surface water features, hydraulic continuity between groundwater (where present) and surface water has been assumed unless available evidence suggests otherwise.

iii. It is acknowledged that there is likely to be perched groundwater within Made Ground at the majority of sites. However, it is not considered likely to impact significantly upon risk ratings as it will not represent an additional pathway to controlled waters and is not a sensitive receptor in its own right.

iv. It should be noted that, as stated in the DETR (2000) guidance on environmental risk assessments, "models provide only an approximation of the real environment". The EQRA is based on perceived probabilities and observations and generates risk ratings based on which assets are considered likely to pose a risk of fugitive emissions. It is possible that an asset given a low risk rating will cause fugitive emissions before one with a high risk rating.

v. While every attempt has been made to minimise subjectivity, there remains some potential for different scores being assigned to assets in the same condition depending on the view of the assessor.

vi. As presented in Section 5.4, many of the source-pathway-receptor linkages identified have been qualitatively assessed to have a 'low' risk. In most causes this is because, whilst a plausible linkage has been identified, the pathway itself is considered to be very unlikely.

    The numerical system adopted by the EQRA assigns a score of zero for a leak pathway component where one or more of the factors that contribute to the leak pathway scores are very unlikely. In doing so, the overall risk of harm is also assigned a score of zero and so this effectively screens out the source-pathway-receptor linkage for that asset and it can be considered to have a low risk.

    It is noted however that whilst the overall source-pathway-receptor linkage may be considered to have a low risk, the leak pathway component is scored independently of the other source and receptor components. This means that despite an overall risk of harm score of zero being assigned, an asset may still have a high leak likelihood or severity score (which in itself may not be considered to be BAT or BAT equivalent).

Table 6.2 Pipework Assets

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status
PST Sludge PS to Strain Presses	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Import Screen to Import Sludge PS	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Import Sludge PS to Strain Presses	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Strain Presses to Strained Transfer Tank	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Strain Press to Pre-Thickened Tank	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Strained Transfer Tank to GBT Feed PS	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance	0	BAT or BAT equivalent

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status
		and inspection programme and, when necessary, asset is repaired.		
GBT Feed PS to GBTs (first pipeline)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
GBT Feed PS to GBTs (second pipeline)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
GBT (2no.) to Liquor PS 1	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
GBTs to Post-Thickened Tanks	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Post-Thickened Tanks to PS	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
APD no.1 to APD Heat Exchangers	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance	0	BAT or BAT equivalent

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status
		and inspection programme and, when necessary, asset is repaired.		
PS to APD (6no.)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
APD (6no.) to (2no.) Digesters (old primary)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
(2no.) Mesophilic Digesters to (2no.) Post Digester Tanks	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
(2no.) Post Digester Tank to Dewater PS (2no. Pumps)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Dewater PS to Belt Presses (2no.)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Belt Presses to Liquor PS	0	Wessex Water Services Limited has identified a build-up of struvite that is being investigated in order to improve flow and process efficiencies. Currently the pipeline is a temporary	0	BAT or BAT equivalent

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status
		arrangement until the investigation is complete and the preferred permanent solution is confirmed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.		
Liquor PS to Liquor Balance Tanks (2no.)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Liquor Balance Tank to Return PS	0	Wessex Water Services Limited has identified a build-up of struvite that is being investigated in order to improve flow and process efficiencies. Currently the pipeline is a temporary arrangement until the investigation is complete and the preferred permanent solution is confirmed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Belt Press to Skip	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent

Table 6.3 Storage Assets

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status.
Sludge Reception Tank	0	Wessex Water Services Limited have identified that the asset is life expired and are due to replace the tank by 2022 under project D14300. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Strained Transfer Tank	0	The tank is currently scheduled for refurbishment by 2022 as part of ongoing improvement works. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Pre-Thickened Tank	0	The tank is currently scheduled for refurbishment by 2022 as part of ongoing improvement works. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Post-Thickened Tanks	0	The tank is currently scheduled for detailed inspection and any required refurbishment will be carried out as part of ongoing improvement works. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status.
Acid Phase Digester 1	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Acid Phase Digester 2	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Acid Phase Digester 3	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Acid Phase Digester 4	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Acid Phase Digester 5	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Acid Phase Digester 6	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status.
Mesophilic Digester 1	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Mesophilic Digester 2	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Post Digester Tank 1	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Post Digester Tank 2	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Liquor Balance Tank 1	0	The tank is currently scheduled for detailed inspection and any required refurbishment is to be implemented as part of ongoing improvement works. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Liquor Balance Tank 2	0	The tank is currently scheduled for detailed inspection and any required refurbishment is to be implemented as part of ongoing improvement works.	0	BAT or BAT equivalent

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status.
		Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.		
Cake Skips	0.1	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0.1	BAT or BAT equivalent
Initial Skip Loading Area	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent

Table 6.4 Other Assets

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status.
Strain Press 1 - 2	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Gravity Belt Thickener 1-2	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance	0	BAT or BAT equivalent

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status.
		and inspection programme and, when necessary, asset is repaired.		
Dewatering Belts 1-3	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Boiler 1 -2	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Imported Sludge Screen 1	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Liquor PS (GBTs to Dewater Liquor PS)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
APD Feed Sludge PS (Thickened Sludge Tank to APDs)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Secondary Digester PS (Secondary Digester to Dewatering Belts)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Dewatering Belt PS (Dewatering Belts to Liquor Balance Tanks)	0	Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent

Asset Name	Existing Risk of Harm	Additional pollution prevention measures	Risk of Harm – post additional mitigation measures	BAT or BAT Equivalent Status.
Return PS (Balance Tank to head of treatment works)	0	Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Red Diesel Tank	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Boilers (2no.)	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent
Site Generator	0	No additional mitigations proposed. Reduced leak likelihood through ongoing implementation of preventative maintenance and inspection programme and, when necessary, asset is repaired.	0	BAT or BAT equivalent

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Appendix A Environmental Data Report

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

384772.0154246649, 158795.5172587785,

Order Details

Date: 09/12/2020

Your ref: EPL000376

Our Ref: GS-7354642

Client: Stantec UK Ltd

Site Details

Location: 384772 158795

Area: 1.2 ha

Authority: Wiltshire Council

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OS MasterMap site plan p.12

Aerial image p. 8

groundsure.com/insightuserguide

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	4	1	18	28	-
15	1.2	Historical tanks	2	1	10	10	-
17	1.3	Historical energy features	0	0	2	6	-
17	1.4	Historical petrol stations	0	0	0	0	-
18	1.5	Historical garages	0	0	0	0	-
18	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
19	2.1	Historical industrial land uses	5	2	27	41	-
22	2.2	Historical tanks	2	1	14	14	-
24	2.3	Historical energy features	0	0	2	7	-
24	2.4	Historical petrol stations	0	0	0	0	-
24	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
25	3.1	Active or recent landfill	0	0	0	0	-
25	3.2	Historical landfill (BGS records)	0	0	1	0	-
26	3.3	Historical landfill (LA/mapping records)	0	0	2	0	-
26	3.4	Historical landfill (EA/NRW records)	0	0	1	2	-
27	3.5	Historical waste sites	0	0	0	0	-
27	3.6	Licensed waste sites	3	0	0	2	-
29	3.7	Waste exemptions	0	0	1	1	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
30	4.1	Recent industrial land uses	3	1	8	-	-
31	4.2	Current or recent petrol stations	0	0	0	0	-
31	4.3	Electricity cables	0	0	0	0	-
32	4.4	Gas pipelines	0	0	0	0	-
32	4.5	Sites determined as Contaminated Land	0	0	0	0	-

32	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
32	4.7	Regulated explosive sites	0	0	0	0	-
32	4.8	Hazardous substance storage/usage	0	0	0	0	-
33	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
33	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
33	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
33	4.12	Radioactive Substance Authorisations	0	0	0	0	-
33	**4.13**	**Licensed Discharges to controlled waters**	0	0	1	16	-
36	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
36	4.15	Pollutant release to public sewer	0	0	0	0	-
37	**4.16**	**List 1 Dangerous Substances**	0	0	1	0	-
37	**4.17**	**List 2 Dangerous Substances**	0	0	3	0	-
37	**4.18**	**Pollution Incidents (EA/NRW)**	0	0	0	2	-
38	4.19	Pollution inventory substances	0	0	0	0	-
38	4.20	Pollution inventory waste transfers	0	0	0	0	-
38	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
39	**5.1**	**Superficial aquifer**	Identified (within 500m)				
41	**5.2**	**Bedrock aquifer**	Identified (within 500m)				
42	**5.3**	**Groundwater vulnerability**	Identified (within 50m)				
43	**5.4**	**Groundwater vulnerability- soluble rock risk**	Identified (within 0m)				
43	5.5	Groundwater vulnerability- local information	None (within 0m)				
44	5.6	Groundwater abstractions	0	0	0	0	0
45	**5.7**	**Surface water abstractions**	0	0	0	1	2
46	5.8	Potable abstractions	0	0	0	0	0
46	5.9	Source Protection Zones	0	0	0	0	-
46	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
47	**6.1**	**Water Network (OS MasterMap)**	0	0	5	-	-

48	**6.2**	**Surface water features**	0	2	7	-	-
48	**6.3**	**WFD Surface water body catchments**	1	-	-	-	-
49	**6.4**	**WFD Surface water bodies**	0	0	0	-	-
49	6.5	WFD Groundwater bodies	0	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
50	7.1	Risk of Flooding from Rivers and Sea (RoFRaS)	None (within 50m)				
51	**7.2**	**Historical Flood Events**	0	0	5	-	-
51	7.3	Flood Defences	0	0	0	-	-
51	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
52	7.5	Flood Storage Areas	0	0	0	-	-
53	7.6	Flood Zone 2	None (within 50m)				
53	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
54	**8.1**	**Surface water flooding**	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding					
56	**9.1**	**Groundwater flooding**	Negligible (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
57	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
58	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
58	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
58	10.4	Special Protection Areas (SPA)	0	0	0	0	0
58	10.5	National Nature Reserves (NNR)	0	0	0	0	0
59	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
59	**10.7**	**Designated Ancient Woodland**	0	0	0	0	3
59	10.8	Biosphere Reserves	0	0	0	0	0
60	10.9	Forest Parks	0	0	0	0	0
60	10.10	Marine Conservation Zones	0	0	0	0	0
60	**10.11**	**Green Belt**	1	0	0	0	0
60	10.12	Proposed Ramsar sites	0	0	0	0	0

61	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
61	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
61	10.15	Nitrate Sensitive Areas	0	0	0	0	0
61	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
62	**10.17**	**SSSI Impact Risk Zones**	1	-	-	-	-
63	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
64	11.1	World Heritage Sites	0	0	0	-	-
64	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
64	11.3	National Parks	0	0	0	-	-
64	11.4	Listed Buildings	0	0	0	-	-
65	11.5	Conservation Areas	0	0	0	-	-
65	11.6	Scheduled Ancient Monuments	0	0	0	-	-
65	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
66	**12.1**	**Agricultural Land Classification**	Grade 3b (within 250m)				
67	12.2	Open Access Land	0	0	0	-	-
67	12.3	Tree Felling Licences	0	0	0	-	-
67	12.4	Environmental Stewardship Schemes	0	0	0	-	-
68	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
69	**13.1**	**Priority Habitat Inventory**	0	0	3	-	-
70	13.2	Habitat Networks	0	0	0	-	-
70	13.3	Open Mosaic Habitat	0	0	0	-	-
70	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
71	**14.1**	**10k Availability**	Identified (within 500m)				
72	14.2	Artificial and made ground (10k)	0	0	0	0	-
73	**14.3**	**Superficial geology (10k)**	0	0	2	0	-

74	14.4	Landslip (10k)	0	0	0	0	-
75	**14.5**	**Bedrock geology (10k)**	1	0	1	0	-
76	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
77	**15.1**	**50k Availability**	Identified (within 500m)				
78	15.2	Artificial and made ground (50k)	0	0	0	0	-
78	15.3	Artificial ground permeability (50k)	0	0	-	-	-
79	**15.4**	**Superficial geology (50k)**	0	0	1	0	-
80	15.5	Superficial permeability (50k)	None (within 50m)				
80	15.6	Landslip (50k)	0	0	0	0	-
80	15.7	Landslip permeability (50k)	None (within 50m)				
81	**15.8**	**Bedrock geology (50k)**	1	0	0	0	-
82	**15.9**	**Bedrock permeability (50k)**	Identified (within 50m)				
82	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
83	**16.1**	**BGS Boreholes**	1	3	12	-	-
Page	Section	Natural ground subsidence					
85	**17.1**	**Shrink swell clays**	Low (within 50m)				
86	**17.2**	**Running sands**	Negligible (within 50m)				
87	**17.3**	**Compressible deposits**	Negligible (within 50m)				
88	**17.4**	**Collapsible deposits**	Very low (within 50m)				
89	**17.5**	**Landslides**	Very low (within 50m)				
90	**17.6**	**Ground dissolution of soluble rocks**	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
92	18.1	Natural cavities	0	0	0	0	-
93	18.2	BritPits	0	0	0	0	-
93	**18.3**	**Surface ground workings**	2	1	13	-	-
94	18.4	Underground workings	0	0	0	0	0
94	18.5	Historical Mineral Planning Areas	0	0	0	0	-

94	18.6	Non-coal mining	0	0	0	0	0
94	18.7	Mining cavities	0	0	0	0	0
94	18.8	JPB mining areas	None (within 0m)				
95	18.9	Coal mining	None (within 0m)				
95	18.10	Brine areas	None (within 0m)				
95	18.11	Gypsum areas	None (within 0m)				
95	18.12	Tin mining	None (within 0m)				
95	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
96	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
97	**20.1**	**BGS Estimated Background Soil Chemistry**	1	0	-	-	-
97	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
97	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

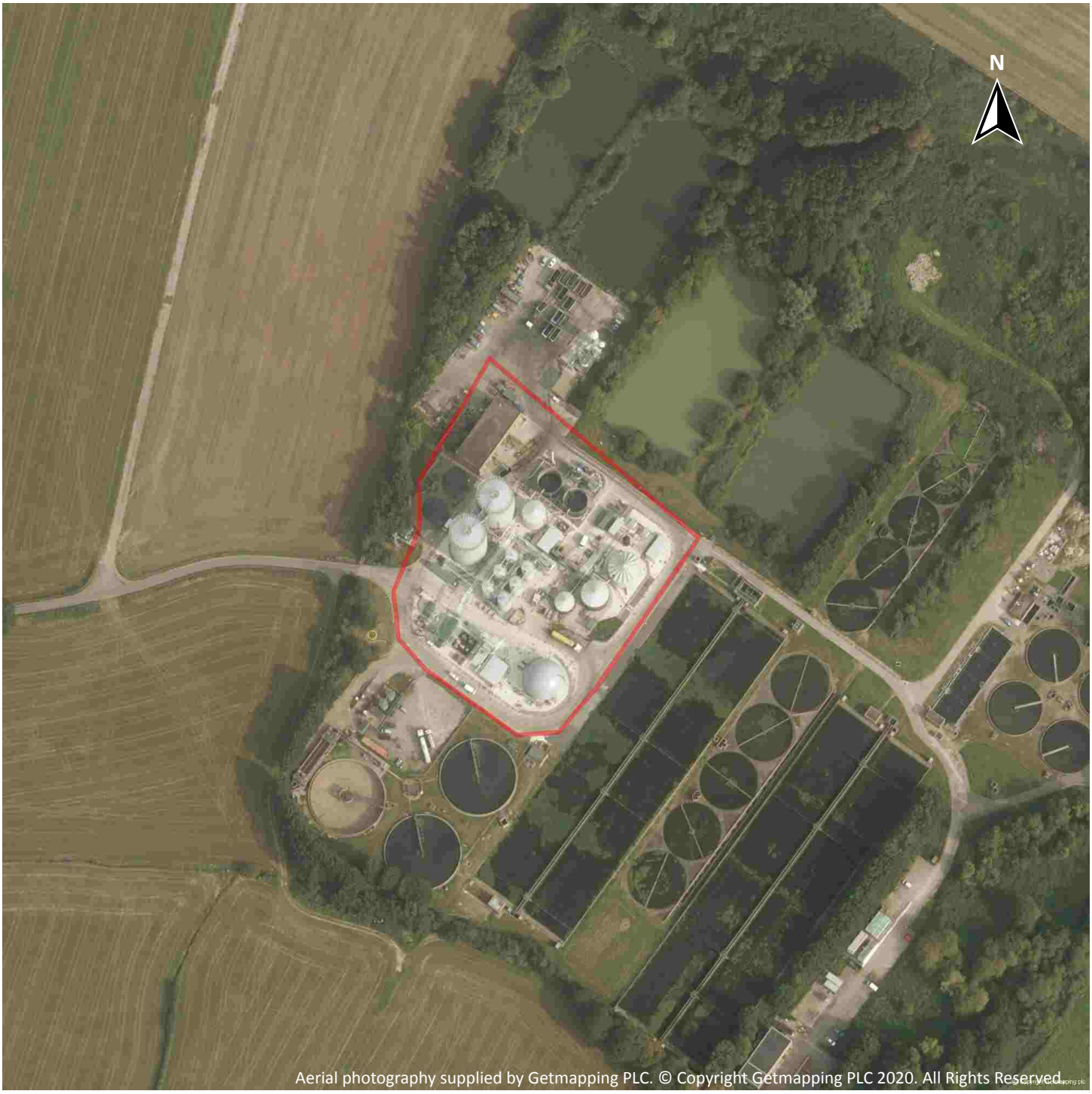
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
98	21.1	Underground railways (London)	0	0	0	-	-
98	21.2	Underground railways (Non-London)	0	0	0	-	-
98	21.3	Railway tunnels	0	0	0	-	-
98	21.4	Historical railway and tunnel features	0	0	0	-	-
98	21.5	Royal Mail tunnels	0	0	0	-	-
99	21.6	Historical railways	0	0	0	-	-
99	21.7	Railways	0	0	0	-	-
99	21.8	Crossrail 1	0	0	0	0	-
99	21.9	Crossrail 2	0	0	0	0	-
99	21.10	HS2	0	0	0	0	-

Recent aerial photograph

Capture Date: 28/08/2017

Site Area: 1.2ha

Recent site history - 2014 aerial photograph



Capture Date: 09/09/2014

Site Area: 1.2ha

Recent site history - 2006 aerial photograph

Capture Date: 03/06/2006

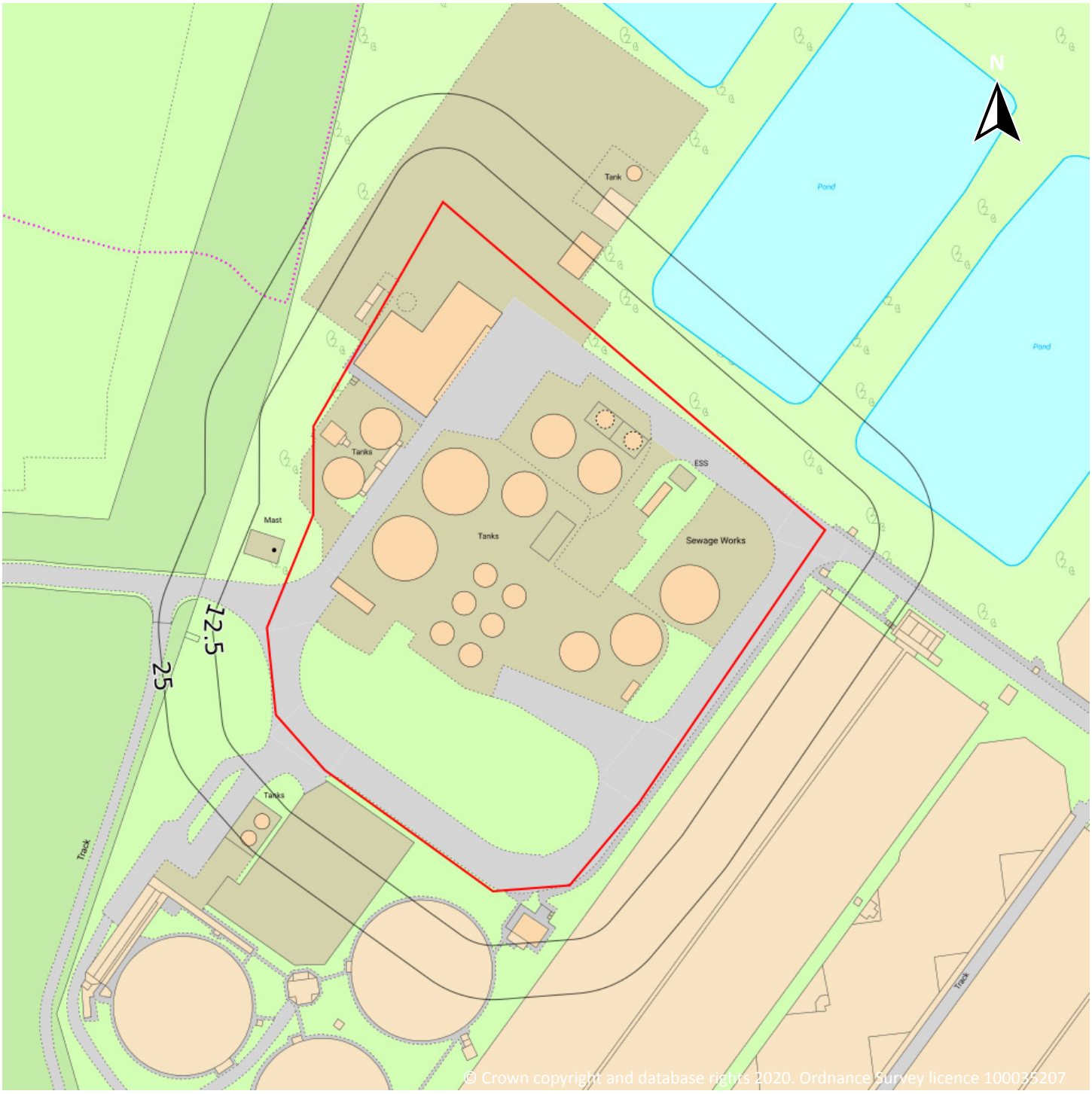
Site Area: 1.2ha

Recent site history - 1999 aerial photograph

Capture Date: 29/08/1999

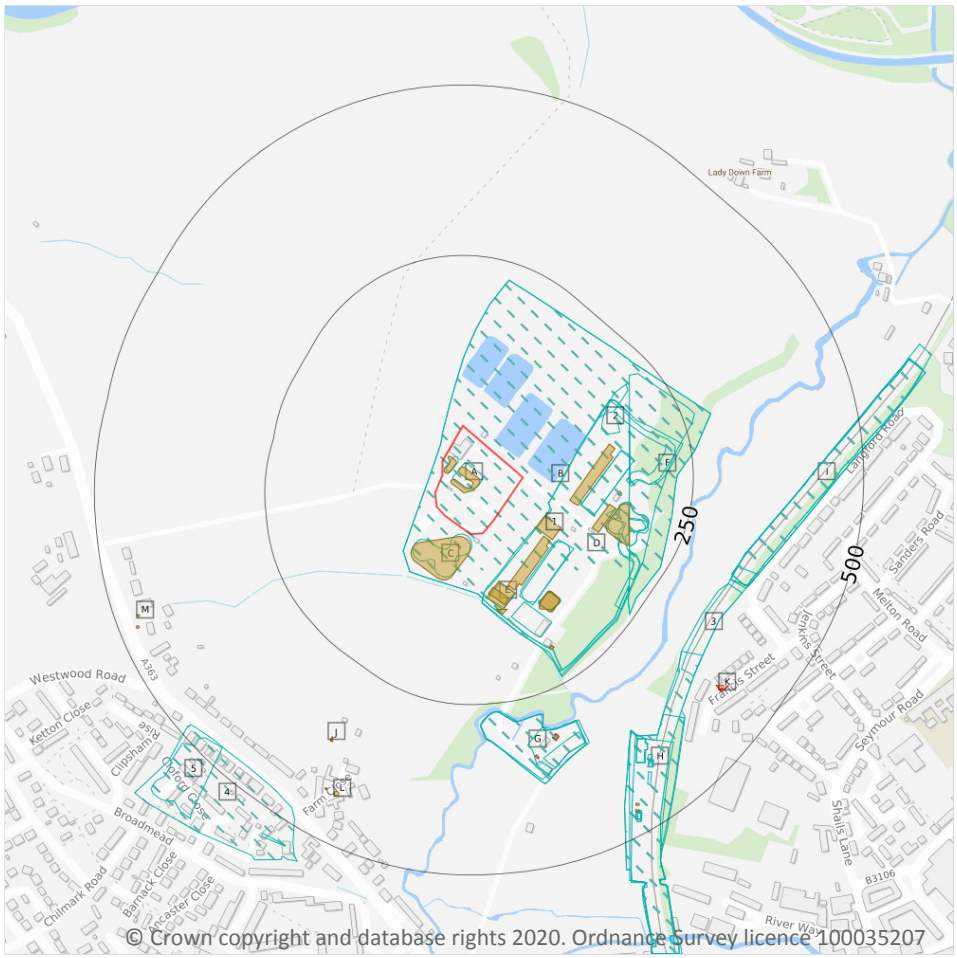
Site Area: 1.2ha

OS MasterMap site plan



Site Area: 1.2ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

1.1 Historical industrial land uses

Records within 500m	51

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Tanks**	**1985**	**1168884**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Tanks**	**1974 - 1985**	**1264420**
B	**On site**	**Sewage Works**	**1973 - 1974**	**1214591**
B	**On site**	**Sewage Works**	**1985 - 1987**	**1244551**
C	5m SW	Unspecified Tanks	1974 - 1985	1195944
D	51m SE	Sewage Works	1922 - 1939	1242230
D	52m SE	Unspecified Works	1956	1179136
E	77m S	Filler Tanks	1939	1157433
E	92m SE	Unspecified Tanks	1956	1242083
D	94m SE	Unspecified Tanks	1956	1238762
E	94m SE	Unspecified Tanks	1922 - 1939	1196198
D	94m SE	Unspecified Tanks	1922 - 1939	1206234
E	117m SE	Filter Tanks	1939	1177109
E	128m SE	Unspecified Tanks	1939	1247618
E	128m SE	Unspecified Tanks	1956 - 1974	1244323
D	134m SE	Unspecified Heap	1939	1163443
2	138m NE	Refuse Heap	1956	1178613
F	141m NE	Unspecified Heap	1939	1163442
D	142m SE	Unspecified Tanks	1985 - 1987	1236616
D	142m SE	Unspecified Tanks	1973 - 1974	1272493
D	144m SE	Refuse Heap	1956	1265726
F	157m E	Refuse Heap	1956	1178611
D	193m SE	Unspecified Ground Workings	1956	1161375
G	262m S	Sewage Works	1922 - 1939	1263636
G	262m S	Unspecified Commercial/Industrial	1974	1159209
G	262m S	Unspecified Works	1956	1179137
G	297m S	Sewage Works	1985	1267773
G	323m SE	Filter Beds	1922 - 1939	1226282
H	330m SE	Railway Sidings	1922 - 1939	1271176

ID	Location	Land use	Dates present	Group ID
3	335m SE	Cuttings	1886	1158740
H	336m SE	Railway Sidings	1886	1244523
I	338m SE	Cuttings	1956 - 1973	1192970
I	338m SE	Cuttings	1987	1257190
I	339m SE	Cuttings	1886	1222460
I	339m SE	Cuttings	1899	1269309
I	339m SE	Cuttings	1922 - 1939	1191740
G	344m S	Engine House	1922 - 1939	1225346
H	362m SE	Railway Sidings	1956	1267784
H	370m SE	Railway Sidings	1899	1208428
H	377m SE	Engine Shed	1956	1258816
H	377m SE	Engine Shed	1886 - 1939	1256058
H	406m SE	Railway Building	1886	1172853
H	412m SE	Railway Building	1956	1191288
H	413m SE	Railway Building	1886 - 1939	1212184
H	426m SE	Railway Building	1899	1172855
H	466m SE	Unspecified Tank	1939	1176513
H	467m SE	Railway Building	1886	1215864
H	467m SE	Railway Building	1899	1212263
4	468m SW	Brick and Tile Works	1886 - 1899	1219102
H	469m SE	Railway Building	1922	1211895
5	472m SW	Unspecified Pit	1886	1186796

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**23**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding

or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Tanks**	**1993**	**170073**
A	**On site**	**Tanks**	**1993**	**170074**
C	9m SW	Tanks	1993	170071
1	57m SE	Filter Tanks	1968	178028
E	73m SE	Filter Tanks	1924 - 1939	178402
E	74m S	Filter Tanks	1968	180960
D	76m SE	Filter Tanks	1924 - 1939	181968
E	81m S	Filter Tanks	1924 - 1939	186298
E	114m S	Filter Tanks	1924 - 1936	188036
D	126m SE	Filter Tanks	1968	178027
E	128m SE	Tanks	1968	170076
E	129m SE	Sludge Tanks	1939	177834
D	140m SE	Tanks	1993	170075
J	360m SW	Unspecified Tank	1979 - 1988	186466
J	361m SW	Unspecified Tank	1968	182443
L	425m SW	Unspecified Tank	1979 - 1993	188248
L	428m SW	Unspecified Tank	1979	185005
L	428m SW	Unspecified Tank	1988	182305
L	429m SW	Unspecified Tank	1993	185207
H	455m SE	Unspecified Tank	1901	175676
H	463m SE	Unspecified Tank	1924 - 1936	189362
M	464m W	Unspecified Tank	1901	175677
M	471m W	Unspecified Tank	1924	175678

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	8

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
D	141m E	Electricity Substation	1993	98477
E	193m SE	Electricity Substation	1993	98476
G	313m S	Electricity Substation	1988 - 1993	109221
G	313m S	Electricity Substation	1979	113184
G	335m S	Electricity Substation	1968	98479
K	407m SE	Electricity Substation	1979	102656
K	414m SE	Electricity Substation	1993	102224
K	415m SE	Electricity Substation	1986	106123

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

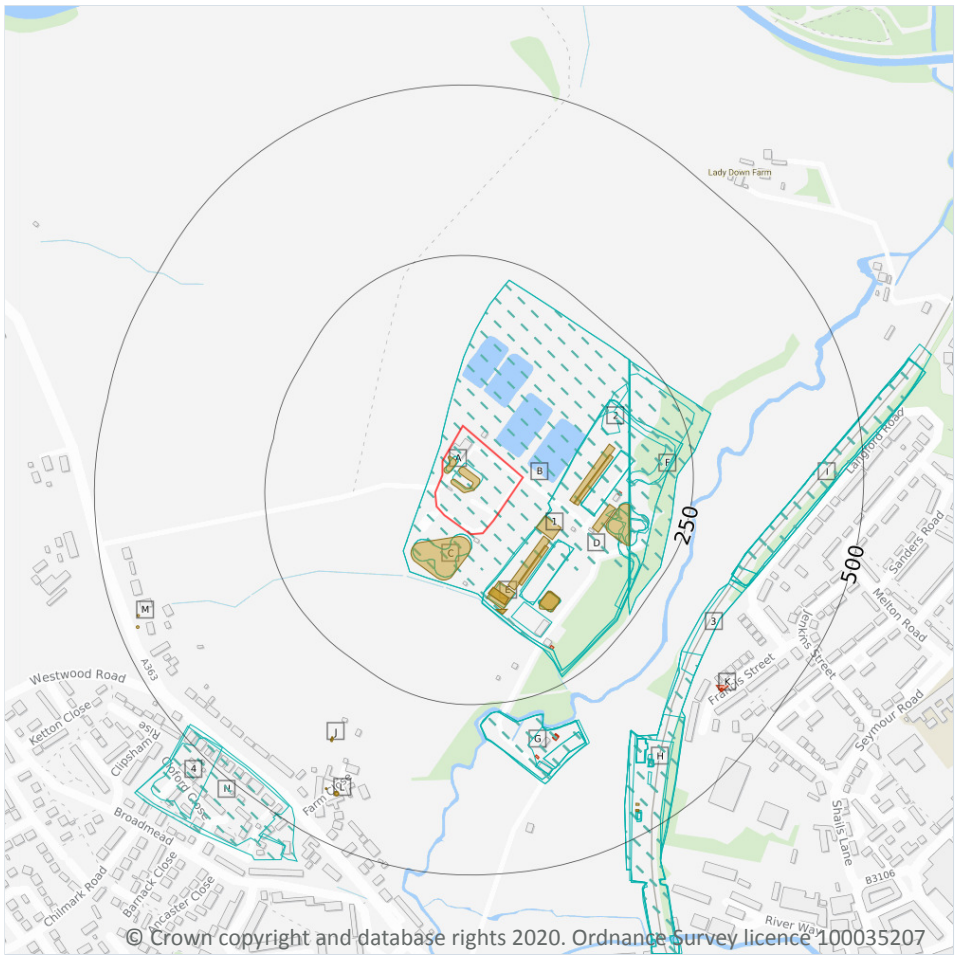
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

2.1 Historical industrial land uses

Records within 500m	75

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Tanks**	**1985**	**1264420**
A	**On site**	**Unspecified Tanks**	**1985**	**1168884**
A	**On site**	**Unspecified Tanks**	**1974**	**1264420**

ID	Location	Land Use	Date	Group ID
B	**On site**	**Sewage Works**	**1985**	**1244551**
B	**On site**	**Sewage Works**	**1974**	**1214591**
C	5m SW	Unspecified Tanks	1985	1195944
C	5m SW	Unspecified Tanks	1974	1195944
D	51m SE	Sewage Works	1939	1242230
D	51m SE	Sewage Works	1922	1242230
D	52m SE	Unspecified Works	1956	1179136
E	77m S	Filler Tanks	1939	1157433
E	92m SE	Unspecified Tanks	1956	1242083
D	94m SE	Unspecified Tanks	1956	1238762
E	94m SE	Unspecified Tanks	1939	1196198
E	94m SE	Unspecified Tanks	1922	1196198
D	94m SE	Unspecified Tanks	1939	1206234
D	94m SE	Unspecified Tanks	1922	1206234
E	117m SE	Filter Tanks	1939	1177109
E	128m SE	Unspecified Tanks	1939	1247618
E	128m SE	Unspecified Tanks	1956	1244323
E	128m SE	Unspecified Tanks	1974	1244323
D	134m SE	Unspecified Heap	1939	1163443
2	138m NE	Refuse Heap	1956	1178613
F	141m NE	Unspecified Heap	1939	1163442
D	142m SE	Unspecified Tanks	1985	1236616
D	142m SE	Unspecified Tanks	1974	1272493
D	144m SE	Refuse Heap	1956	1265726
F	156m E	Sewage Works	1987	1244551
F	156m E	Sewage Works	1973	1214591
F	157m E	Refuse Heap	1956	1178611
D	161m E	Unspecified Tanks	1987	1236616

ID	Location	Land Use	Date	Group ID
D	161m E	Unspecified Tanks	1973	1272493
D	167m E	Refuse Heap	1956	1265726
D	193m SE	Unspecified Ground Workings	1956	1161375
G	262m S	Sewage Works	1939	1263636
G	262m S	Sewage Works	1922	1263636
G	262m S	Unspecified Works	1956	1179137
G	262m S	Unspecified Commercial/Industrial	1974	1159209
G	297m S	Sewage Works	1985	1267773
G	323m SE	Filter Beds	1939	1226282
G	323m SE	Filter Beds	1922	1226282
H	330m SE	Railway Sidings	1939	1271176
H	330m SE	Railway Sidings	1922	1271176
3	335m SE	Cuttings	1886	1158740
H	336m SE	Railway Sidings	1886	1244523
I	338m SE	Cuttings	1956	1192970
I	338m SE	Cuttings	1987	1257190
I	338m SE	Cuttings	1973	1192970
I	339m SE	Cuttings	1886	1222460
I	339m SE	Cuttings	1899	1269309
I	339m SE	Cuttings	1939	1191740
I	339m SE	Cuttings	1922	1191740
G	344m S	Engine House	1939	1225346
G	344m S	Engine House	1922	1225346
H	362m SE	Railway Sidings	1956	1267784
H	370m SE	Railway Sidings	1899	1208428
H	377m SE	Engine Shed	1956	1258816
H	377m SE	Engine Shed	1939	1256058
H	377m SE	Engine Shed	1922	1256058

ID	Location	Land Use	Date	Group ID
H	377m SE	Engine Shed	1899	1256058
H	377m SE	Engine Shed	1886	1256058
H	406m SE	Railway Building	1886	1172853
H	412m SE	Railway Building	1956	1191288
H	413m SE	Railway Building	1939	1212184
H	413m SE	Railway Building	1922	1212184
H	413m SE	Railway Building	1899	1212184
H	413m SE	Railway Building	1886	1212184
H	426m SE	Railway Building	1899	1172855
H	466m SE	Unspecified Tank	1939	1176513
H	467m SE	Railway Building	1899	1212263
H	467m SE	Railway Building	1886	1215864
N	468m SW	Brick and Tile Works	1886	1219102
H	469m SE	Railway Building	1922	1211895
N	471m SW	Brick and Tile Works	1899	1219102
4	472m SW	Unspecified Pit	1886	1186796

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**31**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Tanks**	**1993**	**170074**
A	**On site**	**Tanks**	**1993**	**170073**
C	9m SW	Tanks	1993	170071
1	57m SE	Filter Tanks	1968	178028

ID	Location	Land Use	Date	Group ID
E	73m SE	Filter Tanks	1939	178402
E	74m S	Filter Tanks	1968	180960
D	76m SE	Filter Tanks	1939	181968
E	81m S	Filter Tanks	1924	186298
E	81m S	Filter Tanks	1939	186298
E	83m SE	Filter Tanks	1924	178402
D	83m SE	Filter Tanks	1924	181968
E	114m S	Filter Tanks	1924	188036
E	114m S	Filter Tanks	1936	188036
D	126m SE	Filter Tanks	1968	178027
E	128m SE	Tanks	1968	170076
E	129m SE	Sludge Tanks	1939	177834
D	140m SE	Tanks	1993	170075
J	360m SW	Unspecified Tank	1988	186466
J	360m SW	Unspecified Tank	1979	186466
J	361m SW	Unspecified Tank	1968	182443
L	425m SW	Unspecified Tank	1988	188248
L	425m SW	Unspecified Tank	1979	188248
L	426m SW	Unspecified Tank	1993	188248
L	428m SW	Unspecified Tank	1979	185005
L	428m SW	Unspecified Tank	1988	182305
L	429m SW	Unspecified Tank	1993	185207
H	455m SE	Unspecified Tank	1901	175676
H	463m SE	Unspecified Tank	1924	189362
H	463m SE	Unspecified Tank	1936	189362
M	464m W	Unspecified Tank	1901	175677
M	471m W	Unspecified Tank	1924	175678

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	9

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
D	141m E	Electricity Substation	1993	98477
E	193m SE	Electricity Substation	1993	98476
G	313m S	Electricity Substation	1988	109221
G	313m S	Electricity Substation	1979	113184
G	315m S	Electricity Substation	1993	109221
G	335m S	Electricity Substation	1968	98479
K	407m SE	Electricity Substation	1979	102656
K	414m SE	Electricity Substation	1993	102224
K	415m SE	Electricity Substation	1986	106123

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

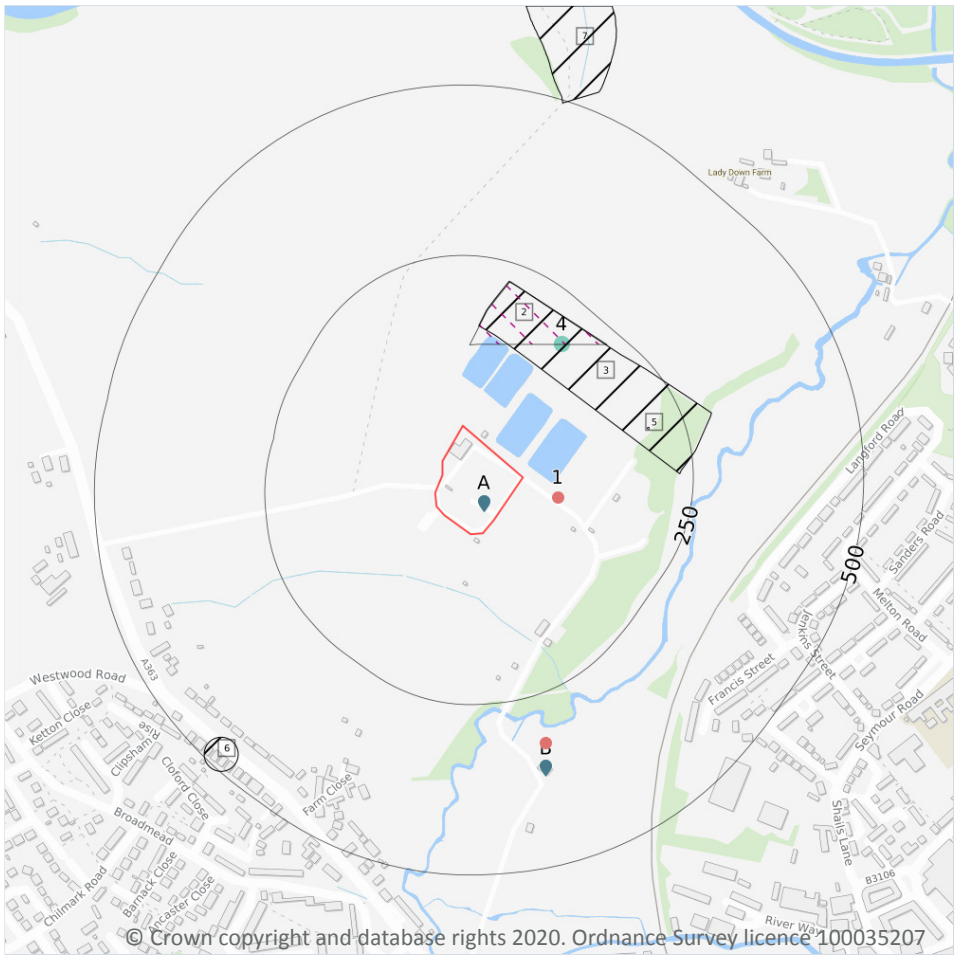
2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	1

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

Features are displayed on the Waste and landfill map on **page 25**

ID	Location	Address	BGS Number	Risk	Waste Type
4	185m NE	Bradford Road, Trowbridge, Wilts	538	Risk to minor aquifer	N/A

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	**2**

Landfill sites identified from Local Authority records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 25**

ID	Location	Site address	Source	Data type
2	119m N	Refuse Tip	1971 mapping	Polygon
5	196m E	Refuse Tip	1968 mapping	Polygon

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	**3**

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 25**

ID	Location	Details		
3	135m NE	Site Address: Bradford Road SD Works, Trowbridge, Wiltshire Licence Holder Address: -	Waste Licence: - Site Reference: - Waste Type: Industrial, Commercial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: Trowbridge Urban District Council Licence Holder: - First Recorded - Last Recorded: -
6	454m SW	Site Address: Disused Brick and Tile Works, Trowbridge, Wiltshire Licence Holder Address: -	Waste Licence: - Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: - Licence Holder: - First Recorded - Last Recorded: -

ID	Location	Details		
7	495m N	Site Address: Cockhill Farm, Trowbridge, Wiltshire Licence Holder Address: c/o Spiers Piece Farm, Steeple Ashton, Trowbridge, Wiltshire	Waste Licence: Yes Site Reference: W790628, W/80/0030/WD Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 31/07/1979 Licence Surrender: 16/10/1992	Operator: - Licence Holder: Messrs F J and A H J Painter First Recorded 19/10/1979 Last Recorded: 16/10/1992

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	**0**

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	**5**

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 25**

ID	Location	Details		
A	**On site**	**Site Name: Trowbridge S T W** **Site Address: Off Bradford Road, Trowbridge, Wiltshire, BA14 9AX** **Correspondence Address: -**	**Type of Site: Combustion of Bio Gas** **Size: 25000 tonnes** **Environmental Permitting Regulations (Waste) Licence Number: WES020** **EPR reference: EA/EPR/HB3602TR/V002** **Operator: Wessex Water Enterprises Limited** **Waste Management licence No: 401731** **Annual Tonnage: 0**	**Issue Date: 10/09/2014** **Effective Date: -** **Modified:: 01/11/2019** **Surrendered Date: -** **Expiry Date: -** **Cancelled Date: -** **Status: Modified**

ID	Location	Details		
A	**On site**	**Site Name: Trowbridge S T W** **Site Address: Trowbridge (Bradford Road) S T W, Langford Road, Trowbridge, Wiltshire, BA14 9BJ** **Correspondence Address: -**	**Type of Site: Sewage sludge treatment** **Size: 25000 tonnes** **Environmental Permitting Regulations (Waste) Licence Number: WES675** **EPR reference: EA/EPR/BB3934AG/A001** **Operator: Wessex Water Services Ltd** **Waste Management licence No: 103333** **Annual Tonnage: 74999**	**Issue Date: 21/11/2011** **Effective Date: -** **Modified:: -** **Surrendered Date: -** **Expiry Date: -** **Cancelled Date: -** **Status: Issued**
A	**On site**	**Site Name: Trowbridge S T W** **Site Address: Off Bradford Road, Trowbridge, Wiltshire, BA14 9AX** **Correspondence Address: -**	**Type of Site: Combustion of Bio Gas** **Size: 25000 tonnes** **Environmental Permitting Regulations (Waste) Licence Number: WEW004** **EPR reference: EA/EPR/CB3000TJ/A001** **Operator: Wessex Water Services Limited** **Waste Management licence No: 401731** **Annual Tonnage: 0**	**Issue Date: 10/09/2014** **Effective Date: -** **Modified:: -** **Surrendered Date: -** **Expiry Date: -** **Cancelled Date: -** **Status: Issued**
B	357m S	Site Name: Bradford Road Sewage Works Site Address: Bradford Road Sewage Works, Land/ Premises At, Bradford Road, Trowbridge, Wiltshire, BA14 9AX Correspondence Address: -	Type of Site: Biological Treatment Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WES015 EPR reference: EA/EPR/HB3205TW/T001 Operator: Wessex Water Enterprises Limited Waste Management licence No: 27142 Annual Tonnage: 74999	Issue Date: 05/08/1993 Effective Date: 22/03/2019 Modified:: 19/10/2001 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred

ID	Location	Details		
B	357m S	Site Name: Bradford Road Sewage Works Site Address: Bradford Road Sewage Works, Land/ Premises At, Bradford Road, Trowbridge, Wiltshire, BA14 9AX Correspondence Address: -	Type of Site: Biological Treatment Facility Size: >= 25000 tonnes 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAT075 EPR reference: EA/EPR/AP3890FF/V002 Operator: Wessex Water Services Ltd Waste Management licence No: 27142 Annual Tonnage: 5000	Issue Date: 05/08/1993 Effective Date: - Modified:: 19/10/2001 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	**2**

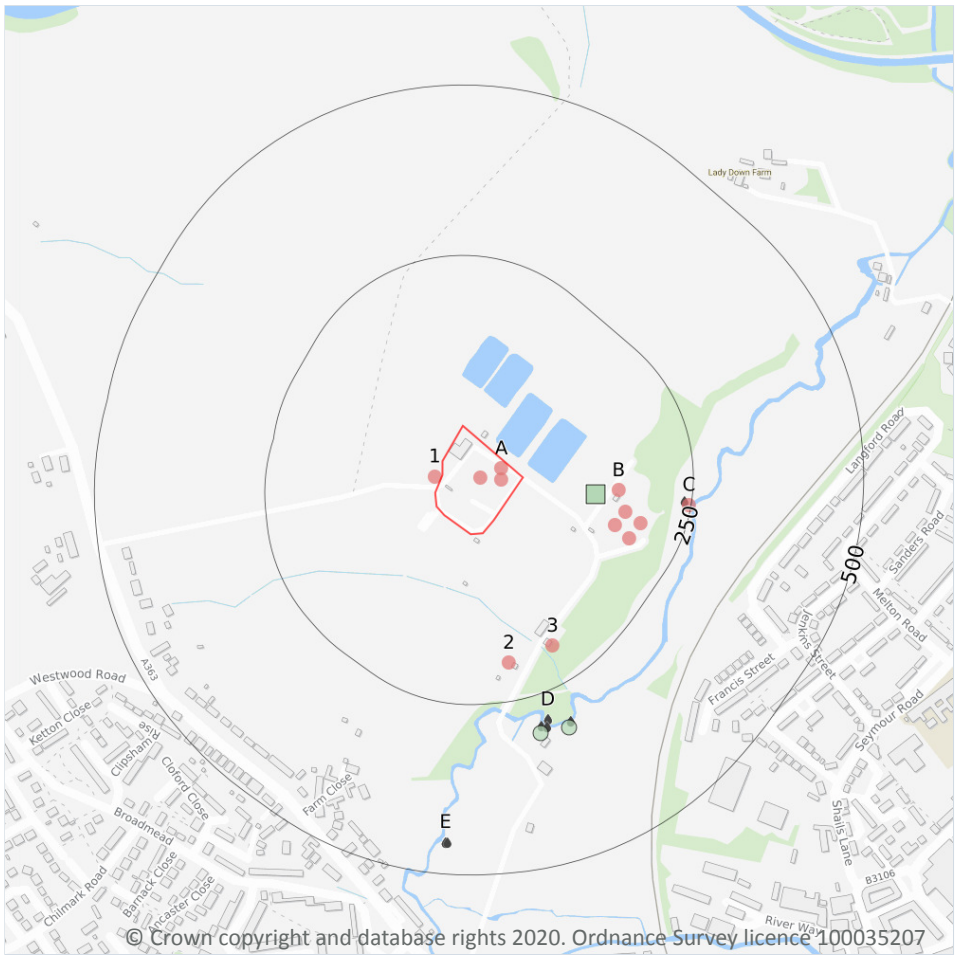
Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 25**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	59m SE	Trowbridge Bradford Road STW Langford Road Trowbridge Wiltshire BA14 9BJ	EPR/LE5040NZ/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in secure containers
B	321m S	BRADFORD ROAD, TROWBRIDGE, BA14 9AX	WEX138167	Storing waste exemption	Not on a farm	Storage of waste in secure containers

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



Site Outline

Search buffers in metres (m)

Recent industrial land uses

Licensed Discharges to controlled waters

List 1 Dangerous Substances

List 2 Dangerous Substances

Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m	12

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Company	Address	Activity	Category
A	**On site**	**Electricity Sub Station**	**Wiltshire, BA14**	**Electrical Features**	**Infrastructure and Facilities**
A	**On site**	**Sewage Works**	**Wiltshire, BA14**	**Waste Storage, Processing and Disposal**	**Infrastructure and Facilities**

ID	Location	Company	Address	Activity	Category
A	**On site**	**Trowbridge Sewage Treatment Works - Sewage Sludge Digestion (DECC)**	**Bradford Road, Trowbridge, Wiltshire, BA14 9AX**	**Energy Production**	**Industrial Features**
1	10m W	Mast	Wiltshire, BA14	Telecommunications Features	Infrastructure and Facilities
B	142m E	Electricity Sub Station	Wiltshire, BA14	Electrical Features	Infrastructure and Facilities
B	152m SE	Tank	Wiltshire, BA14	Tanks (Generic)	Industrial Features
B	159m E	Tank	Wiltshire, BA14	Tanks (Generic)	Industrial Features
B	179m SE	Tank	Wiltshire, BA14	Tanks (Generic)	Industrial Features
B	185m E	Tank	Wiltshire, BA14	Tanks (Generic)	Industrial Features
2	194m S	Gas Valve Compound	Wiltshire, BA14	Gas Features	Infrastructure and Facilities
3	194m SE	Electricity Sub Station	Wiltshire, BA14	Electrical Features	Infrastructure and Facilities
C	247m E	Outfall	Wiltshire, BA14	Waste Storage, Processing and Disposal	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	**0**

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	**0**

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	0

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	17

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Address	Details	
C	238m E	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: 010088 Permit Version: 1 Receiving Water: RIVER BISS	Status: REVISED BY APPLICATION, GRANTED BY SEC.OF STATE -SEC 35 Issue date: - Effective Date: 05/03/1986 Revocation Date: 13/10/1997
D	289m S	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: 102153 Permit Version: 1 Receiving Water: F/E-RIVER AVON, CSO-RIVER BISS	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 19/03/2004 Effective Date: 01/04/2004 Revocation Date: 06/04/2005
D	289m S	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: 102153 Permit Version: 2 Receiving Water: F/E-RIVER AVON, CSO-RIVER BISS	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 19/03/2004 Effective Date: 07/04/2005 Revocation Date: 31/03/2009
D	289m S	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: 102153 Permit Version: 3 Receiving Water: F/E-RIVER AVON, CSO-RIVER BISS	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 14/10/2008 Effective Date: 01/04/2009 Revocation Date: 30/03/2010
D	289m S	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: 102153 Permit Version: 4 Receiving Water: F/E-RIVER AVON, CSO-RIVER BISS	Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 31/03/2010 Effective Date: 31/03/2010 Revocation Date: 31/12/2016
D	289m S	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 013109 Permit Version: 1 Receiving Water: AVON / BISS	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 113 & SCHED 12) Issue date: 25/10/1996 Effective Date: 30/09/1996 Revocation Date: 30/12/2000
D	289m S	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 013109 Permit Version: 2 Receiving Water: AVON / BISS(S)	Status: REVOKED - UNSPECIFIED Issue date: 27/12/2000 Effective Date: 31/12/2000 Revocation Date: 31/03/2004

ID	Location	Address	Details	
D	295m S	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: 010088 Permit Version: 1 Receiving Water: RIVER BISS	Status: REVISED BY APPLICATION, GRANTED BY SEC.OF STATE -SEC 35 Issue date: - Effective Date: 05/03/1986 Revocation Date: 13/10/1997
D	299m S	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 102153 Permit Version: 5 Receiving Water: F/E-RIVER AVON, CSO-RIVER BISS	Status: VARIED UNDER EPR 2010 Issue date: 30/12/2016 Effective Date: 01/01/2017 Revocation Date: 10/04/2019
D	299m S	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 102153 Permit Version: 5 Receiving Water: F/E-RIVER AVON, CSO-RIVER BISS	Status: VARIED UNDER EPR 2010 Issue date: 30/12/2016 Effective Date: 01/01/2017 Revocation Date: 10/04/2019
D	304m SE	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 102153 Permit Version: 6 Receiving Water: F/E-RIVER AVON, CSO-RIVER BISS	Status: VARIED UNDER EPR 2010 Issue date: 11/04/2019 Effective Date: 11/04/2019 Revocation Date: -
D	304m SE	TROWBRIDGE WASTEWATER TRTMNT WORKS, BRADFORD ROAD, TROWBRIDGE, WILTSHIRE, BA14 9AX	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 102153 Permit Version: 6 Receiving Water: F/E-RIVER AVON, CSO-RIVER BISS	Status: VARIED UNDER EPR 2010 Issue date: 11/04/2019 Effective Date: 11/04/2019 Revocation Date: -
E	453m S	ASDA YARD CSO, THE SHIRES, TROWBRIDGE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 101009 Permit Version: 1 Receiving Water: RIVER BISS(S)	Status: REVOKED - UNSPECIFIED Issue date: 30/11/1999 Effective Date: 16/11/1999 Revocation Date: 21/10/2002
E	453m S	SHIRES CAR PARK CSO, BYTHESEA ROAD, TROWBRIDGE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 101007 Permit Version: 1 Receiving Water: RIVER BISS(S)	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 16/11/1999 Effective Date: 16/11/1999 Revocation Date: 11/12/2019

ID	Location	Address	Details	
E	453m S	SHIRES CAR PARK CSO, BYTHESEA ROAD, TROWBRIDGE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 101007 Permit Version: 2 Receiving Water: RIVER BISS VIA SWS	Status: VARIED UNDER EPR 2010 Issue date: 12/12/2019 Effective Date: 12/12/2019 Revocation Date: -
E	453m S	STALLARD STREET CSO, 58 STALLARD STREET, TROWBRIDGE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 101008 Permit Version: 1 Receiving Water: RIVER BISS (S)	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 30/11/1999 Effective Date: 16/11/1999 Revocation Date: 26/07/2020
E	454m S	STALLARD STREET CSO, 58 STALLARD STREET, TROWBRIDGE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 101008 Permit Version: 2 Receiving Water: THE RIVER BISS VIA SWS	Status: VARIED UNDER EPR 2010 Issue date: 27/07/2020 Effective Date: 27/07/2020 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	**0**

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	**0**

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	1

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Name	Status	Receiving Water	Authorised Substances
B	109m E	Trowbridge Stw	Not Active	-	-

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	3

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Name	Status	Receiving Water	Authorised Substances
B	109m E	J & T Beaven Ltd	Active	-	Chromium, Copper, Lead, Nickel, Zinc
B	109m E	Manor House Old Pine & Antiques	Active	-	Lead, Zinc
B	109m E	Trowbridge Stw	Active	-	Iron, pH

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	2

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Details	
D	305m S	Incident Date: 14/05/2001 Incident Identification: 5431 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
D	311m SE	Incident Date: 22/06/2003 Incident Identification: 167783 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 2 (Significant) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

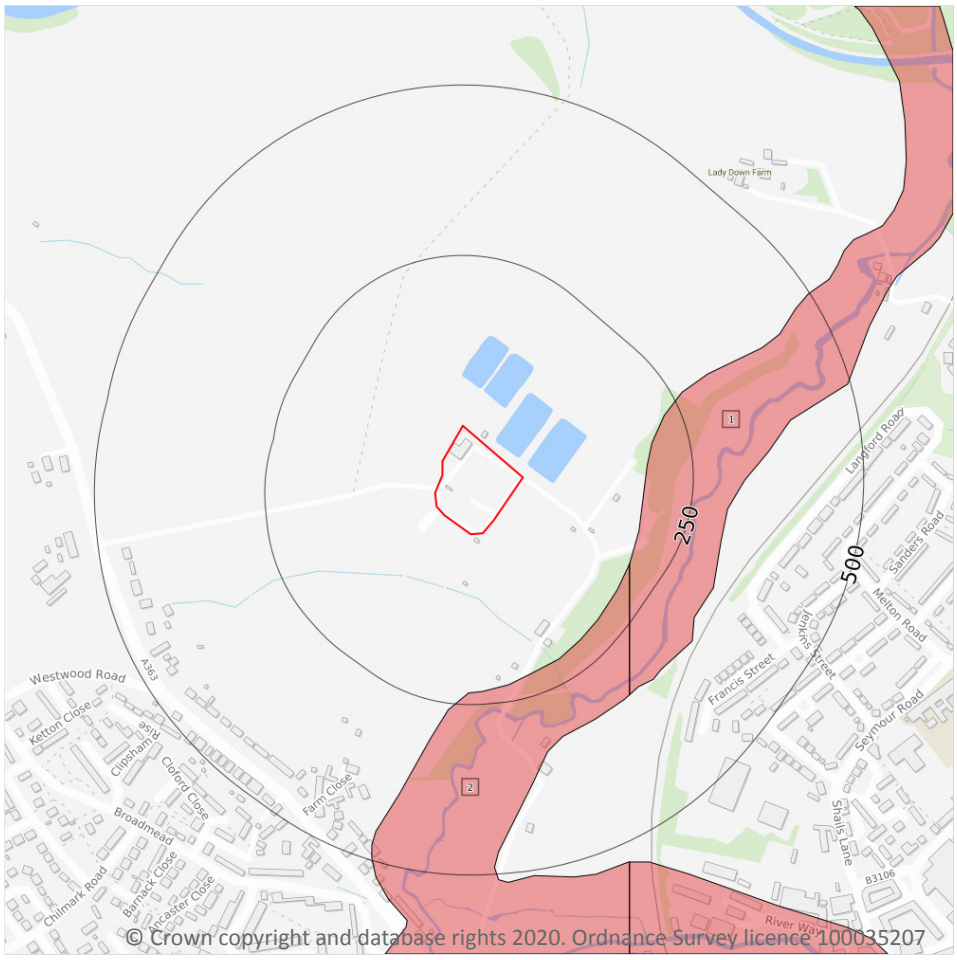
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	2

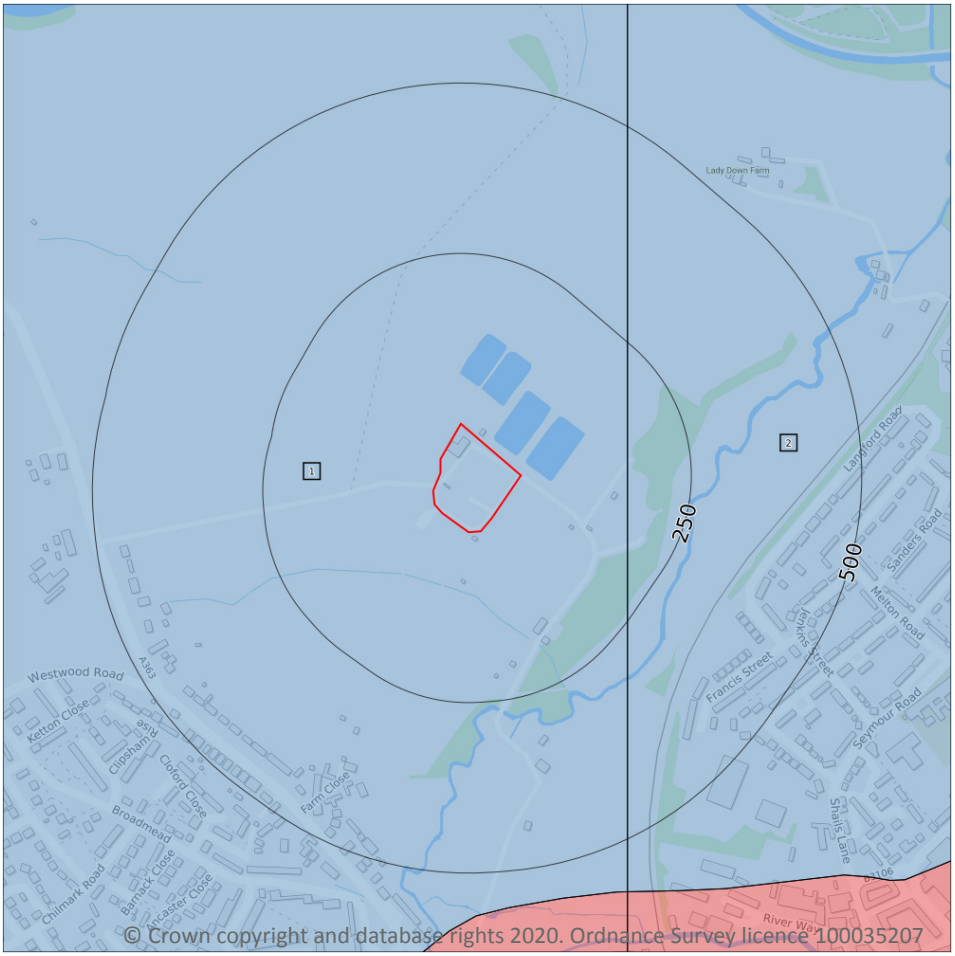
Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 39**

ID	Location	Designation	Description
1	179m E	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	201m SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



5.2 Bedrock aquifer

Records within 500m	2

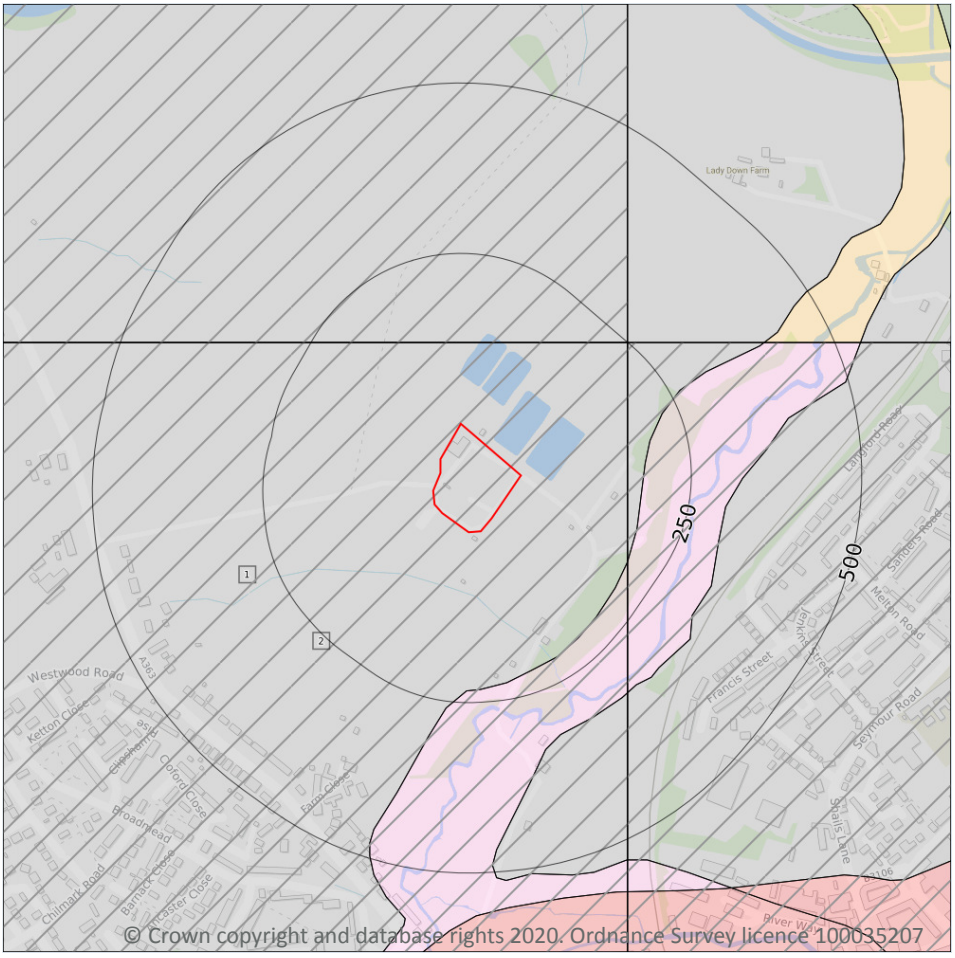
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 41**

ID	Location	Designation	Description
1	**On site**	**Unproductive**	**These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow**
2	156m E	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability

- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability

- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information

- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 42**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	**Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, No Superficial Aquifer**	**Leaching class: Low Infiltration value: 40-70% Dilution value: 300-550mm/year**	**Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data**	**Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures**

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**1**

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
2	**Significant soluble rocks are likely to be present. Low possibility of localised subsidence or dissolution-related degradation of bedrock occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow.**	**3.0%**

This data is sourced from the British Geological Survey and the Environment Agency.

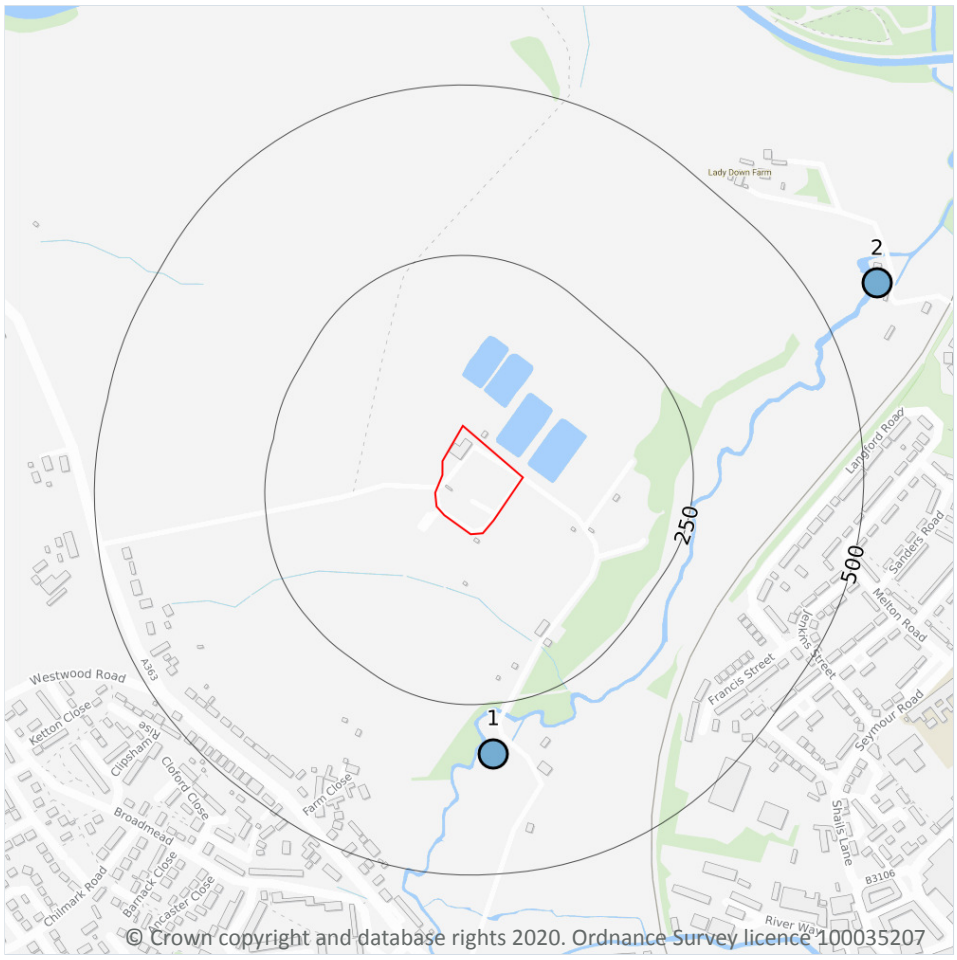
5.5 Groundwater vulnerability- local information

Records on site	**0**

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	0

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**3**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 44**

ID	Location	Details	
1	323m S	Status: Historical Licence No: 17/53/010/S/005 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Surface Water - Fresh Point: BISS Data Type: Point Name: Wessex Water Services Ltd Easting: 384800 Northing: 158400	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 11/04/1990 Version End Date: -
2	592m NE	Status: Active Licence No: SW/053/0010/001 Details: Transfer Between Sources (Post Water Act 2003) Direct Source: Surface Water - Fresh Point: RIVER BLISS AT LADY DOWN MILL Data Type: Point Name: Environment Agency Easting: 385363 Northing: 159090	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 02/05/2013 Expiry Date: 31/03/2029 Issue No: 1 Version Start Date: 02/05/2013 Version End Date: -
-	1870m SE	Status: Historical Licence No: 17/53/010/S/056 Details: Lake & Pond Throughflow Direct Source: Surface Water - Fresh Point: BISS Data Type: Point Name: Tesco Stores Ltd Easting: 386200 Northing: 157500	Annual Volume (m^3): 228500 Max Daily Volume (m^3): 1728 Original Application No: - Original Start Date: 01/10/1991 Expiry Date: - Issue No: 100 Version Start Date: 01/10/1991 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

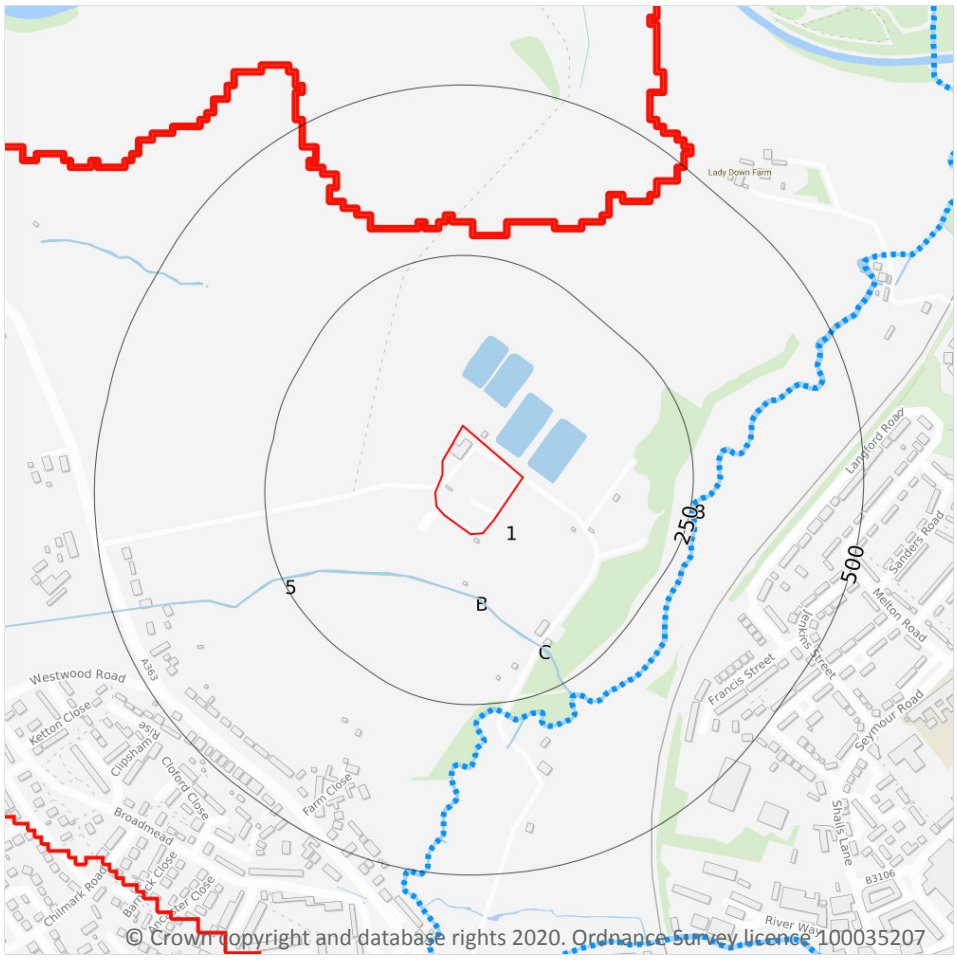
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	**5**

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 47**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	86m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
5	107m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	173m SE	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	-
C	187m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
8	248m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**9**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 47**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	**1**

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 47**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	**On site**	**River WB catchment**	**Biss (Bitham Bk to Bristol Avon)**	**GB109053021791**	**Bristol Avon Rural**	**Avon Bristol and North Somerset Streams**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 47**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
9	252m E	River	Biss (Bitham Bk to Bristol Avon)	GB109053021791	Moderate	Good	Moderate	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

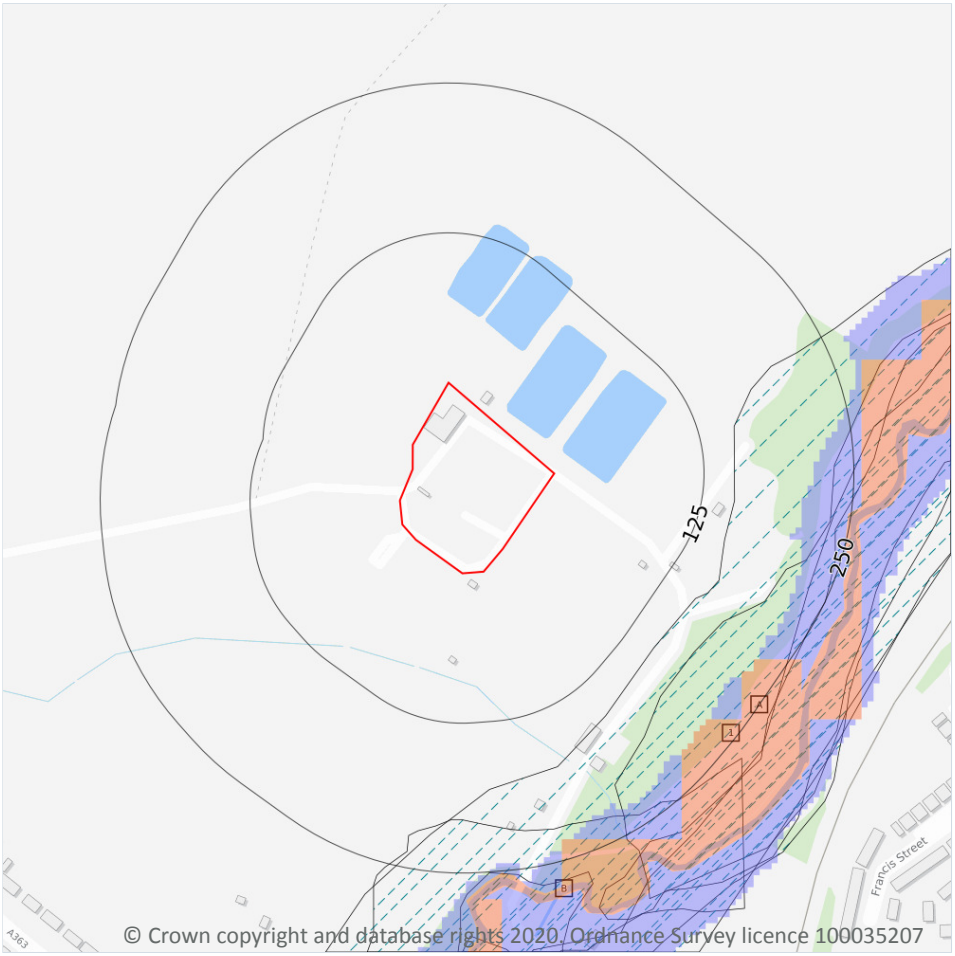
6.5 WFD Groundwater bodies

Records on site	0

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding



Site Outline

Search buffers in metres (m)

Environment Agency river and coastal flooding:

- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	5

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

Features are displayed on the River and coastal flooding map on **page 50**

ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
1	150m E	Ea112_Biss_Trowbridge_1932	1932-05-03 1932-05-31	Main river	Channel capacity exceeded (no raised defences)	Fluvial
A	179m SE	Ea112_Biss_Trowbridge	1979-05-30 1979-05-31	Main river	Channel capacity exceeded (no raised defences)	Fluvial
B	205m S	Ea112_Biss_Trowbridge_Melksham	1974-02-09 1974-02-11	Main river	Channel capacity exceeded (no raised defences)	Fluvial
A	232m E	Ea112_Biss_Trowbridge_1960	1960-12-04 1960-12-05	Main river	Channel capacity exceeded (no raised defences)	Fluvial
A	239m E	Ea112_Biss_Ladydown Mill_Trowbridge	1979-12-27 1979-12-28	Main river	Channel capacity exceeded (no raised defences)	Fluvial

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

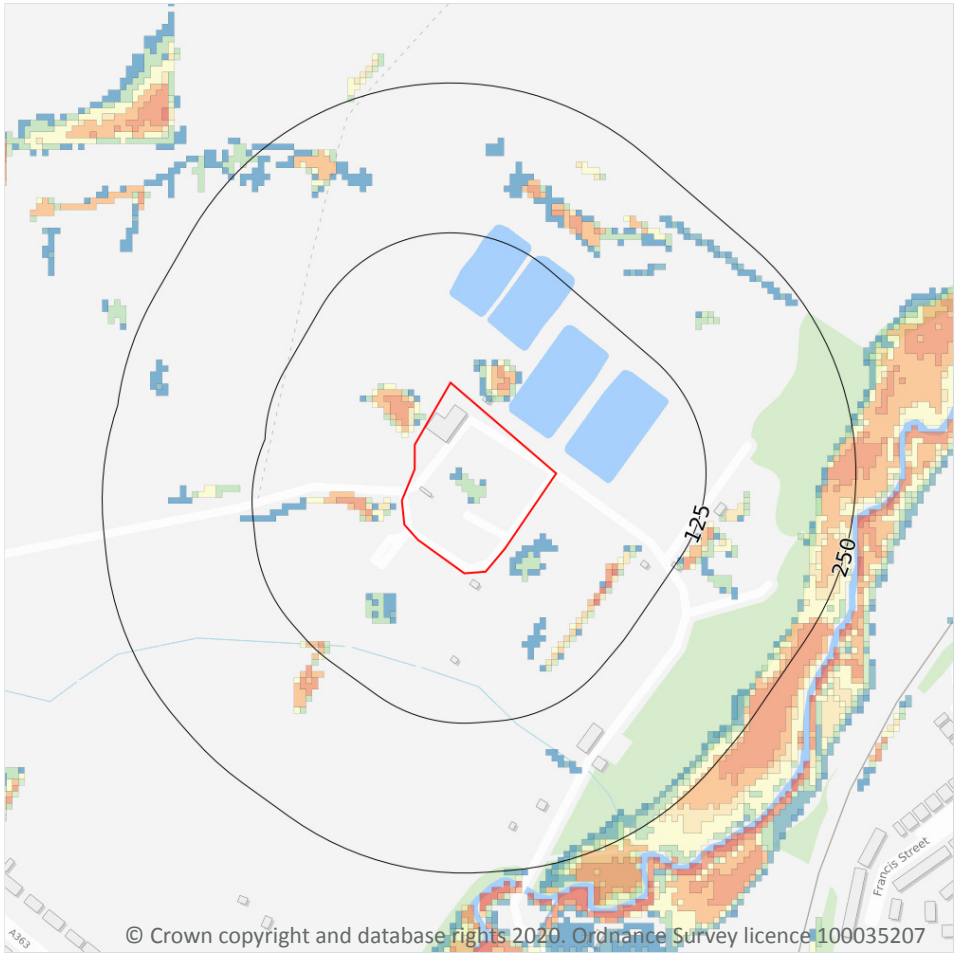
7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 250 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, 0.3m - 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 54**

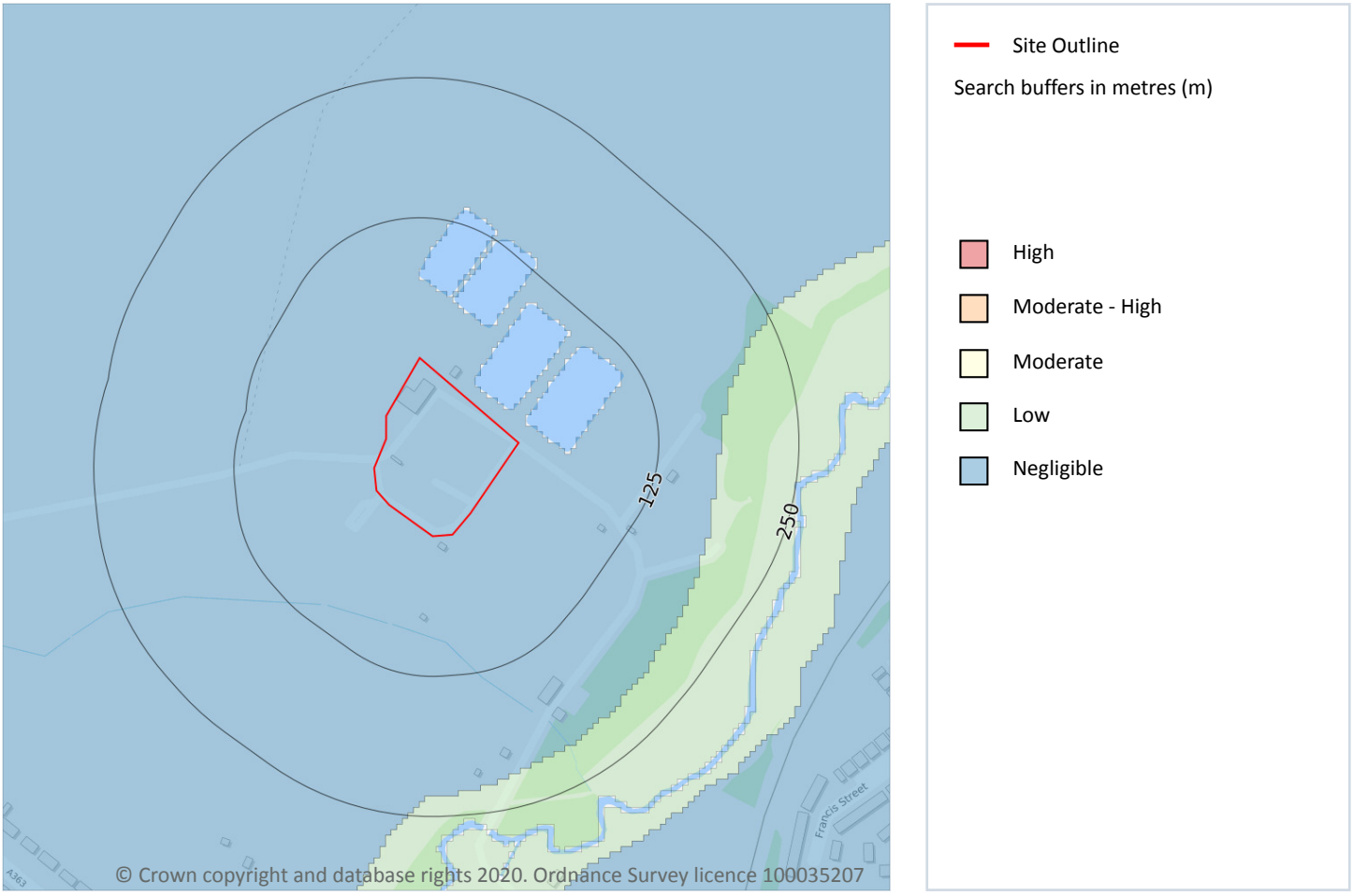
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on

a site. The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Negligible
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



9.1 Groundwater flooding

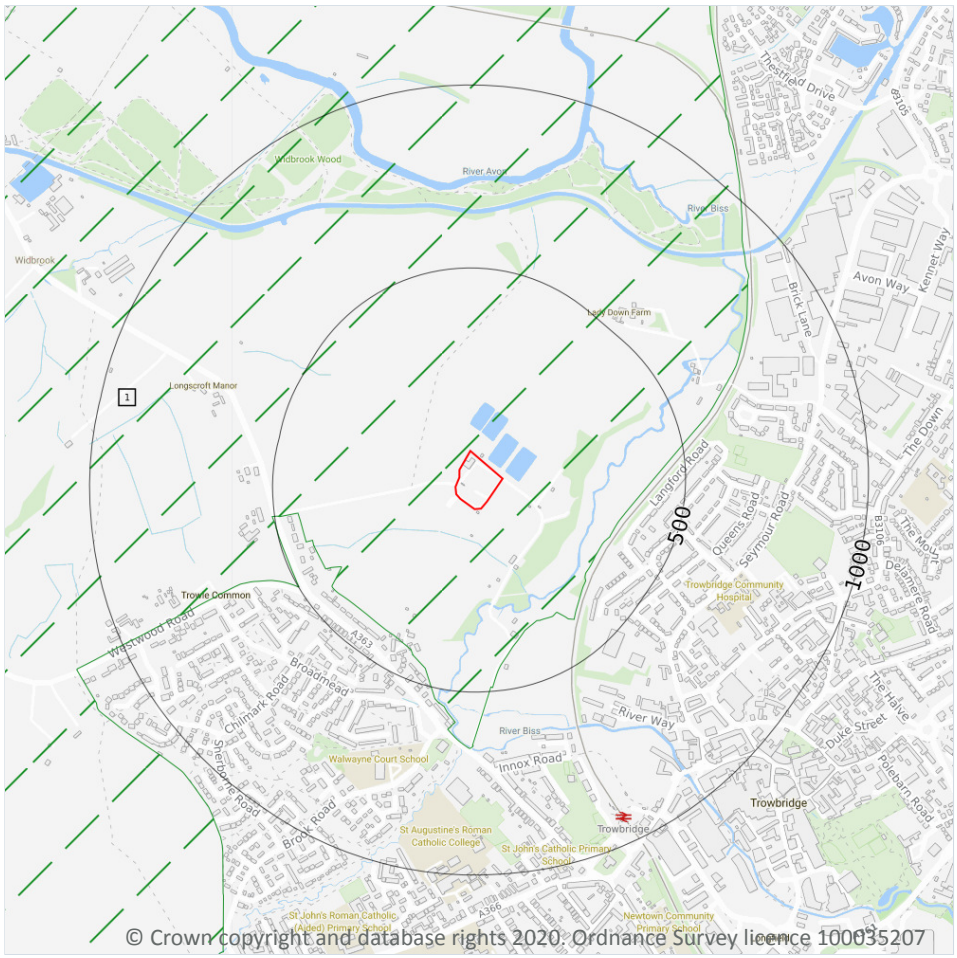
Highest risk on site	**Negligible**
Highest risk within 50m	**Negligible**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 56**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	3

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 57**

ID	Location	Name	Woodland Type
-	1258m N	Great Bradford Wood	Ancient & Semi-Natural Woodland
-	1340m N	Great Bradford Wood	Ancient Replanted Woodland
-	1424m N	Great Bradford Wood	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	1

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 57**

ID	Location	Name	Local Authority name
1	**On site**	**Bath and Bristol**	**Wiltshire**

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

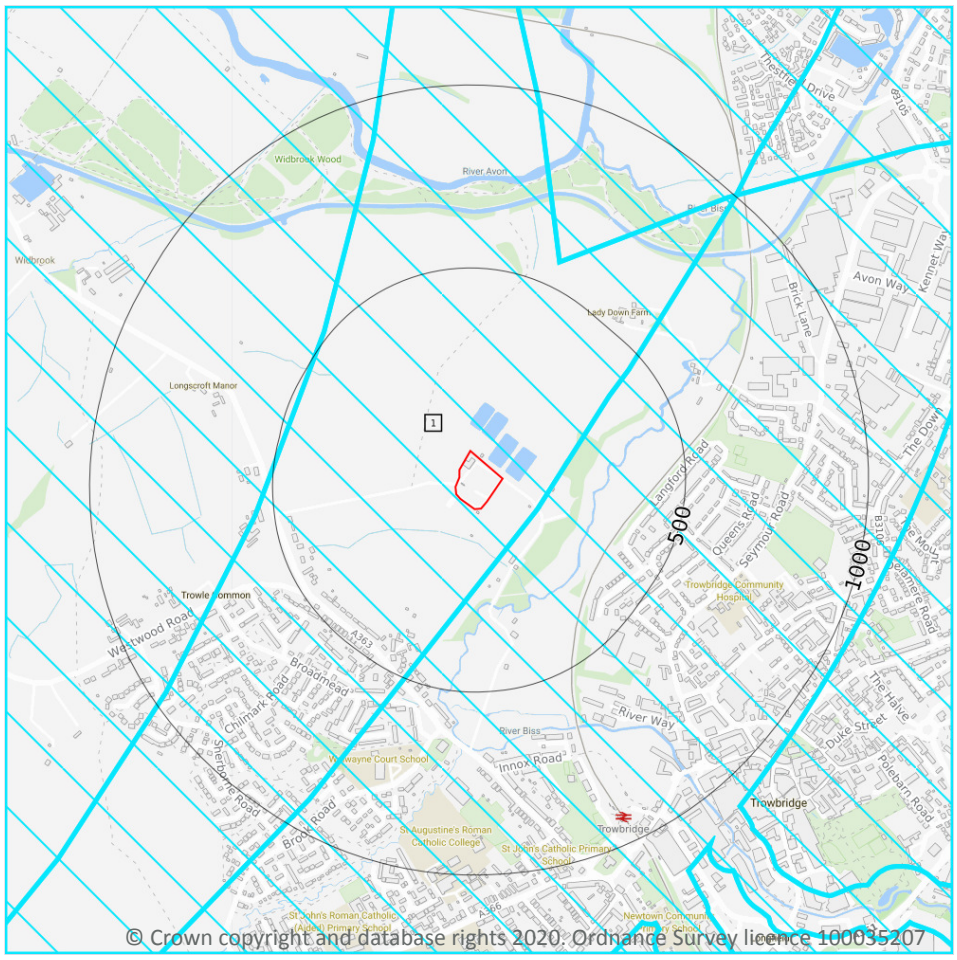
10.16 Nitrate Vulnerable Zones

Records within 2000m	0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 62**

ID	Location	Type of developments requiring consultation
1	On site	**All applications - All Planning Applications (Except Householder) Outside Or Extending Outside Existing Settlements/urban Areas Affecting Greenspace, Farmland, Semi Natural Habitats Or Landscape Features Such As Trees, Hedges, Streams, Rural Buildings/structures** **Infrastructure - Airports, helipads and other aviation proposals.** **Minerals, Oil and Gas - Oil & gas exploration/extraction.** **Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons > 750m² & manure stores > 3500t.** **Combustion - General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

12 Agricultural designations

Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	3

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 66**

ID	Location	Classification	Description
2	14m W	Grade 3b	Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

ID	Location	Classification	Description
3	29m W	Grade 3b	Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.
4	78m S	Grade 3b	Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	**0**

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	**0**

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	**0**

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment.

This data is sourced from Natural England.

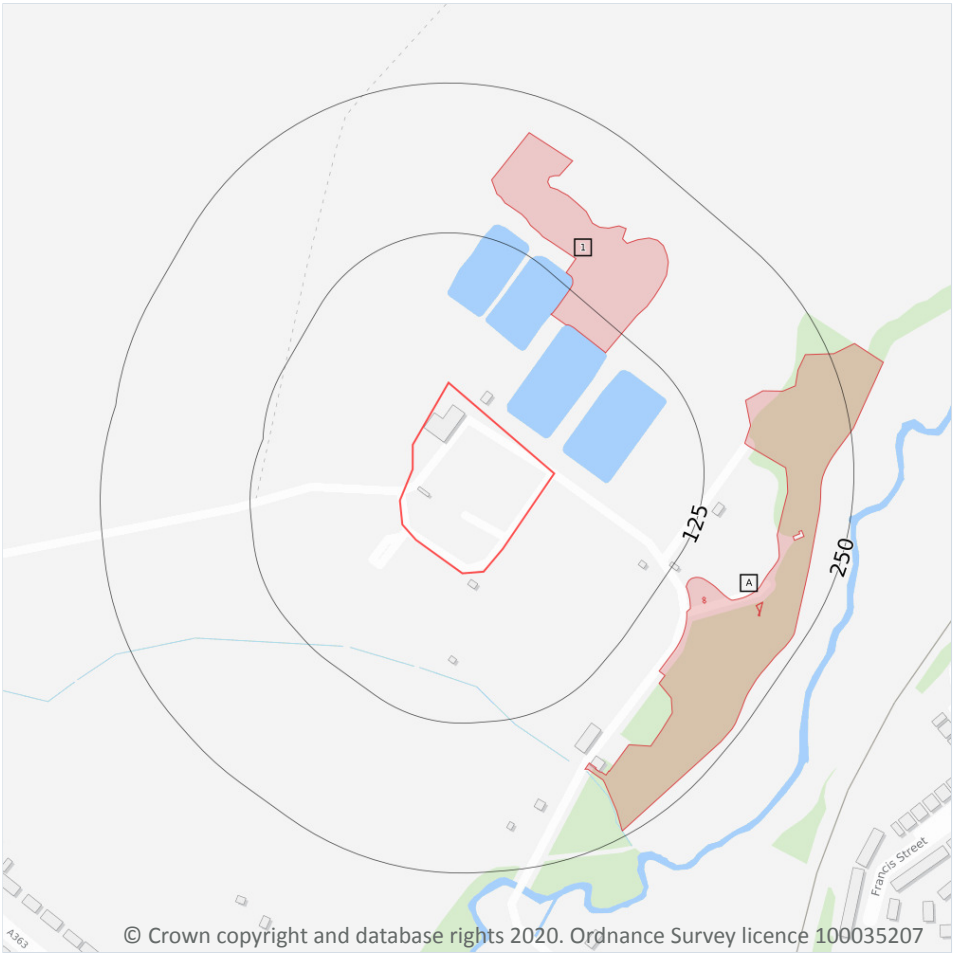
12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks

Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	3

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 69**

ID	Location	Main Habitat	Other habitats
1	99m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	143m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	201m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

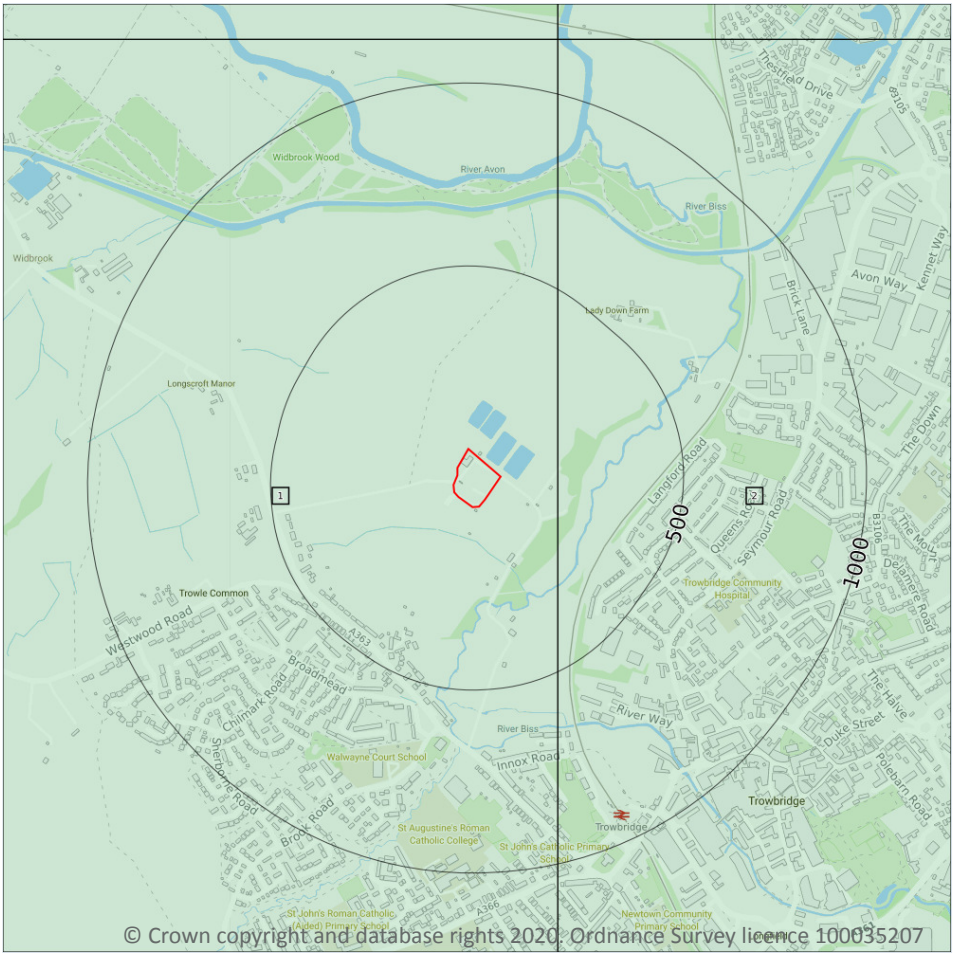
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m	2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 71**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**Full**	**ST85NW**
2	156m E	No coverage	Full	Full	No coverage	ST85NE

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

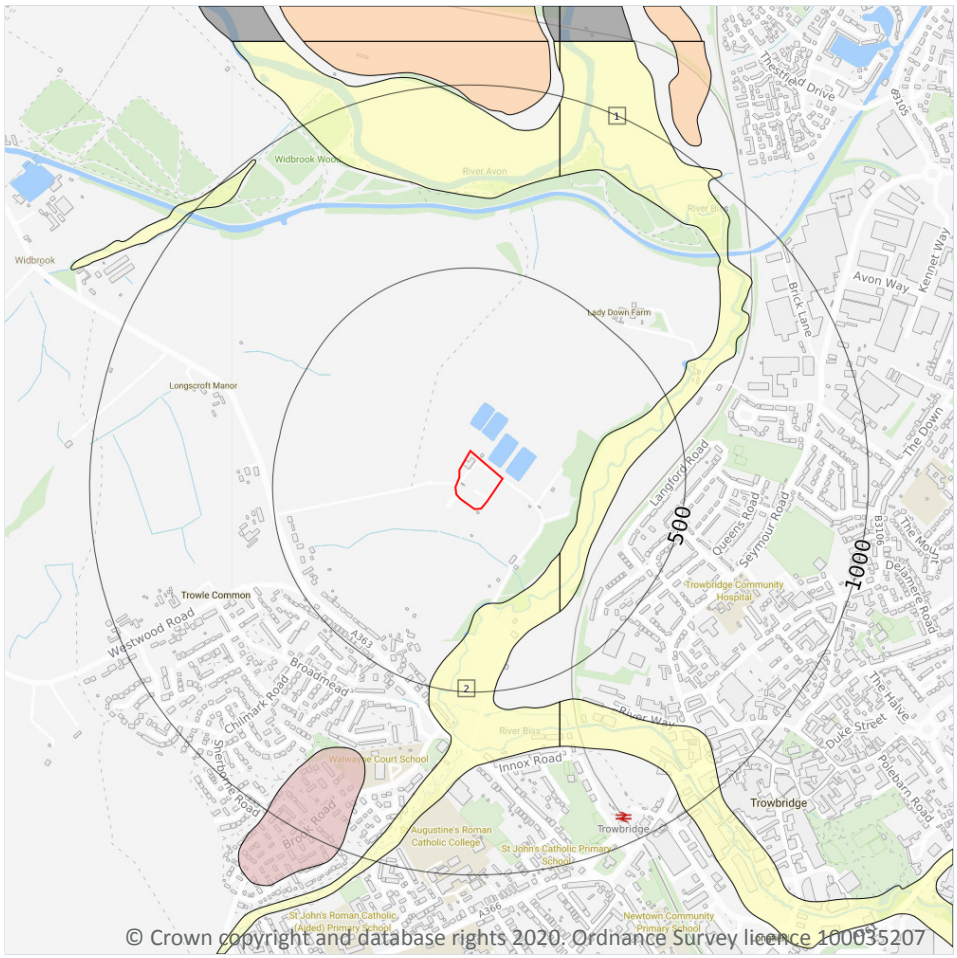
14.2 Artificial and made ground (10k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



14.3 Superficial geology (10k)

Records within 500m	2

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 73**

ID	Location	LEX Code	Description	Rock description
1	218m E	ALV-XCSV	Alluvium - Clay, Sand And Gravel	Clay, Sand And Gravel
2	241m SE	ALV-XCSV	Alluvium - Clay, Sand And Gravel	Clay, Sand And Gravel

This data is sourced from the British Geological Survey.

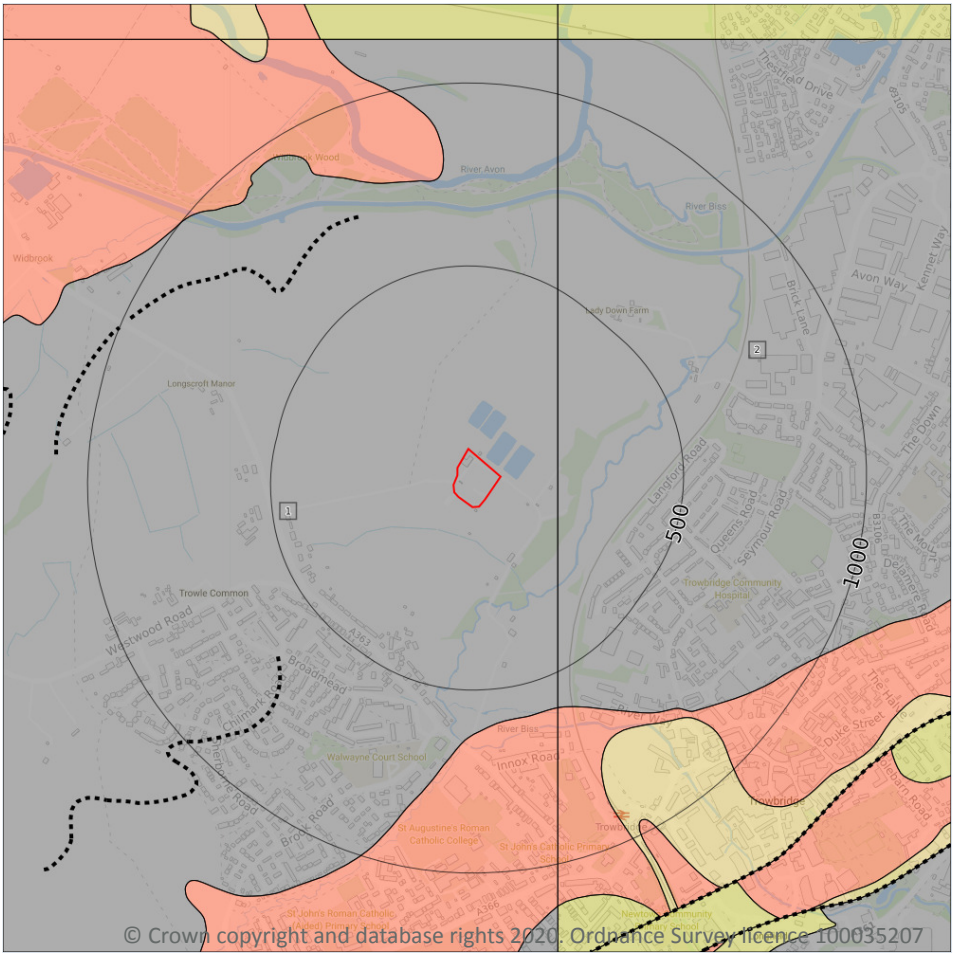
14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m	2

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 75**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**KLOX-SAMDST**	**Kellaways Formation And Oxford Clay Formation (undifferentiated) - Sandy Mudstone**	**Oxfordian Age - Callovian Age**
2	156m E	KLOX-SAMDST	Kellaways Formation And Oxford Clay Formation (undifferentiated) - Sandy Mudstone	Oxfordian Age - Callovian Age

This data is sourced from the British Geological Survey.

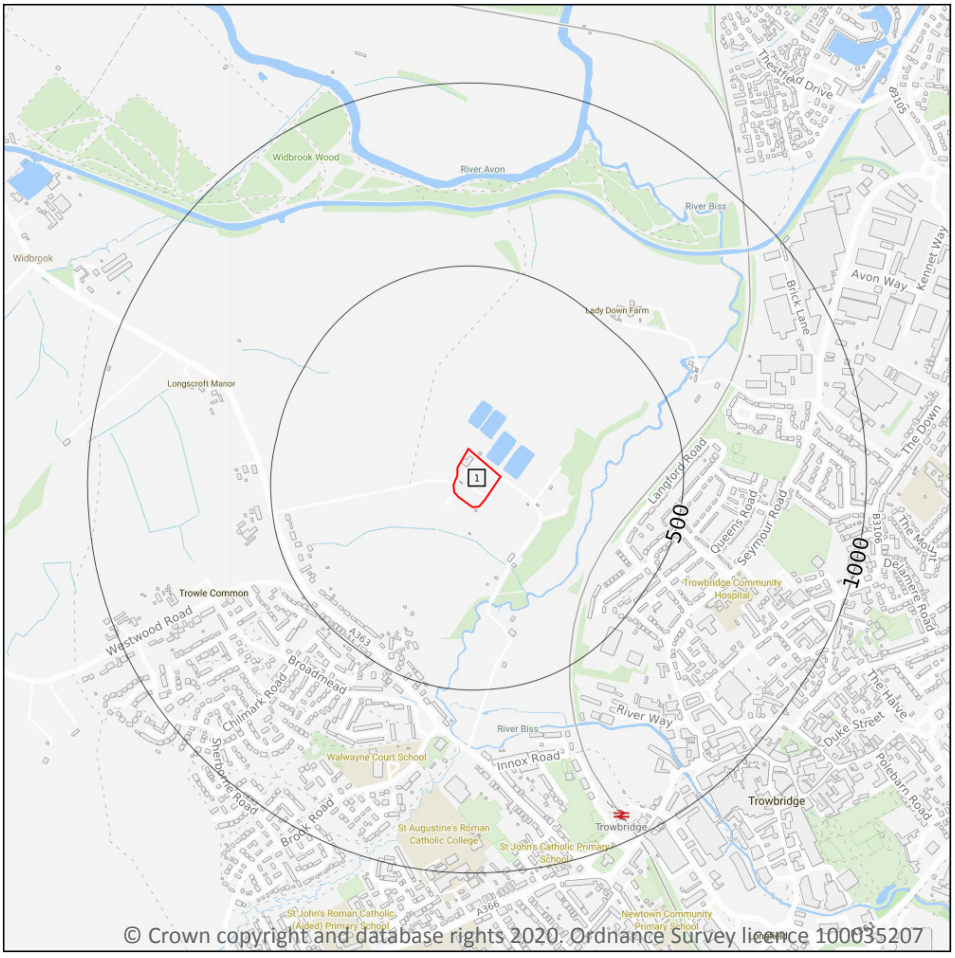
14.6 Bedrock faults and other linear features (10k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 77**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW281_frome_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

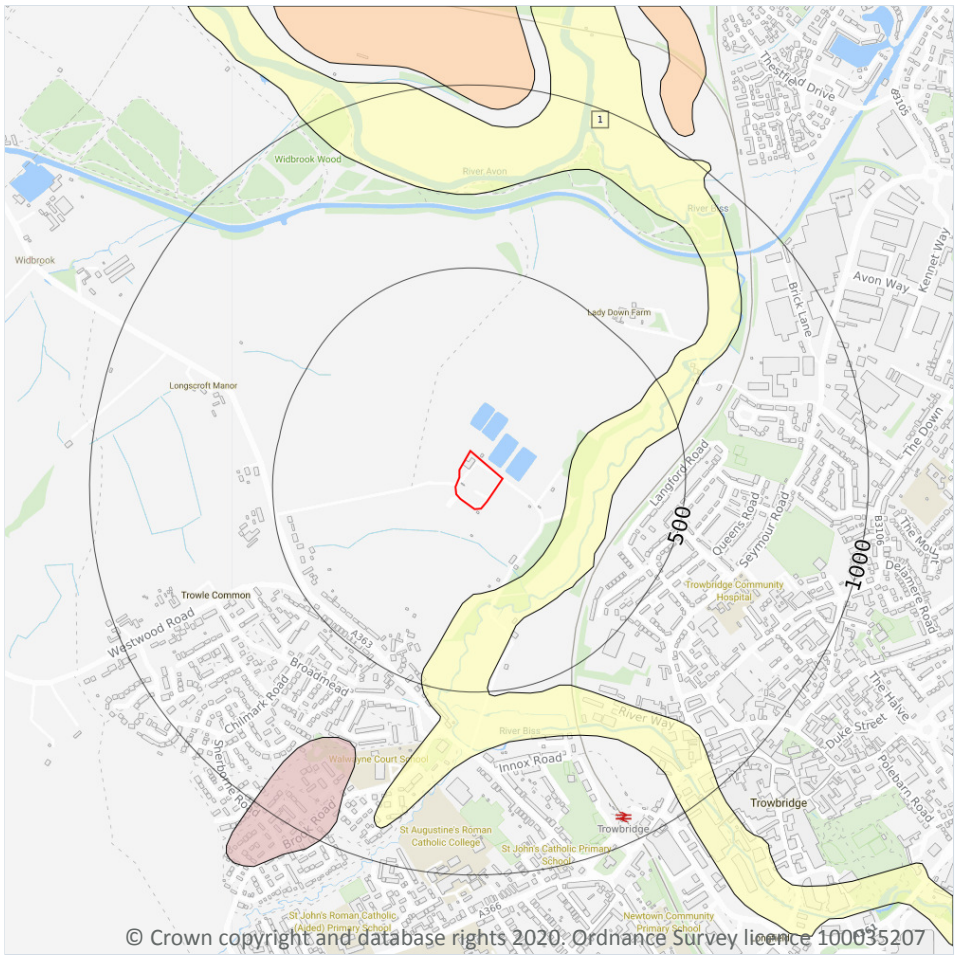
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m	1

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 79**

ID	Location	LEX Code	Description	Rock description
1	179m E	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

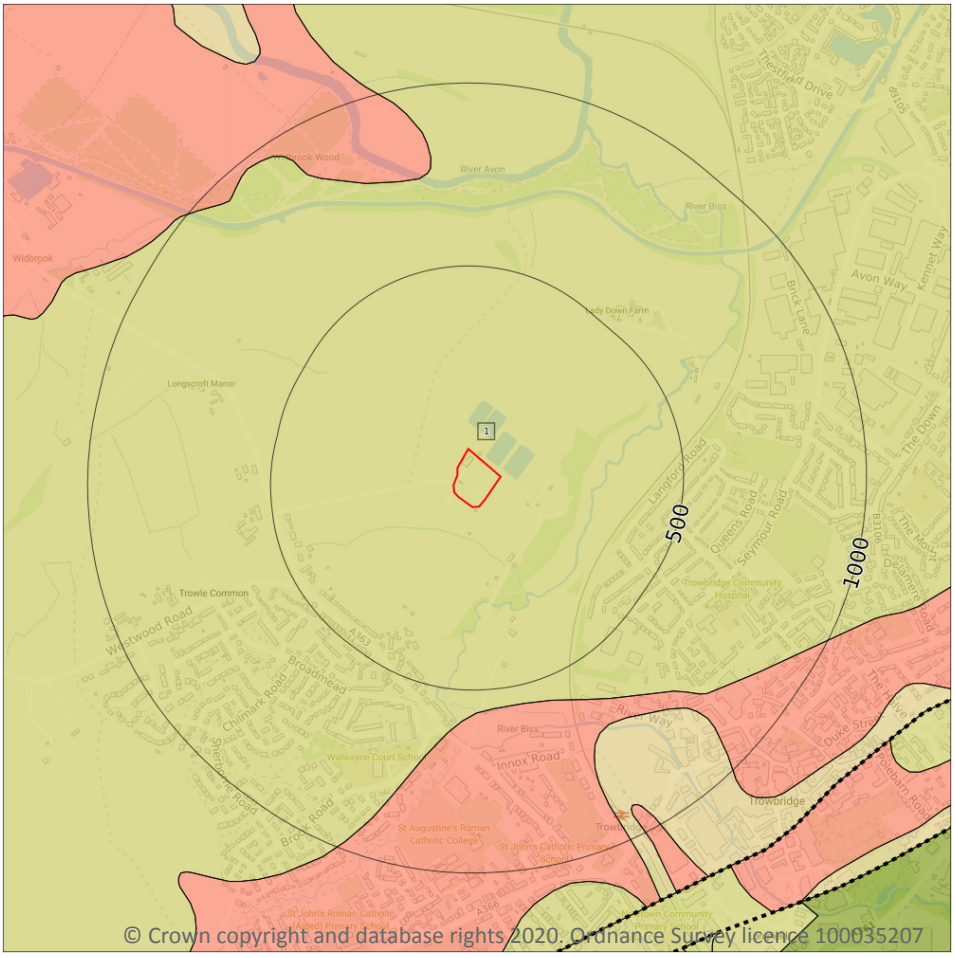
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	1

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 81**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**KLB-SAMDST**	**KELLAWAYS FORMATION - MUDSTONE, SANDY**	**CALLOVIAN**

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Low**	**Very Low**

This data is sourced from the British Geological Survey.

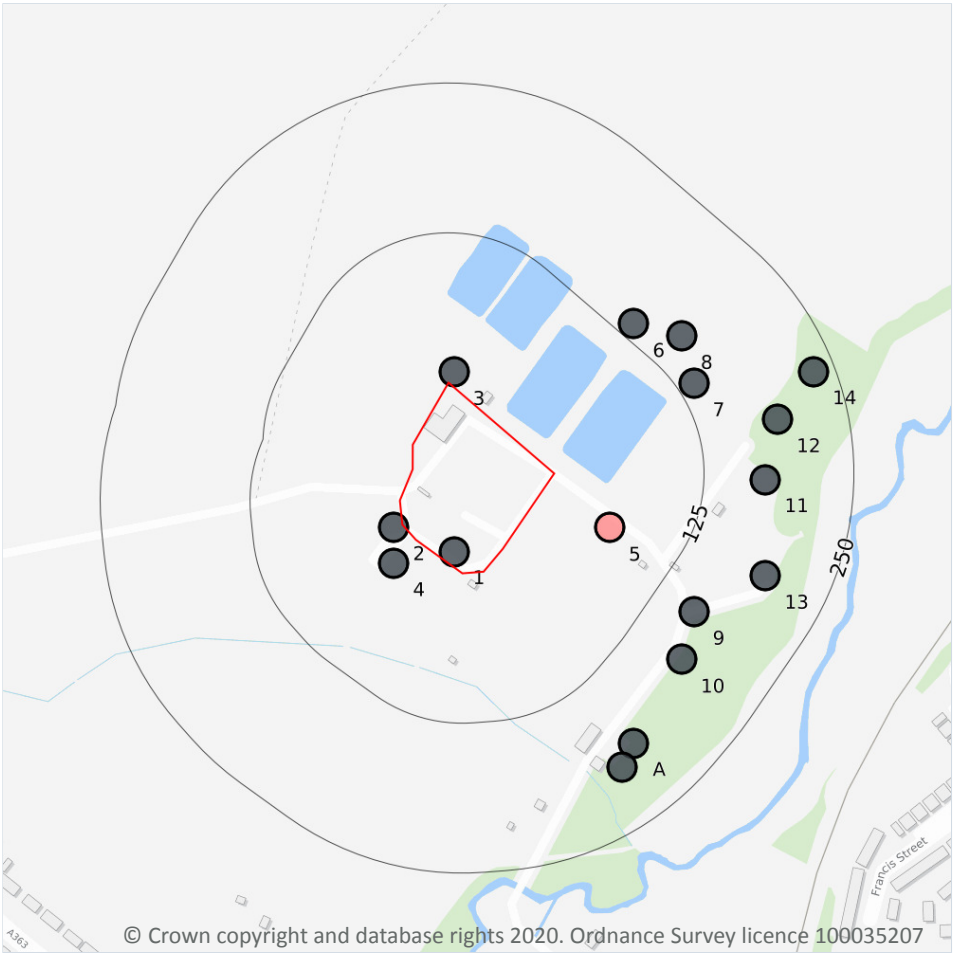
15.10 Bedrock faults and other linear features (50k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



16.1 BGS Boreholes

Records within 250m	16

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

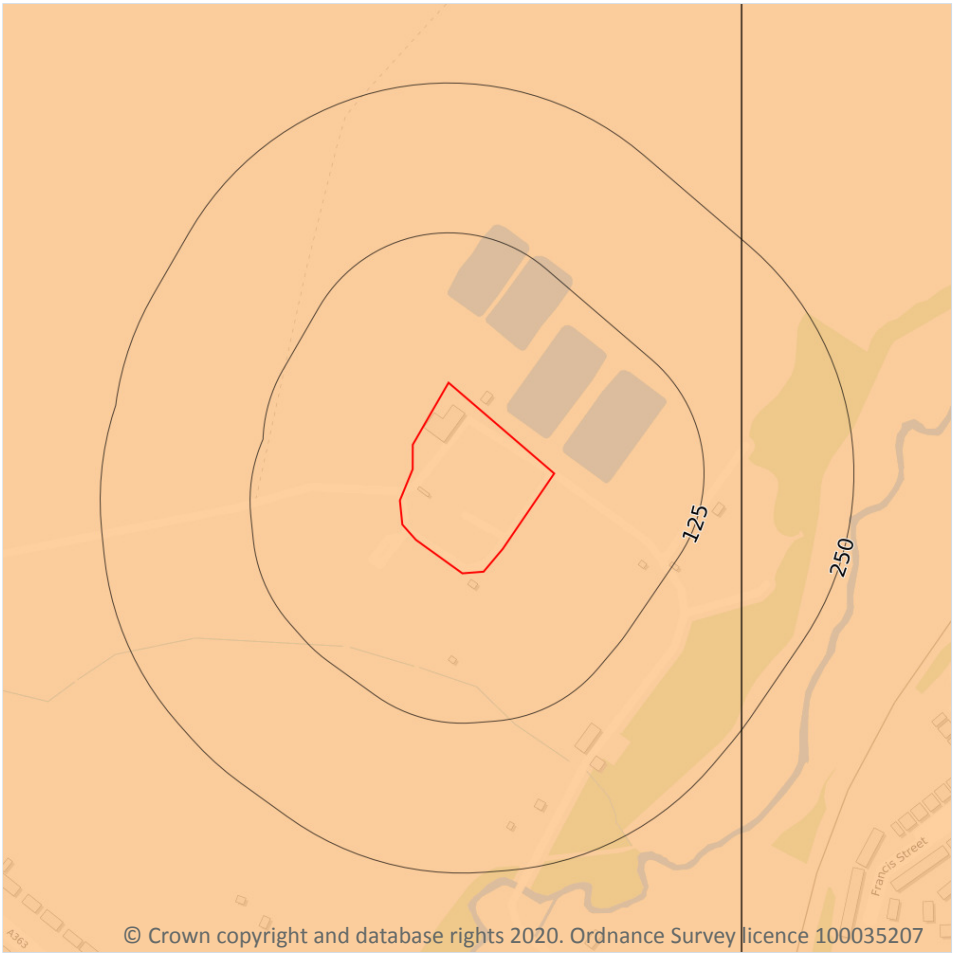
Features are displayed on the Boreholes map on **page 83**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	**On site**	**384760 158740**	**CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 14**	**-**	**Y**	**N/A**

ID	Location	Grid reference	Name	Length	Confidential	Web link
2	7m W	384710 158760	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 15	-	Y	N/A
3	10m NE	384760 158890	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 13	-	Y	N/A
4	27m SW	384710 158730	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 16	-	Y	N/A
5	64m SE	384890 158760	TROWBRIDGE SEWAGE WORKS	60.96	N	395674
6	138m NE	384910 158930	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 11	-	Y	N/A
7	138m NE	384960 158880	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 9	-	Y	N/A
8	157m NE	384950 158920	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 10	-	Y	N/A
9	161m SE	384960 158690	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 4	-	Y	N/A
10	175m SE	384950 158650	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 3	-	Y	N/A
11	176m E	385020 158800	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 6	-	Y	N/A
A	190m SE	384910 158580	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 2	-	Y	N/A
12	192m E	385030 158850	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 7	-	Y	N/A
13	196m SE	385020 158720	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 5	-	Y	N/A
A	200m SE	384900 158560	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 1	-	Y	N/A
14	232m E	385060 158890	CONTAMINATED LAND IMPROVEMENT REVIEW TROWBRIDGE STW 8	-	Y	N/A

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	1

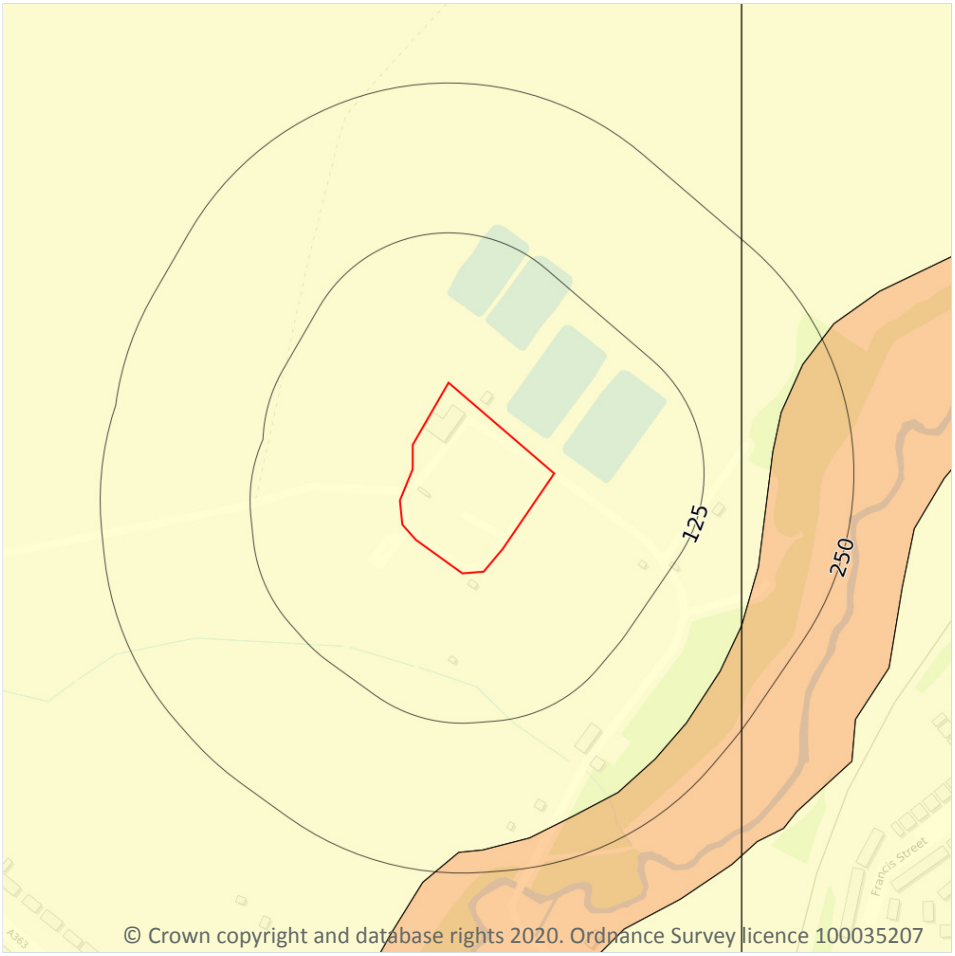
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 85**

Location	Hazard rating	Details
On site	**Low**	**Ground conditions predominantly medium plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	1

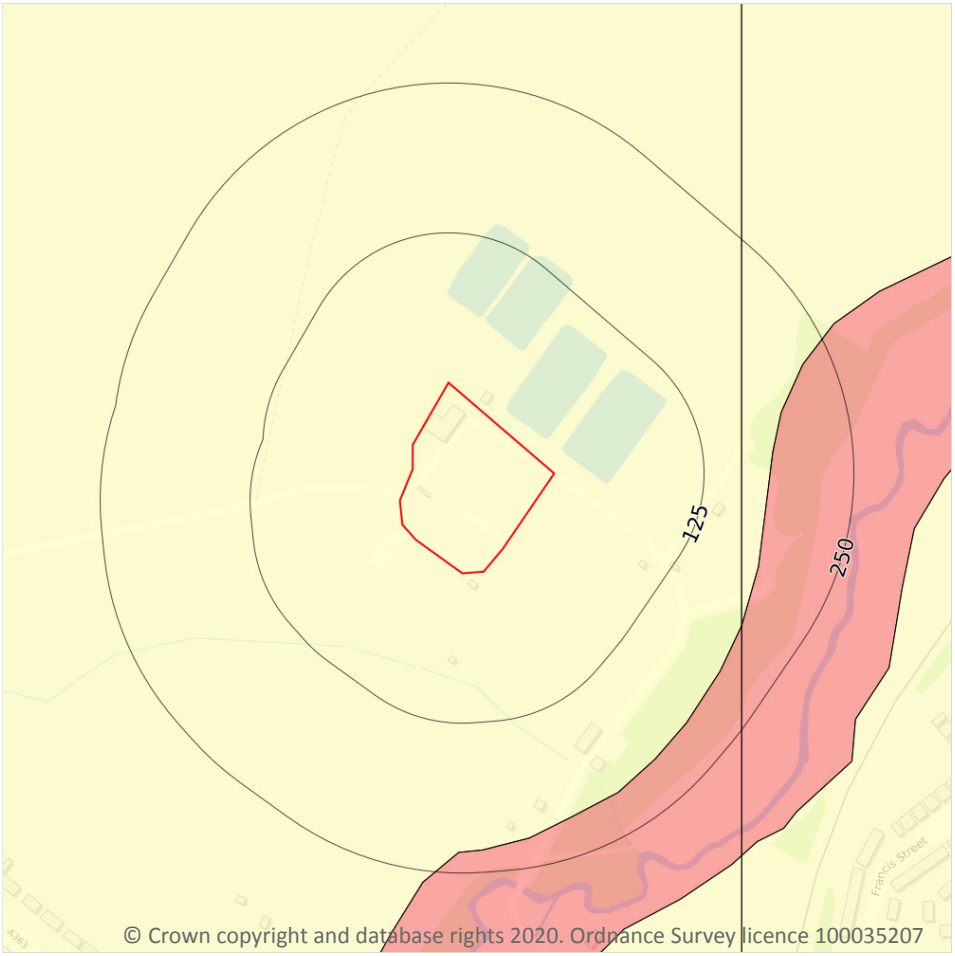
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 86**

Location	Hazard rating	Details
On site	**Negligible**	**Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	1

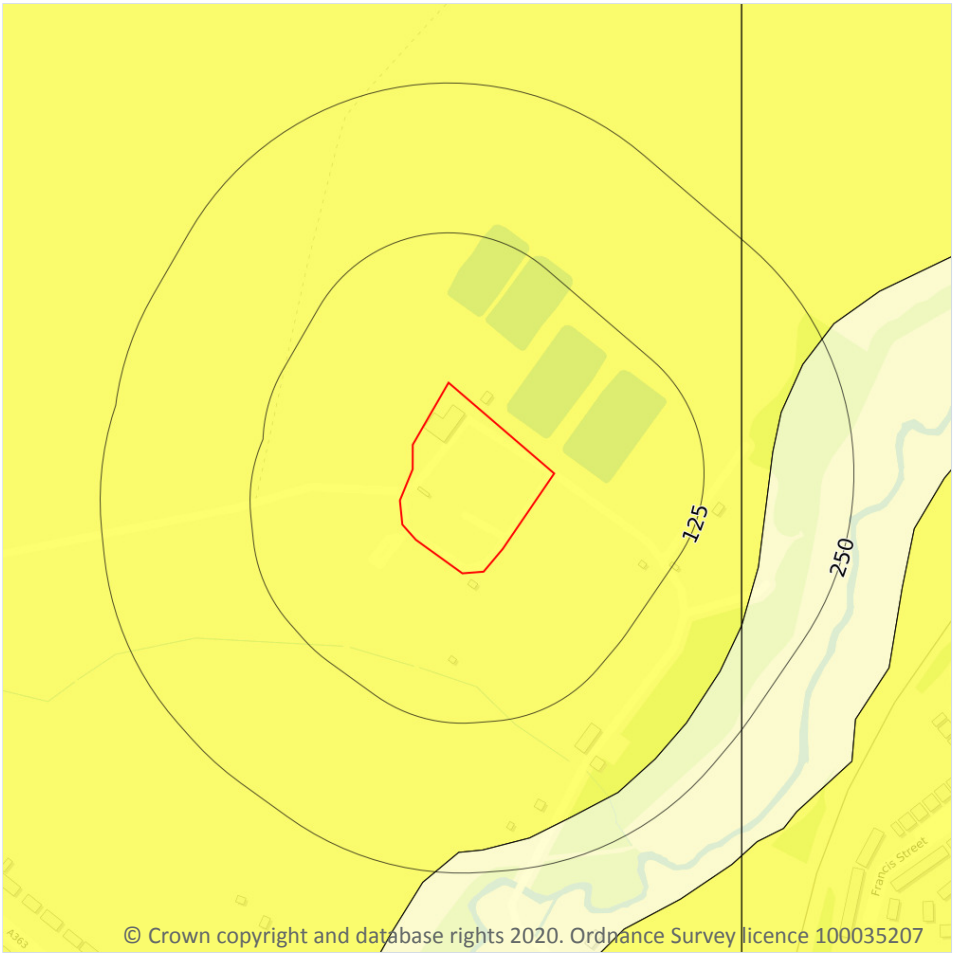
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 87**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

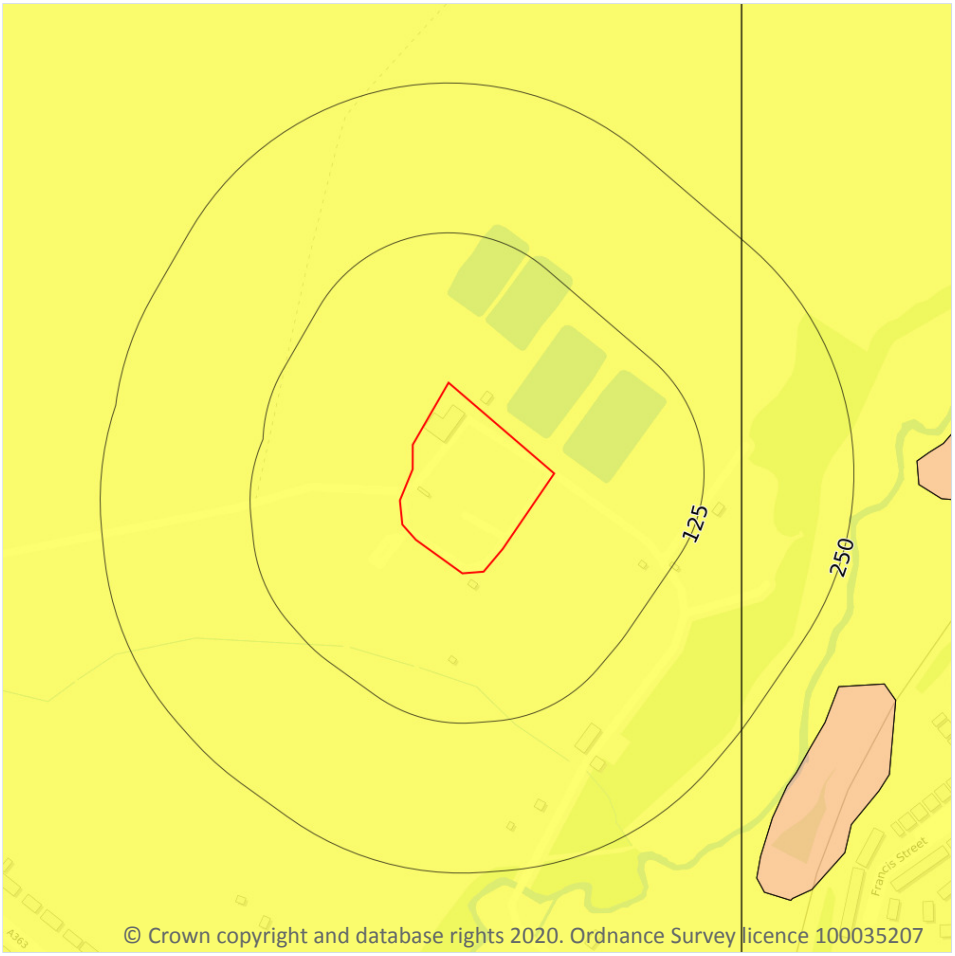
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 88**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

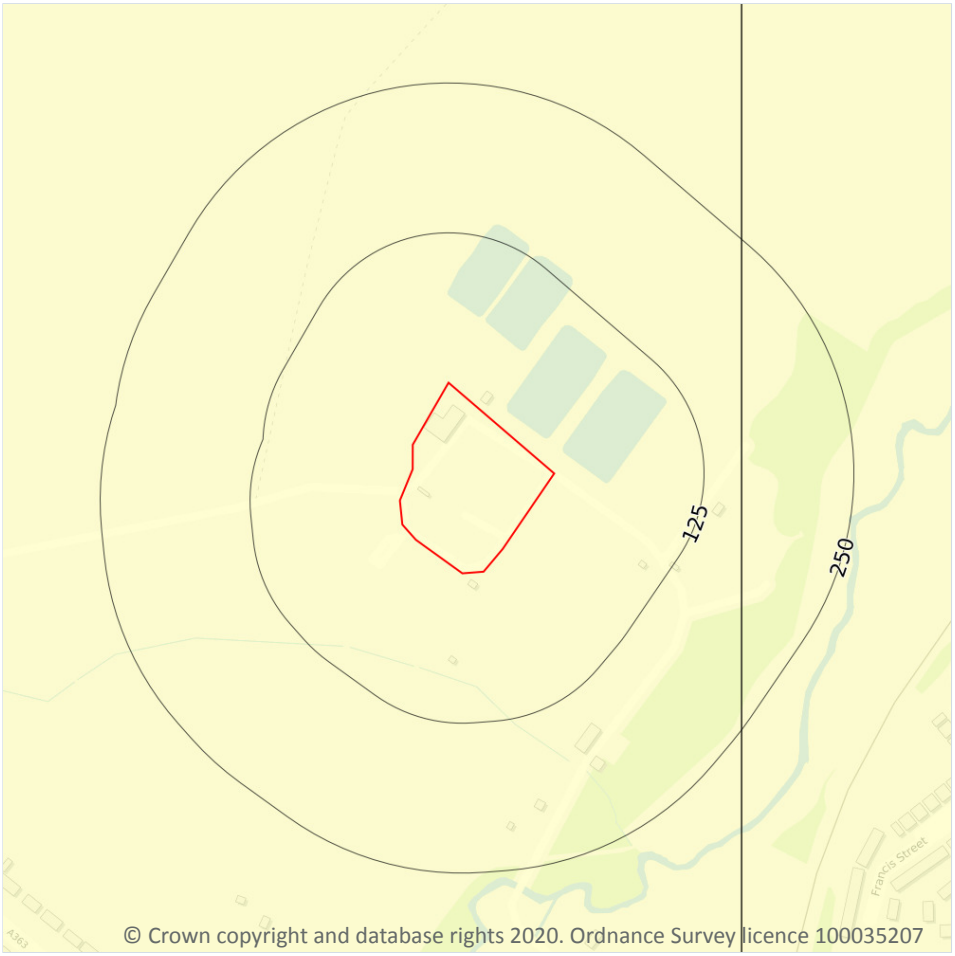
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 89**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

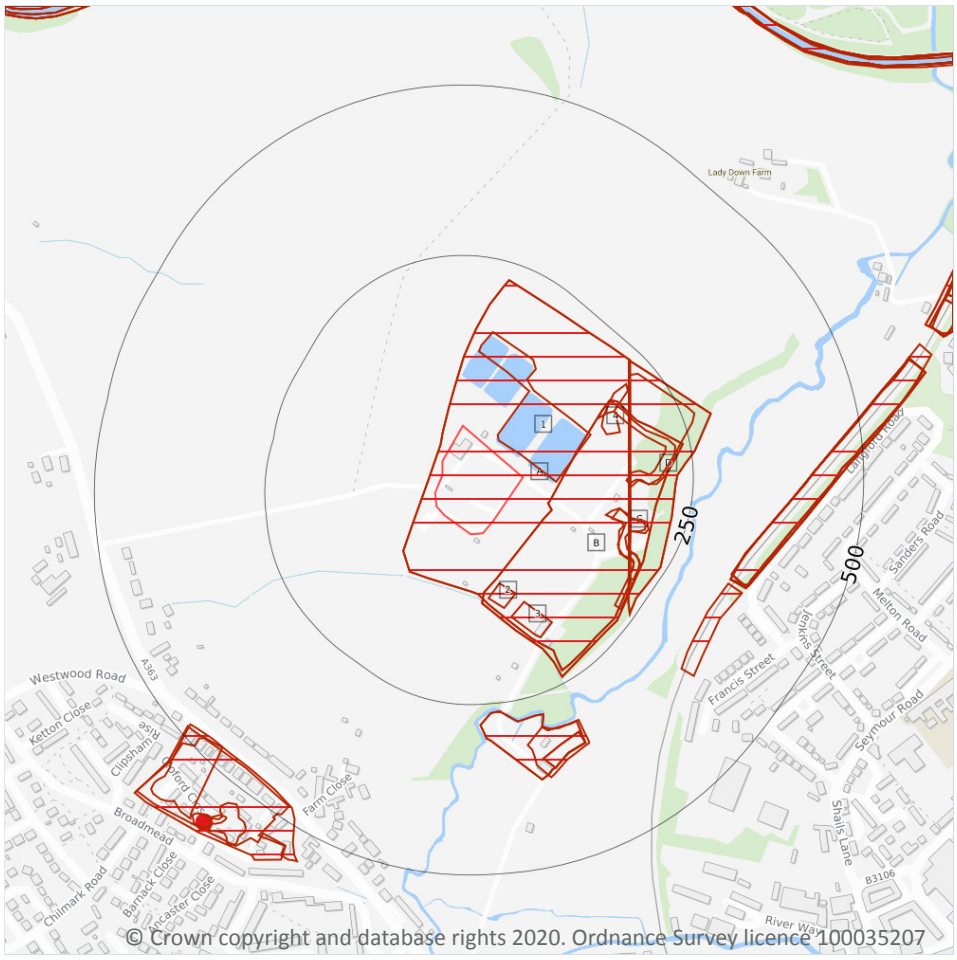
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 90**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Peter Brett Associates (PBA).

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	16

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 92**

ID	Location	Land Use	Year of mapping	Mapping scale
A	**On site**	**Sewage Works**	**1985**	**1:10000**
A	**On site**	**Sewage Works**	**1974**	**1:10000**
1	18m NE	Ponds	1985	1:10000
B	51m SE	Sewage Works	1939	1:10560
B	51m SE	Sewage Works	1922	1:10560
2	77m S	Filler Tanks	1939	1:10560
3	117m SE	Filter Tanks	1939	1:10560
C	134m SE	Unspecified Heap	1939	1:10560
4	138m NE	Refuse Heap	1956	1:10560
D	141m NE	Unspecified Heap	1939	1:10560
C	144m SE	Refuse Heap	1956	1:10560
D	156m E	Sewage Works	1987	1:10000
D	156m E	Sewage Works	1973	1:10000
D	157m E	Refuse Heap	1956	1:10560
C	167m E	Refuse Heap	1956	1:10560
C	193m SE	Unspecified Ground Workings	1956	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Peter Brett Associates (PBA).

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

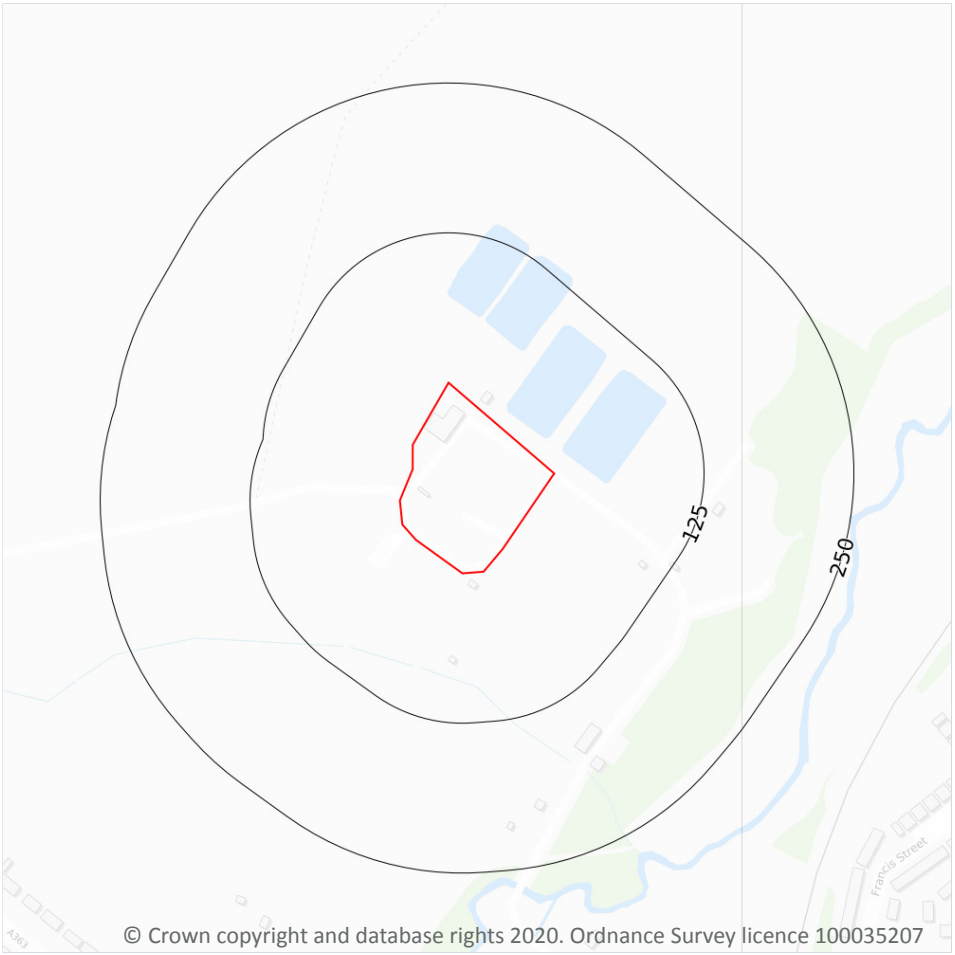
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 96**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None****

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	1

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

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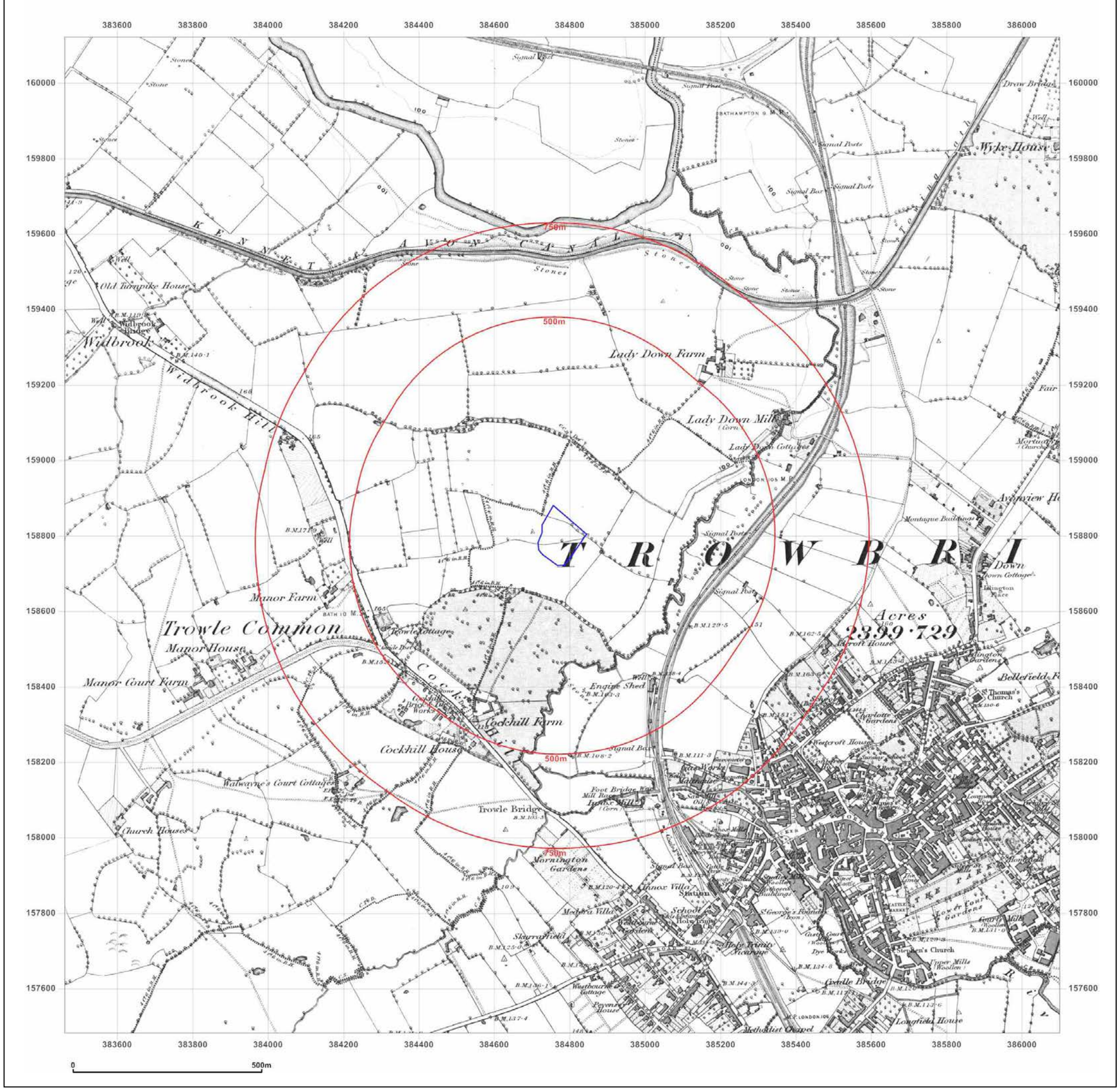
Appendix B Historical mapping – small scale



Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: County Series

Map date: **1886**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1886
Revised 1886
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 09 December 2020

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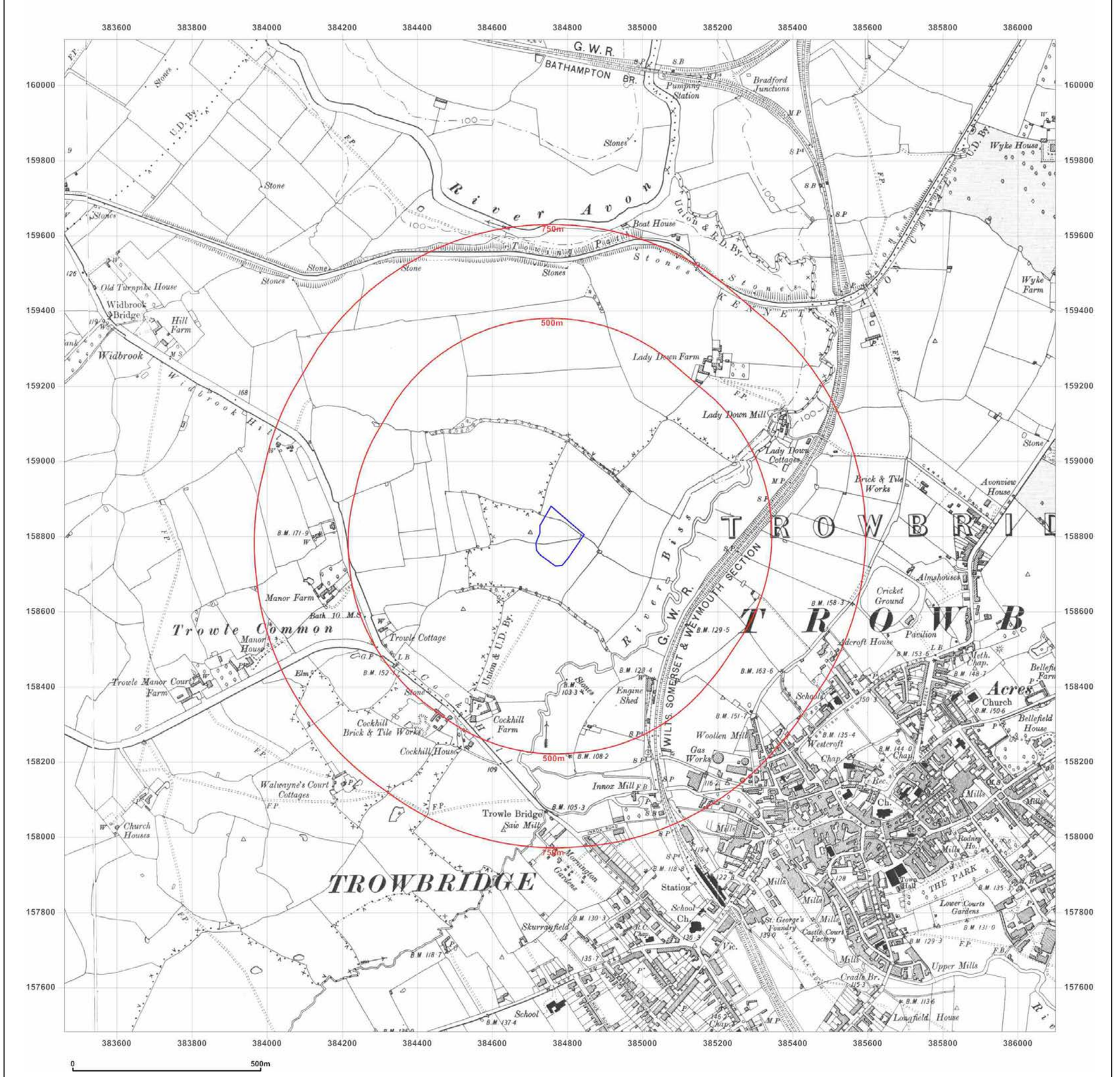

Groundsure INSIGHTS

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158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: County Series

Map date: **1899**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1884
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1885
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

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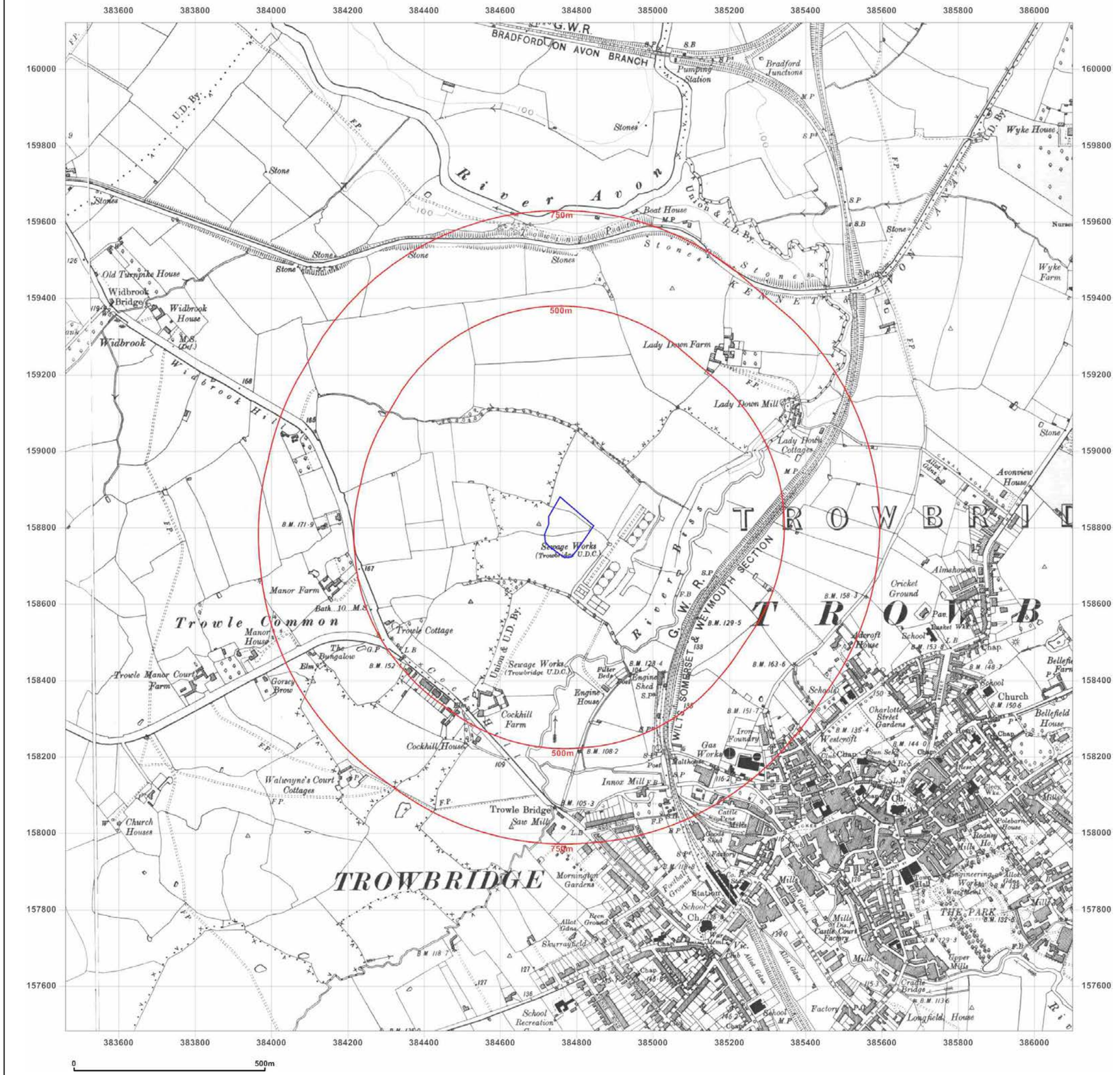

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384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: County Series

Map date: **1922**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1884
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1885
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

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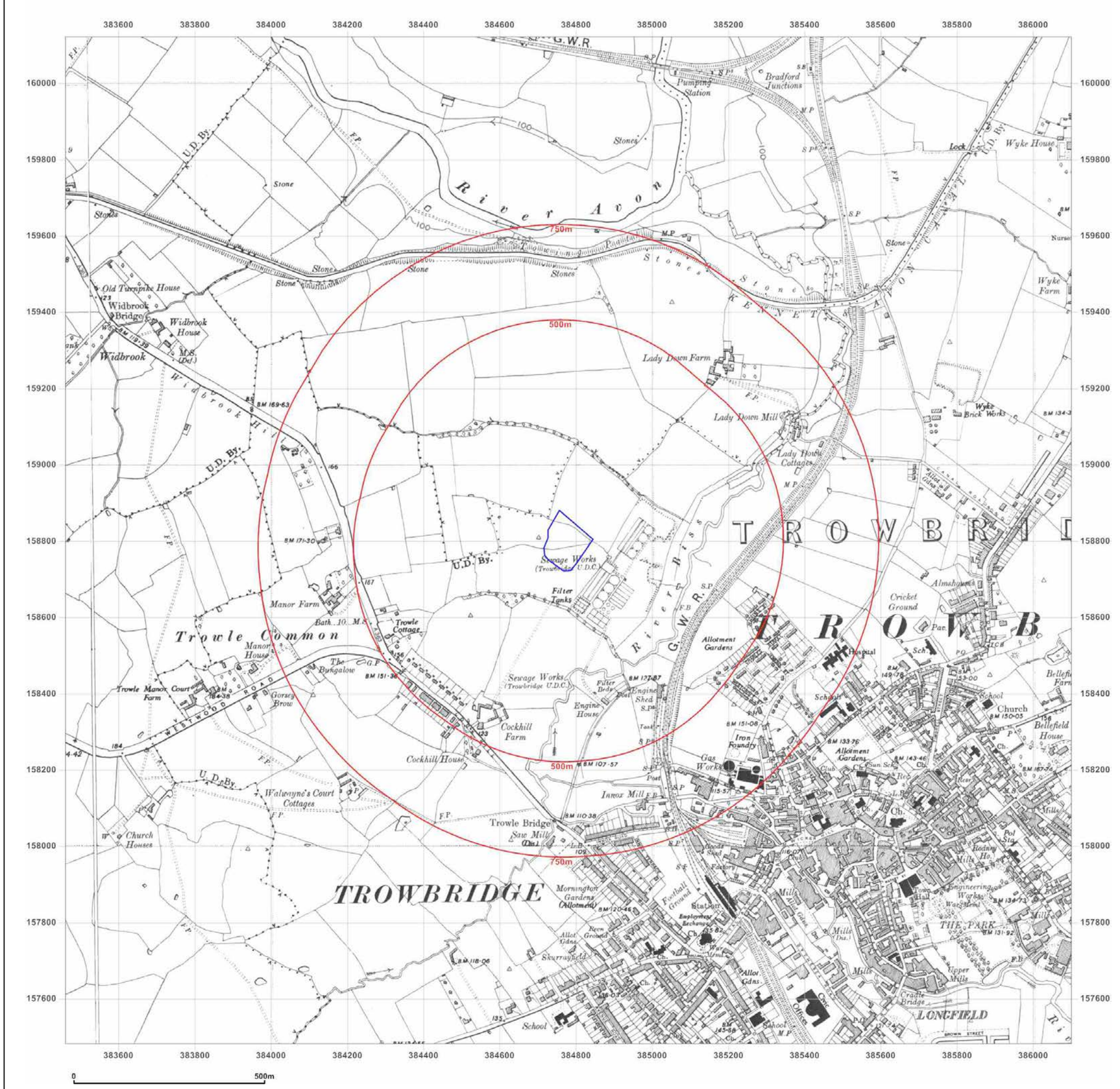

Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: County Series

Map date: **1938-1939**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1884
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1885
Revised 1939
Edition N/A
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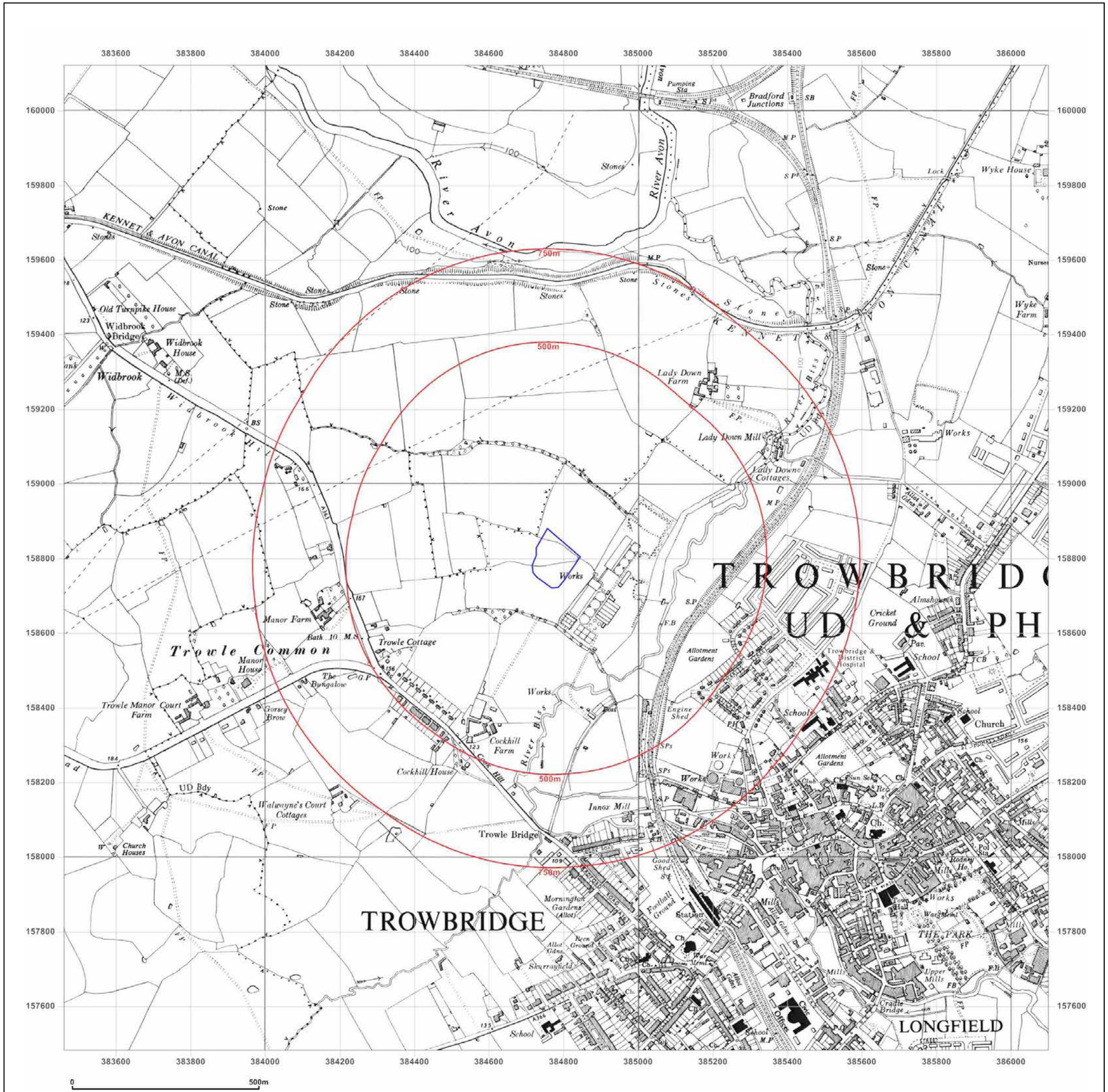

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Site Details:

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Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: Provisional

Map date: **1956-1960**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1956
Revised 1956
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised 1960
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1956
Revised 1956
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1956
Revised 1956
Edition N/A
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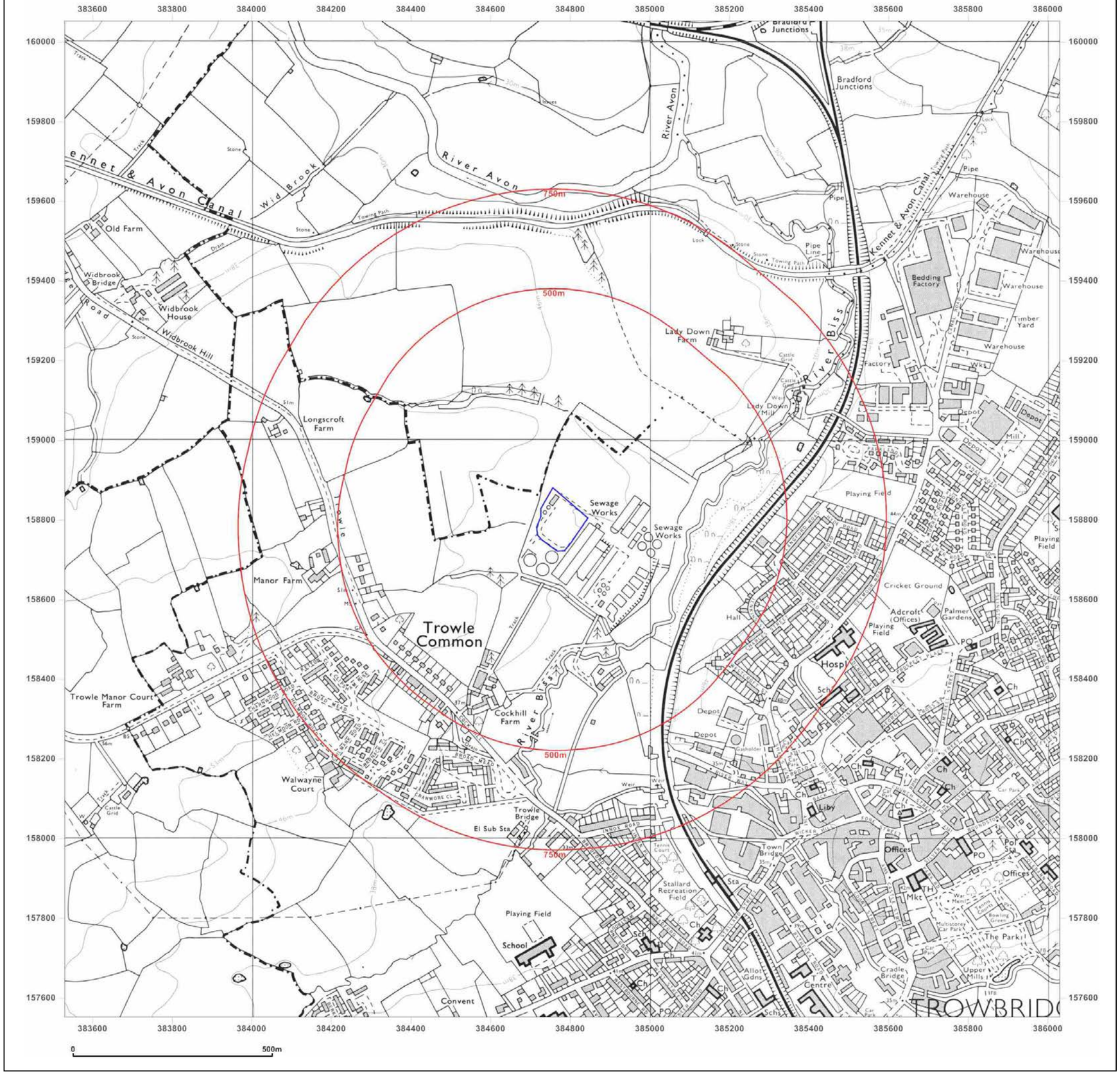

Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: National Grid

Map date: **1974-1977**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1973
Revised 1976
Edition N/A
Copyright 1977
Levelled N/A

Surveyed 1972
Revised 1976
Edition N/A
Copyright 1976
Levelled N/A

Surveyed 1973
Revised 1974
Edition N/A
Copyright 1974
Levelled N/A

Surveyed 1971
Revised 1974
Edition N/A
Copyright 1975
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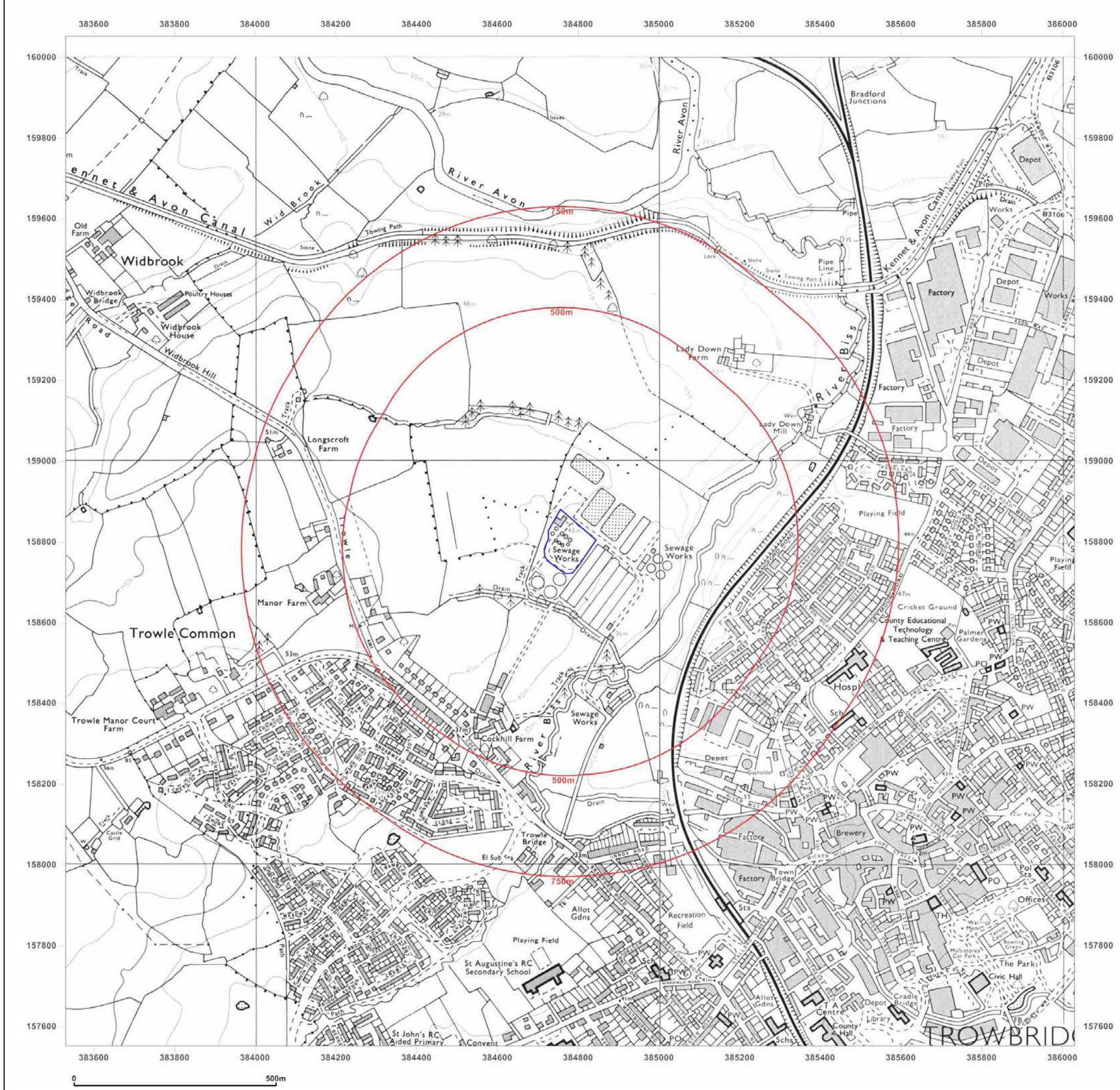

Groundsure INSIGHTS

Site Details:

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158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: National Grid

Map date: **1985-1987**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1983
Revised 1985
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1979
Revised 1987
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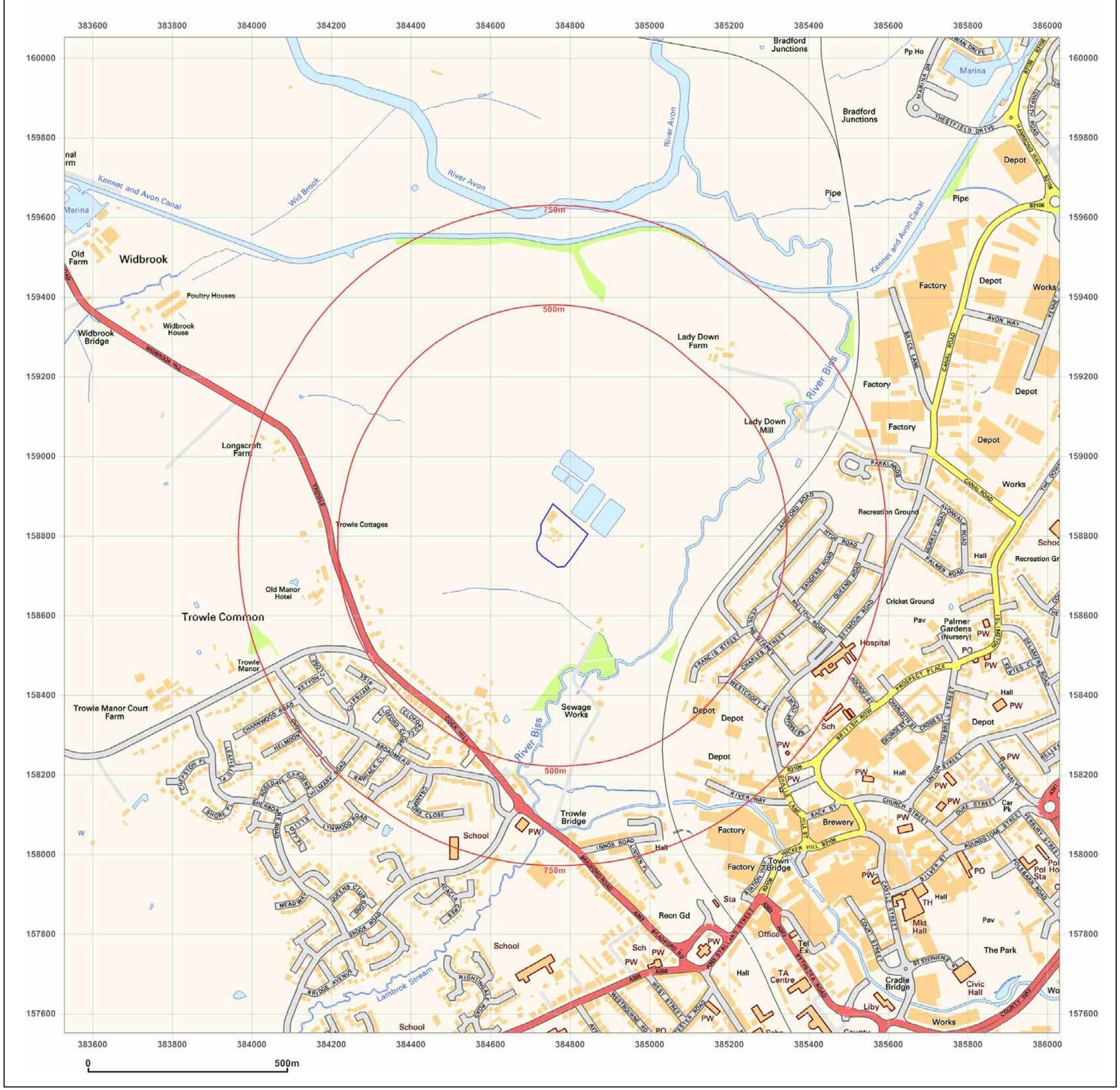

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Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

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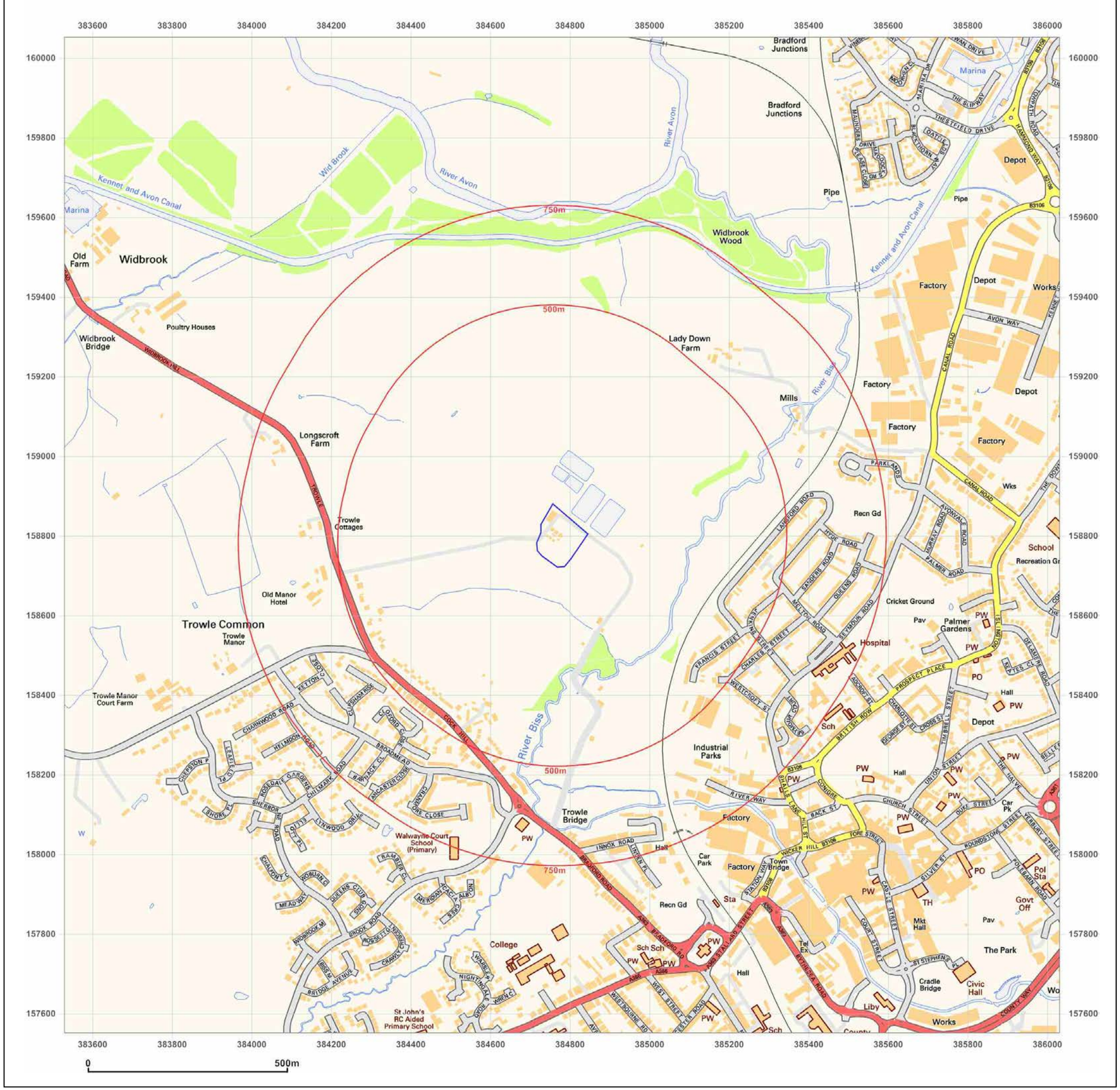

Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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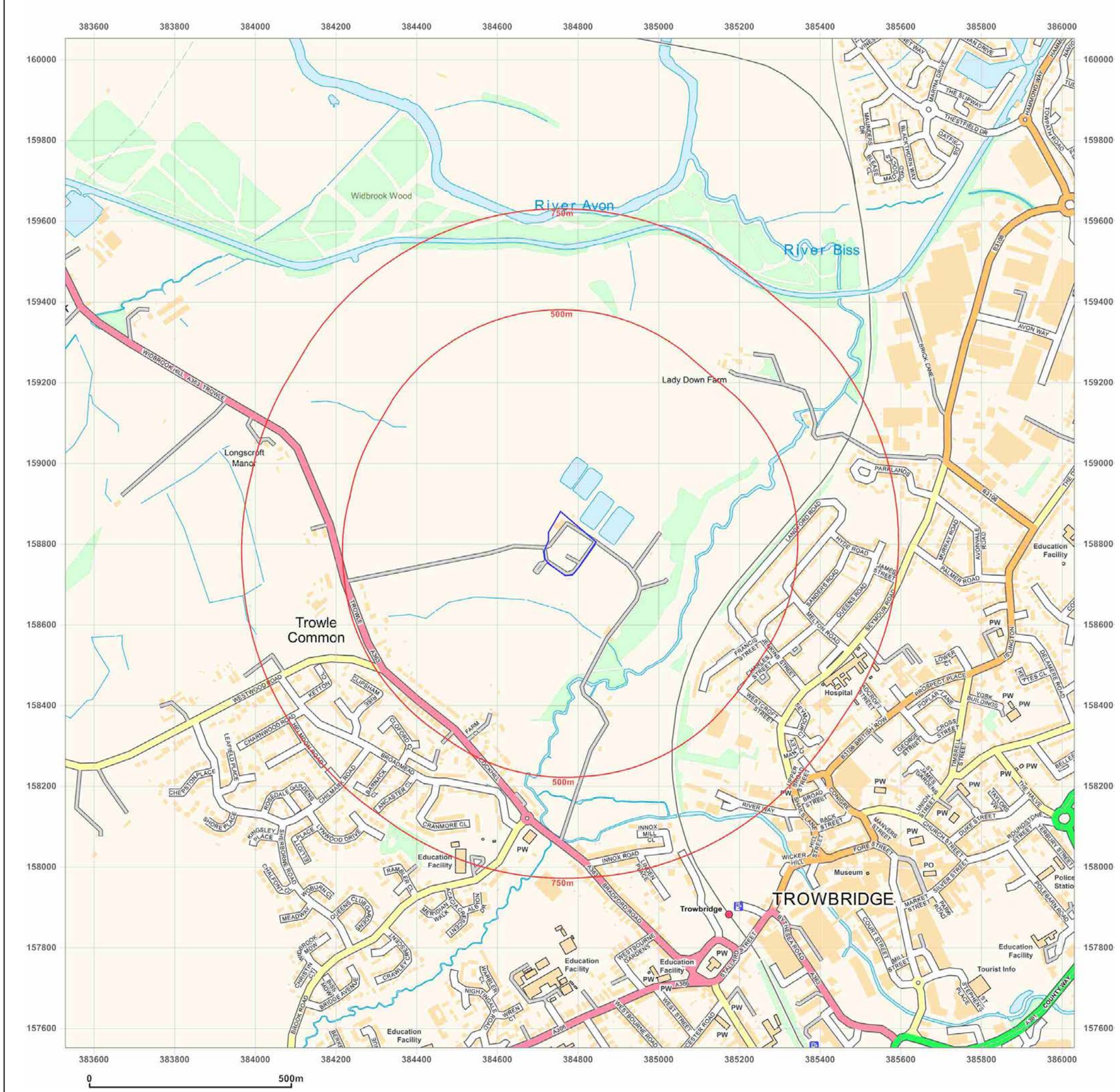

Groundsure INSIGHTS

Site Details:

384772.0154246649, 158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: National Grid

Map date: **2020**

Scale: 1:10,000

Printed at: 1:10,000

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Production date: 09 December 2020

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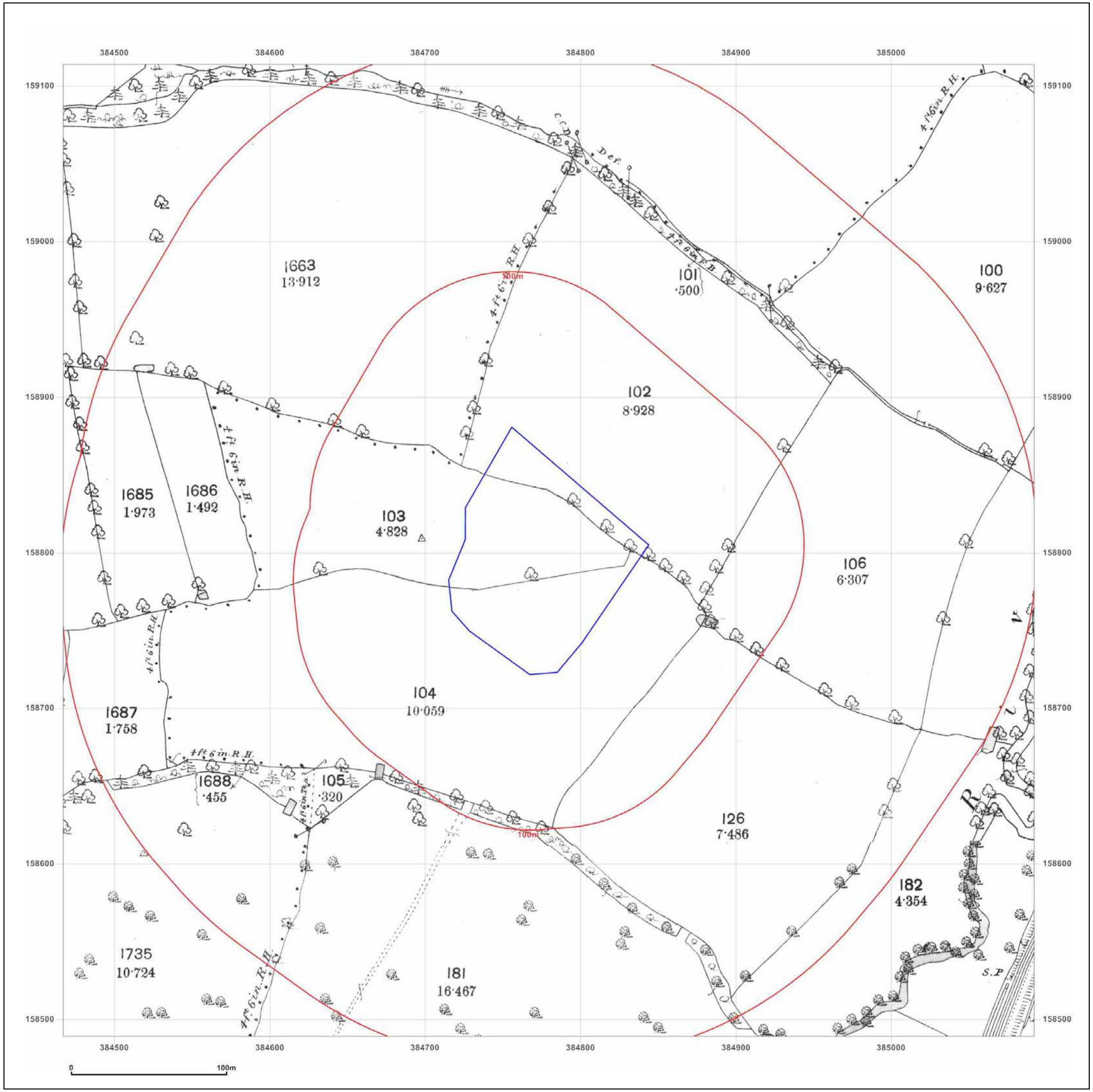
Appendix C Historical Mapping – large scale



Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: County Series

Map date: **1887-1888**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1887
Revised 1887
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 09 December 2020

Map legend available at:
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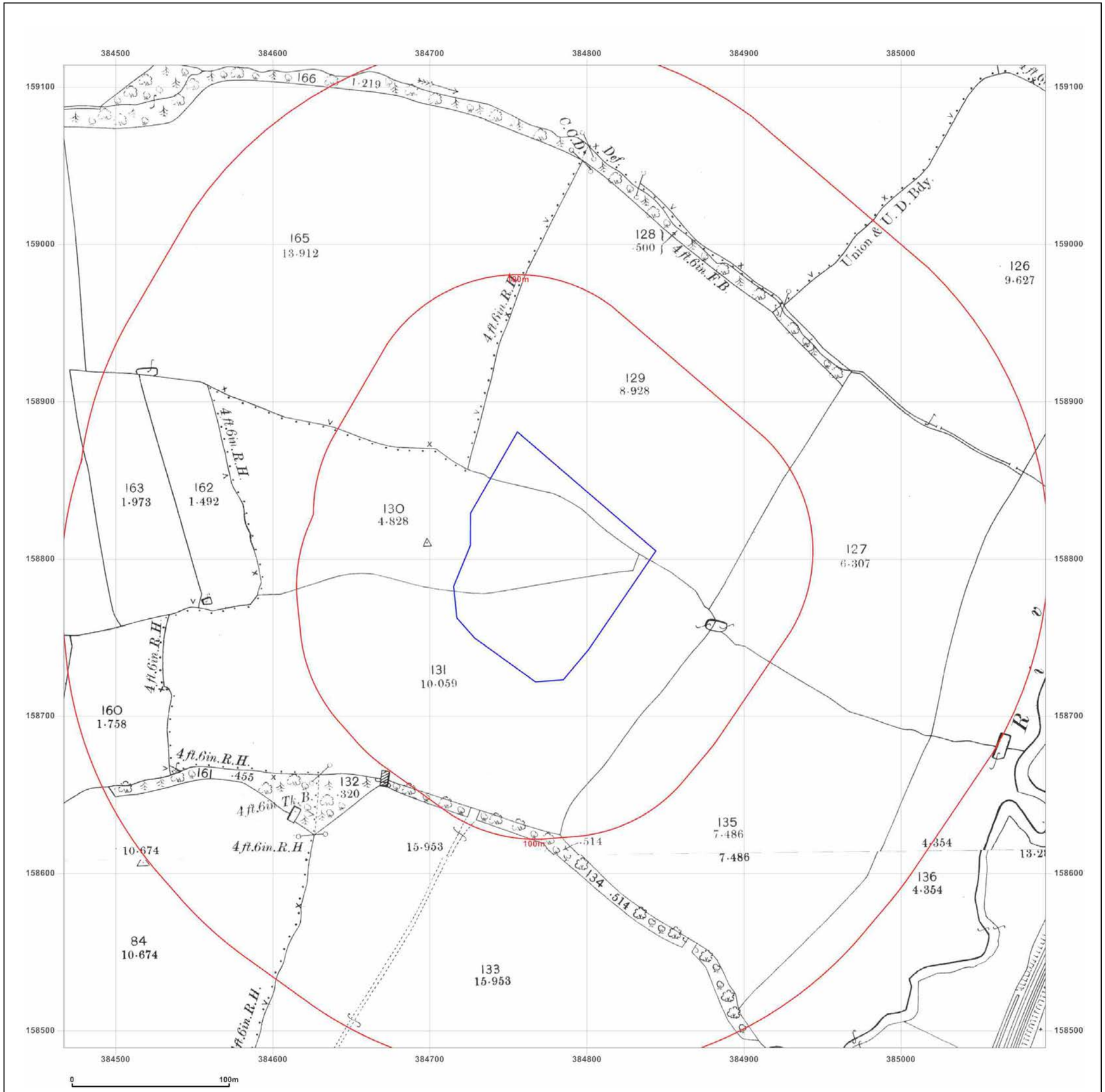

Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: County Series

Map date: **1901**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1901
Revised 1901
Edition N/A
Copyright N/A
Levelled N/A

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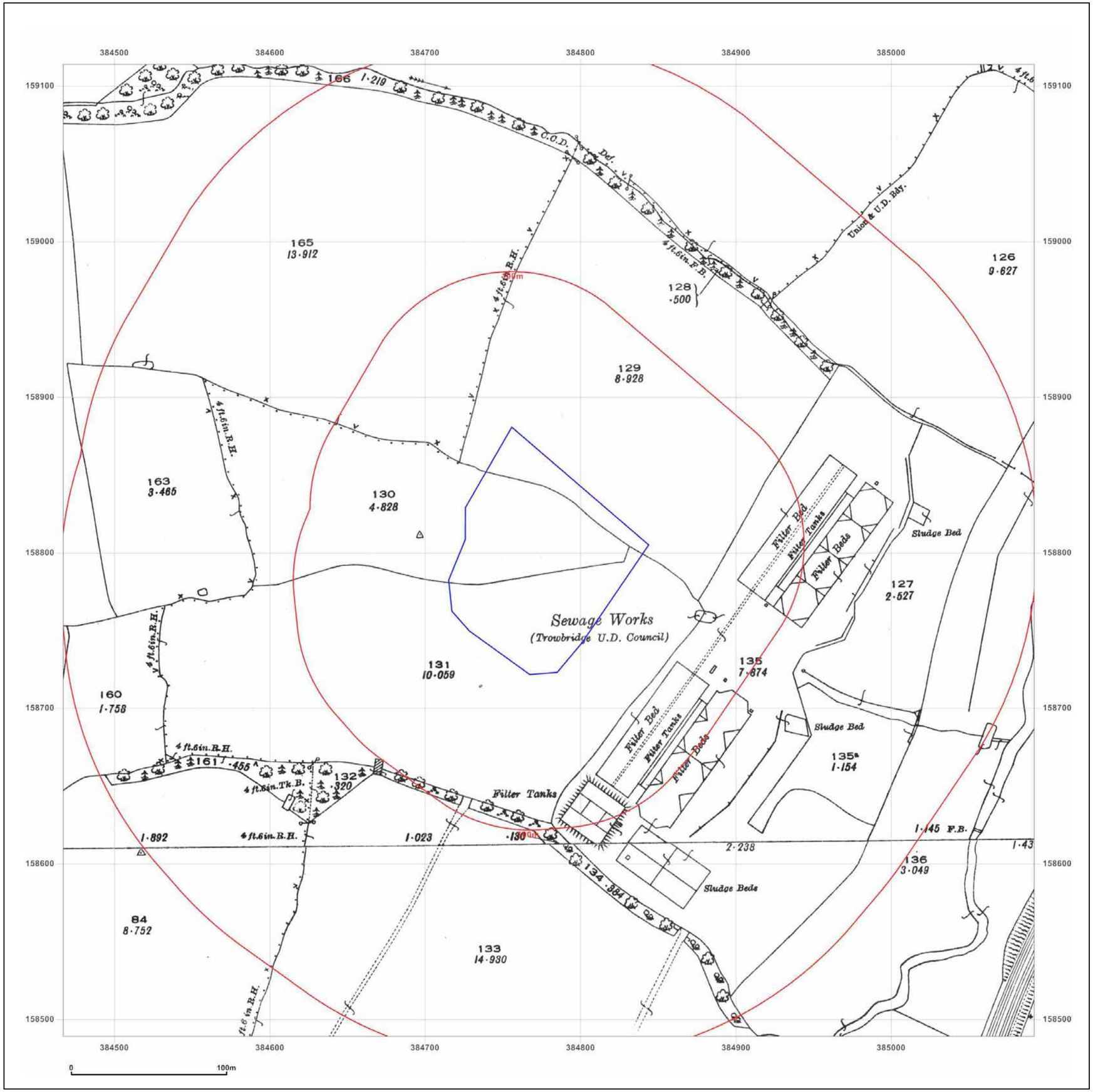
Production date: 09 December 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: County Series

Map date: **1924**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1924
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1924
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

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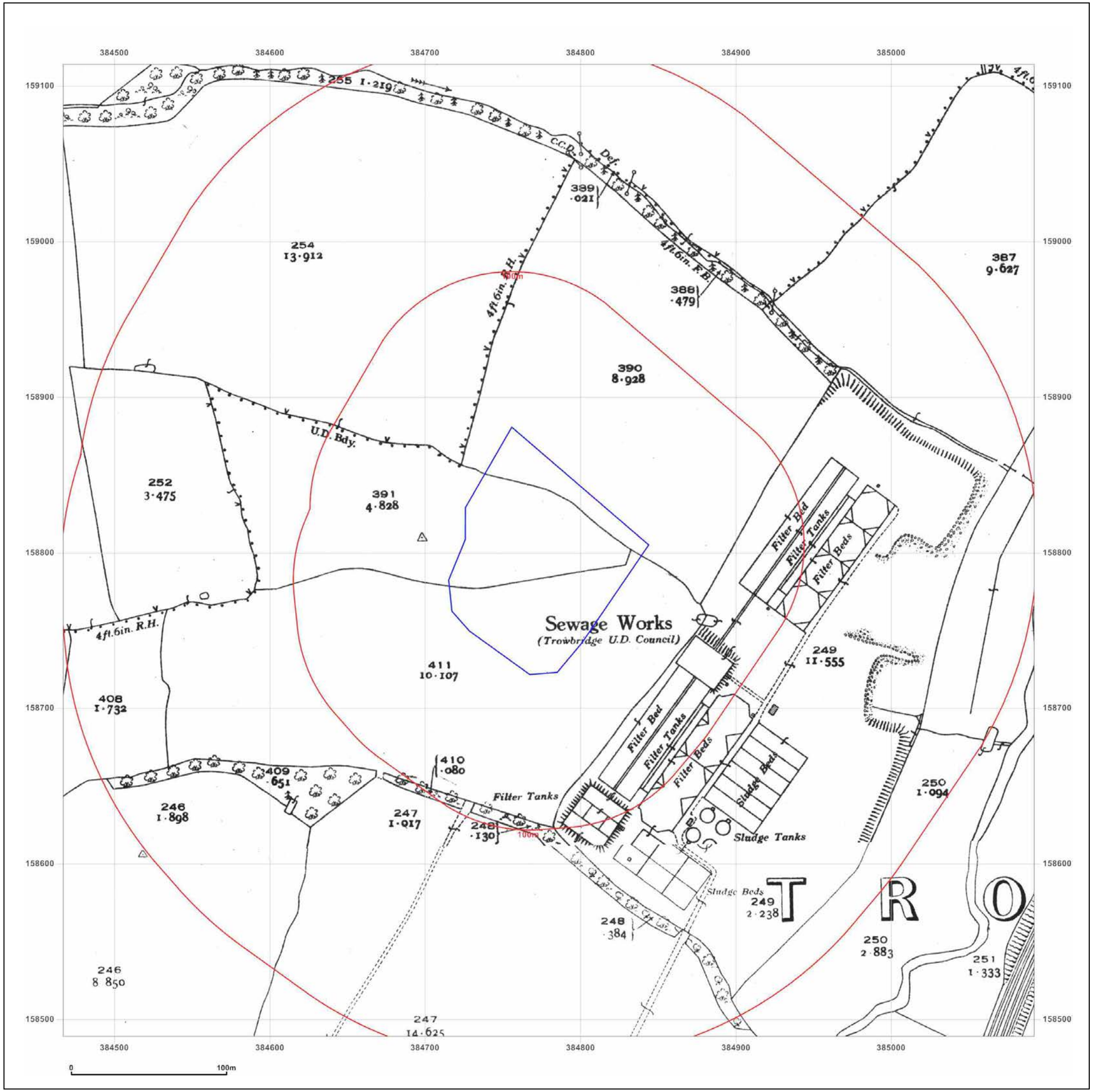
W: www.groundsure.com

Production date: 09 December 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: County Series

Map date: **1936-1939**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1939
Revised 1939
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1936
Revised 1936
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 09 December 2020

Map legend available at:
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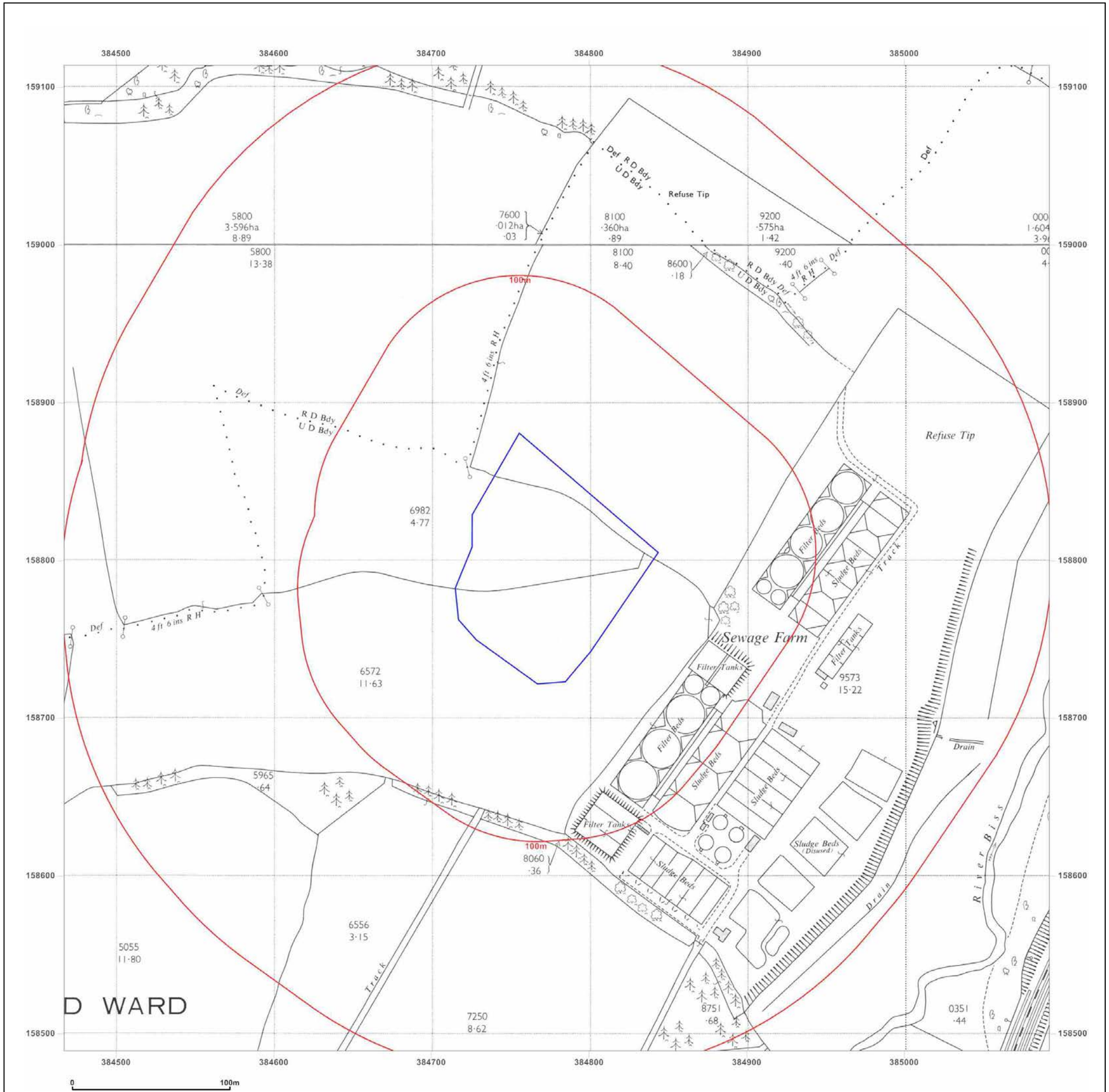

Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: National Grid

Map date: **1968-1971**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1971
Revised 1971
Edition N/A
Copyright 1972
Levelled 1957

Surveyed 1968
Revised 1968
Edition N/A
Copyright 1969
Levelled 1957

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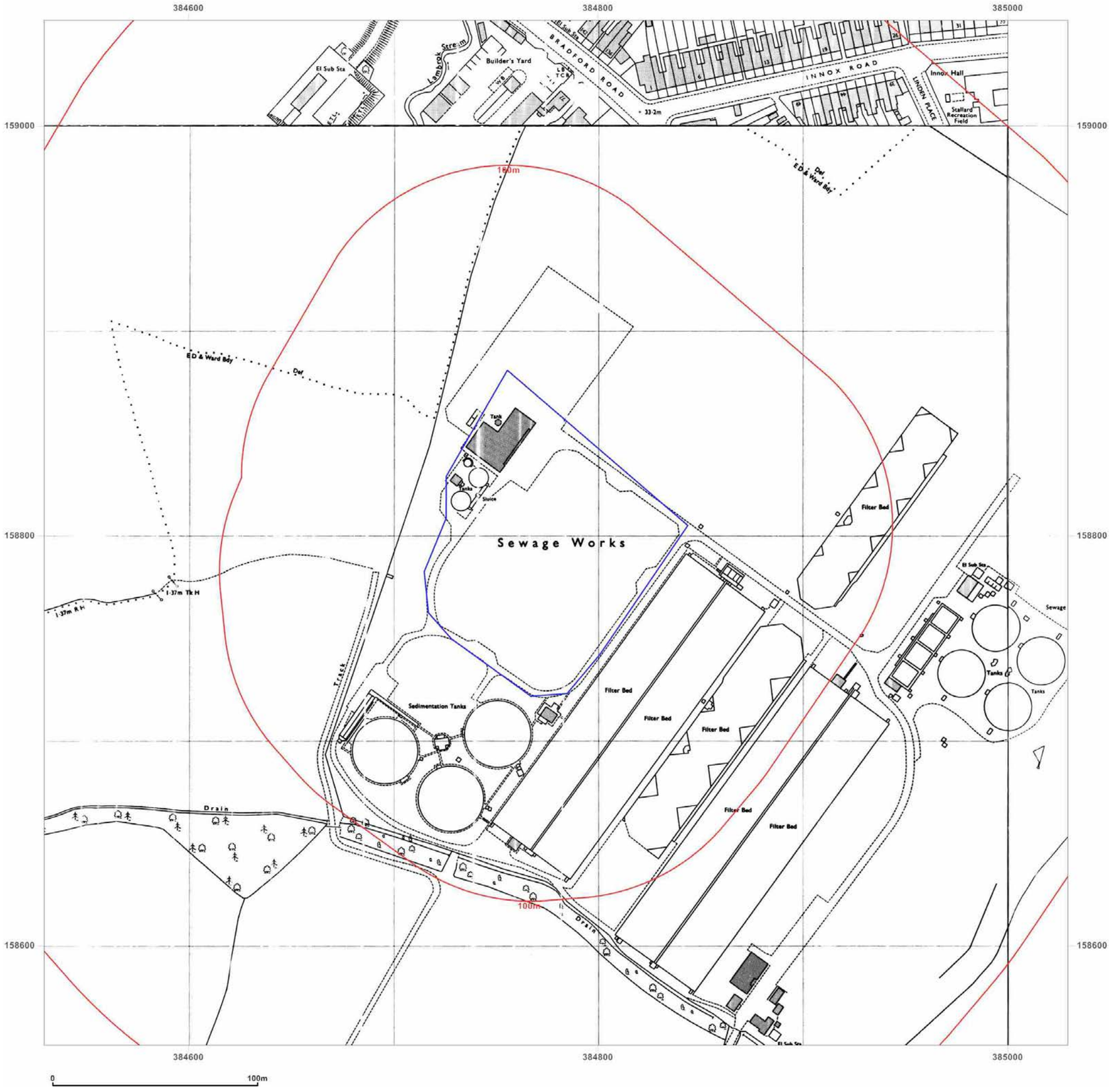
Production date: 09 December 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: National Grid

Map date: **1979**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Produced by
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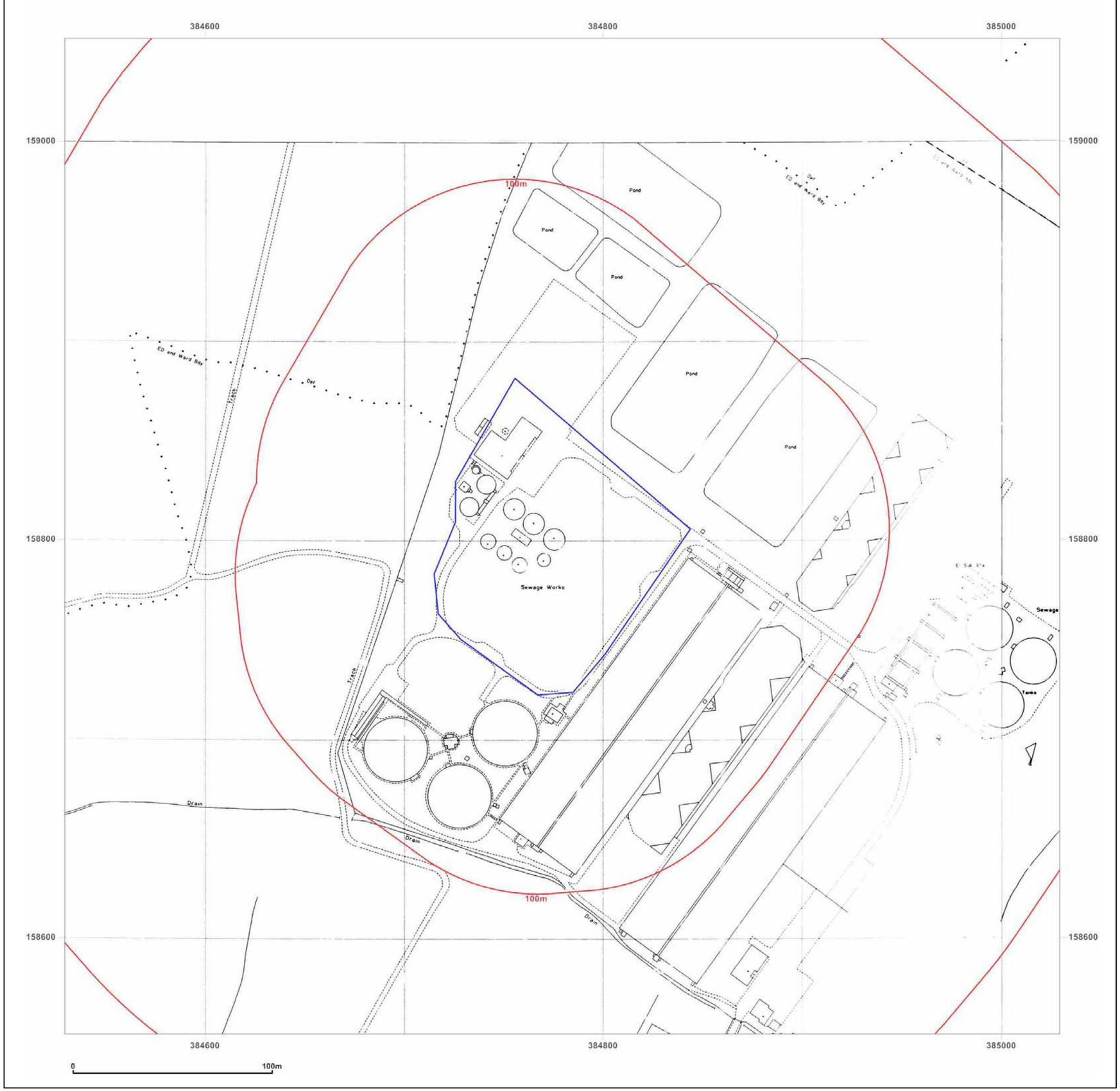
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 09 December 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: National Grid

Map date: **1993**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

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Production date: 09 December 2020

Map legend available at:
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Groundsure INSIGHTS

Site Details:

384772.0154246649,
158795.5172587785

Client Ref: EPL000376
Report Ref: GS-7354641
Grid Ref: 384779, 158801

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

N
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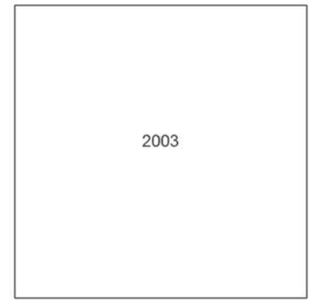

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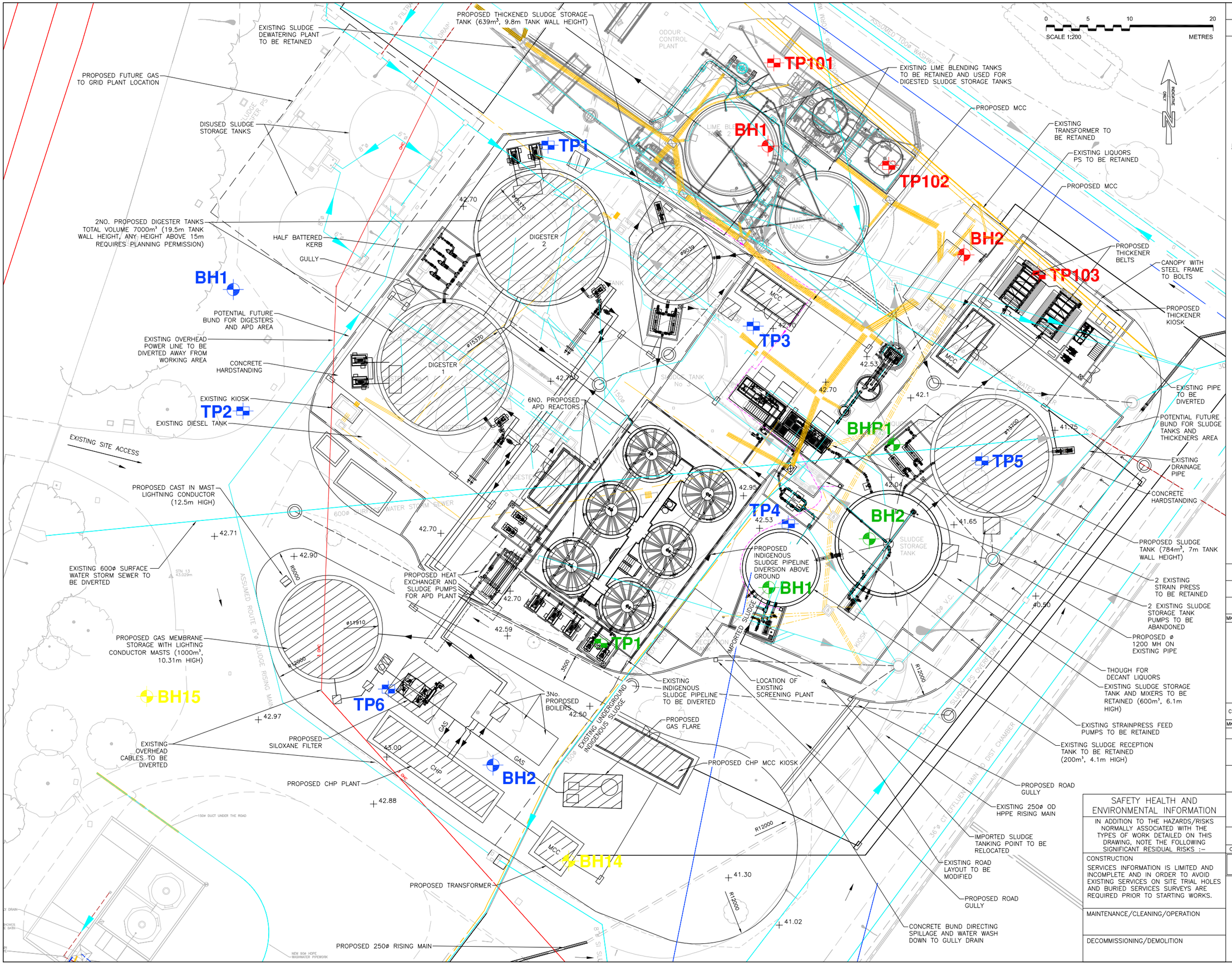
W: www.groundsure.com

Production date: 09 December 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

Appendix D Borehole logs



SITE ID	13318
NGR	ST 84894 58775

NOTES

1. ANY MAPS SHOWN ON THIS DRAWING ARE REPRODUCED FROM THE ORDNANCE SURVEY MAP WITH THE PERMISSION OF HER MAJESTY'S STATIONERY OFFICE © CROWN COPYRIGHT
2. UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETRES & ALL LEVELS ARE IN METRES AOD.

LEGEND:

- SITE ACCESS
- STRUCTURAL SOILS GROUND INVESTIGATION 2004
- CJ ASSOCIATES GROUND INVESTIGATION 2008
- GEOTECHNICS GROUND INVESTIGATION 2008
- PROPOSED GROUND INVESTIGATION 2011
- PIPEWORK
- BT OVERGROUND
- BT UNDERGROUND
- BT OTHER
- GAS
- CABLE DUCTS
- WASHWATER
- CABLE TRAY
- POTABLE WATER
- ODOUR PIPEWORK
- DRAINS
- DOSING LINES
- OVERHEAD CABLE

MK	REVISIONS	DRN	CHK	APP	DATE

MK	CONSULTANT REVISIONS	DRN	CHK	APP	DATE
C	XX	JAR			08/02/12

WUTRAD-HGL-00-XX-DR-CIV-00107-02-00

TROWBRIDGE STW

ADVANCED DIGESTION

GROUND INVESTIGATION PLAN

PRELIMINARY

ORIGINAL DRAWING SIZE A1 | SCALE AS SHOWN

DRAWING NUMBER D9542/0107 | REV. C

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS :–

CONSTRUCTION

SERVICES INFORMATION IS LIMITED AND INCOMPLETE AND IN ORDER TO AVOID EXISTING SERVICES ON SITE TRIAL HOLES AND BURIED SERVICES SURVEYS ARE REQUIRED PRIOR TO STARTING WORKS.

MAINTENANCE/CLEANING/OPERATION

DECOMMISSIONING/DEMOLITION

Wessex Water

Wessex Engineering & Construction Services

Cable Percussion Borehole Log Sheet

BH No: **1**

Site: **Trowbridge STW**

Job Number: **AA0125**

Client: BWB Consulting

Rig Type: Dando 2000

Start Date: 10/02/2012

Finish Date: 10/02/2012

Vertical Scale: 1:50

Total BH Depth: 12.37m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPT's) Test type	Blow Counts Seat.	Test Drive	N-value	Pen. (mm) Seat	Test	U100 Samples: Blows % recovery	Water Strike / Standing Water	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
											(0.50)		Grass / topsoil (Driller's description).	
0.50 - 1.20	B1									0.50			Orange / brown clay (Driller's description).	
1.20		S	1,2	1,2,2,3	N=8	150	300							
1.20 - 1.65	D2													
1.20 - 1.65	B3													
1.70 - 2.00	T4													
2.00 - 2.45	U5							128b 80%			(3.10)			
2.50 - 3.00	T6													
3.00		S	3,3	3,4,4,6	N=17	150	300							
3.00 - 3.45	D7													
3.00 - 3.50	B8													
3.50 - 4.00	T9													
										3.60	(0.20)		grey siltstone (Driller's description).	
4.00 - 4.45	U10							110b 100%		3.80			Blue / grey sandy clay (Driller's description).	
4.50 - 5.00	T11													
5.00		S	4,5	6,6,6,8	N=26	150	300							
5.00 - 5.45	D12													
5.00 - 5.50	B13													
6.00 - 6.50	T14													
6.50 - 6.95	U15							109b 60%						
7.50 - 8.00	T16													
8.00		S	5,6	6,7,8,9	N=30	150	300				(8.57)			
8.00 - 8.45	D17													
8.00 - 8.50	B18													
9.00 - 9.50	T19													
9.50 - 9.95	U20							170b 100%						

(Continued on next sheet)

Hole Progress with Time (Depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks
		1.65		

Chiselling		
From (m)	To (m)	Time (hrs)
3.60	3.80	

Casing Record	
Depth (m)	Dia. (mm)
1.65	

Groundwater Strikes (depths in m. below G.L.)				
Strike	Casing	Water (20mins)	Sealed	Remarks
No Groundwater encountered during excavation				

General Remarks:

Drilled By: AN

Logged By:

Cable Percussion Borehole Log Sheet

BH No: **1**

Site: **Trowbridge STW**

Job Number: **AA0125**

Client: BWB Consulting

Rig Type: Dando 2000

Start Date: 10/02/2012

Finish Date: 10/02/2012

Vertical Scale: 1:50

Total BH Depth: 12.37m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPT's) Test type	Blow Counts Seat.	Test Drive	N-value	Pen. (mm) Seat	Test	U100 Samples: Blows % recovery	Water Strike ↓ Standing Water ▽	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
10.50 - 11.00	T21												Blue / grey sandy clay (Driller's description).	
11.00		S	8,8	10,10,15,15	N>50	150	145							
11.00 - 11.43	D22													
11.00 - 11.50	B23													
11.50 - 12.00	T24													
12.00		S	10,12	13,15,22,-	N>50	150	220							
12.00 - 12.37	D25													
										12.37			BOREHOLE CONTINUED BY ROTARY DRILLING	

Hole Progress with Time (Depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks
	12.37			

Chiselling		
From (m)	To (m)	Time (hrs)

Casing Record	
Depth (m)	Dia. (mm)

Groundwater Strikes (depths in m. below G.L.)				
Strike	Casing	Water (20mins)	Sealed	Remarks
No Groundwater Encountered				

General Remarks:

Drilled By: AN

Logged By:

Cable Percussion Borehole Log Sheet

BH No: **2**

Site: **Trowbridge STW**

Start Date: 09/02/2011

Job Number: **AA0125**

Finish Date: 09/02/2011

Client: BWB Consulting

Vertical Scale: 1:50

Rig Type: Dando 2000

Total BH Depth: 11.14m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPT's) Test type	Blow Counts Seat.	Test Drive	N-value	Pen. (mm) Seat	Test	U100 Samples: Blows % recovery	Water Strike / Standing Water	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
										0.30	(0.30)		Grass / topsoil (Driller's description).	
0.50 - 1.20	B1												Orange / brown clay (Driller's description).	
											(1.30)			
1.20		S	1,2	3,3,3,3	N=12	150	300							
1.20 - 1.65	D2													
1.20 - 1.65	B3													
										1.60				
1.70 - 2.00	T4												Orange / green silty / sandy clay (Driller's description).	
2.00 - 2.45	U5							130b 100%			(0.90)			
2.50 - 3.00	T6									2.50			Blue / grey sandy clay (Driller's description).	
3.00		S	2,3	3,4,4,5	N=16	150	300							
3.00 - 3.45	D7													
3.00 - 3.50	B8													
3.50 - 4.00	T9													
4.00 - 4.45	U10							63b 70%						
4.50 - 5.00	T11													
5.00		S	4,5	5,5,8,8	N=26	150	300							
5.00 - 5.45	D12													
5.00 - 5.50	B13													
6.00 - 6.50	T14													
6.50 - 6.95	U15							120b 100%						
											(8.64)			
7.50 - 8.00	T16													
8.00		S	5,6	6,7,9,9	N=31	150	300							
8.00 - 8.45	D17													
8.00 - 8.50	B18													
9.00 - 9.50	T19													
9.50 - 9.95	U20							140b 70%						

(Continued on next sheet)

Hole Progress with Time (Depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks
		1.65		

Chiselling		
From (m)	To (m)	Time (hrs)

Casing Record	
Depth (m)	Dia. (mm)
1.65	

Groundwater Strikes (depths in m. below G.L.)				
Strike	Casing	Water (20mins)	Sealed	Remarks
	1.65			

General Remarks:

Drilled By: AN
Logged By:

Cable Percussion Borehole Log Sheet

BH No: **2**

Site: **Trowbridge STW**

Job Number: **AA0125**

Client: BWB Consulting

Rig Type: Dando 2000

Start Date: 09/02/2011

Finish Date: 09/02/2011

Vertical Scale: 1:50

Total BH Depth: 11.14m

C J Associates

Depth (m)	Samp. Ref.	Standard Penetration Tests (SPT's) Test type	Blow Counts Seat.	Test Drive	N-value	Pen. (mm) Seat	Test	U100 Samples: Blows % recovery	Water Strike / Standing Water	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
10.50 - 11.00	T21												Blue / grey sandy clay (Driller's description).	
11.00 11.00 - 11.14	D22	S	13,12	50,-,-,-	N>50	100	35			11.14			BOREHOLE CONTINUED BY ROTARY DRILLING	

Hole Progress with Time (Depths in m. below G.L.)				
Date	Hole depth	Casing depth	Depth to water	Remarks
	11.14		11.14	

Chiselling		
From (m)	To (m)	Time (hrs)

Casing Record	
Depth (m)	Dia. (mm)

Groundwater Strikes (depths in m. below G.L.)				
Strike	Casing	Water (20mins)	Sealed	Remarks
11.14		10.70		

General Remarks:

Drilled By: AN
Logged By:

APPENDIX 4

BOREHOLE LOGS AND PHOTOGRAPHS

Project Title Trowbridge STW		**Hole Ref.**	BH1
Client Wessex Water		**Project No.**	BME2019
Plant used Dando 2000 / Comacchio 300		**Start Date** 09/02/2012	**End Date** 21/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		0.15	MADE GROUND: Grass over dark brown slightly clayey slightly gravelly sandy TOPSOIL. Gravel is subangular fine and medium of flint, mudstone, rare brick and concrete with frequent rootlets.			B	0.50	1.20		
		0.65				DJV		0.50		
			MADE GROUND: Reworked soft orangish brown and greyish brown occasionally mottled orange slightly gravelly sandy CLAY with angular cobble of concrete at 0.30m bgl (150x220x260mm). Gravel is angular to subangular fine and medium of mudstone, slate and rare brick with rare rootlets.						1.20 (S)	N=8 (1,2/1,2,2,3)
						DJV	1.50	1.50		
			Firm becoming stiff below 4.00m light grey and blueish grey locally silty CLAY with frequent orange mottling and rare rootlets to 1.30m bgl.						3.00 (S)	N=17 (3,3/3,4,4,6)
									5.00 (S)	N=26 (4,5/6,6,6,8)
									8.00 (S)	N=30 (5,6/6,7,8,9)

Continued next sheet

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 12.37m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.53m bgl.
3. Chiselling undertaken between 3.60m bgl and 3.80m bgl.
4. Simmitrex casing advanced to a depth of 12.50m bgl.
5. No water strike.
6. No visual or olfactory evidence encountered within the exploratory hole.
7. Installation of a 50mm gas and groundwater standpipe with a response zone between 1.00m bgl and 19.00m bgl.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 1 of 3

BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS
Environment Group
5th Floor
Waterfront House
Station Street
Nottingham
NG2 3DQ
Tel : 0115 9241100
Fax : 0115 9503966

Project Title	Trowbridge STW	**Hole Ref.**	BH1
Client	Wessex Water	**Project No.**	BME2019
Plant used	Dando 2000 / Comacchio 300	**Start Date** 09/02/2012	**End Date** 21/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
			Firm becoming stiff below 4.00m light grey and blueish grey locally silty CLAY with frequent orange mottling and rare rootlets to 1.30m bgl.							
		11.00	Stiff becomnig very stiff below 12.00m, dark greyish blue and dark blue slightly sandy gravelly CLAY locally tending to extremely weak weathered mudstone. Gravel is angular fine to coarse of mudstone.						11.00 (S)	N=50 (8,8/10,10,15,15)
									12.00 (S)	50 (10,12/13,15,22,0 for 0mm)
		13.15	Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly with weak mudstone from 19.00m bgl.						13.50 (S)	50 (4,8/11,17,18,4 for 5mm)
			Pyrite nodule							
									15.00 (S)	50 (5,9/18,24,8 for 30mm)
									16.50 (S)	50 (5,11/13,19,18 for 63mm)
			Non intact zone						18.00 (S)	50 (8,15/19,21,10 for 38mm)
			Non intact zone							
			Non intact zone							
			Not silty							
			Continued next sheet							

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 12.37m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.53m bgl.
3. Chiselling undertaken between 3.60m bgl and 3.80m bgl.
4. Simmitrex casing advanced to a depth of 12.50m bgl.
5. No water strike.
6. No visual or olfactory evidence encountered within the exploratory hole.
7. Installation of a 50mm gas and groundwater standpipe with a response zone between 1.00m bgl and 19.00m bgl.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 2 of 3

BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS
Environment Group
5th Floor
Waterfront House
Station Street
Nottingham
NG2 3DQ
Tel : 0115 9241100
Fax : 0115 9503966

Project Title	Trowbridge STW	**Hole Ref.**	BH1
Client	Wessex Water	**Project No.**	BME2019
Plant used	Dando 2000 / Comacchio 300	**Start Date** 09/02/2012	**End Date** 21/02/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		20.53	Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly with weak mudstone from 19.00m bgl.						20.30 (S)	50 (18,7 for 38mm/28,22 for 50mm
			End of hole at 20.53 m							

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 12.37m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.53m bgl.
3. Chiselling undertaken between 3.60m bgl and 3.80m bgl.
4. Simmitrex casing advanced to a depth of 12.50m bgl.
5. No water strike.
6. No visual or olfactory evidence encountered within the exploratory hole.
7. Installation of a 50mm gas and groundwater standpipe with a response zone between 1.00m bgl and 19.00m bgl.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 3 of 3

BWB
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Tel : 0115 9241100
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Project Title	Trowbridge STW	**Hole Ref.**	BH2
Client	Wessex Water	**Project No.**	BME2019
Plant used	Dando 2000 / Comacchio 300	**Start Date** 10/02/2012	**End Date** 22/01/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		0.20	MADE GROUND: Grass over dark brown clayey slightly gravelly sandy TOPSOIL. Gravel is angular to subangular fine to coarse of flint, mudstone and limestone with frequent rootlets.			B	0.50	1.20		
		0.60				DJV	0.80	0.80		
			MADE GROUND: Reworked soft brown and greyish brown with occasional orange mottling slightly sandy CLAY with occasional rootlets.			D	1.20	1.65	1.20 (S)	N=12 (1,2/3,3,3,3)
						B				
						D	1.70	2.00		
			Soft becoming firm below 1.20m with depth brown and greyish brown with occasional orange mottling slightly sandy CLAY with occasional rootlets.			U	2.00	2.45		
		2.50	Occasional orangish brown fine sand pockets			D	2.50	3.00		
						DJV	3.00	3.00	3.00 (S)	N=16 (2,3/3,4,4,5)
			Firm locally tending to stiff below 3.00m, greyish blue and dark greyish blue slightly sandy CLAY with rare shell fragments (<20mm) to 4.00m bgl.			B		3.50		
						D		3.45		
			Firm locally tending to stiff greyish blue and dark greyish blue locally slightly sandy CLAY with rare shell fragments (<20mm) to 4.00m bgl.			U	4.00	4.45		
						D		4.00		
						D	4.50	5.00		
						D	5.00	5.45	5.00 (S)	N=26 (4,5/5,5,8,8)
						B		5.50		
		6.00	Becoming stiff locally silty and slightly sandy Stiff greyish blue and grey locally silty slightly sandy CLAY. Becoming stiff locally silty and slightly sandy			D	6.00	6.50		
						U	6.50	6.95		
						D	7.50	8.00		
						D	8.00	8.45	8.00 (S)	N=31 (5,6/6,7,9,9)
						B		8.50		
						D	9.00	9.50		
						U	9.50	9.95		

Continued next sheet

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 11.06m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.05m bgl.
3. Simmitrex casing advanced to a depth of 8.50m bgl.
4. Groundwater strikes encountered at 11.14m bgl rising to 10.70m bgl after 20 minutes.
5. No visual or olfactory evidence encountered within the exploratory hole.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 1 of 3

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Project Title	Trowbridge STW	**Hole Ref.**	BH2
Client	Wessex Water	**Project No.**	BME2019
Plant used	Dando 2000 / Comacchio 300	**Start Date** 10/02/2012	**End Date** 22/01/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
			Firm locally tending to stiff greyish blue and dark greyish blue locally slightly sandy CLAY with rare shell fragments (<20mm) to 4.00m bgl.							
		10.70				D	10.70	11.00		
			Stiff greyish blue and grey locally silty slightly sandy CLAY.							
▽ 11.14		11.00				D	11.00	11.06	11.00 (S)	50 (13,12 for 25mm/50 for 35mm
		11.40	Very stiff dark blue and dark greyish blue sandy gravelly CLAY tending to extremely weak weathered mudstone. Gravel is angular fine to coarse of weathered mudstone.							
			Grey weak silty fossiliferous MUDSTONE. Fractures are horizontal, planar, rough with silt infilling.						12.20 (S)	50 (7,7/12,17,18,3 for 4mm)
			Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly of weak mudstone from 19.00m.							
			Non intact zone							
			Non intact zone							
			Non intact zone						13.70 (S)	50 (5,9/11,13,19,7 for 23mm)
			Tending to extremely weak mudstone						15.20 (S)	50 (7,13/19,17,14 for 60mm)
			Tending to extremely weak mudstone						16.70 (S)	50 (7,11/13,19,18 for 66mm)
			Non intact zone							
			Occasional fossils present							
			Horizontal fracture with silt infilling							
			Silt band						18.20 (S)	50 (7,11/14,18,18 for 61mm)
			Silt band							
			Tending to extremely weak and weak mudstone						19.70 (S)	50 (8,13/16,18,16 for 52mm)
			Continued next sheet							

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 11.06m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.05m bgl.
3. Simmitrex casing advanced to a depth of 8.50m bgl.
4. Groundwater strikes encountered at 11.14m bgl rising to 10.70m bgl after 20 minutes.
5. No visual or olfactory evidence encountered within the exploratory hole.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 2 of 3

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Project Title	Trowbridge STW	**Hole Ref.**	BH2
Client	Wessex Water	**Project No.**	BME2019
Plant used	Dando 2000 / Comacchio 300	**Start Date** 10/02/2012	**End Date** 22/01/2012

Groundwater Strike	Groundwater Well	Depth (m)	Description of Strata	Level (mAOD)	Legend	Samples Type	Samples Depth From	Samples Depth To	In-situ Testing Depth (m) (SPT Type)	In-situ Testing Result
		20.05	Very stiff grey very closely fissured fossiliferous locally silty CLAY becoming gravelly of weak mudstone from 19.00m.							
			End of hole at 20.05 m							

REMARKS

1. Hand dug service pit to 1.20m bgl.
2. Borehole advanced using cable percussive techniques to 11.06m bgl followed by rotary drilling using air mist techniques to scheduled depth of 20.05m bgl.
3. Simmitrex casing advanced to a depth of 8.50m bgl.
4. Groundwater strikes encountered at 11.14m bgl rising to 10.70m bgl after 20 minutes.
5. No visual or olfactory evidence encountered within the exploratory hole.

SOIL SAMPLE TYPE
D - 500g to 1kg Disturbed
B - 5kg to 20kg Disturbed
U - 100mm dia. Undisturbed
J - 250ml Amber Glass Jar
V - Glass Vial

IN-SITU TESTS
SV - Hand Shear Vane
HP - Hand Penetrometer
N = SPT blows over 300mm
S = Split Spoon Sampler
C = Solid Cone
PID - Photo Ionisation Detector (ppm)

GROUNDWATER
▽ Groundwater strike
▼ Standing groundwater level

EASTING	NORTHING	GROUND LEVEL
-	-	-
LOGGED BY	**SCALE**	**SHEET**
GA	1:50	Sheet 3 of 3

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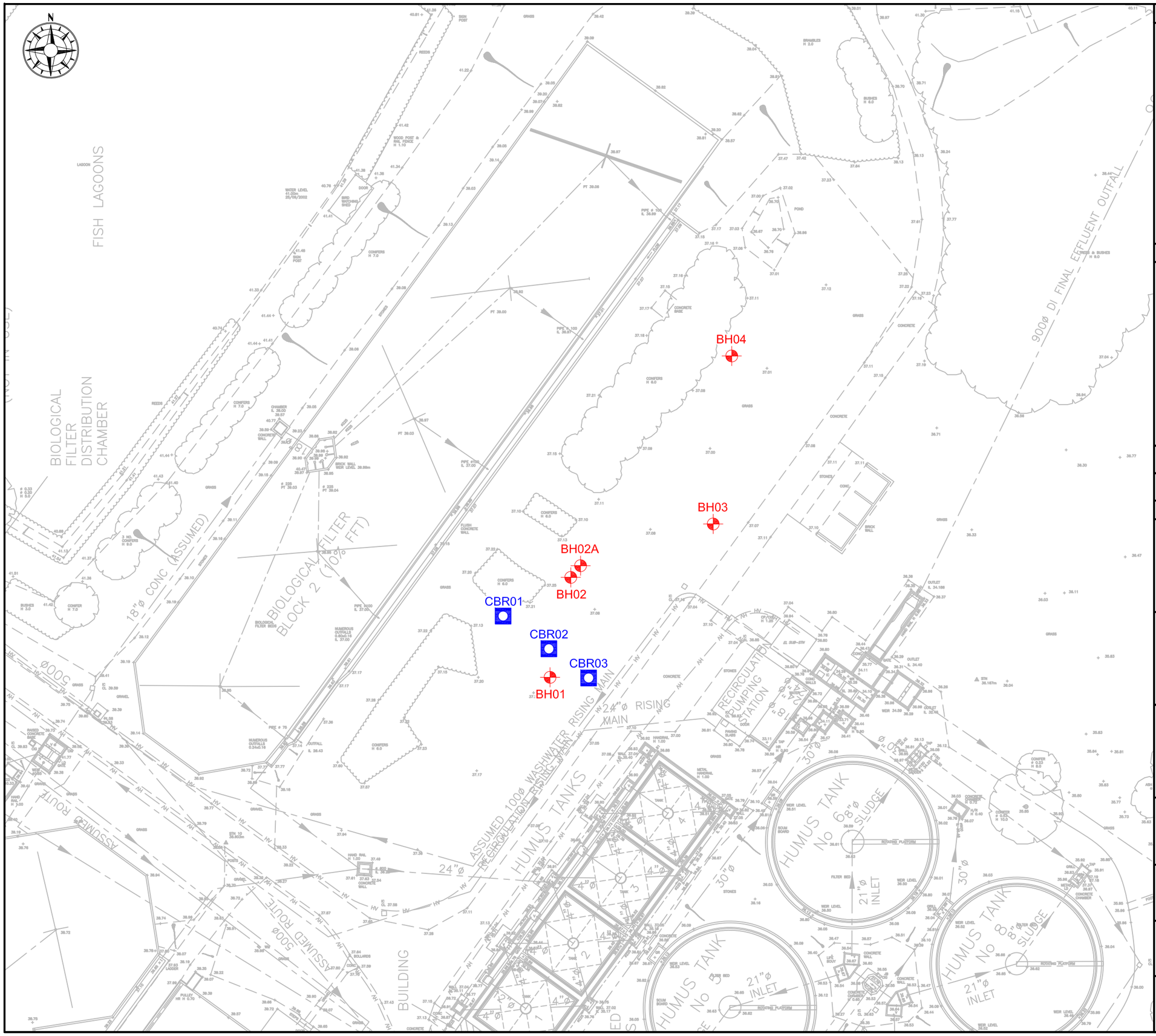


GENERAL NOTES

1. Reproduced from Wessex Water Services Limited's Drawing No. D9702/0001 Rev No. B.
2. Hole Locations to National Grid Co-ordinate Reference System.

LEGEND TO SYMBOLS

Borehole Location

CBR Location

Scale: 1:500

0 5m 10 15 20 25

Rev	Drawn	Date	Approv.	Date	Modification Details
x	x	x	x	x	x

AMENDMENTS

Title

SITE PLAN

Project

TROWBRIDGE STW, WILTSHIRE

Client

WESSEX WATER SERVICES LIMITED

ESG

Date	Drawn By	Approv. By
07/12/2016	BS	AP

Sheet Size	Scale	Project No
A3	1:500	H6100-16

Drawing No	Rev
A2	0

APPENDIX B

EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
SPT Hammer Energy Ratio Report	SPT Hammer Reference JD5
Dynamic Probing Rig Energy Ratio Report	DP Rig Reference
Borehole Logs	BH01 to BH04 (inc. BH02A, BH04A and BH04B)

Key to Exploratory Hole Records

SAMPLES

Undisturbed

U	Driven tube sample
UT	Driven thin wall tube sample
TW	Pushed thin wall tube sample
P	Pushed piston sample

} nominally 100 mm diameter and full recovery unless otherwise stated

L	Liner sample (from Windowless or similar sampler), full recovery unless otherwise stated
CBR	CBR mould sample
BLK	Block sample
CS	Core sample (from rotary core) taken for laboratory testing
AMAL	Amalgamated sample

Disturbed

D	Small sample
B	Bulk sample

Other

W	Water sample
G	Gas sample
	Environmental chemistry samples (in more than one container where appropriate)
ES	Soil sample
EW	Water sample

Comments

Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that attempt was made to take a tube sample, however, there was no recovery.

Monitoring samples taken after completion of hole construction are not shown on the exploratory hole logs.

TESTS

SPT S or SPT C — Standard Penetration Test, open shoe (S) or solid cone (C)

The Standard Penetration Test is defined in BS EN ISO 22476-3:2005+A1:2011. The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 the total blow count beyond the seating drive is given (without the N = prefix).

IV	*in situ* Vane shear strength, peak (p) and remoulded (r)
HV	Hand vane shear strength, peak (p) and remoulded (r)
PP	Pocket penetrometer test, converted to shear strength
KFH, KRH, KPI	Permeability tests (KFH = falling head, KRH = rising head; KPI = packer inflow); results provided in Field Records column (one value per stage for packer tests)

DRILLING RECORDS

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930:2015

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacings are presented. The term non-intact (NI) is used where the core is fragmented.

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss
NR	Not recovered

GROUNDWATER

▼	Groundwater strike
▽	Groundwater level after standing period

Key to Exploratory Hole Records

INSTALLATION

Standpipe/ piezometer

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:

SP Standpipe
SPIE Standpipe piezometer
PPIE Pneumatic piezometer
EPIE Electronic piezometer

Inclinometer or Slip Indicator

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:

ICE Biaxial inclinometer
ICM Inclinometer tubing for use with probe
SLIP Slip indicator

Settlement Points or Pressure Cells

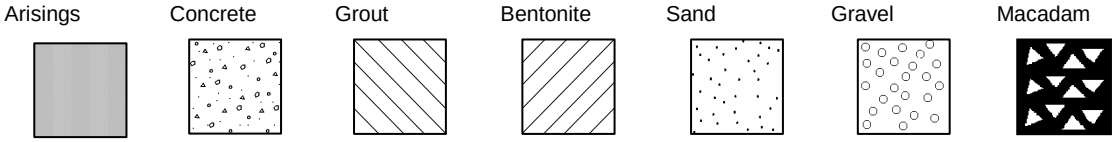
The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column:

ESET Electronic settlement cell/gauge
ETM Magnetic extensometer settlement point
EPCE Electronic embedment pressure cell
PPCE Electronic push in pressure cell

INSTALLATION LEGENDS

A legend describing the installation is shown in the rightmost column. Legends used to describe the backfill materials as indicated below.



NOTES

1 Soils and rocks are described in accordance with BS EN ISO 14688-1:2002+A1:2013 and 14689-1:2003 respectively as amplified by BS 5930:2015.

2 For fine soils, consistency determined during description is reported for those strata where undisturbed samples are available. Where the logger considers that the sample may not be representative of the condition in situ, for whatever reason, the reported consistency is given in brackets. The reliability of the sample is indicated by Probably or Possibly as appropriate. Hence (Probably firm) indicates the logger is reasonably confident of the assessment, but (Possibly firm) means less certainty. Where the samples available are too disturbed to allow a reasonable assessment of the in situ condition, no consistency is given.

3 Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs, however, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.

4 The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.

5 The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures

6 Water level observations of discernible entries during the advancing of the exploratory hole are given at the foot of the log and in the Legend column. The term "none observed" is used where no discrete entries are identified although this does not necessarily indicate that the hole has not been advanced below groundwater level. Under certain conditions groundwater cannot be observed, for instance, drilling with water flush or overwater, or boring at a rate much faster than water can make its way into the borehole In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.

7 The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.

SPT Calibration Report

EQUIPE GROUP
www.equipegroup.com

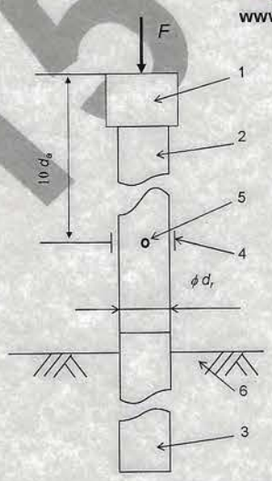
Hammer Energy Measurement Report

Type of Hammer	SPT HAMMER
Client	JACKSON DRILLING
Test No	EQU1392
Test Depth (m)	7.80
Date of Test	23 December 2015
Valid until	22 December 2016
Hammer ID	JD5

Mass of the hammer	m = 63.5kg
Falling height	h = 0.76m
E_{theor} =	$m \times g \times h$ = 473J

Characteristics of the instrumented rod

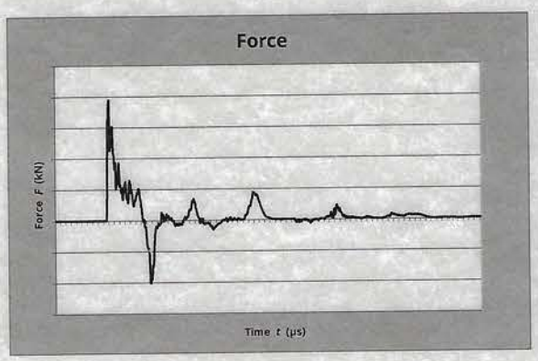
Diameter	d_r = 0.052 m
Length of the instrumented rod	0.558 m
Area	A = 11.61 cm^2
Modulus	E_a = 206843 MPa

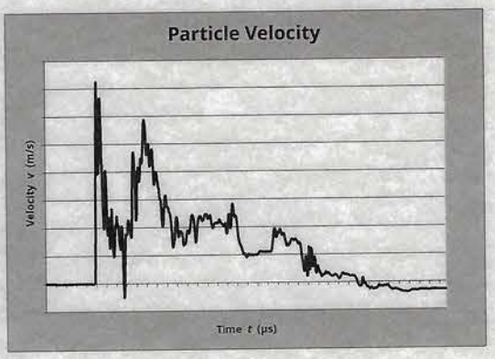


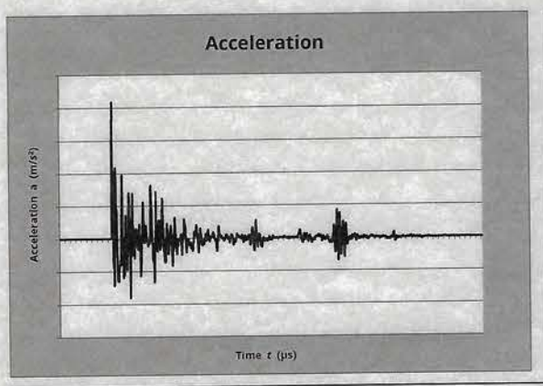
Key
1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

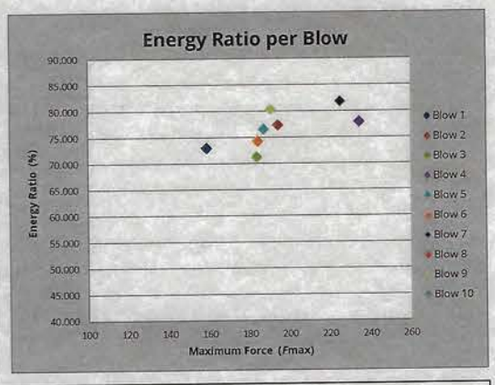
F Force
d_r Diameter of rod

Fig. B.1 and B.2 BS EN ISO 22476-3 : 2005 + A1 : 2011









Observations:
1.

E_{meas} = **0.363** kN-m

E_{theor} = **0.473** kN-m

Energy Ratio (E_r) $= \frac{E_{meas}}{E_{theor}}$ **76.79%**

Equipe SPT Analyzer Operators: MH

Prepared by: **Checked by:** **Date** 06/01/2016

 Equipe Group, The Paddocks, Home Farm Offices, The Upton Estate, Banbury, Oxfordshire, OX15 6HU
Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

Borehole Log

Drilled	LM/PM	**Start**	
Logged	ND	30/09/2016	
Checked	AP	**End**	
Approved	LL	04/10/2016	

Equipment, Methods and Remarks

Comacchio 205
Hand excavated inspection pit from 0.00m to 1.50m depth. Dynamic sampling from 1.50m to 7.20m. Rotary coring from 7.20m to 25.15m depth.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.50	3.00	101	4.50
3.00	4.50	101	
4.50	5.70	87	
5.70	7.20	87	
7.20	22.15	120	

Ground Level	37.15 mOD
Coordinates (m)	E 384953.00
National Grid	N 158777.00

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						Brown gravelly silty fine to medium SAND. Gravel is subangular to subrounded fine to coarse of chert, chalk and brick. (MADE GROUND)		(0.25)		
0.10 - 0.20	ES 2			30/09/16	0800			0.25 +36.90		
0.10 - 0.20	D 1							(0.20)		
0.30 - 0.40	ES 4					Very stiff light brown to brown sandy gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of chalk, brick and chert. (MADE GROUND)		0.45 +36.70		
0.30 - 0.40	D 3							(0.55)		
0.50 - 0.60	ES 6									
0.50 - 0.70	B 5									
						Greyish brown sandy clayey angular to subangular fine to coarse GRAVEL of limestone and macadam. (MADE GROUND)		1.00 +36.15		
1.00 - 1.20	ES 8									
1.00 - 1.20	B 7									
1.20 - 1.65	SPTS		N=20 (2,5/5,5,5,5)							
1.20 - 1.65	D 9									
						Grey slightly silty sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)				
1.50 - 3.00	L 16		100% rec		Dry			(1.00)		
						Soft to firm yellowish brown mottled grey slightly sandy silty CLAY. Sand is fine to medium. (KELLWAY'S FORMATION)		2.00 +35.15		
2.00 - 2.10	D 10									
2.10 - 2.30	ES 11							(0.85)		
						Stiff yellowish brown mottled grey and orange slightly sandy silty CLAY. Sand is fine to medium. (KELLWAY'S FORMATION)		2.85 +34.30		
3.00 - 3.45	SPTS		N=16 (2,2/3,5,5,3)	3.00	Dry					
3.00 - 4.50	L 17		100% rec	4.50	Dry					
3.00 - 3.45	D 12							(1.65)		
4.50 - 4.95	SPTS		N=16 (1,1/2,3,5,6)	4.50	Dry					
4.50 - 5.70	L 18		100% rec	4.50	Dry	Very stiff dark grey locally thinly laminated CLAY. Occasional shell fragments. (KELLWAY'S FORMATION)		4.50 +32.65		
4.50 - 4.95	D 13									
5.70 - 6.15	SPTS		N=23 (1,2/4,4,7,8)	4.50	Dry					
5.70 - 7.20	L 19		100% rec	4.50	Dry			(2.70)		
5.70 - 6.15	D 14									
7.20 - 7.65				4.50	Dry					
7.20 - 7.65	NA	NA	N=50 (5,7/8,13,20,9)			NO RECOVERY.		7.20 +29.95		
7.20 - 7.65	NA	NA	C 20					(0.45)		
7.20 - 7.65	NA	NA	D 15							
7.65 - 9.15			C 21			Very stiff dark grey locally thinly laminated CLAY. Occasional shell fragments. (KELLWAY'S FORMATION)	8.03-8.05 Silty sandy with shell fragments	7.65 +29.50		
7.65 - 9.15	100	NA						(1.50)		
	NA	NA								
	NA	NA								
				30/09/16	1800					
				4.50	Dry					
9.15 - 10.65			C 22	03/10/16	0800	Soft dark grey CLAY. (KELLWAY'S FORMATION)	9.15-9.20 AZCL	9.15 +28.00		
		NA		4.50	Dry					
	100	NA						(0.70)		
	NA	NA								
	NA									
9.15 - 10.65						Very stiff dark grey thinly laminated slightly		9.85 +27.30		

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	**Trowbridge STW, Wiltshire**
Project No.	**H6100-16**
Carried out for	**Wessex Water Services Limited**

Borehole

BH01

Borehole Log

Drilled	LM/PM	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.15 mOD
Logged	ND	30/09/2016	Comacchio 205	1.50	3.00	101	4.50	**Coordinates (m)**	E 384953.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00m to 1.50m depth. Dynamic sampling from 1.50m to 7.20m. Rotary coring from 7.20m to 25.15m depth.	3.00	4.50	101		**National Grid**	N 158777.00
Approved	LL	04/10/2016		4.50	5.70	87			
				5.70	7.20	87			
				7.20	22.15	120			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		NA NA NA				gravelly CLAY. Gravel is subangular fine to coarse of mudstone lithorelics. (KELLWAY'S FORMATION)		(1.00)		
10.65 - 12.15			C 23					10.85 +26.30		
10.65 - 12.15	100 NA NA					Very stiff dark grey thickly laminated slightly gravelly CLAY with occasional shell fragments. Gravel is subangular fine to coarse of mudstone lithorelics. Occasional partings of fine to medium sand between laminae. (KELLWAY'S FORMATION)	10.80-10.81 Some subangular pieces of coarse gravel of calcareous mudstone.			
12.15 - 13.65			C 24				11.79-11.80 Band of shell fragments			
12.15 - 13.65	100 NA NA									
13.65 - 15.15		NA NA NA	C 25					(5.80)		
13.65 - 15.15	100 NA NA									
15.15 - 16.65			C 26							
15.15 - 16.65	100 NA NA									
			Flush: 7.20 - 25.15 Air/mist 100%							
16.65 - 18.15		NA NA NA	C 27			Very stiff dark grey thinly laminated CLAY. (KELLWAY'S FORMATION)		16.65 +20.50		
								(0.35)		
		650 650 650				Weak dark grey lightly calcareous very shelly thickly laminated MUDSTONE. (KELLWAY'S FORMATION)		17.00 +20.15		
16.65 - 18.15	100 73 73							(0.65)		
						Medium strong light grey calcareous fossiliferous fine grained LIMESTONE. (CORNBRASH FORMATION). Weathering: Trace sand infill on discontinuity surfaces. Discontinuities: Medium spaced horizontal undulating rough.		17.65 +19.50		
18.15 - 19.65		NI 230 450	C 28					(1.40)		
18.15 - 19.65	100 62 55						18.45-18.70 Subvertical fracture stepped rough with trace sand infill. Some voids in fracture (up to 2 mm diameter). 18.70-19.05 NI	19.05 +18.10		
						Strong grey slightly calcareous very fossiliferous fine grained LIMESTONE. (CORNBRASH FORMATION). Weathering: Some clay infill up to 7 mm thick on discontinuity surfaces. Discontinuities: closely to medium spaced horizontal undulating rough.	19.10-19.15 Band of clayey gravel of limestone			
19.65 - 21.15			C 29							

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed
1	15.00		

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole BH01

Borehole Log

Drilled	LM/PM	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.15 mOD
Logged	ND	30/09/2016	Comacchio 205 Hand excavated inspection pit from 0.00m to 1.50m depth. Dynamic sampling from 1.50m to 7.20m. Rotary coring from 7.20m to 25.15m depth.	1.50	3.00	101	4.50	**Coordinates (m)**	E 384953.00
Checked	AP	**End**		3.00	4.50	101		**National Grid**	N 158777.00
Approved	LL	04/10/2016		4.50	5.70	87			
				5.70	7.20	87			
				7.20	22.15	120			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
								(1.95)		
19.65 - 21.15	100 89 72	NI 180 300								
			NA NA NA			Stiff grey to dark green thickly laminated CLAY. Frequent pockets of black organic material (up to 3 mm diameter). Rare voids (up to 3 mm diameter). (CORNBRASH FORMATION)		21.00 +16.15 (0.15)		
21.15 - 22.65		NI 70 140	C 30			Stiff to very stiff green thickly laminated CLAY. (CORNBRASH FORMATION)		21.15 +16.00 (0.50)		
			NA NA NA			Very stiff grey to dark green thickly laminated CLAY. Frequent pockets of black organic material (up to 3 mm diameter). Rare voids (up to 3 mm diameter). (CORNBRASH FORMATION)		21.65 +15.50 (0.30)		
21.15 - 22.65	100 NA NA							21.95 +15.20		
		NA NA NA				Weak green mottled dark green MUDSTONE. Occasional veins of dark brown organic material (up to 1 mm thick). Rare pockets of black organic material (up to 2 mm diameter). (CORNBRASH FORMATION). Discontinuities: closely spaced horizontal to dipping 5 degrees planar smooth with trace clay infill.		(0.70)		
22.65 - 24.15			C 31	03/10/16 4.50	1800 Dry			22.65 +14.50		
				04/10/16 4.50	0800 Dry					
22.65 - 24.15	100 97 80	NI 120 260				Medium strong to strong calcareous greenish grey interlaminated LIMESTONE AND MUDSTONE. (CORNBRASH FORMATIONS). Weathering: Up to 1 mm clay infill on discontinuity surfaces. Discontinuities: Closely to medium spaced horizontal to dipping 5 degrees planar smooth.		(1.40)		
24.15 - 25.15			C 32			Weak calcareous interlaminated LIMESTONE and MUDSTONE. (CORNBRASH FORMATION). Weathering: Trace clay infill on discontinuity surfaces. Discontinuities: closely spaced horizontal to dipping 5 degrees planar smooth.	24.00-24.05 Very stiff greenish grey clay 24.41-24.50 Extremely weak mudstone	24.05 +13.10		
24.15 - 25.15	100 100 56	NI 70 140						(1.10)		
				04/10/16 4.50	1800 15.37					
						END OF EXPLORATORY HOLE		25.15 +12.00		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH01

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.16 mOD
Logged	NJD	10/10/2016	Commachio Geo 205	1.20	1.65	92		**Coordinates (m)**	E 384956.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 1.65 m. SPT from 1.65 m to 1.73 m.	1.65	1.73	45		**National Grid**	N 158791.00
Approved	LL	10/10/2016	Terminated at 1.73 m depth due to obstruction. Relocated 2 m NE to BH02A.						

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
0.10 - 0.20	ES 2			07/10/16	0800
0.10 - 0.20	D 1				
0.40 - 0.50	ES 4				
0.40 - 0.60	B 3				
0.70 - 0.80	ES 6				
0.70 - 0.80	D 5				
				07/10/16	1800 Dry
1.20 - 1.65	B 7				
				10/10/16	0800 Dry
				10/10/16	1800 Dry
1.65 - 1.73	SPTC		50 (25 for 75mm/50 for 5mm)		Dry

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Brown gravelly silty fine to coarse SAND. Gravel is angular to rounded fine to medium of chert, clinker and brick. (MADE GROUND)		(0.20) 0.20 +36.96		
Dark brown sandy silty angular to subangular fine to coarse GRAVEL of limestone, clinker and brick. Occasional pockets of clay. (MADE GROUND)		(0.50) 0.70 +36.46		
Stiff becoming firm from 1.20 m depth grey slightly gravelly CLAY with orangish brown silty fine sand and dark brown sandy silt partings. Gravel is angular to rounded fine to medium of chalk and chert. (MADE GROUND)		(0.90)		
Medium strong light grey CONCRETE. (MADE GROUND)		1.60 (0.05) +35.56		
Hole progressed by SPT.		1.65 (0.08) +35.51		
END OF EXPLORATORY HOLE		1.73 +35.43		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
1.20 - 1.73	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH02

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.09 mOD
Logged	NJD	10/10/2016	Commachio Geo 205	0.00	11.90	102	3.00	**Coordinates (m)**	E 384957.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic window sampling from 1.20 m to 11.90 m. Rotary coring from 11.90 m to 25.40 m.	11.90	25.40	92		**National Grid**	N 158792.00
Approved	LL	11/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				10/10/16	0800	Brown very gravelly silty fine to coarse SAND. Gravel is angular to rounded fine to medium of chert, clinker and brick. (MADE GROUND)		(0.20) 0.20 +36.89		
						Dark brown sandy silty angular to subangular fine to coarse GRAVEL of limestone, clinker and brick. Occasional pockets of clay. Sand is fine to coarse. (MADE GROUND)		(0.60) 0.80 +36.29		
						Stiff grey slightly gravelly CLAY with orangish brown silty fine sand partings. Gravel is angular to rounded fine to coarse of various lithologies. (MADE GROUND)	1.20-1.65 Firm and light brown. 1.45 Angular cobble of clinker.	(0.85)		
1.20 - 1.50	ES 1				Dry					
1.20 - 1.65	L 14		100% rec							
1.50 - 1.60	D 2									
1.65 - 2.02	SPTC		N=20 (25 for		Dry			1.65 (0.10) +35.44		
1.65 - 3.00	L 15		75mm/13,3,2,2)		Dry			1.75 +35.34		
1.65 - 1.75	D 3		100% rec			Medium strong light greyish brown CONCRETE. Recovered as sandy angular to subangular fine to coarse gravel. (MADE GROUND)				
1.75 - 2.00	ES 4							(0.65)		
2.00 - 2.10	D 5					Stiff light brown mottled grey slightly sandy CLAY with orange silty fine sand partings. Sand is fine to medium. (Reworked KELLAWAYS FORMATION)		2.40 +34.69		
						Stiff brownish grey slightly sandy CLAY with orangish brown fine sand and yellow silt partings. (Reworked KELLAWAYS FORMATION)				
				10/10/16	1800		2.80-3.40 Shell fragments.	(1.00)		
3.00 - 3.45	SPTS		N=17 (2,2/3,4,5,5)		Dry		3.00-3.40 Gypsum crystals.			
3.00 - 4.50	L 16		100% rec	3.00	Dry					
3.00 - 3.45	D 6			11/10/16	0800					
				3.00	Dry					
3.40 - 3.60	ES 7							3.40 +33.69		
						Very stiff grey CLAY with silty fine sand dustings. Occasional gypsum crystals and rare shell fragments. (KELLAWAYS FORMATION)				
4.50 - 4.95	SPTS		N=23 (2,3/4,5,7,7)	3.00	Dry					
4.50 - 6.00	L 17		100% rec	3.00	Dry					
4.50 - 4.95	D 8						4.70-6.40 Orangish brown silty fine sand partings.	(3.00)		
6.00 - 6.45	SPTS		N=38 (5,7/7,10,10,11)	3.00	Dry					
6.00 - 7.50	L 18		100% rec	3.00	Dry					
6.00 - 6.45	D 9						6.28 Ammonite fragments.	6.40 +30.69		
						Stiff grey sandy silty CLAY with silty fine sand dustings. Sand is fine. Occasional shell fragments. (KELLAWAYS FORMATION)		6.50 (0.10) +30.59		
						Very stiff grey CLAY. (KELLAWAYS FORMATION)		(0.80)		
						Stiff grey sandy silty CLAY with silty fine sand dustings. Sand is fine to medium. Occasional shell fragments. (KELLAWAYS FORMATION)		7.30 +29.79		
7.50 - 7.95	SPTS		N=37 (5,6/8,9,9,11)	3.00	Dry			(0.70)		
7.50 - 9.00	L 19		100% rec	3.00	Dry					
7.50 - 7.95	D 10									
						Very stiff grey CLAY. (KELLAWAYS FORMATION)		8.00 +29.09		
								(1.20)		
9.00 - 9.45	SPTS		N=36 (5,6/8,8,9,11)	3.00	Dry					
9.00 - 10.50	L 20		100% rec	3.00	Dry					
9.00 - 9.45	D 11									
						Very stiff grey sandy silty CLAY. Sand is fine. Occasional shell fragments. (KELLAWAYS FORMATION)		9.20 +27.89		
								(0.40)		
						Very stiff grey CLAY. (KELLAWAYS FORMATION)	9.54 Fossil fragments.	9.60 +27.49		
								(0.70)		

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
0.00 - 23.99	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH02A

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.09 mOD
Logged	NJD	10/10/2016	Commachio Geo 205	0.00	11.90	102	3.00	**Coordinates (m)**	E 384957.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic window sampling from 1.20 m to 11.90 m. Rotary coring from 11.90 m to 25.40 m.	11.90	25.40	92		**National Grid**	N 158792.00
Approved	LL	11/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
						Stiff grey sandy silty CLAY. Occasional shell fragments. (KELLAWAYS FORMATION)		10.30 +26.79		
								(0.20)		
10.50 - 10.95	SPTS		N=34 (3,4/5,8,10,11)	3.00	Dry			10.50 +26.59		
10.50 - 11.90	L 21		100% rec	3.00	Dry	Very stiff grey CLAY. (KELLAWAYS FORMATION)				
10.50 - 10.95	D 12							(0.40)		
						Stiff grey silty sandy CLAY. Sand is fine. Occasional shell fragments. (KELLAWAYS FORMATION)		10.90 +26.19		
								(0.50)		
						Very stiff grey CLAY with silty fine sand dustings. (KELLAWAYS FORMATION)		11.40 +25.69		
				11/10/16	1800			(0.50)		
				3.00	Dry					
11.90 - 12.31				3.00	Dry			11.90 +25.19		
11.90 - 12.65			50 (10,14/13,14,15,8 for 35mm)	12/10/16	0800	Extremely weak medium to thickly bedded grey MUDSTONE with silty fine sand partings and dustings. Occasional shell fragments. (KELLAWAYS FORMATION) Discontinuities: Horizontal medium to widely spaced undulating smooth clean.				
11.90 - 12.41	100		C 22	3.00	Dry		12.38 Drilling induced fracture			
11.90 - 12.65	100		D 13				12.45-12.65 Core recovered in following run.			
	100						12.93 Drilling induced fracture.			
12.65 - 13.40			C 23				13.17 Drilling induced fracture.			
12.65 - 13.40	99									
	99									
13.40 - 13.85				3.00	Dry		13.40-13.51 AZCL			
13.40 - 14.90			SPTC N=49 (4,7/10,12,13,14) C 24							
	93									
13.40 - 14.90	92									
	92							(5.25)		
		380								
		540								
14.90 - 15.33		1420		3.00	Dry		14.90-14.93 AZCL.			
14.90 - 16.40			SPTC 50 (5,9/11,12,15,12 for 55mm) C 25				14.91 Light brown calcareous accretion.			
	98						15.00 Light grey calcareous accretion			
14.90 - 16.40	97						15.10 Fracture: 60 degrees planar smooth. Possible shear surface.			
	93						15.35 Drilling induced fracture			
							15.69 Drilling induced fracture			
16.40 - 16.77				3.00	Dry		15.86 Light brown calcareous accretion.			
16.40 - 17.90			SPTC 50 (6,11/12,17,21 for 70mm) C 26				16.40-16.51 AZCL.			
	93						16.84-17.16 Silty Sandy			
16.40 - 17.90	91									
	91							17.15 +19.94		
						Extremely to very weak medium bedded dark grey silty sandy MUDSTONE with calcareous laminae. Frequent shell fragments increasing with depth. (KELLAWAYS FORMATION)		(0.62)		
								17.77 +19.32		
17.90 - 18.14				3.00	Dry	Weak thickly bedded grey fine to medium grained clayey LIMESTONE with occasional very weak dark grey silty sandy mudstone partings. (CORNBRASH FORMATION)	17.78 Drilling induced fracture.			
17.90 - 19.40			SPTC 50 (20,5/35,15 for 20mm) C 27					(0.63)		
		1160								
		1160						18.40 +18.69		
		1160				Medium strong medium bedded light grey fine grained LIMESTONE. (CORNBRASH FORMATION) Discontinuities: Horizontal undulating rough clean.	18.70-18.93 Fine to medium grained.	(0.53)		
	100							18.93 +18.16		
17.90 - 19.40	95									
	92									
						Very weak thickly bedded grey fine to coarse grained clayey LIMESTONE with very closely spaced laminae and partings of extremely weak dark grey mudstone. (CORNBRASH FORMATION) Discontinuities: Very closely to medium spaced horizontal undulating rough clean.	19.13 Trace firm grey clay infill.			
		NI					19.30 Drilling induced fracture.			
19.40 - 19.50		180		3.00	Dry		19.36-19.40 Non-intact	(1.25)		
19.40 - 20.90		410	SPTC 50 (25 for 75mm/50 for 25mm) C 28				19.40-19.41 AZCL			
							19.99-20.18 Largely non-intact. Trace firm grey clay infill.			

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH02A

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.09 mOD
Logged	NJD	10/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic window sampling from 1.20 m to 11.90 m. Rotary coring from 11.90 m to 25.40 m.	0.00 11.90	11.90 25.40	102 92	3.00	**Coordinates (m)**	E 384957.00
Checked	AP	**End**						**National Grid**	N 158792.00
Approved	LL	11/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
19.40 - 20.90	99 86 86			12/10/16 3.00 3.00	1800 Dry Dry	Weak thickly bedded grey fine to medium grained clayey LIMESTONE with occasional very weak dark grey silty sandy mudstone partings. (CORNBRASH FORMATION)	20.32 Drilling induced fracture.	20.18 +16.91 (0.72)		
20.90 - 21.00 20.90 - 22.40			SPTC 50 (25 for 75mm/50 for 20mm) C 29	13/10/16 3.00	0800 Dry	Extremely to very weak medium to thickly bedded light grey calcareous MUDSTONE. (CORNBRASH FORMATION) Discontinuities: Medium to widely spaced horizontal undulating smooth clean.	20.90-20.91 AZCL. 20.91-21.32 Extremely closely spaced black carbonaceous partings and fragments.	20.90 +16.19		
20.90 - 22.40	99 99 99	330 750 1560					21.48 Drilling induced fracture. 21.82 Drilling induced fracture. 22.15 Drilling induced fracture.	(1.61)		
22.40 - 22.49 22.40 - 23.90			SPTC 50 (25 for 75mm/50 for 15mm) C 30	3.00	Dry	Very weak thinly interlaminated to very thinly interbedded light grey calcareous mudstone and weak clayey LIMESTONE. (CORNBRASH FORMATION) Discontinuities: Very closely to widely spaced horizontal planar smooth clean.	22.40-22.41 AZCL.	22.51 +14.58		
22.40 - 23.90	99 99 99						23.66 Drilling induced fracture.	(2.89)		
23.90 - 23.98 23.90 - 25.40		30 170 600	SPTC 50 (25 for 75mm/50 for 10mm) C 31	3.00	Dry					
23.90 - 25.40	97 87 77						24.90-24.94 AZCL. 25.01 Drilling induced fracture.			
				13/10/16 3.00	1800 Dry					
						END OF EXPLORATORY HOLE		25.40 +11.69		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH02A

Borehole Log

Drilled	DH	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.03 mOD
Logged	NJD	05/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 10.25 m. Open holing from 10.25 m to 10.40 m. Rotary coring from 10.40 to 25.40 m.	1.20	10.40	92	4.50	**Coordinates (m)**	E 384975.00
Checked	AP	**End**		10.40	25.40	121		**National Grid**	N 158798.00
Approved	LL	07/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.10 - 0.20	ES 2			05/10/16	0800	Very stiff dark brown gravelly silty CLAY. Gravel is angular to rounded fine to medium of chert. (TOPSOIL)		(0.20) 0.20 +36.83		
0.10 - 0.20	D 1									
0.30 - 0.40	ES 4									
0.30 - 0.40	D 3									
0.50 - 0.70	B 5					Very stiff light brown becoming brownish grey from 0.60 m gravelly CLAY with low cobble content. Gravel is angular to rounded fine to coarse of chalk, chert and brick. Cobbles are angular of limestone and concrete. (MADE GROUND)		(0.80)		
1.00 - 1.10	ES 7							1.00 +36.03		
1.00 - 1.10	D 6									
1.20 - 2.25	L 17		100% rec		Dry	Stiff greyish brown to brown clayey slightly gravelly SILT with low cobble content. Gravel is angular to rounded fine to coarse of limestone and brick. Cobbles are angular of concrete. (MADE GROUND)				
1.20 - 2.00	B 8							(1.00)		
2.00 - 2.10	ES 9							2.00 +35.03		
2.25 - 2.70	SPTS		N=8 (1,1/2,1,2,3)	0.00	Dry	Firm becoming stiff from 2.80 m light brown mottled orange and grey sandy CLAY with orange clayey sand partings. Sand is fine to medium. (ALLUVIUM)	2.40-2.80 Very sandy.			
2.25 - 3.75	L 18		100% rec		Dry					
2.25 - 2.70	D 10						2.80-3.05 Slightly sandy.	(1.50)		
3.75 - 4.20	SPTS		N=14 (1,3/3,4,4,3)	0.00	Dry	Stiff brownish grey slightly sandy CLAY with orange clayey sandy silt partings. Sand is fine to medium. (Weathered KELLAWAYS FORMATION)		3.50 +33.53		
3.75 - 5.30	L 19		100% rec		Dry			(0.30)		
3.75 - 4.20	D 12					Very stiff grey CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		3.80 +33.23		
3.80 - 3.90	ES 11									
								(2.40)		
5.30 - 5.75	SPTS		N=16 (3,3/3,4,4,5)	0.00	Dry					
5.30 - 6.80	L 20		100% rec		Dry					
5.30 - 5.75	D 13									
						Very stiff grey slightly sandy silty CLAY with occasional calcareous accretions. (KELLAWAYS FORMATION)		6.20 +30.83		
								(0.55)		
6.80 - 7.25	SPTS		N=21 (2,3/4,5,6,6)	0.00	Dry	Very stiff grey CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		6.75 +30.28		
6.80 - 8.30	L 21		100% rec		Dry			(0.35)		
6.80 - 7.25	D 14					Very stiff grey slightly sandy silty CLAY with occasional shell fragments. (KELLAWAYS FORMATION)		7.10 +29.93		
								(0.60)		
						Very stiff grey CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		7.70 +29.33		
								(0.60)		
8.30 - 8.75	SPTS		N=32 (2,4/6,8,8,10)	0.00	Dry	Very stiff grey silty sandy CLAY with moderate shell and fossil fragments. (KELLAWAYS FORMATION)		8.30 +28.73		
8.30 - 9.80	L 22		100% rec		Dry			(0.40)		
8.30 - 8.75	D 15					Very stiff CLAY with occasional silty fine sand partings. Rare shell fragments. (KELLAWAYS FORMATION)		8.70 +28.33		
								(1.55)		
9.80 - 10.25	SPTS		N=27 (5,5/4,6,8,9)	0.00	Dry					
9.80 - 10.25	D 16									

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed
1	6.18		
2	6.22		

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH03

Borehole Log

Drilled	DH	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.03 mOD
Logged	NJD	05/10/2016	Commachio Geo 205	1.20	10.40	92	4.50	**Coordinates (m)**	E 384975.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 10.25 m. Open holing from 10.25 m to 10.40 m. Rotary coring from 10.40 to 25.40 m.	10.40	25.40	121		**National Grid**	N 158798.00
Approved	LL	07/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				05/10/16	1800 Dry			10.25 (0.15) +26.78		
10.40 - 11.15			C 23	06/10/16	0800	NO RECOVERY.	10.40-10.45 AZCL.	10.40 +26.63		
10.40 - 11.15	93 0 0			4.50	6.18	Very stiff grey slightly sandy silty CLAY. Sand is fine to medium. Occasional shell fragments (up to 10mm). (KELLAWAYS FORMATION)	10.87 Drilling induced fracture.	(0.77)		
11.15 - 11.90			C 24			Stiff to very stiff grey thinly laminated CLAY. Rare shell fragments (up to 5mm). (KELLAWAYS FORMATION)		11.17 +25.86		
11.15 - 11.90	100 0 0						11.58 Drilling induced fracture. 11.65-11.87 Moderate shell fragments. 11.89-11.90 CRF.	(0.83)		
11.90 - 12.28				4.50	Wet					
11.90 - 13.40			SPTC 50 (10,12/14,14,19,3 for 5mm) C 25			Soft to firm grey CLAY. Occasional shell fragments (up to 5mm). (KELLAWAYS FORMATION)	11.90-12.55 Reduced strength due to CPT.	12.00 +25.03		
11.90 - 13.40	100 0 0	NA NA NA				Very stiff grey slightly sandy silty CLAY. Sand is fine to medium. Rare shell fragments (up to 5mm). (KELLAWAYS FORMATION)	12.15-12.90 Moderate shell fragments.	(0.54)		
								12.54 +24.49		
								(0.91)		
13.40 - 13.75				4.50	Wet		13.27 Drilling induced fractures.			
13.40 - 14.90			SPTC 50 (5,6/17,20,13 for 50mm) C 26			Soft to firm grey CLAY. (KELLAWAYS FORMATION)	13.34 Drilling induced fractures. 13.40-13.49 AZCL.	13.45 +23.58		
13.40 - 14.90	94 0 0					Stiff to very stiff grey thinly laminated CLAY. Rare shell fragments (up to 5mm). (KELLAWAYS FORMATION)		(0.40)		
								13.85 +23.18		
							14.51 35 degree fracture. 14.73 Drilling induced fracture.			
14.90 - 15.23				4.50	Wet					
14.90 - 16.40			SPTC 50 (13,12/15,19,16 for 30mm) C 27							
14.90 - 16.40	100 0 0	NI 130 350					15.40 Accidental cut. 15.44 Calcareous clasts. 15.51-15.62 Non-intact and reduced strength.	(2.93)		
				06/10/16	1800					
				4.50	Wet					
16.40 - 16.77				4.50	Wet					
16.40 - 17.90			SPTC 50 (9,11/12,15,23 for 75mm) C 28	07/10/16	0000		16.32 Drilling induced fracture. 16.40-16.42 AZCL. 16.42-16.47 Non-intact and reduced strength due to CPT.			
				4.50	6.22					
16.40 - 17.90	99 80 80	NA NA NA				Extremely weak grey sandy MUDSTONE. Occasional shell fragments (up to 10mm). (KELLAWAYS FORMATION)	16.97 Drilling induced fracture. 17.10 Drilling induced fracture. 17.25 Drilling induced fracture.	16.78 +20.25		
								(0.97)		
17.90 - 18.25				4.50	Wet			17.75 +19.28		
17.90 - 19.40		390 450 520	SPTC 50 (10,12/17,17,16 for 50mm) C 29			Medium strong thinly laminated grey and light grey fine to medium grained LIMESTONE. (CORNBRASH FORMATION) Discontinuities: Medium spaced horizontal undulating rough clean.	17.90-17.94 AZCL. 17.94-18.03 Non-intact with trace of firm grey clay infill.	(1.15)		
17.90 - 19.40	97 90 84							18.90 +18.13		
						Weak thinly bedded grey fine to medium grained clayey LIMESTONE with very closely spaced laminae and partings of extremely weak grey silty sandy mudstone. Occasional shell fragments (up to 10mm). (CORNBRASH FORMATION) Discontinuities: Closely to medium spaced horizontal undulating stepped rough.	19.18 Drilling induced fracture. 19.23-19.34 <5 mm firm grey clay infill. 19.29 Drilling induced fracture. 19.40-19.43 CRF. 19.51 Drilling induced fracture. 19.63 Drilling induced fracture.			
19.40 - 19.73		100 190 390		4.50	Wet					
19.40 - 20.90			SPTC 50 (17,8/20,19,11 for 25mm) C 30					(2.10)		
						Hole continues on next sheet				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
11.90 - 24.07	SPT hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole BH03

Borehole Log

Drilled	DH	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	37.03 mOD
Logged	NJD	05/10/2016	Commachio Geo 205	1.20	10.40	92	4.50	**Coordinates (m)**	E 384975.00
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 10.25 m. Open holing from 10.25 m to 10.40 m. Rotary coring from 10.40 to 25.40 m.	10.40	25.40	121		**National Grid**	N 158798.00
Approved	LL	07/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
19.40 - 20.90	100 0 0						20.12 Drilling induced fracture. 20.16-20.41 Extremely closely spaced dark brown to black carbonaceous partings. 20.40 Drilling induced fracture 20.50-21.12 Occasional closely spaced laminae and partings. 20.90-20.94 AZCL. 20.94 Possible <5 mm firm grey clay infill. 21.24 Drilling induced fracture. 21.55 Drilling induced fracture. 21.73 Drilling induced fracture. 21.81 Drilling induced fracture. 21.97 Drilling induced fracture. 22.19 Drilling induced fracture. 22.30 Drilling induced fracture. 22.48-22.50 Extremely closely spaced dark brown to black carbonaceous partings. 22.70 Drilling induced fracture. 22.81 Drilling induced fracture. 23.06-23.12 Non-intact and sandy. 23.48 Drilling induced fracture. 23.64 Drilling induced fracture. 23.90-23.96 AZCL. 24.39-24.42 Mainly non-intact. 24.87-24.93 Mainly non-intact and sandy. 25.02-25.12 Mainly non-intact and sandy. 25.26-25.29 Mainly non-intact and sandy.		
20.90 - 21.06				4.50	Wet					
20.90 - 22.40			SPTC 50 (25 for 75mm/30,20 for 15mm) C 31			Extremely weak to very weak locally thinly laminated greenish grey calcareous MUDSTONE. (CORNBRASH FORMATION) Discontinuities: Very closely to closely spaced horizontal planar smooth.		21.00 +16.03		
20.90 - 22.40	97 97 97	50 150 200						(1.65)		
22.40 - 22.58				4.50	Wet					
22.40 - 23.90			SPTC 50 (25 for 75mm/27,23 for 30mm) C 32			Thinly interlaminated to thinly interbedded very weak light grey calcareous MUDSTONE and weak grey clayey LIMESTONE. (CORNBRASH FORMATION) Discontinuities: Very closely to closely spaced horizontal planar smooth.		22.65 +14.38		
22.40 - 23.90	100 91 80									
23.90 - 24.07		30		4.50	Wet					
23.90 - 25.40		80 140	SPTC 50 (25 for 75mm/35,15 for 20mm) C 33					(2.75)		
23.90 - 25.40	96 89 13									
				07/10/16 4.50	1800 Wet					
						END OF EXPLORATORY HOLE		25.40 +11.63		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH03

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from**	**to**	**Diameter**	**Casing Depth**	**Ground Level**		36.99 mOD
Logged	NJD	14/10/2016	Commachio Geo 205	(m)	(m)	(mm)	(m)	**Coordinates (m)**		E 384977.00
Checked	AP	**End**	Hand excavated trial pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 1.75 m. SPT from 1.75 m to 1.84 m.	1.20	1.75	92		**National Grid**		N 158820.00
Approved	LL	14/10/2016	Terminated at 1.84 m depth due to obstruction. Relocated 2 m NE to BH04A.	1.75	1.84	45				

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
0.10 - 0.20	ES 2			14/10/16	0800
0.10 - 0.20	D 1				
0.40 - 0.50	ES 4				
0.40 - 0.50	D 3				
0.70 - 0.90	B 5				
0.90 - 1.20	B 6				
				14/10/16	1800 Dry
1.75 - 1.84	SPTC		50 (25 for 75mm/50 for 10mm)		Dry

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Dark brown sandy silty angular to subrounded fine to coarse GRAVEL of limestone, clinker and chert. Sand is fine to coarse. (MADE GROUND)		(0.30) 0.30 +36.69		
Very stiff light brown mottled grey slightly gravelly CLAY with orangish brown silty fine sand partings. Gravel is angular coarse of tile. (MADE GROUND)		(0.60) 0.90 +36.09		
Brownish grey sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		(0.85)		
Hole progressed by SPT.		1.75 (0.09) +35.24		
END OF EXPLORATORY HOLE		1.84 +35.15		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
1.20 - 1.84	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04

Borehole Log

Drilled	ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	
Logged	NJD	14/10/2016	Commachio Geo 205 Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 1.75 m. SPT from 1.75 to 1.84.	1.20	1.75	92		**Coordinates (m)**	
Checked	AP	**End**	Terminated at 1.84 m due to obstruction. Relocated 2 m SE to BH04B.	1.75	1.84	45		**National Grid**	
Approved	LL	14/10/2016							

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				14/10/16	0800	Dark brown sandy silty angular to subrounded fine to coarse GRAVEL of limestone, clinker and chert. Sand is fine to coarse. (MADE GROUND)		(0.20) 0.20		
						Very stiff light brown mottled grey slightly gravelly CLAY with orangish brown silty fine sand partings. Gravel is angular coarse of tile. (MADE GROUND)		(0.70) 0.90		
1.20 - 1.65	SPTC		N=26 (6,7/8,7,6,5)		Dry	Brownish grey sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		(0.85)		
				14/10/16	1800 Dry					
1.75 - 1.84	SPTC		50 (25 for 75mm/50 for 10mm)		Dry	Hole progressed by SPT. END OF EXPLORATORY HOLE		1.75 (0.09) 1.84		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
1.20 - 1.84	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04A

Sheet 1 of 1

Borehole Log

Drilled	TP ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	
Logged	JH	14/10/2016	Commachio Geo 205	1.20	8.70	102	3.00	**Coordinates (m)**	
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 8.70 m. Rotary coring from 8.70 m to 25.30m. SPT from 25.30 m to 25.72 m.	8.70	25.30	92		**National Grid**	
Approved	LL	19/10/2016		25.30	25.72	45			

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
				14/10/16	0800
				14/10/16	1800 Dry
1.20	L 1			0.00	Dry
1.20 - 1.75	ES 20		55% rec	17/10/16	0800 Dry
1.75 - 1.84	SPTC		50 (25 for 75mm/50 for 20mm)	0.00	Dry
2.00 - 2.50			L 2 60% rec	0.00	Dry
2.00 - 3.00	100 0 0		ES 21	0.00	Dry
2.50			L 3 60% rec		
2.50 - 3.00					
3.00 - 3.45				3.00	Dry
3.00 - 4.50			SPTS N=13 (2,2/2,3,4,4)	3.00	Dry
3.00			L 4 100% rec		
3.40			D 23 ES 22		
3.00 - 4.50	99 0 0				
4.50 - 4.95				3.00	Dry
4.50 - 6.00			SPTS N=16 (2,2/3,4,4,5)	3.00	Dry
4.50			L 5 100% rec D 24		
4.50 - 6.00	99 0 0	NA NA NA			
6.00 - 6.45				3.00	Dry
6.00 - 7.30			SPTS N=24 (2,3/3,6,7,8)	3.00	Dry
6.00			L 6 100% rec D 25		
6.00 - 7.30	98 0 0				
7.30 - 7.71				3.00	Dry
7.30 - 8.70			SPTS 50 (5,10/16,15,12,7 for 35mm)	3.00	Dry
7.30			L 7 100% rec D 26		
7.30 - 8.80	93 0 0				
				17/10/16	1800
				3.00	Dry
8.80 - 9.22				18/10/16	0800
8.80 - 9.55			SPTS 50 (9,10/11,13,15,11 for 40mm)	3.00	Dry
8.80			C 8 D 27	3.00	Dry
8.80 - 9.55	95 0 0				
9.55 - 10.30			C 9		
9.55 - 10.30	100 100 100				

Strata Description

Main	Detail	Depth, Level (Thickness)
Dark brown gravelly slightly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick, limestone, mudstone and concrete. Occasional rootlets. (MADE GROUND)		(2.00)
Dark brown and grey clayey angular to subangular fine to coarse GRAVEL of mixed lithologies including limestone, basalt and macadam. (MADE GROUND)		2.00 (0.70)
Firm grey mottled orange fissured slightly sandy CLAY. Sand is fine. Occasional pockets of fine sand. (Weathered KELLAWAYS FORMATION)		2.70 (0.90)
Soft to firm dark grey slightly sandy CLAY. Sand is fine to medium. (Weathered KELLAWAYS FORMATION)		3.60 (1.15)
Soft thinly laminated dark grey CLAY. (Weathered KELLAWAYS FORMATION)		4.75 (2.10)
Stiff thinly laminated dark silty CLAY. (Weathered KELLAWAYS FORMATION)		6.85 (0.65)
Soft dark grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine of chert and quartzite. (Weathered KELLAWAYS FORMATION)		7.50 (0.50)
Stiff thinly laminated dark grey CLAY. (Weathered KELLAWAYS FORMATION)		8.00 (0.80)
Soft becoming stiff with depth dark grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine of mixed lithologies including quartzite and chert. (Weathered KELLAWAYS FORMATION)		8.80 (0.55)
Very weak thinly laminated dark grey MUDSTONE. (KELLAWAYS FORMATION) Discontinuities: Medium spaced planar smooth partings along laminae.	9.35-11.06 Rarely grades to soft CLAY in thin beds.	9.35

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks
0.00 - 1.20	No samples required
1.20 - 25.72	SPT Hammer ID: JD3 Er%: 70.62

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04B

Borehole Log

Drilled	TP ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	
Logged	JH	14/10/2016	Commachio Geo 205	1.20	8.70	102	3.00	**Coordinates (m)**	
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 8.70 m. Rotary coring from 8.70 m to 25.30m. SPT from 25.30 m to 25.72 m.	8.70	25.30	92		**National Grid**	
Approved	LL	19/10/2016		25.30	25.72	45			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
10.30 - 10.72								(1.71)		
10.30 - 11.80		100 200 400	SPTC 50 (5,7/12,12,15,11 for 40mm) C 10	3.00	Dry					
10.30 - 11.80	97 97 97	200 250 320				Very weak thinly interlaminated dark grey silty MUDSTONE. (KELLAWAYS FORMATION) Discontinuities: Widely spaced horizontal planar smooth partings along laminae.		11.06		
11.80 - 12.22								(1.04)		
11.80 - 13.30			SPTC 50 (6,9/13,12,13,12 for 40mm) C 11	3.00	Dry		11.80-12.05 Weathered soft grey CLAY.			
		NA NA NA				Firm laminated dark grey CLAY. (KELLAWAYS FORMATION)		12.10		
11.80 - 13.30	96 96 94							(0.50)		
						Very weak thinly laminated dark grey silty MUDSTONE. (KELLAWAYS FORMATION) Discontinuities: Very closely to closely spaced horizontal planar occasionally stepped partings along laminae.	12.60-15.60 Rare brown nodules (up to 10mm). Possibly iron.	12.60		
13.30 - 13.64				3.00	Dry					
13.30 - 14.80			SPTC 51 (12,13/17,19,15 for 35mm) C 12							
13.30 - 14.80	99 99 90	100 150 350						(3.00)		
14.80 - 15.14				3.00	Dry					
14.80 - 16.30			SPTC 50 (11,9/16,14,20 for 45mm) C 13							
14.80 - 16.30	99 94 76							15.60		
		40 120 150				Very weak thinly laminated dark grey slightly silty MUDSTONE with rare laminae of fine sandstone. (KELLAWAYS FORMATION) Discontinuities: Medium spaced and locally closely spaced horizontal planar stepped smooth along laminae partings.		(1.10)		
16.30 - 16.63				3.00	Dry					
16.30 - 17.80			SPTC 50 (12,10/18,16,16 for 30mm) C 14					16.70		
16.30 - 17.80	98 98 93	70 180 280				Weak thinly laminated dark grey silty MUDSTONE. Occasional thin shell-rich beds. Shell content increases with depth. (KELLAWAYS FORMATION) Discontinuities: Medium spaced horizontal rough stepped partings.		(0.79)		
		150 260 260				Medium strong thickly laminated dark grey silty fine to medium grained bioclastic LIMESTONE. (CORNBRASH FORMATION) Discontinuity: horizontal planar rough partings.	17.49-18.00 Sharp upper contact. Rare bioturbation below upper contact.	17.49		
17.80 - 17.90				3.00	Dry			(0.51)		
17.80 - 19.30			SPTC 50 (25 for 75mm/50 for 20mm) C 15 NI NI 100			Strong light grey slightly silty medium grained ooidal and shelly LIMESTONE. (CORNBRASH FORMATION) Discontinuity: Horizontal undulating rough.	18.00-18.30 Occasional disseminations of pyrite. 18.30-18.94 Rare subvertical to vertical veins of calcite.	18.00		
								(0.30)		
17.80 - 19.30	96 90 84	100 NI 500				Very strong thinly and thickly bedded light grey bioclastic slightly sandy fine to medium grained LIMESTONE. (CORNBRASH FORMATION) Discontinuity (Joint): Subvertical (~75 degrees) planar rough with calcitic coating.		18.30		
								(0.64)		
								18.94		
19.30 - 19.40				3.00	Dry	Weak to medium strong lenticular cross-bedded light grey mottled dark grey silty bioclastic medium grained LIMESTONE with beds of poorly consolidated MUDSTONE. Shell content increases with depth. (CORNBRASH FORMATION) Discontinuities: Very closely to closely spaced	19.05-19.10 Non-intact.			
19.30 - 20.80		60 72 590	SPTC 50 (25 for 75mm/50 for 25mm) C 16					(2.09)		

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04B

Borehole Log

Drilled	TP ML	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	
Logged	JH	14/10/2016	Commachio Geo 205	1.20	8.70	102	3.00	**Coordinates (m)**	
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 8.70 m. Rotary coring from 8.70 m to 25.30m. SPT from 25.30 m to 25.72 m.	8.70	25.30	92		**National Grid**	
Approved	LL	19/10/2016		25.30	25.72	45			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
19.30 - 20.80	100 100 92					subhorizontal undulating smooth partings along beds.	20.40-21.03 Becomes medium strong with no mudstone beds.			
20.80 - 22.30			C 17							
20.80 - 22.30	93 93 83	70 150 304		18/10/16 3.00	1800 Dry	Weak poorly bedded dark green mottled light brown occasionally calcareous MUDSTONE. (FOREST MARBLE FORMATION) Discontinuities: Horizontal closely spaced undulating smooth occasionally rough partings along bedding.	21.03-22.85 Rare laminae of carbonaceous MUDSTONE.	21.03 (1.82)		
22.30 - 22.72				3.00	Dry					
22.30 - 23.80			SPTC 50 (5,7/12,12,15,11 for 40mm) C 18	19/10/16 3.00	0800 Dry					
22.30 - 23.80	96 77 75	170 200 250				Weak thinly to thickly laminated dark green and white MUDSTONE with occasional thin laminae of fine grained bioclastic LIMESTONE. (FOREST MARBLE FORMATION) Discontinuities: Closely spaced horizontal planar smooth partings along laminae.		22.85 (0.61) 23.46		
23.80 - 25.30			C 19			Weak to medium strong thickly interlaminated olive green and white MUDSTONE and LIMESTONE. (FOREST MARBLE FORMATION) Discontinuities: Medium spaced horizontal planar rough partings along laminations. One joint vertical stepped rough.		(1.84)		
23.80 - 25.30	66 55 48	40 170 290								
25.30 - 25.72			SPTC 50 (6,9/13,12,13,12 for 50mm)	3.00	Dry	Hole progressed by SPT.		25.30		
				19/10/16 3.00	1800 Dry			(0.42)		
						END OF EXPLORATORY HOLE		25.72		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Trowbridge STW, Wiltshire

Project No. H6100-16

Carried out for Wessex Water Services Limited

Borehole

BH04B

GENERAL NOTES

1. Reproduced from Wessex Water Services Limited's Drawing.
2. Hole Locations to National Grid Co-ordinate Reference System.

LEGEND TO SYMBOLS

Borehole Location

Trial Pit Location

Scale: 1:500

0 5m 10 15 20 25

Rev	Drawn	Date	Approv.	Date	Modification Details
x	x	x	x	x	x

AMENDMENTS

Title

SITE PLAN

Project

TROWBRIDGE STW

Client

WESSEX WATER SERVICES LIMITED

ESG

Date	Drawn By	Approv. By
15/05/2017	BS	AGJ

Sheet Size	Scale	Project No
A3	1:500	H7046-17

Drawing No	Rev
A2	0

DRAFT

Borehole Log

Drilled	DG	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	43.53 mOD
Logged	GP	02/05/2017	Comacchio 205 Tracked Rotary Rig Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 7.20 m. Rotary coring from 7.20 m to 20.00 m	0.00 4.20 7.20	4.20 7.20 20.00	87 76 120	1.50	Coordinates (m)	E 384772.14
Checked	AP	End						National Grid	N 158923.09
Approved	JE	03/05/2017							

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
				02/05/17	0700 Dry
0.40 0.40	ES 1 B 1				
0.80 0.90	ES 2 B 2				
1.20 - 1.65 1.20 1.20 - 2.70			N=11 (1,1/2,2,3,4) ES 3 L 1 100% rec		Dry
1.20 - 2.70	100 0 0				
2.70 - 3.15 2.70 - 4.20			SPTS N=19 (1,2/4,4,5,6) L 2 100% rec	1.50	Dry
2.70 - 4.20	93 0 0				
4.20 - 4.65 4.20 - 5.70			SPTS N=28 (6,5/6,7,7,8) L 3 100% rec	1.50	Dry
4.20 - 5.70	90 0 0				
		NA NA NA			
5.70 - 6.15 5.70 - 7.20			SPTS N=32 (3,5/6,8,8,10) L 4 100% rec	1.50	Dry
5.70 - 7.20	100 0 0				
7.20 - 7.54			SPTS 50 (6,14/16,20,14 for 45mm)	1.50	Wet
7.20 - 8.70	100 0 0				
8.70 - 9.00			SPTC 50 (9,15/21,24,5 for 2mm)	1.50	Wet
8.70 - 10.20	100 0 0				
				02/05/17 1.50	1700 9.70

Strata Description

Main	Detail	Depth	Level	(Thickness)
Strong light grey CONCRETE. 50% subangular to angular fine to coarse aggregate of limestone 10% <10mm small voids. 40% matrix. (MADE GROUND)		0.15 0.35	+43.38 +43.18	(0.15) (0.20)
Reddish brown slightly clayey sandy angular to subangular fine to coarse GRAVEL of limestone with low cobble content. Sand is fine to coarse. Cobbles are subangular of limestone. (MADE GROUND)		0.70	+42.83	(0.35)
Soft to firm orangish brown mottled bluish grey slightly gravelly sandy CLAY. Gravel is subangular to angular fine to coarse limestone and mudstone. Sand is fine to coarse. (Possible MADE GROUND)		1.20	+42.33	(0.50)
Firm orangish brown bluish grey slightly sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		1.90	+41.63	(0.70)
Firm to stiff orangish brown mottled bluish grey slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium mudstone with rare fine angular limestone. (ALLUVIUM)				
Stiff bluish grey mottled orangish brown slightly sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		2.80	+40.73	(0.90)
Stiff grey silty calcareous CLAY. (OXFORD CLAY)		4.20	+39.33	(1.40)
Firm to stiff grey mottled orangish brown silty slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium limestone. Rare shell fragments. (OXFORD CLAY)		5.70	+37.83	(1.50)
Very stiff grey silty slightly gravelly calcareous CLAY. Gravel is subangular to angular fine to coarse limestone. (OXFORD CLAY)		6.20	+37.33	(0.50)
Very stiff grey silty laminated calcareous CLAY. Laminations are gravelly undulating to subhorizontal. (OXFORD CLAY)		7.30	+36.23	(1.10)
Grey LIMESTONE. Recovered as slightly silty angular to subangular fine to coarse gravel. (OXFORD CLAY)		7.40	+36.13	(0.10)
Very stiff grey slightly gravelly silty laminated calcareous CLAY. Laminations are randomly orientated. Gravel is fine to medium subangular limestone. (OXFORD CLAY)		8.70	+34.83	(1.30)
Soft grey silty CLAY. (OXFORD CLAY)		9.20	+34.33	(0.50)
Very stiff to stiff grey silty laminated calcareous CLAY with occasional friable shell fragments within laminations. Laminations are randomly orientated. (OXFORD CLAY)				

Legend / Backfill: water strike 1 at 6.00, rose to 5.80.

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed
1	6.00	Rose to 5.80 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks
7.20 - 20.00	SPT Hammer ID JD03, Energy Ratio 73.24%

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	Geneco Trowbridge STW
Project No.	H7046-17
Carried out for	Wessex Water Services Limited
Borehole	**BH101**

Borehole Log

DRAFT

Drilled	DG	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	43.53 mOD
Logged	GP	02/05/2017	Comacchio 205 Tracked Rotary Rig	0.00	4.20	87	1.50	**Coordinates (m)**	E 384772.14
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 7.20 m. Rotary coring from 7.20 m to 20.00 m	4.20	7.20	76		**National Grid**	N 158923.09
Approved	JE	03/05/2017		7.20	20.00	120			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				03/05/17 1.50	0700 6.60	Very stiff to stiff grey silty laminated calcareous CLAY with occasional friable shell fragments within laminations. Laminations are randomly orientated. (OXFORD CLAY)				
10.20 - 11.70	100 0 0									
11.70 - 13.20	60 0 0							(5.22)		
13.20 - 14.70	100 0 0		Flush: 7.20 - 20.00 Air/mist 100%							
			140			Strong light grey coarse grained LIMESTONE. (OXFORD CLAY)		14.42 (0.14) +29.11		
			140					14.56 +28.97		
			140			Very stiff silty laminated calcareous CLAY with occasional subangular to angular friable shell fragments within laminations. Laminations are randomly orientated. (OXFORD CLAY)				
14.70 - 16.20	100 0 0									
16.20 - 17.70	100 0 0	NA NA NA						(5.44)		
17.70 - 19.20	93 0 0									
19.20 - 20.00	100 0 0			03/05/17 1.50	1700 Wet					
						END OF EXPLORATORY HOLE		20.00 +23.53		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Geneco Trowbridge STW

Project No. H7046-17

Carried out for Wessex Water Services Limited

Borehole

BH101

Trial Pit Log

DRAFT

Logged GP **Checked** AP **Approved** JE	**Start** 04/05/2017 **End** 04/05/2017	**Equipment, Methods and Remarks** Hand excavated trial pit from 0.00 m to 1.20 m	**Dimension and Orientation** Width 0.40 m Length 0.40 m A / D / B / C 90 (Deg)	**Ground Level** 43.20 mOD **Coordinates (m)** E 384761.46 **National Grid** N 158912.40	

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			Brown slightly gravelly clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone. Frequent roots and rootlets (5 to 15mm). (MADE GROUND)		(0.40)		
0.30	ES1						
0.40	B1		Firm orangish brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium of mudstone. Sand is fine to coarse. Occasional rootlets. (ALLUVIUM)		0.40 +42.80		
0.70	B2				(0.80)		
0.80	ES2						
			END OF EXPLORATORY HOLE		1.20 +42.00		

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Dry

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

AGS

Project **Geneco Trowbridge STW**
Project No. **H7046-17**
Carried out for **Wessex Water Services Limited**

Trial Pit

HDP1

Sheet 1 of 1

Trial Pit Log

DRAFT

Logged GP **Checked** AP **Approved** JE	**Start** 03/05/2017 **End** 03/05/2017	**Equipment, Methods and Remarks** Hand excavated trial pit from 0.00 m to 1.20 m	**Dimension and Orientation** Width 0.40 m Length 0.40 m A / D / B / C 90 (Deg)	**Ground Level** 42.82 mOD **Coordinates (m)** E 384766.34 **National Grid** N 158900.90	

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			Strong light grey CONCRETE. 50% subangular to angular fine to coarse aggregated of limestone. 40% matrix. 10% <10mm voids. (MADE GROUND)		(0.15) 0.15 +42.67		
0.20	ES1		Reddish brown sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone with low cobble content. Sand is fine to coarse. Cobbles are subangular of limestone. (MADE GROUND)		(0.20) 0.35 +42.47		
0.40	ES2		Soft orangish brown bluish grey slightly gravelly sandy CLAY with dark grey black staining. Occasional pockets of clay (up to 100mm). Slight hydrocarbon odour. Gravel is subangular firm to weak mudstone. (MADE GROUND)		(0.15) 0.50 +42.32		
0.50 0.50	B1 D1		Firm orangish brown mottled bluish grey slightly sandy CLAY. Sand is fine to coarse. Occasional pockets of black decomposed root fibres (up to 10mm). (ALLUVIUM)		(0.50)		
0.70	ES3						
1.00 1.00 1.10	B2 D2 ES4		Firm bluish grey mottled orangish brown sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		1.00 +41.82 (0.20) 1.20 +41.62		
			END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Dry

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

AGS

Project **Geneco Trowbridge STW**
Project No. **H7046-17**
Carried out for **Wessex Water Services Limited**

Trial Pit

HDP2

Trial Pit Log

DRAFT

Logged GP	**Start** 03/05/2017	**Equipment, Methods and Remarks**	**Dimension and Orientation**	**Ground Level**	42.46 mOD
Checked AP	**End** 03/05/2017	Hand excavated trial pit from 0.00 m to 1.20 m	Width 0.40 m, Length 0.40 m, 90 (Deg)	**Coordinates (m)**	E 384749.46
Approved JE				**National Grid**	N 158883.58

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			Strong light grey CONCRETE. 50% subangular to angular fine to coarse aggregate of limestone. 40% matrix. <10% <10mm small voids. (MADE GROUND)		(0.17)		
0.20	ES1		Reddish brown sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone with low cobble content. Sand is fine to coarse. Cobbles are subangular of limestone. (MADE GROUND)		0.17 +42.29		
					(0.18)		
			Soft bluish grey slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to angular fine to coarse limestone. Cobbles are subangular of limestone. (MADE GROUND)		0.35 +42.11		
0.50	ES2				(0.35)		
0.60	B1						
0.60	D1						
			Firm orangish brown mottled bluish grey slightly sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		0.70 +41.76		
0.80	ES3				(0.20)		
			Firm bluish grey mottled orangish brown slightly sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		0.90 +41.56		
1.00	B2						
1.00	D2				(0.30)		
1.20	ES4		END OF EXPLORATORY HOLE		1.20 +41.26		

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks

Stability Stable

Shoring None

Weather Dr

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project **Geneco Trowbridge STW**

Project No. **H7046-17**

Carried out for **Wessex Water Services Limited**

Trial Pit

HDP3

Sheet 1 of 1

KEY:

BH1 Borehole Location

WS1 Water Sample Location

BH 12 ?

geotechnics

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Client:
Wessex Water Services Limited

Project:

Contaminated Land Improvement Review

Trowbridge STW

Drawing Title:
Exploratory Hole Location Plan
Taken from a drawing supplied by the client

Not To Scale	Date: June 2008
Project No: PE080558	File Name: PE080558_EXP

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW Engineer WESSEX WATER SERVICES LIMITED **Borehole** **BH13** Project No PE080558

Client WESSEX WATER SERVICES LIMITED Ground Level 42.50 m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
							G.L.		42.50
					Concrete ** [MADE GROUND]		0.15		42.35
0.50	E				Hardcore ** [MADE GROUND]		0.25		42.25
1.00	E				Stiff orange brown and grey indistinctly structured slightly sandy CLAY.				
1.50	1.50								
3.00	D				Soft grey slightly sandy CLAY.		3.10		39.40
					Grey CLAY limestone bands **	Below 5.60m: with rare subangular fine to coarse gravel of limestone.	5.60		36.90
7.00	D								
					End of Drillhole		8.00		34.50

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
1.50	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			25/03/08	08:00
8.00	1.50		25/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
5.90	1.50				

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure 1 of 1
02/07/2008

geotechnics

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW Engineer WESSEX WATER SERVICES LIMITED **Borehole** **BH14** Project No PE080558

Client WESSEX WATER SERVICES LIMITED Ground Level 42.20 m AOD

Scale 1:50

Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
							G.L.		42.20
					Soil ** [TOPSOIL]		0.20		42.00
0.50	E				Firm to stiff orange mottled blue - grey slightly sandy CLAY with rare rootlet traces.				
1.00	E								
1.50	1.50								
							1.90		40.30
					Grey CLAY with yellow bands **				
							3.40		38.80
					Grey CLAY with limestone bands **				
							8.00		34.20
					End of Drillhole				

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
1.50	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			25/03/08	08:00
8.00	1.50		25/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered during boring.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure 1 of 1
02/07/2008

geotechnics

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW Engineer WESSEX WATER SERVICES LIMITED **Borehole** **BH15** Project No PE080558

Client WESSEX WATER SERVICES LIMITED Ground Level 43.20 m AOD

Drilling		Properties/Sampling			Strata				
								Scale 1:50	
Core Run/Depth	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	Description General	Description Detail	Depth	Legend	Level m AOD
					Firm to stiff orange mottled blue - grey slightly sandy CLAY with rare rootlet traces.		G.L.		43.20
0.50	E								
1.00	E								
1.50	1.50								
					Grey CLAY with limestone bands **		3.30		39.90
					End of Drillhole		8.00		35.20

Drilling				Progress					Groundwater					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.30	Inspection Pit	AB-OVO	G.L.			20/03/08	08:00						None encountered during boring.
1.50	0.14	ODEX Rotary	AB-OVO	8.00	1.50		20/03/08	18:00						
8.00	0.11	Rotary Open Hole	AB-OVO											

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of; 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with upright lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure 1 of 1
02/07/2008

geotechnics

BOREHOLE RECORD - Rotary

Project CONTAMINATED LAND IMPROVEMENT REVIEW - TROWBRIDGE STW Engineer WESSEX WATER SERVICES LIMITED **Borehole** **BH16** Project No PE080558

Client WESSEX WATER SERVICES LIMITED Ground Level 42.20 m AOD

Scale 1:50

Drilling: Core Run/Depth	Drilling: Depth Cased & (to Water)	Properties/Sampling: Type TCR/SCR%	Properties/Sampling: Length Max/Min	Properties/Sampling: RQD %	Strata: Description General	Strata: Description Detail	Depth	Legend	Level m AOD
					Hardcore gravel ** [MADE GROUND]		G.L.		42.20
0.50	E				Firm to stiff orange mottled blue grey slightly sandy CLAY with rare rootlet traces.		0.30		41.90
1.00	E								
							1.40		40.80
1.50	1.50				Grey and yellow CLAY **				
							2.90		39.30
					Grey CLAY with limestone bands **				
							8.00		34.20
					End of Drillhole				

Drilling

Depth	Dia	Technique	Crew
1.20	0.30	Inspection Pit	AB-OVO
1.50	0.14	ODEX Rotary	AB-OVO
8.00	0.11	Rotary Open Hole	AB-OVO

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			25/03/08	08:00
8.00	1.50		25/03/08	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered during boring.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Borehole set out by Geotechnics Limited and the area was CAT scanned prior to excavation.
Inspection pit hand excavated to 1.20m depth to check for presence of buried services.
E sample consists of: 1 x 1L plastic jar, 1 x 250ml glass jar, 1 x 20ml vial.
** = Drillers' description
A 50mm standpipe was installed to 8.00m with a slotted section from 1.00m to 8.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to ground level.

Figure 1 of 1
02/07/2008

geotechnics

GENERAL NOTES

1. Reproduced from Wessex Water Services Limited's Drawing.
2. Hole Locations to National Grid Co-ordinate Reference System.

LEGEND TO SYMBOLS

Borehole Location

Trial Pit Location

Scale: 1:500

0 5m 10 15 20 25

Rev	Drawn	Date	Approv.	Date	Modification Details
x	x	x	x	x	x

AMENDMENTS

Title

SITE PLAN

Project

TROWBRIDGE STW

Client

WESSEX WATER SERVICES LIMITED

ESG

Date	Drawn By	Approv. By
15/05/2017	BS	AGJ

Sheet Size	Scale	Project No
A3	1:500	H7046-17

Drawing No	Rev
A2	0

Borehole Log

DRAFT

ESG

Drilled	DG	Start	Equipment, Methods and Remarks	Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)	Ground Level	43.53 mOD
Logged	GP	02/05/2017	Comacchio 205 Tracked Rotary Rig	0.00	4.20	87	1.50	Coordinates (m)	E 384772.14
Checked	AP	End	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 7.20 m. Rotary coring from 7.20 m to 20.00 m	4.20	7.20	76		National Grid	N 158923.09
Approved	JE	03/05/2017		7.20	20.00	120			

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
				02/05/17	0700 Dry
0.40	ES 1				
0.40	B 1				
0.80	ES 2				
0.90	B 2				
1.20 - 1.65			N=11 (1,1/2,2,3,4)		Dry
1.20			ES 3		
1.20 - 2.70			L 1 100% rec		
1.20 - 2.70	100 0 0				
2.70 - 3.15			SPTS N=19 (1,2/4,4,5,6)	1.50	Dry
2.70 - 4.20			L 2 100% rec		
2.70 - 4.20	93 0 0				
4.20 - 4.65			SPTS N=28 (6,5/6,7,7,8)	1.50	Dry
4.20 - 5.70			L 3 100% rec		
4.20 - 5.70	90 0 0				
		NA NA NA			
5.70 - 6.15			SPTS N=32 (3,5/6,8,8,10)	1.50	Dry
5.70 - 7.20			L 4 100% rec		
5.70 - 7.20	100 0 0				
7.20 - 7.54			SPTS 50 (6,14/16,20,14 for 45mm)	1.50	Wet
7.20 - 8.70	100 0 0				
8.70 - 9.00			SPTC 50 (9,15/21,24,5 for 2mm)	1.50	Wet
8.70 - 10.20	100 0 0				
				~~02/05/17~~ 1.50	~~1700~~ 9.70

Strata Description

Main	Detail	Depth	Level	(Thickness)
Strong light grey CONCRETE. 50% subangular to angular fine to coarse aggregate of limestone 10% <10mm small voids. 40% matrix. (MADE GROUND)		0.15	+43.38	(0.15)
		0.35	+43.18	(0.20)
Reddish brown slightly clayey sandy angular to subangular fine to coarse GRAVEL of limestone with low cobble content. Sand is fine to coarse. Cobbles are subangular of limestone. (MADE GROUND)		0.70	+42.83	(0.35)
Soft to firm orangish brown mottled bluish grey slightly gravelly sandy CLAY. Gravel is subangular to angular fine to coarse limestone and mudstone. Sand is fine to coarse. (Possible MADE GROUND)		1.20	+42.33	(0.50)
Firm orangish brown bluish grey slightly sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		1.90	+41.63	(0.70)
Firm to stiff orangish brown mottled bluish grey slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium mudstone with rare fine angular limestone. (ALLUVIUM)				
Stiff bluish grey mottled orangish brown slightly sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		2.80	+40.73	(0.90)
Stiff grey silty calcareous CLAY. (OXFORD CLAY)		4.20	+39.33	(1.40)
Firm to stiff grey mottled orangish brown silty slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium limestone. Rare shell fragments. (OXFORD CLAY)		5.70	+37.83	(1.50)
Very stiff grey silty slightly gravelly calcareous CLAY. Gravel is subangular to angular fine to coarse limestone. (OXFORD CLAY)		6.20	+37.33	(0.50)
Very stiff grey silty laminated calcareous CLAY. Laminations are gravelly undulating to subhorizontal. (OXFORD CLAY)		7.30	+36.23	(1.10)
Grey LIMESTONE. Recovered as slightly silty angular to subangular fine to coarse gravel. (OXFORD CLAY)		7.40	+36.13	(0.10)
Very stiff grey slightly gravelly silty laminated calcareous CLAY. Laminations are randomly orientated. Gravel is fine to medium subangular limestone. (OXFORD CLAY)		8.70	+34.83	(1.30)
Soft grey silty CLAY. (OXFORD CLAY)		9.20	+34.33	(0.50)
Very stiff to stiff grey silty laminated calcareous CLAY with occasional friable shell fragments within laminations. Laminations are randomly orientated. (OXFORD CLAY)				

Legend / Backfill: 1 (water strike symbols at 5.70–6.20)

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed
1	6.00	Rose to 5.80 m after 20 minutes.	

Depth Related Remarks

Depths (m)	Remarks
7.20 - 20.00	SPT Hammer ID JD03, Energy Ratio 73.24%

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	Geneco Trowbridge STW
Project No.	H7046-17
Carried out for	Wessex Water Services Limited
Borehole	BH101

Borehole Log

DRAFT

Drilled	DG	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	43.53 mOD
Logged	GP	02/05/2017	Comacchio 205 Tracked Rotary Rig	0.00	4.20	87	1.50	**Coordinates (m)**	E 384772.14
Checked	AP	**End**	Hand excavated inspection pit from 0.00 m to 1.20 m. Dynamic sampling from 1.20 m to 7.20 m. Rotary coring from 7.20 m to 20.00 m	4.20	7.20	76		**National Grid**	N 158923.09
Approved	JE	03/05/2017		7.20	20.00	120			

Samples and Tests

Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
				03/05/17 1.50	0700 6.60	Very stiff to stiff grey silty laminated calcareous CLAY with occasional friable shell fragments within laminations. Laminations are randomly orientated. (OXFORD CLAY)				
10.20 - 11.70	100 0 0									
11.70 - 13.20	60 0 0							(5.22)		
13.20 - 14.70	100 0 0		Flush: 7.20 - 20.00 Air/mist 100%							
			140			Strong light grey coarse grained LIMESTONE. (OXFORD CLAY)		14.42 (0.14) +29.11		
			140					14.56 +28.97		
			140			Very stiff silty laminated calcareous CLAY with occasional subangular to angular friable shell fragments within laminations. Laminations are randomly orientated. (OXFORD CLAY)				
14.70 - 16.20	100 0 0									
16.20 - 17.70	100 0 0	NA NA NA						(5.44)		
17.70 - 19.20	93 0 0									
19.20 - 20.00	100 0 0			03/05/17 1.50	1700 Wet					
						END OF EXPLORATORY HOLE		20.00 +23.53		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Geneco Trowbridge STW

Project No. H7046-17

Carried out for Wessex Water Services Limited

Borehole

BH101

Trial Pit Log

DRAFT

Logged GP **Checked** AP **Approved** JE	**Start** 04/05/2017 **End** 04/05/2017	**Equipment, Methods and Remarks** Hand excavated trial pit from 0.00 m to 1.20 m	**Dimension and Orientation** Width 0.40 m Length 0.40 m A / D / B / C 90 (Deg)	**Ground Level** 43.20 mOD **Coordinates (m)** E 384761.46 **National Grid** N 158912.40	

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			Brown slightly gravelly clayey fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone. Frequent roots and rootlets (5 to 15mm). (MADE GROUND)		(0.40)		
0.30	ES1						
0.40	B1		Firm orangish brown slightly gravelly sandy CLAY. Gravel is subangular fine to medium of mudstone. Sand is fine to coarse. Occasional rootlets. (ALLUVIUM)		0.40 +42.80		
0.70	B2				(0.80)		
0.80	ES2						
			END OF EXPLORATORY HOLE		1.20 +42.00		

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Dry

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

AGS

Project **Geneco Trowbridge STW**
Project No. **H7046-17**
Carried out for **Wessex Water Services Limited**

Trial Pit

HDP1

Sheet 1 of 1

Trial Pit Log

DRAFT

Logged GP **Checked** AP **Approved** JE	**Start** 03/05/2017 **End** 03/05/2017	**Equipment, Methods and Remarks** Hand excavated trial pit from 0.00 m to 1.20 m	**Dimension and Orientation** Width 0.40 m Length 0.40 m A / D / B / C 90 (Deg)	**Ground Level** 42.82 mOD **Coordinates (m)** E 384766.34 **National Grid** N 158900.90	

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			Strong light grey CONCRETE. 50% subangular to angular fine to coarse aggregated of limestone. 40% matrix. 10% <10mm voids. (MADE GROUND)		(0.15) 0.15 +42.67		
0.20	ES1		Reddish brown sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone with low cobble content. Sand is fine to coarse. Cobbles are subangular of limestone. (MADE GROUND)		(0.20) 0.35 +42.47		
0.40	ES2		Soft orangish brown bluish grey slightly gravelly sandy CLAY with dark grey black staining. Occasional pockets of clay (up to 100mm). Slight hydrocarbon odour. Gravel is subangular firm to weak mudstone. (MADE GROUND)		(0.15) 0.50 +42.32		
0.50 0.50	B1 D1		Firm orangish brown mottled bluish grey slightly sandy CLAY. Sand is fine to coarse. Occasional pockets of black decomposed root fibres (up to 10mm). (ALLUVIUM)		(0.50)		
0.70	ES3						
1.00 1.00 1.10	B2 D2 ES4		Firm bluish grey mottled orangish brown sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		1.00 +41.82 (0.20) 1.20 +41.62		
			END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks

Stability Stable
Shoring None
Weather Dry

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

AGS

Project **Geneco Trowbridge STW**
Project No. **H7046-17**
Carried out for **Wessex Water Services Limited**

Trial Pit

HDP2

Trial Pit Log

DRAFT

Logged GP	**Start** 03/05/2017	**Equipment, Methods and Remarks**	**Dimension and Orientation**	**Ground Level**	42.46 mOD
Checked AP	**End** 03/05/2017	Hand excavated trial pit from 0.00 m to 1.20 m	Width 0.40 m, Length 0.40 m, 90 (Deg)	**Coordinates (m)**	E 384749.46
Approved JE				**National Grid**	N 158883.58

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			Strong light grey CONCRETE. 50% subangular to angular fine to coarse aggregate of limestone. 40% matrix. <10% <10mm small voids. (MADE GROUND)		(0.17)		
0.20	ES1		Reddish brown sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone with low cobble content. Sand is fine to coarse. Cobbles are subangular of limestone. (MADE GROUND)		0.17 +42.29		
					(0.18)		
			Soft bluish grey slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to angular fine to coarse limestone. Cobbles are subangular of limestone. (MADE GROUND)		0.35 +42.11		
0.50	ES2				(0.35)		
0.60	B1						
0.60	D1						
			Firm orangish brown mottled bluish grey slightly sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		0.70 +41.76		
0.80	ES3				(0.20)		
			Firm bluish grey mottled orangish brown slightly sandy CLAY. Sand is fine to coarse. (ALLUVIUM)		0.90 +41.56		
1.00	B2						
1.00	D2				(0.30)		
1.20	ES4		END OF EXPLORATORY HOLE		1.20 +41.26		

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks

Stability Stable

Shoring None

Weather Dr

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

Project **Geneco Trowbridge STW**

Project No. **H7046-17**

Carried out for **Wessex Water Services Limited**

Trial Pit

HDP3

Sheet 1 of 1

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key Plan

Legend

- BH01 — Borehole Location
- DCP01 — DCP TRL Test Location
- HP01 — Hand Pit Location

Rev	Date	Details of issue / revision	Drw	Rev
P1	17.12.20	FINAL	IW	LC

Issues & Revisions

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

- Birmingham | 0121 233 3322
- Leeds | 0113 233 8000
- London | 020 7234 9122
- Manchester | 0161 233 4260
- Nottingham | 0115 924 1100

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Client
WESSEX WATER SERVICES LTD

Project Title
TROWBRIDGE WRC

Drawing Title
EXPLORATORY HOLE LOCATION PLAN

Drawn:	I. WORT	Reviewed:	L. CROSS
BWB Ref:	BMG2109	Date: 17.12.20	Scale@A3: NTS

Drawing Status
FINAL

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
TBWRC-BWB-ZZ-XX-DR-YE-0001	S1	R1

C:\Users\imogen.wort\Desktop\Trowbridge EHLP.dwg

APPENDICES

Appendix 1: Exploratory Hole Records

BOREHOLE LOG

Scale 1:50 Sheet 1 of 3

LOCATION ID	Project Name:	Trowbridge WRC			Ground Level (m AOD):	36.19		
BH01	Project Number:	BMG2109			Eastings:	385008.60		
	Client:	Wessex Water Services Ltd			Northings:	158786.11		
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date:	10/11/2020 - 11/11/2020	Engineer:	IW	Checker:	LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
		[0.20]	Dark greyish brown slightly clayey GRAVEL of angular coarse limestone and mudstone. Plastic net membrane at base. (Made Ground)	0.20						B1	0.20 - 0.50m		
		35.99 [0.30]								D1	0.50 - 0.50m		
		35.69 [2.00]	Soft greyish brown slightly gravelly CLAY. Gravel is angular to subangular fine to coarse brick, concrete and limestone. (Made Ground)	0.50						ES1	0.70 - 0.70m		
			Loose dark greyish brown gravelly silty fine to coarse SAND with a moderate cobble content. Gravel is angular to subangular fine to coarse brick, concrete, mudstone and ash with frequent glass and ceramic inclusions. Cobbles are angular to subangular concrete. (Made Ground)							S	1.20	N=5 (1,1/2,1,1,1)	
										D2	1.20 - 1.65m		
										D3	1.70 - 1.70m		
										S	2.00	N=0 (1,1/0,0,0,0)	1.70m (NR)
										D4	2.00 - 2.45m		
		33.69 [1.00]	Very soft orangish brown and dark brown silty CLAY. (Kellaways Formation)	2.50						D5	2.50 - 2.50m		
										S	3.00	N=2 (1,0/0,0,1,1)	3.00m (NR)
										B2	3.00 - 3.00m		
										D6	3.00 - 3.00m		
		32.69 [1.20]	Very soft to soft orangish brown mottled grey silty CLAY with frequent fine sandy lenses. (Kellaways Formation)	3.50						ES2	3.00 - 3.45m		
										D7	3.00 - 3.50m		
										UT1 (17)	3.50 - 3.50m		
											4.00 - 4.45m		
										D8	4.50 - 4.50m		
		31.49 [0.80]	Soft greyish brown sandy CLAY. Sand is fine and medium. (Kellaways Formation)	4.70						D9	4.70 - 4.70m		
										S	5.00	N=6 (0,1/1,1,2,2)	4.70m (NR)
										D10	5.00 - 5.45m		
		30.69 [11.00]	Firm dark grey mottled light grey thinly laminated slightly sandy CLAY. Sand is fine and medium. (Kellaways Formation)	5.50						D11	5.50 - 5.50m		
										UT2 (29)	6.00 - 6.45m		
										D12	6.50 - 6.50m		
										B3	7.00 - 7.00m		
										D13	7.00 - 7.50m		
										S	7.50	N=16 (2,2/2,4,4,6)	6.00m (NR)
										D14	7.50 - 7.95m		
										D15	8.50 - 8.50m		
										UT3 (37)	9.00 - 9.45m		
										D16	9.50 - 9.50m		

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole backfilled with bentonite and arisings upon completion. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 16.50m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 6.00m bgl using 150mm casing and to 16.50m using rotary casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

BOREHOLE LOG

LOCATION ID	Project Name:	Trowbridge WRC	Ground Level (m AOD):	36.19
BH01	Project Number:	BMG2109	Eastings:	385008.60
	Client:	Wessex Water Services Ltd	Northings:	158786.11
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date:	10/11/2020 - 11/11/2020
	Engineer:	IW	Checker:	LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Firm dark grey mottled light grey thinly laminated slightly sandy CLAY. Sand is fine and medium. (Kellaways Formation)								D17	10.00 - 10.00m		
											S D18	10.50 10.50 - 10.95m	N=36 (1,4/8,9,9,10)	6.00m (NR)
											D19	11.50 - 11.50m		
											UT4	12.00 - 12.45m		
											D20	12.40 - 12.40m		
											D21	13.00 - 13.00m		
											S D22	13.50 13.50 - 13.95m	N=36 (3,4/6,8,10,12)	6.00m (NR)
											D23	14.00 - 14.00m		
											S D24	15.00 15.00 - 15.45m	N=44 (4,7/9,10,10,15)	6.00m (NR)
											D25	16.00 - 16.00m		
		19.69 [1.80]	Strong thinly laminated grey sandy MUDSTONE with frequent fine and medium shell fragments. Sand is fine and medium. Medium and coarse sand along fractures. (Kellaways Formation)		16.50	16.50 - 18.00	87	80	80	2	S D26 C1	16.50 16.50 - 16.95m 16.57 - 17.20m	50 (7,11/50 for 150mm)	6.00m (NR)
											C2	17.20 - 17.61m		
		17.89 [2.10]	Moderately strong light and dark grey fine grained SANDSTONE with very frequent shell fragments. Clayey along fractures with thin weak grey mudstone beds.		18.30	18.00 - 19.50	99	73	63	12	C3	18.18 - 18.40m		
											C4	18.45 - 18.61m		
											C5	18.88 - 19.20m		

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole backfilled with bentonite and arisings upon completion. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 16.50m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 6.00m bgl using 150mm casing and to 16.50m using rotary casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

BOREHOLE LOG

Scale 1:50 Sheet 3 of 3

LOCATION ID	Project Name:	Trowbridge WRC	Ground Level (m AOD):	36.19
BH01	Project Number:	BMG2109	Eastings:	385008.60
	Client:	Wessex Water Services Ltd	Northings:	158786.11
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date: 10/11/2020 - 11/11/2020	Engineer: IW / Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Moderately strong light and dark grey fine grained SANDSTONE with very frequent shell fragments. Clayey along fractures with thin weak grey mudstone beds. (Kellaways Formation)							C6	19.20 - 19.46m		
					19.50 - 21.00	99	85	76	10	C7	19.58 - 19.72m		
										C8	19.85 - 20.10m		
		15.79 [1.10]	Very weak light greenish grey MUDSTONE recovered as very stiff clay. (Kellaways Formation)	20.40						C9	20.27 - 20.39m		
			20.70m - 21.00m: Becoming dark grey.							C10			
										C11	20.40 - 20.55m		
											20.55 - 20.90m		
		14.69 [3.50]	Strong thinly laminated greenish grey MUDSTONE mottled reddish brown along fractures. Fractures filled with clay and gravel. (Kellaways Formation)	21.50	21.00 - 22.50	99	34	85	10	C12	21.07 - 21.20m		
										C13	21.23 - 21.43m		
										C14	21.50 - 22.22m		
										C15	22.23 - 22.63m		
			23.00m - 24.00m: Becoming slightly sandy.		22.50 - 24.00	89	83	83	6	C16	22.70 - 22.82m		
					24.00 - 25.00	60	47	35	9	C17	24.16 - 24.39m		
										C18	24.40 - 24.45m		
										C19	24.52 - 24.56m		
		11.19	Hole Terminated at 25.00m bgl.	25.00									

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole backfilled with bentonite and arisings upon completion. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 16.50m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 6.00m bgl using 150mm casing and to 16.50m using rotary casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

BOREHOLE LOG

Scale 1:50 Sheet 1 of 3

LOCATION ID	Project Name:	Trowbridge WRC			Ground Level (m AOD):	36.10	
BH02	Project Number:	BMG2109			Eastings:	385021.58	
	Client:	Wessex Water Services Ltd			Northings:	158787.55	
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date:	11/11/2020 - 12/11/2020	Engineer:	IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & (Thickness (m))	Description	Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
		[0.20]	Dark greyish brown slightly clayey GRAVEL of angular coarse limestone and mudstone. Plastic net membrane at base. (Made Ground)	0.20						B1	0.30 - 0.30m		
		35.90 [0.50]								ES1	0.30 - 0.50m		
		35.40 [2.30]	Dark greyish brown sandy clayey GRAVEL of angular to subangular fine to coarse brick, concrete, mudstone, limestone with rare glass and ceramic inclusions. (Made Ground)	0.70						D1	0.50 - 0.50m		
										ES2	1.00 - 1.00m		
			Soft friable dark greyish black gravelly very sandy CLAY. Gravel is angular to subangular fine to coarse brick, ash and concrete with rare glass, ceramic and wood inclusions. Sand is fine to coarse. (Made Ground)							S		N=4 (1,0/1,1,1,1)	
										D2	1.20 - 1.65m		
										S	2.00	N=3 (1,2/1,1,0,1)	1.70m (NR)
										B2	2.00 - 2.45m		
										D3	2.00 - 3.00m		
		33.10 [1.50]	Soft dark greyish brown and reddish brown slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse brick, ash and concrete with rare glass, ceramic and wood inclusions. Sand is fine to coarse. (Made Ground)	3.00						S	3.00	N=2 (1,0/1,0,1,0)	3.00m (NR)
										D4	3.00 - 3.45m		
										D5	3.50 - 3.50m		
										S	4.00	N=4 (0,0/1,1,1,1)	3.00m (NR)
										B3	4.00 - 4.00m		
										D6			
										ES3	4.00 - 4.45m		
		31.60 [1.00]	Soft to firm orangish brown mottled light grey silty CLAY with frequent orangish brown fine sandy lenses. (Kellaways Formation)	4.50						D7	4.00 - 4.45m		
										UT1 (22)	4.50 - 4.50m		
											5.00 - 5.45m		
		30.60 [3.50]	Firm dark grey silty CLAY with rare orangish brown mottling and fine sandy lenses. (Kellaways Formation)	5.50						D8	5.50 - 5.50m		
										D9	5.70 - 5.70m		
										S	6.00	N=18 (1,2/3,4,5,6)	4.70m (NR)
										D10	6.00 - 6.45m		
										D11	6.50 - 6.50m		
										B4	7.00 - 7.50m		
										UT2 (23)	7.50 - 7.95m		
										D12	8.00 - 8.00m		
										D13	8.50 - 8.50m		
		27.10 [6.00]	Firm to stiff dark grey silty CLAY with frequent fine and medium shell fragments and dark and light grey	9.00						S	9.00	N=21 (2,3/4,5,6,6)	4.70m (NR)
										D14	9.00 - 9.45m		

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 15.00m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 4.70m bgl using 150mm casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

BOREHOLE LOG

Scale 1:50 Sheet 2 of 3

LOCATION ID	Project Name:	Trowbridge WRC			Ground Level (m AOD):	36.10	
BH02	Project Number:	BMG2109			Eastings:	385021.58	
	Client:	Wessex Water Services Ltd			Northings:	158787.55	
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date:	11/11/2020 - 12/11/2020	Engineer:	IW	Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & (Thickness (m))	Description	Legend / Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Firm to stiff dark grey silty CLAY with frequent fine and medium shell fragments and dark and light grey fine sandy lenses. (Kellaways Formation)							D15	10.00 - 10.00m		
										UT3 (48)	10.50 - 10.95m		
										D16	11.00 - 11.00m		
										D17	11.50 - 11.50m		
										S D18	12.00 12.00 - 12.45m	N=32 (2,4/6,8,8,10)	4.70m (NR)
										D19	13.00 - 13.00m		
										S D20	13.50 13.50 - 13.95m	N=42 (3,6/6,9,12,15)	4.70m (NR)
										D21	14.00 - 14.00m		
		21.10 [1.65]	Very stiff dark grey silty CLAY. Weathered reddish brown along fractures. (Kellaways Formation)	15.00	15.00 - 16.50	97	93	91	1	S D22	15.00 15.00 - 15.45m	50 (8,9/50 for 150mm)	4.70m (NR)
		19.45 [2.05]	Strong thinly laminated grey sandy MUDSTONE with frequent fine and medium shell fragments. Sand is fine and medium. Medium and coarse sand along fractures. (Kellaways Formation)	16.65	16.50 - 18.00	89	89	89	2	C1 C2	16.63 - 16.81m 16.81 - 17.14m		
		17.40 [2.15]	Moderately strong light and dark grey fine grained	18.70	18.00 - 19.50	97	86	82	11	C3 C4 C5	18.00 - 18.27m 18.29 - 18.53m 18.72 - 18.96m		

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 15.00m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 4.70m bgl using 150mm casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

BOREHOLE LOG

Scale 1:50 Sheet 3 of 3

LOCATION ID	Project Name:	Trowbridge WRC	Ground Level (m AOD):	36.10
BH02	Project Number:	BMG2109	Eastings:	385021.58
	Client:	Wessex Water Services Ltd	Northings:	158787.55
Hole Type: CP+RC	Rig:	Dando 3000 and Comacchio GEO205	Start & End Date: 11/11/2020 - 12/11/2020	Engineer: IW / Checker: LC

Boring		Strata			Rock Core Details					Samples and In-Situ Testing			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend / Depth (m bgl)	Core Run	TCR (%)	SCR (%)	RQD (%)	FI (Spacing Min, Avg, Max)	Type	Depth (m)	Result	Casing Depth (Water Level)
			Moderately strong light and dark grey fine grained SANDSTONE with very frequent shell fragments. Clayey along fractures with thin weak grey mudstone beds. (Kellaways Formation)							C6	19.20 - 19.45m		
					19.50 - 21.00	98	85	80	10	C7	19.83 - 21.04m		
		15.25 [3.15]	Very weak light greenish grey MUDSTONE recovered as very stiff clay. (Kellaways Formation)	20.85						C8	21.20 - 21.67m		
					21.00 - 22.50	93	87	87	7	C9	21.82 - 22.05m		
										C10	22.05 - 22.27m		
					22.50 - 24.00	95	79	88	11	C11	23.30 - 23.62m		
		12.10 [1.00]	Strong thinly laminated greenish grey MUDSTONE mottled reddish brown along fractures. Fractures filled with clay and gravel. (Kellaways Formation)	24.00						C12	24.00 - 24.33m		
					24.00 - 25.00	100	70	46	15	C13	24.57 - 24.70m		
										C14	24.84 - 24.93m		
		11.10	Hole Terminated at 25.00m bgl.	25.00									

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole drilled using cable percussive techniques to 15.00m bgl, with rotary coring to 25.00m bgl. 4. Borehole cased to 4.70m bgl using 150mm casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

BOREHOLE LOG

Scale 1:50 Sheet 1 of 2

LOCATION ID					
BH03	**Project Name:** Trowbridge WRC			**Ground Level (m AOD):** 35.73	
	Project Number: BMG2109			**Eastings:** 385014.77	
	Client: Wessex Water Services Ltd			**Northings:** 158701.01	
Hole Type: CP	**Rig:** Dando 3000	**Start & End Date:** 12/11/2020		**Engineer:** IW	**Checker:** LC

Boring		Strata			Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (Ublows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		[0.50]	Dark greyish brown slightly clayey GRAVEL of angular coarse limestone and mudstone. Plastic net membrane at base. (Made Ground)									
		35.23 [0.50]			0.50	1	0.50	0.50				
			Soft brown, orangish brown and reddish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, brick, mudstone, concrete and quartzite. (Made Ground)			1	0.50	1.00				
		34.73 [3.50]			1.00	1	0.70	0.70				
			Very soft dark greyish black slightly gravelly slightly sandy silty CLAY with rare rootlets. Gravel is angular fine to coarse brick and concrete. Sand is fine to coarse. (Made Ground)			2	1.20	1.65	SPT	1.20	N=3 (1,0/0,1,1,1)	
						3	1.70	1.70				
						4	2.00	2.45	SPT	2.00	N=3 (0,0/3,0,0,0)	1.70m (NR)
						5	2.50	2.50				
						2	3.00	3.45	SPT	3.00	N=4 (1,0/1,1,1,1)	3.00m (NR)
						6	3.00	3.50				
						2	3.50	3.50				
						7	3.50					
						8	4.00	4.45	SPT	4.00	N=5 (1,1/1,1,1,2)	3.00m (NR)
		31.23 [3.00]			4.50	9	4.50	4.50				
			Soft light greyish brown mottled orangish brown and black sandy silty CLAY. Sand is fine and medium. (Made Ground)			1	5.00	5.45				
						(9)						
			5.50m: Clay pipe fragment.			10	5.50	5.50				
						3	5.50	6.00				
						3	5.50					
						11	6.00	6.45	SPT	6.00	N=16 (3,5/4,4,4,4)	6.00m (NR)
			6.50m: Metal fragment.			12	6.50	6.50				
						13	6.80	6.80				
		28.23 [4.95]			7.50	2	7.50	7.45				
			Stiff dark grey silty CLAY with fine and medium shell fragments. (Kellaways Formation)			4	7.50	7.50				
						4	7.50	8.00				
						(29)						
						14	8.50	8.50				
						15	9.00	9.45	SPT	9.00	N=27 (3,3/8,8,5,6)	7.50m (NR)

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth, as specified by consultant engineer.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole cased to 7.5m bgl using 150mm casing and to 15.00m bgl using rotary casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

BOREHOLE LOG

Scale 1:50 Sheet 2 of 2

LOCATION ID					
BH03	**Project Name:** Trowbridge WRC			**Ground Level (m AOD):**	35.73
	Project Number: BMG2109			**Eastings:**	385014.77
	Client: Wessex Water Services Ltd			**Northings:**	158701.01
Hole Type: CP	**Rig:** Dando 3000	**Start & End Date:**	12/11/2020	**Engineer:** IW	**Checker:** LC

Boring		Strata				Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (Ublows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
			Stiff dark grey silty CLAY with fine and medium shell fragments. (Kellaways Formation)			16	10.00	10.00				
						3 (39)	10.50	10.95				
						17	11.00	11.00				
						18	11.50	11.50				
						19	12.00	12.45	SPT	12.00	N=30 (2,4/6,7,7,10)	7.50m (NR)
		23.28	Hole Terminated at 12.45m bgl.		12.45							

Chiseling		
From (m bgl)	To (m bgl)	Time (hh:mm)

Water Added		
From (m bgl)	To (m bgl)	Volume (l)

Remarks

Reason for Termination:

Terminated at target depth, as specified by consultant engineer.

Groundwater Remarks:

No groundwater encountered.

Other Remarks:

1. Borehole installed with dual 50mm and 19mm HPDE pipe, gas taps, bungs and flush cover. 2. No visual or olfactory evidence of contamination noted. 3. Borehole cased to 7.5m bgl using 150mm casing and to 15.00m bgl using rotary casing.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	Project Name:	Trowbridge WRC		0.50
HP01	Project Number:	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	Start & End Date:	10/11/2020	Stability: Fair
Ground Level (m AOD):	43.04	Eastings & Northings:	384716E 158696N	Engineer: IW / Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		42.84	Grass covered soft dark brown silty CLAY. Rootlets present throughout. (Topsoil)			D1	0.10	0.10			
		0.20m				ES1	0.10	0.10			
		42.84	Soft to firm brown and orangish brown slightly gravelly silty CLAY. Gravel is angular medium and coarse concrete and limestone. (Made Ground)		0.20	D2	0.30	0.30			
		0.30m				ES2	0.30	0.30			
		42.54	Soft light orangish brown mottled greyish brown silty CLAY. Frequent orangish brown sandy lenses throughout. (Kellaways Formation)		0.50	D3	0.60	0.60			
						ES3	0.60	0.60			
						B1	0.80	0.80			
		0.70m									
		41.84	Hole Terminated at 1.20m bgl.		1.20						

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	Project Name:	Trowbridge WRC		0.50
HP02	Project Number:	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	Start & End Date:	10/11/2020	Stability: Fair
Ground Level (m AOD):	42.49	Eastings & Northings:	384758E 158724N	Engineer: IW / Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m 42.29	Grass covered soft dark brown silty CLAY. Rootlets present throughout. (Topsoil)			D1 ES1	0.10 0.10	0.10 0.10			
		0.30m 41.99	Soft to firm brown and orangish brown slightly gravelly silty CLAY. Gravel is angular medium and coarse concrete and limestone. Limestone cobble at base. (Made Ground) *0.30m - 0.50m: Becoming very gravelly.* Hole Terminated at 0.50m bgl.		0.20 0.50	D2 ES2	0.30 0.30	0.30 0.30			

Remarks

Reason for Termination:

Terminated on limestone cobble.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	Project Name:	Trowbridge WRC		
HP03	Project Number:	BMG2109		
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	Start & End Date:	10/11/2020	
Ground Level (m AOD):	41.94	Eastings & Northings:	384846E 158813N	

0.50

0.50 Pit Dimensions (m) Degrees

Stability: Fair

Engineer: IW Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m 41.74	Grass covered soft dark brown silty CLAY. Rootlets present throughout. (Topsoil)			D1 ES1	0.10 0.10	0.10 0.10			
		1.00m	Soft light orangish brown mottled greyish brown silty CLAY. Frequent orangish brown sandy lenses throughout. (Kellaways Formation)		0.20	D2 ES2	0.50 0.50	0.50 0.50			
		40.74	Hole Terminated at 1.20m bgl.		1.20	B1	1.00	1.00			

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	Project Name:	Trowbridge WRC		0.50
HP04	Project Number:	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	Start & End Date:	10/11/2020	Stability: Fair
Ground Level (m AOD):	38.10	Eastings & Northings:	384919E 158761N	Engineer: IW / Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m / 37.90	Grass covered soft friable dark brown very gravelly CLAY with a moderate cobble content. Gravel is angular to rounded fine to coarse mudstone, quartzite and concrete. Cobbles are subangular concrete. Woven plastic membrane at base. Rootlets present throughout. (Made Ground)		0.20	D1 ES1	0.10 0.10	0.10 0.10			
		1.00m	Soft friable orangish brown slightly gravelly silty CLAY. Gravel is angular fine to coarse brick and flint. Frequent orange sandy lenses throughout. (Made Ground)			D2 ES2	0.50 0.50	0.50 0.50			
						B1	1.00	1.00			
		36.90	Hole Terminated at 1.20m bgl.		1.20						

Remarks

Reason for Termination:

Terminated at target depth.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	**Project Name:**	Trowbridge WRC		0.50
HP05	**Project Number:**	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	**Start & End Date:**	10/11/2020	Stability: Fair
Ground Level (m AOD):	37.20	**Eastings & Northings:**	384970E 158822N	Engineer: IW / Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.30m 36.90	Grass covered soft friable dark greyish brown sandy gravelly CLAY with a moderate cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse asphalt, brick, concrete, quartzite and mudstone with frequent glass and ceramic inclusions. Cobbles are angular to subangular brick and concrete. Rootlets present throughout.			ES1	0.10	0.10			
		0.15m 36.75	(Made Ground) Dark greyish brown slightly clayey GRAVEL of angular coarse limestone.		0.30	B1 D1 ES2 D2 ES3	0.20 0.20 0.20 0.35 0.35	0.20 0.20 0.20 0.35 0.35			
		0.25m 36.50	(Made Ground) Soft friable orangish brown mottled brown slightly gravelly silty CLAY. Gravel is angular to subangular fine and medium brick, mudstone and rare ash.		0.45	B2 D3 ES4	0.50 0.50 0.50	0.50 0.50 0.50			
		36.50 0.00m	(Made Ground) Concrete. (Made Ground)		0.70 0.70						
			Hole Terminated at 0.70m bgl.								

Remarks

Reason for Termination:

Terminated on concrete obstruction.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

BWB CONSULTANCY | ENVIRONMENT INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	Project Name:	Trowbridge WRC		0.50
HP06	Project Number:	BMG2109		0.50 Pit Dimensions (m) Degrees
	Client:	Wessex Water Services Ltd		
	Plant: Hand tools	Start & End Date:	10/11/2020	Stability: Fair
Ground Level (m AOD):	35.72	Eastings & Northings:	385033E 158747N	Engineer: IW / Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.15m 35.57	Grass covered soft dark brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse brick, mudstone, ash and rare asphalt. Woven plastic membrane at base. Rootlets present throughout. (Made Ground)		0.15	D1 ES1	0.10 0.10	0.10 0.10			
		0.35m 35.22	Soft orangish brown mottled brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse flint and mudstone. Rootlets present throughout. (Made Ground)		0.50	D2 ES2	0.20 0.20	0.20 0.20	HSV	0.40	(91, 73, 70)kPa
			0.40m: Plastic pipe, approximately 30mm diameter.								
		0.50m	Soft dark brown slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse brick and flint with rare glass and metal inclusions. (Made Ground)			B1 D3 ES3	0.60 0.60 0.60	0.60 0.60 0.60			
		34.72 34.72 0.00m	Obstruction. (Made Ground)		1.00 1.00						
			Hole Terminated at 1.00m bgl.								

Remarks

Reason for Termination:

Terminated on obstruction.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

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TRIAL PIT LOG

Scale: 1:20 Sheet 1 of 1

LOCATION ID:	**Project Name:** Trowbridge WRC		0.50
HP07	**Project Number:** BMG2109		0.50 Pit Dimensions (m) Degrees
	Client: Wessex Water Services Ltd		
	Plant: Hand tools.	**Start & End Date:** 10/11/2020	Stability: Fair
Ground Level (m AOD): 36.32	**Eastings & Northings:** 384962E 158727N		Engineer: IW / Checker: LC

Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.30m 36.02	Light orangish brown clayey sandy GRAVEL of angular to subrounded fine to coarse flint, mudstone and concrete. Sand is fine to coarse. (Made Ground)			ES1 D1 ES2	0.10 0.20 0.20	0.10 0.20 0.20			
		0.20m 35.82	Soft to firm friable dark blackish grey with rare lightly grey and orangish brown mottling gravelly silty CLAY. Gravel is angular to subangular fine to coarse brick, concrete and mudstone with frequent wood, metal and glass inclusions. Concrete at base. (Made Ground)		0.30 0.50	B1 D2 ES3	0.40 0.40 0.40	0.40 0.40 0.40			
			Hole Terminated at 0.50m bgl.								

Remarks

Reason for Termination:

Terminated on limestone cobble.

Groundwater Notes:

No groundwater encountered.

Other Remarks:

1. Hand pit backfilled with arisings on completion. 2. No visual or olfactory evidence of contamination noted.

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Appendix E EA Surface Water Quality Data

Samples from 9 Oct 2003 to 24 Jun 2004

	Determinand	Units	09-Oct 2003 11:50	26-Nov 2003 11:45	30-Dec 2003 11:45	20-Jan 2004 12:35	16-Feb 2004 11:40	03-Mar 2004 11:45	31-Mar 2004 11:35	23-Apr 2004 11:30	19-May 2004 11:25	24-Jun 2004 11:40
61	pH		8.14	7.88	7.91	8.02	8.15	8.04	8.25	7.83	8.1	7.37
76	Temperature of Water	°C	12.77	9.79	6.13	8.5	8.18	5.73	10.06	11.34	16.49	14.64
85	BOD : 5 Day ATU	mg/l	1.6	5.2	2.1	1.2	1.6	1.7	< 1	2.1	1.9	2.9
111	Ammoniacal Nitrogen as N	mg/l	0.084	0.136	0.106	0.058	0.036	0.085	< 0.03	0.08	0.032	0.127
116	Nitrogen, Total Oxidised as N	mg/l	7.85	12.9	12.6	9.54	8.3	9.18	8.73	5.54	5.03	4.22
117	Nitrate as N	mg/l	7.81	12.8	12.5	9.5	8.25	9.11	8.68	5.48	5	4.16
118	Nitrite as N	mg/l	0.041	0.086	0.0711	0.0412	0.0478	0.0656	0.0451	0.0581	0.0303	0.0644
119	Ammonia un-ionised as N	mg/l	0.0019	0.0019	0.0012	0.001	0.00057	0.0011	< 0.00055	0.0011	0.0009	0.0008
135	Solids, Suspended at 105 C	mg/l	6.2	143	18.7	7.7	8.1	< 3	5.4	10.4	5.3	6.1
158	Hardness, Total as CaCO3	mg/l	333									
162	Alkalinity to pH 4.5 as CaCO3	mg/l	272	138	172							
180	Orthophosphate, reactive as P	mg/l	1.11	0.49	0.255	0.151	0.23	0.166	0.246	0.133	0.212	0.25
182	Silica, reactive as SiO2	mg/l	21.8	10.6	11.2	14.8	16.8	16.7	11.1	9.93	14.9	13.4
211	Potassium	mg/l	7.77	7.97	6.58	5.54	5.46	6.19	6.94	6.44	6.82	7.09
237	Magnesium	mg/l	3.27									
241	Calcium	mg/l	128									
1183	Weather : Precipitation		1	1	1	2	1	1	1	1	1	1
3267	Type of flow as description		3	3	3	3	3	3	3	3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	7.93	13	12.7	9.6	8.34	9.27	8.76	5.62	5.06	4.35
6450	Copper, Dissolved	µg/l	2.5					< 2.5			< 2.5	
6455	Zinc	µg/l	9.5					8.9			23.1	
7888	Chlorophyll : Methanol Extract	µg/l	6.6	45.5	10.2	1.6	4.6	6.7	11	25.4	8.2	14.9
9901	Oxygen, Dissolved, % Saturation	%	88.1	81.9	88.9	95.8	98.1	125.1	121.8	104.6	102	82.2
9924	Oxygen, Dissolved as O2	mg/l	9.31	9.27	11	11.2	11.5	15.7	13.7	11.4	9.94	8.33

Biss U/S S/W

Description	U/S TROWBRIDGE S/W
Sampling point ID	SW-A0340106
Type	Freshwater – Rivers
Status	closed
Location	easting northing: 384825 158437 lat lon: 51.324824, -2.219158
Area	Wessex
Sub-Area	East Wessex
Summary	44 samples taken between 2004 and 2000

Samples from 24 Jun 2002 to 17 Sep 2003

	Determinand	Units	24-Jun 2002 12:15	16-Oct 2002 11:15	26-Nov 2002 11:35	16-Jan 2003 11:10	06-Apr 2003 12:02	20-May 2003 13:40	25-Jun 2003 11:35	25-Jul 2003 12:00	19-Aug 2003 11:15	17-Sep 2003 11:30
61	pH		8.19	7.55	7.78	7.23	8.19	8.07	7.87	7.85	8.15	8.14
76	Temperature of Water	°C	15.73	11.33	9.11	7.03	11.48	12.44	15.93	16.44	15	14.2
85	BOD : 5 Day ATU	mg/l	1.6	4.9	1.6	2.4	3	2.6	1.3	3.5	1.1	1.1
111	Ammoniacal Nitrogen as N	mg/l	0.031	0.114	0.1	0.141	< 0.03	0.209	0.063	0.07	0.034	0.056
116	Nitrogen, Total Oxidised as N	mg/l	6.34	13.5	5.72	6.07	4.94	3.84	4.11	4	5.87	5.79
117	Nitrate as N	mg/l	6.28	13.4	5.67	6.02	4.9	3.77	4.05	3.97	5.85	5.77
118	Nitrite as N	mg/l	0.0564	0.0895	0.0525	0.0548	0.0369	0.0682	0.058	0.0323	0.016	0.0189
119	Ammonia un-ionised as N	mg/l	0.0009	0.0008	0.001	0.0004	< 0.00061	0.0046	0.00132	0.0015	0.0009	0.0014
135	Solids, Suspended at 105 C	mg/l					5.6	12.6	< 3	59.6	8	8.1
158	Hardness, Total as CaCO3	mg/l					321			206		
162	Alkalinity to pH 4.5 as CaCO3	mg/l	273	139	220	262	284	203	256	147	277	272
180	Orthophosphate, reactive as P	mg/l	0.947	0.375	0.195	0.358	0.562	0.821	0.728	0.81	1.01	1.49
182	Silica, reactive as SiO2	mg/l					12	15.1	20.3	13.7	22.6	21.9
211	Potassium	mg/l	7.09	10.2	5.74	5.01	6.16	5.93	7.76	5.37	6.07	8.15
237	Magnesium	mg/l					3.43			2.8		
241	Calcium	mg/l					123			77.8		
1183	Weather : Precipitation		1	2	2	2	1	1	1	4	1	1
3267	Type of flow as description		3	4	3	3	3	3	3	3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	6.37	13.6	5.82	6.21	4.97	4.05	4.17	4.07	5.9	5.85
6450	Copper, Dissolved	µg/l					< 2.5			3.4		
6455	Zinc	µg/l					13.2			79.7		
7888	Chlorophyll : Methanol Extract	µg/l					23.3	12.7	5.3	38.7	7.5	6.7
9901	Oxygen, Dissolved, % Saturation	%	115.9	75.4	82.8	90.3	109	89.4	74.7	70.4	81.2	89.6
9924	Oxygen, Dissolved as O2	mg/l	11.5	8.23	9.53	10.9	11.9	9.52	7.36	6.87	8.17	9.17

Samples from 15 Feb 2001 to 12 Mar 2002

	Determinand	Units	15-Feb 2001 12:05	23-Jul 2001 11:50	07-Aug 2001 11:15	06-Sep 2001 10:50	01-Nov 2001 11:10	20-Nov 2001 10:50	18-Dec 2001 10:45	16-Jan 2002 11:20	20-Feb 2002 10:50	12-Mar 2002 11:20
61	pH		8.05	7.52	8.11	8.18	7.82	8.09	8.08	7.94	7.32	7.41
76	Temperature of Water	°C	6.5	16.02	16.16	14.78	10.21	6.75	4.35	5.87	8.47	8.04
85	BOD : 5 Day ATU	mg/l	1.7	1.2	1.3	1.7	1.9	1.6	1.8	2.1	6	2.5
111	Ammoniacal Nitrogen as N	mg/l	0.158	0.031	0.061	0.067	0.164	0.034	0.434	0.063	0.262	0.138
116	Nitrogen, Total Oxidised as N	mg/l	4.92	4.65	4.18	5.92	6.38	4.43	6.91	6.65	4.49	4.64
117	Nitrate as N	mg/l	4.88	4.62	4.14	5.85	6.28	4.42	6.85	6.61	4.44	4.59
118	Nitrite as N	mg/l	0.0372	0.0324	0.0412	0.0689	0.102	0.0129	0.0647	0.0382	0.0486	0.0532
119	Ammonia un-ionised as N	mg/l	0.0022	0.0003	0.0017	0.0017	0.002	0.0005	0.0052	0.0007	0.0009	0.0006
158	Hardness, Total as CaCO3	mg/l				329			363			312
162	Alkalinity to pH 4.5 as CaCO3	mg/l	248	266	255	249	251	261	276	232	172	205
180	Orthophosphate, reactive as P	mg/l	0.239	0.465	0.417	0.682	0.668	0.389	0.634	0.367	0.257	0.312
211	Potassium	mg/l					8.02	5.82	7.36	7.04	7.53	6.28
237	Magnesium	mg/l				3.38			5.06			4.82
241	Calcium	mg/l				126			137			117
729	Chlorophyll a	µg/l	2.8	7.4	10.8	12.3	2.8	3.6	6.8	9.3	14.8	14.2
1183	Weather : Precipitation		13	1	2	2	1	1	1	1	2	2
3267	Type of flow as description		3	3	3	3	3	3	3	3	4	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	5.08	4.68	4.24	5.99	6.54	4.46	7.34	6.71	4.75	4.78
6450	Copper, Dissolved	µg/l				5.7			< 2.5			4.1
6455	Zinc	µg/l				28.2			10.6			72.6
9901	Oxygen, Dissolved, % Saturation	%	82	116.8	96.1	101.1	98	95.2	94	88.9	89.7	95.4
9924	Oxygen, Dissolved as O2	mg/l	10.1	11.5	9.43	10.2	11	11.6	12.2	11.1	10.5	11.3

Samples from 12 May 2000 to 18 Jan 2001

	Determinand	Units	12-May 2000 09:40	13-Jun 2000 14:50	12-Jul 2000 11:15	15-Aug 2000 11:25	24-Aug 2000 11:00	20-Sep 2000 11:40	18-Oct 2000 11:45	22-Nov 2000 12:00	21-Dec 2000 11:55	18-Jan 2001 11:40
61	pH		8.2	8.25	8.2	8.2		7.8	8.05	8.05	8.15	8.15
76	Temperature of Water	°C	12	15.9	13.6	16.6		13.7	12	8.5	8.8	5.2
85	BOD : 5 Day ATU	mg/l	2.1	1.4	1.5	1.4		< 3	2.3	1.9	1.3	2.6
111	Ammoniacal Nitrogen as N	mg/l	0.045	0.048	0.039	0.053		0.094	0.051	0.19	0.146	0.41
116	Nitrogen, Total Oxidised as N	mg/l	5.61	4.35	3.75	4.09		6.77	4.44	4.54	5.31	5.94
117	Nitrate as N	mg/l	5.52	4.3	3.69	4.07		6.71	4.4	4.47	5.25	5.88
118	Nitrite as N	mg/l	0.0856	0.048	0.0602	0.0207		0.0623	0.0447	0.0687	0.0567	0.0565
119	Ammonia un-ionised as N	mg/l	0.001	0.0013	0.0009	0.0016		0.0014	0.0011	0.0031	0.0024	0.0053
158	Hardness, Total as CaCO3	mg/l		317				245			333	
162	Alkalinity to pH 4.5 as CaCO3	mg/l	252	261	239	256		163	236	229	261	268
180	Orthophosphate, reactive as P	mg/l	0.441	0.395	0.433	0.553		0.421	0.365	0.323	0.266	0.407
237	Magnesium	mg/l		3.52				4.7			4.53	
241	Calcium	mg/l		121				90.3			126	
729	Chlorophyll a	µg/l	21.7	3.9	5.9	5.2	4.1	19.3	4.7	5	2.4	1.8
1183	Weather : Precipitation		1	1	1	1		2	1	1	1	13
3267	Type of flow as description		3	3	3	3		4	3	3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	5.66	4.4	3.79	4.14		6.86	4.49	4.73	5.46	6.35
6450	Copper, Dissolved	µg/l		< 2.5				4.3			< 2.5	
6455	Zinc	µg/l		< 5				23.9			10.7	
6515	Action Taken		0	0	0	0	0	0	0	0	0	
9901	Oxygen, Dissolved, % Saturation	%	89.4	96	97	89		85	91	93.5	91	101.3
9924	Oxygen, Dissolved as O2	mg/l	9.61	9.47	10.1	8.65		8.8	9.78	10.9	10.6	12.9

Samples from 24 Jan 2000 to 14 Apr 2000

	Determinand	Units	24-Jan 2000 09:30	02-Feb 2000 09:45	23-Mar 2000 10:00	14-Apr 2000 09:35
61	pH		8.15	7.95	8.2	7.85
76	Temperature of Water	°C	4.8	8.01	9.6	7.3
85	BOD : 5 Day ATU	mg/l	2	6.5	2.7	2.8
111	Ammoniacal Nitrogen as N	mg/l	0.56	0.522	0.188	0.186
116	Nitrogen, Total Oxidised as N	mg/l	6.78	4.79	5.94	5.42
117	Nitrate as N	mg/l	6.71	4.71	5.85	5.36
118	Nitrite as N	mg/l	0.0729	0.0849	0.0938	0.0559
119	Ammonia un-ionised as N	mg/l	0.007	0.0073	0.0033	0.002
158	Hardness, Total as CaCO3	mg/l			348	
162	Alkalinity to pH 4.5 as CaCO3	mg/l			259	221
180	Orthophosphate, reactive as P	mg/l	0.532	0.439	0.504	0.225
237	Magnesium	mg/l			4.45	
241	Calcium	mg/l			132	
1183	Weather : Precipitation		1	1	4	1
3267	Type of flow as description		3	3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	7.34	5.31	6.13	5.61
6450	Copper, Dissolved	µg/l			2.6	
6455	Zinc	µg/l			6.6	
6515	Action Taken		0	0	0	0
9901	Oxygen, Dissolved, % Saturation	%	91	89	87.9	91.3
9924	Oxygen, Dissolved as O2	mg/l	11.7	10.5	10	11

Samples from 7 Nov 2014 to 20 Feb 2017

	Determinand	Units	07-Nov 2014 14:12	07-Apr 2015 13:26	30-Jun 2015 15:20	29-Sep 2015 13:39	16-Dec 2015 13:44	18-Jan 2016 16:04	08-Apr 2016 14:34	27-Jul 2016 14:43	17-Nov 2016 12:45	20-Feb 2017 13:03
61	pH		7.64	8.18	8.11	8.06	7.98	8.19	8.34	8.16	7.95	8.18
76	Temperature of Water	°C	11.5	12	19.8	13.6	12	6.7	9.9	17.6	10.7	9.8
77	Conductivity at 25 C	µs/cm	566	806	912	805	672	772	720	855	794	770
111	Ammoniacal Nitrogen as N	mg/l	0.096	0.056	0.105	0.089	0.09	0.095	0.06	0.053	0.051	0.041
116	Nitrogen, Total Oxidised as N	mg/l	5.48	5.3	5.48	6.23	4.37	5.14	5.5	6.94	7.12	6.11
117	Nitrate as N	mg/l	5.44	5.28	5.44	6.16	4.3	5.09	5.44	6.92	7.06	6.08
118	Nitrite as N	mg/l	0.0436	0.0236	0.0448	0.0727	0.0677	0.0454	0.0594	0.0234	0.0601	0.0305
119	Ammonia un-ionised as N	mg/l	0.00086	0.00118	0.0039	0.00211	0.00182	0.00136	0.00109	0.00168	0.00087	0.00074
162	Alkalinity to pH 4.5 as CaCO3	mg/l	168	278	290	256	226	268	256	257	237	257
180	Orthophosphate, reactive as P	mg/l	0.262	0.158	0.332	0.331	0.252	0.13	0.136	0.426	0.395	0.169
9901	Oxygen, Dissolved, % Saturation	%	81	106.4	102.1	91.2	94.3	94.5	116.7	90.4	82.5	99
9924	Oxygen, Dissolved as O2	mg/l	8.81	11.4	9.3	9.46	10.1	11.5	13.2	8.61	9.14	11.2

R Biss At K&A Canal Aqueduct

Description	RIVER BISS AT KENNET & AVON CANAL AQUEDUCT
Sampling point ID	SW-A0340179
Type	Freshwater – Rivers
Status	open
Location	easting northing: 385448 159431 lat lon: 51.333778, -2.210258
Area	Wessex
Sub-Area	East Wessex
Summary	171 samples taken between 2017 and 2000

Samples from 13 Jan 2014 to 15 Oct 2014

	Determinand	Units	13-Jan 2014 13:05	18-Feb 2014 14:30	13-Mar 2014 12:17	02-May 2014 13:28	23-May 2014 10:53	24-Jun 2014 13:19	29-Jul 2014 11:19	01-Sep 2014 14:29	19-Sep 2014 12:56	15-Oct 2014 14:32
61	pH			8			8.13			8.02		
76	Temperature of Water	°C	7.4	7.9	8.3	11.7	13.3	18.7	18.4	15.9	17	12.7
77	Conductivity at 25 C	µs/cm	660	499	695	676	692	810	799	776	515	674
85	BOD : 5 Day ATU	mg/l	1.29	2.18	1.93	1.69	1.51	1.01	1.1	< 1	5.5	2.14
92	Chemical Oxygen Demand :- {COD}	mg/l	26	23	14	19	19	12	11	33	43	37
111	Ammoniacal Nitrogen as N	mg/l	0.125	0.091	0.164	0.114	0.101	0.069	0.045	0.048	0.154	0.058
116	Nitrogen, Total Oxidised as N	mg/l	3.89	2.37	4.73	3.8	3.95	4.96	4.82	5.16	6.45	10.8
117	Nitrate as N	mg/l	3.85	2.35	4.68	3.72	3.88	4.93	4.8	5.14	6.35	10.7
118	Nitrite as N	mg/l	0.0394	0.0235	0.0544	0.0757	0.0678	0.0333	0.0226	0.0215	0.104	0.0628
119	Ammonia un-ionised as N	mg/l		0.00142			0.00234			0.00135		
135	Solids, Suspended at 105 C	mg/l	20.8	70	10.3	11.9	8.05	6.5	5.95	7.47	44.3	20.2
162	Alkalinity to pH 4.5 as CaCO3	mg/l		189			244			259		
172	Chloride	mg/l	37	25.7	28.3	28.6	32.4	40.8	41.9	39.2	27.5	33.3
180	Orthophosphate, reactive as P	mg/l	0.113	0.102	0.113	0.157	0.182	0.224	0.214	0.238	0.191	0.206
182	Silica, reactive as SiO2	mg/l	14.3	10.7	17.7	14.4	16.3	20.6	19.8	19.3	9.66	13.1
7887	Chlorophyll : Acetone Extract	µg/l	3.1	4.8	3.1	10.7	6	3.7	5	2.6	8.4	10.5
9901	Oxygen, Dissolved, % Saturation	%	96.9	94.4	96.9	94.6	80.8	99	85.4	89.1	74	88.4
9924	Oxygen, Dissolved as O2	mg/l	11.6	11.2	11.4	10.2	8.43	9.21	8	8.79	7.13	9.35

Samples from 28 Feb 2013 to 11 Dec 2013

	Determinand	Units	28-Feb 2013 12:03	09-Apr 2013 12:37	15-Apr 2013 10:55	17-Jun 2013 10:26	03-Jul 2013 13:34	10-Sep 2013 11:45	04-Oct 2013 12:17	16-Oct 2013 11:14	21-Nov 2013 10:27	11-Dec 2013 10:13
61	pH			8.26			8.24			8.12		
76	Temperature of Water	°C	5	7	10.4	13.6	15.7	14.2	16	10.9	7	7.3
77	Conductivity at 25 C	µs/cm	747	740	643	777	902	928	659	752	692	926
85	BOD : 5 Day ATU	mg/l	1.31	1.94	1.86	2.34	1.29	< 1	1.21	1.44	1.68	1.29
92	Chemical Oxygen Demand :- {COD}	mg/l	14	14	40	22	19	13	26	< 10	19	< 10
111	Ammoniacal Nitrogen as N	mg/l	0.127	0.054	0.13	0.131	0.066	0.043	0.058	0.075	0.076	0.06
116	Nitrogen, Total Oxidised as N	mg/l	5.73	6.14	5.21	4.15	5.13	5.7	4.02	5.72	4.77	4.77
117	Nitrate as N	mg/l	5.69	6.09	5.15	4.08	5.07	5.68	3.99	5.66	4.72	4.74
118	Nitrite as N	mg/l	0.0414	0.0471	0.0585	0.0692	0.057	0.0188	0.0271	0.0561	0.0539	0.031
119	Ammonia un-ionised as N	mg/l		0.00079			0.00182			0.00146		
135	Solids, Suspended at 105 C	mg/l	11.8	7.02	18.9	11	9.67	4.78	15.5	12.4	19.8	12
162	Alkalinity to pH 4.5 as CaCO3	mg/l		252			235			246		
172	Chloride	mg/l	38.9	42.4	33.8	52.1	69.8	62.3	40.1	45.1	40.6	64.2
180	Orthophosphate, reactive as P	mg/l	0.114	0.057	0.12	0.192	0.171	0.262	0.489	0.293	0.151	0.182
182	Silica, reactive as SiO2	mg/l	18	14	11.5	17.7	18.3	20.7	15.9	16.8	13.5	18.7
7887	Chlorophyll : Acetone Extract	µg/l	2.3	29.8	29.6	8.1	5.5	4.3	5.6	7.2	3.5	3.2
9901	Oxygen, Dissolved, % Saturation	%	97.8	103.9	98.1	82.3	88.8	97.9	79.5	89.5	88.8	86.6
9924	Oxygen, Dissolved as O2	mg/l	12.5	12.6	10.9	8.53	8.79	10	7.82	9.87	10.8	10.4

Samples from 4 May 2012 to 21 Feb 2013

	Determinand	Units	04-May 2012 13:35	27-Jun 2012 12:08	03-Jul 2012 12:25	14-Aug 2012 12:39	13-Sep 2012 13:59	15-Oct 2012 11:30	29-Oct 2012 09:57	26-Nov 2012 11:12	24-Jan 2013 13:16	21-Feb 2013 11:13
61	pH										8.1	
76	Temperature of Water	°C	10	19	14.9	17.7	16.4	9.8	8.9	8.8	4.3	4.6
77	Conductivity at 25 C	µs/cm	559	538	775	753	649	692	754	471	650	722
85	BOD : 5 Day ATU	mg/l	1.5	3.3	1	1.3	2.9	2.1	1.4	1.08	1.49	1.35
92	Chemical Oxygen Demand :- {COD}	mg/l	42	47	13	22	26	28	17	48	36	30
111	Ammoniacal Nitrogen as N	mg/l	0.067	< 0.03	0.077	0.066	< 0.03	0.084	0.051	0.059	0.136	0.184
116	Nitrogen, Total Oxidised as N	mg/l	3.91	1.94	4.26	4.06	0.83	4.78	4.92	3.42	3.43	5.27
117	Nitrate as N	mg/l	3.88	1.86	4.23	4.03	0.814	4.73	4.88	3.4	3.4	5.22
118	Nitrite as N	mg/l	0.0284	0.0756	0.0315	0.0332	0.0156	0.0548	0.0357	0.0195	0.0304	0.0477
119	Ammonia un-ionised as N	mg/l									0.00163	
135	Solids, Suspended at 105 C	mg/l	19	52	5.33	4.97	51.1	61.2	7.5	46.8	29.2	13.5
162	Alkalinity to pH 4.5 as CaCO3	mg/l									220	
172	Chloride	mg/l	23.1	27.3	50.8	44.5	33.8	29.7	36.4	20.4	44.9	33.4
180	Orthophosphate, reactive as P	mg/l	0.119	< 0.02	0.162	0.184	< 0.02	0.133	0.139	0.152	0.095	0.102
182	Silica, reactive as SiO2	mg/l	11	9.32	17.2	18.2	10.5	14.6	16.9	10.5	11.9	16.8
7887	Chlorophyll : Acetone Extract	µg/l	4.1	68.8	3.7	2.6	81.8	3.2	1.3	4.5	3.9	1.6
9901	Oxygen, Dissolved, % Saturation	%	90.6	78.5	86.8	90.1	89.8	94.1	92.8	86.1	96.5	95.6
9924	Oxygen, Dissolved as O2	mg/l	10.2	7.26	8.74	8.56	8.76	10.6	10.7	9.98	12.5	12.3

Samples from 18 Jul 2011 to 4 Apr 2012

	Determinand	Units	18-Jul 2011 11:07	22-Aug 2011 11:48	19-Sep 2011 11:19	10-Oct 2011 11:50	31-Oct 2011 11:47	21-Nov 2011 11:00	12-Jan 2012 13:46	31-Jan 2012 11:37	29 Feb 2012 10:17	04-Apr 2012 13:07
76	Temperature of Water	°C	15.21	16.22	13.4	14.8	13.55	10.3	8.8	4.1	9.7	9.1
77	Conductivity at 25 C	µs/cm	664	955	755	1029	787	880	801	824	867	882
85	BOD : 5 Day ATU	mg/l	1.1	< 1	1.1	< 1	< 1	< 1	1.5	1	1.1	2.4
92	Chemical Oxygen Demand :- {COD}	mg/l	29	14	18	18	18	11	19	20	19	17
111	Ammoniacal Nitrogen as N	mg/l	0.105	0.061	0.042	0.059	0.059	0.055	0.076	0.069	0.05	0.042
116	Nitrogen, Total Oxidised as N	mg/l	4.28	4.71	9.28	11.2	9.13	9.05	9.18	6.46	8.55	6.75
117	Nitrate as N	mg/l	4.23	4.68	9.23	11.2	9.09	9.01	9.13	6.41	8.52	6.7
118	Nitrite as N	mg/l	0.052	0.0339	0.048	0.0476	0.0415	0.0357	0.0528	0.0475	0.0309	0.0529
135	Solids, Suspended at 105 C	mg/l	4.72	3.58	4.4	4.8	5.38	7.05	4.9	7.73	11.4	5.85
172	Chloride	mg/l	43.1	58.8	49.1	85	52.7	55.9	43.5	57.5	62	49.3
180	Orthophosphate, reactive as P	mg/l	0.22	0.313	0.208	0.302	0.292	0.256	0.145	0.14	0.18	0.137
182	Silica, reactive as SiO2	mg/l	15.3	20.4	17.4	21.1	19.6	20.2	14.8	14.1	14.2	8.14
7887	Chlorophyll : Acetone Extract	µg/l	3.69	2	3.5	3.7	3.2	2.6	1.2	2.5	34.7	32
9901	Oxygen, Dissolved, % Saturation	%	77.2	93.7	81.6	81.1	79.4	85.5	91.4	92.6	93.7	99.1
9924	Oxygen, Dissolved as O2	mg/l	7.73	9.18	8.5	8.19	8.24	9.56	10.6	12.1	10.6	11.4

Samples from 20 Sep 2010 to 6 Jun 2011

	Determinand	Units	20-Sep 2010 13:35	18-Oct 2010 11:40	08-Nov 2010 13:18	29-Nov 2010 13:20	08-Feb 2011 11:58	25-Feb 2011 10:40	21-Mar 2011 11:10	12-Apr 2011 10:50	23-May 2011 11:11	06-Jun 2011 10:55
76	Temperature of Water	°C	14.44	9.25	9	1.1	6.59	9.23	10	11.08	12.97	14.56
77	Conductivity at 25 C	µs/cm		901	531	320	787	688	766	787	810	766
85	BOD : 5 Day ATU	mg/l	< 1	< 1	1.3	2	1.6	1.5	1.1	< 1	1.5	1.4
92	Chemical Oxygen Demand :- {COD}	mg/l	17	18	19	15	< 12	25	11	14	22	18
111	Ammoniacal Nitrogen as N	mg/l	0.084	0.064	0.032	0.155	0.049	0.085	0.053	0.054	0.089	0.185
116	Nitrogen, Total Oxidised as N	mg/l	9.64	11	4.46	8.5	7.5	5.44	5.3	6.41	7.44	5.53
117	Nitrate as N	mg/l	9.6	11	4.44	8.35	7.46	5.39	5.28	6.38	7.33	5.45
118	Nitrite as N	mg/l	0.0366	0.0309	0.0248	0.148	0.0377	0.0485	0.0228	0.032	0.109	0.0833
135	Solids, Suspended at 105 C	mg/l	3.83	4.7	16.3	5.08	5.6	12.1	5.03	4.17	4.55	6.38
172	Chloride	mg/l	49.4	52.9	25.5	42.8	45.5	33.5	42.1	37.7	37.5	35.4
180	Orthophosphate, reactive as P	mg/l	0.253	0.234	0.18	0.173	0.147	0.113	0.111	0.133	0.259	0.496
182	Silica, reactive as SiO2	mg/l	21	18.9	11.4	18.5	16.7	13	14.2	11.5	17.4	18.4
7887	Chlorophyll : Acetone Extract	µg/l	3.4	1.5	5.6	1.3	1.1	4.5	4.7	6.1	5.1	3.5
9901	Oxygen, Dissolved, % Saturation	%	95.6	93.7	89.1	106	93.8	101.3	101.5	103.4	86.1	83.4
9924	Oxygen, Dissolved as O2	mg/l	9.73	10.7	10.3	15	11.5	11.6	11.4	11.4	9.05	8.47

Samples from 18 Nov 2009 to 7 Sep 2010

	Determinand	Units	18-Nov 2009 12:05	15-Dec 2009 12:06	02-Feb 2010 15:08	26-Feb 2010 12:51	19-Apr 2010 14:21	04-May 2010 10:59	26-May 2010 11:42	28-Jun 2010 11:50	04-Aug 2010 10:58	07-Sep 2010 11:56
76	Temperature of Water	°C	10.8	6.95	5.8	6.46	8.45	9.71	16.13	19.03	16.69	15.31
77	Conductivity at 25 C	µs/cm	712	698	704	539	711	741	809	869	900	617
85	BOD : 5 Day ATU	mg/l	1.7	< 1	3.2	1.3	1.7	1.7	1.6	< 1	< 1	2.5
92	Chemical Oxygen Demand :- {COD}	mg/l	26	16	< 12	< 12	< 12	19	13	13	< 12	15
111	Ammoniacal Nitrogen as N	mg/l	0.075	0.068	0.12	0.071	0.045	0.082	0.174	0.106	0.054	0.143
116	Nitrogen, Total Oxidised as N	mg/l	7.95	6.64	7.09	4.16	7.36	8.4	5.98	5.71	7.6	4.75
117	Nitrate as N	mg/l	7.88	6.59	7.04	4.14	7.32	8.31	5.88	5.67	7.58	4.71
118	Nitrite as N	mg/l	0.0671	0.0506	0.0535	0.023	0.0389	0.086	0.104	0.0439	0.0233	0.0417
135	Solids, Suspended at 105 C	mg/l	8.3	8.27	6.8	42.1	4.4	4.55	6.43	5.48	4.83	5.63
172	Chloride	mg/l	36.6	29.6	34.5	25.4	31	32.2	35.6	49.8	45	30.9
180	Orthophosphate, reactive as P	mg/l	0.154	0.115	0.105	0.12	0.152	0.246	0.367	0.401	0.456	0.215
182	Silica, reactive as SiO2	mg/l	14.6	16.3	15.2	10.5	11.1	15.8	19.2	21.3	21.1	14.6
7887	Chlorophyll : Acetone Extract	µg/l	3.6	0.93	1.2	4.7	8.9	12.1	9	3.7	4.6	4.7
9901	Oxygen, Dissolved, % Saturation	%	95.4	101.1	102.2	96.2	125.6	95.9	87.5	95.7	90.1	80.4
9924	Oxygen, Dissolved as O2	mg/l	10.5	12.3	12.8	11.8	14.7	10.9	8.59	8.85	8.74	8.03

Samples from 13 Jan 2009 to 23 Sep 2009

	Determinand	Units	13-Jan 2009 11:05	12-Feb 2009 11:20	04-Mar 2009 10:20	08-Apr 2009 10:43	14-May 2009 10:30	06-Jul 2009 13:47	20-Jul 2009 11:44	03-Aug 2009 11:07	01-Sep 2009 14:50	23-Sep 2009 10:59
61	pH											8.14
76	Temperature of Water	°C	6.5	4	6.5	10.4	12.9	18.4	15.9	16.5	16.1	14.7
77	Conductivity at 25 C	µs/cm	724	631	576	693	802	919	748	747	889	907
85	BOD : 5 Day ATU	mg/l	4.7	1.9	8.8	2.5	1.6	< 1	1.3	< 1	< 1	< 1
92	Chemical Oxygen Demand :- {COD}	mg/l	58	22	72	< 12	< 12	17	15	14	< 12	13
111	Ammoniacal Nitrogen as N	mg/l	0.232	0.169	0.675	0.05	0.119	0.095	0.068	0.07	0.052	0.054
116	Nitrogen, Total Oxidised as N	mg/l	5.75	5.34	4.27	5.12	8.96	8.5	8.65	8.49	8.53	11.2
117	Nitrate as N	mg/l	5.69	5.31	4.23	5.07	8.87	8.44	8.6	8.43	8.5	11.2
118	Nitrite as N	mg/l	0.0621	0.033	0.0419	0.0464	0.0891	0.0617	0.0527	0.0604	0.026	0.0321
135	Solids, Suspended at 105 C	mg/l	54.7	18.4	98.7	7.9	6.7	5.7	5.6	4.4	5.3	10.1
172	Chloride	mg/l	58.6	28.6	31.8	36.2	35.1	57.4	41.9	46.7	54.3	52
180	Orthophosphate, reactive as P	mg/l	0.204	0.127	0.246	0.201	0.428	0.461	0.401	0.373	0.402	0.312
182	Silica, reactive as SiO2	mg/l	12.5	12.8	11	9.7	17.2	21.5	19.7	18.5	20.8	20.8
664	Visible oil or grease, significant trace: Present/Not found (1/0)	pres/nf										0
7887	Chlorophyll : Acetone Extract	µg/l	7.5	3.3	25.6	14.5	11.4	4.1	6.7	4.1	3.1	7.3
9901	Oxygen, Dissolved, % Saturation	%	92.8	91.4	91.5	90.5	93.4	88.1	85.3	84.2	91	84.5
9924	Oxygen, Dissolved as O2	mg/l	11.4	12	11.2	10.1	9.84	8.25	8.41	8.2	8.93	8.55

Samples from 14 Mar 2008 to 15 Dec 2008

	Determinand	Units	14-Mar 2008 09:53	08-Apr 2008 10:52	27-May 2008 12:55	07-Jul 2008 09:59	05-Aug 2008 10:30	16-Sep 2008 10:29	16-Oct 2008 09:56	04-Nov 2008 10:22	24-Nov 2008 12:15	15-Dec 2008 10:23
76	Temperature of Water	°C	8.68	7.3	12.66	15.02	16.35	13.58	12.13	10.1	6.67	5.7
77	Conductivity at 25 C	µs/cm	667	760	483	460	707	713	748	697	760	626
85	BOD : 5 Day ATU	mg/l	2	1.7	4.7	3.7	< 1	< 1	< 1	1.6	1.1	1.5
92	Chemical Oxygen Demand :- {COD}	mg/l	28	< 12	60	27	16	16	16	24	18	29
111	Ammoniacal Nitrogen as N	mg/l	0.083	0.057	0.116	0.692	0.052	0.037	0.051	0.1	0.125	0.132
116	Nitrogen, Total Oxidised as N	mg/l	4.37	6.37	5.38	2.92	3.6	4.09	6.81	4.93	5.36	4.64
117	Nitrate as N	mg/l	4.33	6.33	5.32	2.85	3.58	4.07	6.78	4.93	5.31	4.61
118	Nitrite as N	mg/l	0.0376	0.0378	0.0557	0.0745	0.0246	0.0186	0.0254	< 0.004	0.0466	0.0339
135	Solids, Suspended at 105 C	mg/l	15.5	6	37.1	20.2	9	6.5	8	13.4	8	33.3
172	Chloride	mg/l	32.6	44.7	23.5	21.6	35.1	28.5	34.9	27.8	34.6	27.5
180	Orthophosphate, reactive as P	mg/l	0.123	0.115	0.213	0.316	0.264	0.171	0.178	0.148	0.163	0.151
182	Silica, reactive as SiO2	mg/l	11.8	13.3	9.97	12.4	18.6	18	17.5	14.7	16.9	13.1
3267	Type of flow as description		3	3	3	3						
7887	Chlorophyll : Acetone Extract	µg/l	14.5	7.5	12.8	11.5	5.6	4.6	2.2	3.2	0.69	1.7
9901	Oxygen, Dissolved, % Saturation	%	101.6	92.5	87.8	81.6	77.9	90.7	83.1	94.6	89.4	87.3
9924	Oxygen, Dissolved as O2	mg/l	11.8	11.1	9.3	8.2	7.61	9.41	8.91	10.6	10.9	10.9

Samples from 26 Sep 2007 to 13 Feb 2008

	Determinand	Units	26-Sep 2007 12:50	03-Oct 2007 12:39	10-Oct 2007 12:20	23-Oct 2007 09:35	31-Oct 2007 09:25	13-Nov 2007 11:40	26-Nov 2007 14:15	04-Dec 2007 09:15	21-Jan 2008 09:22	13-Feb 2008 11:16
76	Temperature of Water	°C	12.8	14.6	13.41	7.7	10.11	8.06	9.07	8.35	10.04	5.22
77	Conductivity at 25 C	µs/cm	647	711	698	765	761	825	740	628	499	717
85	BOD : 5 Day ATU	mg/l	1.8	2.3	2.3	2.8	1.4	1.3	< 1	1.9	< 1	1.6
92	Chemical Oxygen Demand :- {COD}	mg/l	21	29	21	17	17	13	20	35	36	17
111	Ammoniacal Nitrogen as N	mg/l	0.127	0.129	0.133	0.089	0.069	0.087	0.135	0.085	0.256	0.155
116	Nitrogen, Total Oxidised as N	mg/l	4.48	7.57	5.43	6.54	6.32	8.67	6.18	6.47	2.15	5.67
117	Nitrate as N	mg/l	4.42	7.48	5.36	6.46	6.25	8.59	6.1	6.42	2.11	5.62
118	Nitrite as N	mg/l	0.0551	0.087	0.0695	0.0832	0.0676	0.0831	0.0836	0.0501	0.0408	0.055
135	Solids, Suspended at 105 C	mg/l	8.6	11.7	24.7	23.6	6.9	< 3	8.3	21.8	23.9	9.3
172	Chloride	mg/l	36.4	35.2	38	37	38	43.7	34.3	29.3	24.1	28.7
180	Orthophosphate, reactive as P	mg/l	0.362	0.265	0.355	0.228	0.322	0.331	0.201	0.299	0.058	0.14
182	Silica, reactive as SiO2	mg/l	16.6	16.3	19.7	18.8	18.7	20.4	15.3	12.7	9.94	16.8
3267	Type of flow as description		3	3	3	3	3	3	3	3	3	3
7887	Chlorophyll : Acetone Extract	µg/l	9.5	9.9	10.3	15.3	2.7	1.3	9.2	4.5	75.5	1.7
9901	Oxygen, Dissolved, % Saturation	%	84.2	89.2	86.8	80.3	88.5	98.8	99	94.6	99.1	96.2
9924	Oxygen, Dissolved as O2	mg/l	8.89	9.05	9.04	9.56	9.94	11.7	11.4	11.1	11.2	12.2

Samples from 9 Jul 2006 to 24 Apr 2007

	Determinand	Units	09-Jul 2006 16:48	18-Jul 2006 10:38	17-Oct 2006 11:00	23-Nov 2006 11:45	29-Nov 2006 14:40	08-Dec 2006 11:15	04-Jan 2007 14:01	27-Feb 2007 13:31	28-Mar 2007 13:29	24-Apr 2007 13:22
61	pH			8.01	8.04	7.91	8	7.73				
76	Temperature of Water	°C		20.39	14.2	10.7	10.13	8.34	9.1	9.6	10.6	14.5
85	BOD : 5 Day ATU	mg/l		< 1	1.6	3.2	1.2	< 1				
111	Ammoniacal Nitrogen as N	mg/l		0.125	0.157	0.168	0.121	0.09	0.061	0.074	0.072	0.105
116	Nitrogen, Total Oxidised as N	mg/l		6.46	5.93	8.18	8.6	6.87	6.72	5.5	5.58	4.51
117	Nitrate as N	mg/l		6.4	5.88	8.13	8.53	6.83	6.68	5.47	5.56	4.46
118	Nitrite as N	mg/l		0.0642	0.049	0.0523	0.0702	0.0437	0.0431	0.0271	0.0221	0.0514
119	Ammonia un-ionised as N	mg/l		0.00485	0.00389	0.00263	0.00223	0.00079				
180	Orthophosphate, reactive as P	mg/l		0.474	0.391	0.22	0.16	0.166	0.186	0.119	0.074	0.169
182	Silica, reactive as SiO2	mg/l		18.7	18.4	10.7	12.7	12.2	13.2	12.6	14.8	11.1
211	Potassium	mg/l		7.12								
1183	Weather : Precipitation			1	1	6	1	1				
3267	Type of flow as description		7	3	3	3	3	3		3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l		6.59								
7887	Chlorophyll : Acetone Extract	µg/l		5.8	7.9	15.2	2.9	4.8	2.9	4.1	10	11.7
9901	Oxygen, Dissolved, % Saturation	%		88.4	84.3	98.9	94.1	88.7	92.6	91.5	114.9	96.6
9924	Oxygen, Dissolved as O2	mg/l		7.96	8.63	11	10.6	10.4	10.7	10.4	12.8	9.82

Samples from 21 Sep 2005 to 5 Jul 2006

	Determinand	Units	21-Sep 2005 12:05	27-Oct 2005 13:45	21-Nov 2005 16:00	15-Dec 2005 12:25	09-Jan 2006 12:05	06-Feb 2006 11:40	07-Mar 2006 12:25	10-Apr 2006 11:40	08-May 2006 14:30	05-Jul 2006 09:30
61	pH		7.97	7.75	7.64	8.16	8.22	8.38	8.26	8.43	7.98	8.06
76	Temperature of Water	°C	16.08	14.91	3.67	7.84	5.7	4.37	5.4	7.9	13.3	18.9
85	BOD : 5 Day ATU	mg/l	1.03	1.29	1.72	1.2	1.74	1.66	1.45	2.2	5.9	1.5
111	Ammoniacal Nitrogen as N	mg/l	0.086	0.052	0.085	0.079	0.188	0.068	0.048	0.046	0.219	0.156
116	Nitrogen, Total Oxidised as N	mg/l	8.66	7.17	10.1	8.17	8.15	7.11	7.26	5.48	2.58	6.59
117	Nitrate as N	mg/l	8.62	7.13	10	8.12	8.07	7.09	7.23	5.46	2.53	6.51
118	Nitrite as N	mg/l	0.0424	0.0386	0.0533	0.055	0.0778	0.0189	0.0278	0.0206	0.0486	0.0848
119	Ammonia un-ionised as N	mg/l	0.00228	0.00077	0.00043	0.00123	0.0025	0.00082	0.00062	0.00072	0.00486	0.00543
180	Orthophosphate, reactive as P	mg/l	0.451	0.275	0.21	0.142	0.194	0.219	0.126	0.116	0.195	0.585
182	Silica, reactive as SiO2	mg/l	21	15.6	18.2	14.8	15.5	16	12.8	10.6	6.35	19.8
211	Potassium	mg/l	9.11	7.91	6.64	6.24	6.48	5.9	5.51	5.81	3.9	6.72
1183	Weather : Precipitation		1	1	1	1	1	1	5	1	4	1
3267	Type of flow as description		3	3	3	3	3	3	3	3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	8.75	7.22	10.2	8.25	8.34	7.18	7.31	5.53	2.8	6.75
7887	Chlorophyll : Acetone Extract	µg/l	5.1	7.9	0.55	1.5	2.8	4.2	9.5	17.5	36.2	27.8
9901	Oxygen, Dissolved, % Saturation	%	83.2	90.2	87.7	93.5	90.3	95.2	97.6	100.6	86.1	82.6
9924	Oxygen, Dissolved as O2	mg/l	8.18	9.09	11.6	11.1	11.3	12.3	12.3	11.9	8.99	7.66

Samples from 19 Nov 2004 to 8 Aug 2005

	Determinand	Units	19-Nov 2004 11:10	17-Dec 2004 12:40	17-Jan 2005 11:28	04-Feb 2005 12:00	28-Feb 2005 11:50	08-Apr 2005 11:15	19-May 2005 11:45	14-Jun 2005 11:20	14-Jul 2005 12:15	08-Aug 2005 11:45
61	pH		8.15	7.77	8.27	8.17	8.47	8.23	8.42	8.13	8.2	7.68
76	Temperature of Water	°C	11.9	11.34	11.47	11.61	7.04	11.38	15.97	16.85	21.85	16.78
85	BOD : 5 Day ATU	mg/l	1.5	8.8	1.11	1.55	1.31	1.42	1.98	2.05	1.29	< 1
111	Ammoniacal Nitrogen as N	mg/l	0.068	0.23	0.057	0.0521	0.064	0.13	0.096	0.115	0.136	0.097
116	Nitrogen, Total Oxidised as N	mg/l	6.97	4.15	7.16	5.97	6.09	5.13	4.13	4.11	6.48	6.65
117	Nitrate as N	mg/l	6.94	4.12	7.13	5.94	6.08	5.08	4.09	4.06	6.41	6.61
118	Nitrite as N	mg/l	0.0276	0.0284	0.0304	0.0295	0.0146	0.0477	0.0407	0.047	0.0697	0.0386
119	Ammonia un-ionised as N	mg/l	0.00143	0.00275	0.00116	0.00107	0.00094	0.00262	0.00271	0.00345	0.00585	0.00141
180	Orthophosphate, reactive as P	mg/l	0.294	0.205	0.199	0.192	0.154	0.237	0.206	0.386	0.376	0.318
182	Silica, reactive as SiO2	mg/l									17.8	18.8
211	Potassium	mg/l	7.63	5.15	6.1	6.2	6.24	2.46	6.43	7.31	7.57	8.56
1183	Weather : Precipitation		1	6	1	1	1	1	1	1	1	1
3267	Type of flow as description		3	3	3	3	3	3	3	3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	7.04	4.38	7.22	6.02	6.15	5.26	4.23	4.23	6.62	6.75
6450	Copper, Dissolved	µg/l		4.1								
6455	Zinc	µg/l		93.1								
7887	Chlorophyll : Acetone Extract	µg/l									7.8	6.9
9901	Oxygen, Dissolved, % Saturation	%	77.6	89.6	97.6	96.4	105.2	88.2	93.3	87.5	90	85.5
9924	Oxygen, Dissolved as O2	mg/l	8.36	9.78	10.6	10.5	12.7	9.62	9.19	8.46	7.87	8.28

Samples from 16 Feb 2004 to 14 Nov 2004

	Determinand	Units	16-Feb 2004 12:05	03-Mar 2004 12:10	31-Mar 2004 11:55	23-Apr 2004 11:50	19-May 2004 11:50	24-Jun 2004 12:05	20-Sep 2004 14:45	03-Oct 2004 11:55	27-Oct 2004 12:25	14-Nov 2004 11:20
61	pH		8.11	8	8.12	7.78	8.14		7.84	7.87	7.97	7.72
76	Temperature of Water	°C	8.16	5.42	10.38	11.53	17.26		15.23	13.37	11.75	6.92
85	BOD : 5 Day ATU	mg/l	1.3	2.1	2	2.7	1.7		1.2	1.9	1.5	2.3
111	Ammoniacal Nitrogen as N	mg/l	0.049	0.122	0.039	0.107	0.105		0.074	0.064	0.048	0.074
116	Nitrogen, Total Oxidised as N	mg/l	8.37	9.46	9.35	5.4	4.64		3.87	5.94	6.49	7.23
117	Nitrate as N	mg/l	8.33	9.4	9.3	5.34	4.6		3.84	5.92	6.46	7.19
118	Nitrite as N	mg/l	0.0392	0.0569	0.0454	0.0578	0.0355		0.0257	0.0247	0.0322	0.0407
119	Ammonia un-ionised as N	mg/l	0.00078	0.00159	0.00073	0.00133	0.00325		0.00138	0.00111	0.00093	0.00057
180	Orthophosphate, reactive as P	mg/l	0.238	0.181	0.24	0.134	0.209		0.463	0.67	0.265	0.323
211	Potassium	mg/l	5.51	6.06	7.04	6.31	7.35		8.44	8.3	7.61	7.89
1183	Weather : Precipitation		1	1	1	1	1	1	1	2	1	1
3267	Type of flow as description		3	3	3	3	3	7	3	3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	8.42	9.58	9.39	5.51	4.75		3.94	6	6.54	7.3
6450	Copper, Dissolved	µg/l		< 2.5			2.6					2.3
6455	Zinc	µg/l		6.7			10.6					41.8
9901	Oxygen, Dissolved, % Saturation	%	99.8	110.9	102.7	109.5	86.3			84.1	85.6	88
9924	Oxygen, Dissolved as O2	mg/l	11.8	14	11.5	11.9	8.27			8.77	9.26	10.7

Samples from 20 Feb 2002 to 20 Jan 2004

	Determinand	Units	20-Feb 2002 11:40	12-Mar 2002 11:55	24-Jun 2002 13:10	16-Oct 2002 11:35	26-Nov 2002 12:15	16-Jan 2003 11:45	20-May 2003 14:00	19-Aug 2003 11:35	26-Nov 2003 12:20	20-Jan 2004 12:15
61	pH		7.41	7.43	8.04	7.57	7.84	7.21	8.13	8.03	7.86	8.02
76	Temperature of Water	°C	8.53	8.1	15.92	11.51	9.23	7.27	12.83	15.67	9.79	8.51
85	BOD : 5 Day ATU	mg/l	5.5	2.5	2.1	5.2	1.5	2.2	1.5	1.2	6.7	1.2
111	Ammoniacal Nitrogen as N	mg/l	0.21	0.14	0.033	0.116	0.137	0.159	0.11	0.073	0.162	0.066
116	Nitrogen, Total Oxidised as N	mg/l	4.33	4.64	6.11	13.6	5.6	5.89	3.83	7.73	11.8	9.41
117	Nitrate as N	mg/l	4.28	4.59	5.67	13.5	5.54	5.84	3.78	7.7	11.7	9.36
118	Nitrite as N	mg/l	0.0484	0.0543	0.44	0.0844	0.0595	0.0471	0.0487	0.0272	0.0912	0.0473
119	Ammonia un-ionised as N	mg/l	0.0009	0.0006	0.0009	0.0009	0.00164	0.00039	0.00247	0.00201	0.00212	0.00108
135	Solids, Suspended at 105 C	mg/l	124	13.5								
158	Hardness, Total as CaCO3	mg/l	240	307								
162	Alkalinity to pH 4.5 as CaCO3	mg/l	152	205	273	138	213	245	268	273	136	
180	Orthophosphate, reactive as P	mg/l	0.247	0.313	0.852	0.379	0.185	0.324	1.12	1.25	0.456	0.155
182	Silica, reactive as SiO2	mg/l	10.1	14.3								
211	Potassium	mg/l	7.49	5.99	6.89	9.84	5.73	5.87	6.66	6.66	7.74	5.79
237	Magnesium	mg/l	4.45	4.81								
241	Calcium	mg/l	88.7	115								
729	Chlorophyll a	µg/l	14	14.3								
1183	Weather : Precipitation		2	2	1	2	2	2	1	1	1	2
3267	Type of flow as description		4	3	3	4	3	3	3	3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	4.54	4.78	6.14	13.7	5.74	6.05	3.94	7.8	12	9.48
6450	Copper, Dissolved	µg/l	3.7	4.3								
6455	Zinc	µg/l	57.7	45								
9901	Oxygen, Dissolved, % Saturation	%	92.2	93.7	110.1	77.9	85.1	91.9	88.4	70.1	81.9	99.5
9924	Oxygen, Dissolved as O2	mg/l	10.8	11.1	10.9	8.47	9.77	11.1	9.33	6.95	9.27	11.6

Samples from 21 Dec 2000 to 16 Jan 2002

	Determinand	Units	21-Dec 2000 12:25	18-Jan 2001 12:20	15-Feb 2001 12:40	23-Jul 2001 12:35	07-Aug 2001 11:45	06-Sep 2001 12:10	01-Nov 2001 12:05	20-Nov 2001 11:20	18-Dec 2001 11:20	16-Jan 2002 11:50
61	pH		8.15	8.1	8.05	7.4	7.8	8.11	7.89	8.07	8.11	7.85
76	Temperature of Water	°C	8.7	5.3	6.5	17.35	18.87	15.21	10.32	6.8	4.41	5.94
85	BOD : 5 Day ATU	mg/l	1.6	2.7	2	1.3	1.3	1.6	2.4	1.6	1.8	1.9
111	Ammoniacal Nitrogen as N	mg/l	0.2	0.482	0.184	0.096	0.057	0.062	0.16	< 0.03	0.302	0.064
116	Nitrogen, Total Oxidised as N	mg/l	5.33	6.03	4.95	4.58	4.18	5.82	6.37	4.16	9.22	6.53
117	Nitrate as N	mg/l	5.27	5.97	4.91	4.53	4.14	5.75	6.27	4.15	9.15	6.49
118	Nitrite as N	mg/l	0.0625	0.0621	0.0362	0.0495	0.0413	0.0672	0.102	0.0143	0.07	0.0383
119	Ammonia un-ionised as N	mg/l	0.0033	0.0062	0.0026	0.0008	0.0013	0.0017	0.0023	< 0.0004	0.0037	0.0006
135	Solids, Suspended at 105 C	mg/l	20.5	17.8	18.7	11.3	7.4	9.1	12.2	5	7.6	11.5
158	Hardness, Total as CaCO3	mg/l	336	349	322	295	311	331	345	360	352	351
162	Alkalinity to pH 4.5 as CaCO3	mg/l	259	269	246	264	262	255	250	262	274	232
180	Orthophosphate, reactive as P	mg/l	0.273	0.421	0.239	0.515	0.426	0.674	0.666	0.364	0.789	0.374
182	Silica, reactive as SiO2	mg/l	16.2	18.3	14.2	19.8	19.7	20.7	18.8	19.9	10.7	14.3
211	Potassium	mg/l							8.07	5.81	7.56	6.83
237	Magnesium	mg/l	4.67	4.14	4.71	3.07	3.3	3.35	5.02	4.38	5.42	6.38
241	Calcium	mg/l	127	133	121	113	119	127	130	137	132	130
729	Chlorophyll a	µg/l	2.5	1.6	2.6	5.9	10.4	11.5	3.7	6.9	8.3	9.4
1183	Weather : Precipitation		1	13	1	1	2	1	1	1	1	1
3267	Type of flow as description		3	3	3	3	3	3	3	3	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	5.53	6.51	5.13	4.68	4.24	5.88	6.53	4.19	9.52	6.59
6450	Copper, Dissolved	µg/l	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	7.1	2.9	< 2.5	< 2.5	2.9
6455	Zinc	µg/l	11.9	11.7	10.9	6.5	10.4	11.5	20.5	6.1	10.3	10.8
6515	Action Taken		0									
9901	Oxygen, Dissolved, % Saturation	%	89	101.7	83	100.3	78.1	99.9	94.6	91.1	89.7	89.3
9924	Oxygen, Dissolved as O2	mg/l	10.3	12.9	10.2	9.6	7.25	10	10.6	11.1	11.6	11.1

Samples from 17 Feb 2000 to 22 Nov 2000

	Determinand	Units	17-Feb 2000 12:50	15-Mar 2000 10:25	18-Apr 2000 11:35	18-May 2000 09:35	15-Jun 2000 11:35	12-Jul 2000 11:35	15-Aug 2000 11:50	20-Sep 2000 12:05	18-Oct 2000 12:05	22-Nov 2000 13:00
61	pH		8.05		7.8	8.15	8.45	8.1	8.15	7.8	8.05	8.1
76	Temperature of Water	°C	5.7		7.6	11.6	15.6	13.6	17.4	13.8	11.9	9.8
85	BOD : 5 Day ATU	mg/l	< 3		3.4	2.8	1.8	1.8	2.2	3.8	2.2	2.4
111	Ammoniacal Nitrogen as N	mg/l	0.2		0.244	0.061	0.095	0.088	0.078	0.13	0.067	0.198
116	Nitrogen, Total Oxidised as N	mg/l	5.26		4.06	5.08	4.82	3.88	4.63	6.5	4.3	4.6
117	Nitrate as N	mg/l	5.21		4.02	5.03	4.75	3.8	4.59	6.43	4.26	4.53
118	Nitrite as N	mg/l	0.0472		0.0359	0.0485	0.0676	0.0775	0.0414	0.0688	0.04	0.0716
119	Ammonia un-ionised as N	mg/l	0.0027		0.0024	0.0013	0.0026	0.0021	0.0024	0.002	0.0014	0.0036
135	Solids, Suspended at 105 C	mg/l	16.7		69.3	6.4	5.2	24	24	49.9	9.8	28.1
158	Hardness, Total as CaCO3	mg/l	328		214	318	331	320	306	240	309	298
162	Alkalinity to pH 4.5 as CaCO3	mg/l			170	245	264	239	252	157	231	233
163	Hardness, Calcium	mg/l	305		197.25	302.5						
164	Hardness, Magnesium	mg/l	23.206		16.4	15.252						
180	Orthophosphate, reactive as P	mg/l	0.292		0.178	0.465	0.481	0.474	0.704	0.444	0.358	0.33
182	Silica, reactive as SiO2	mg/l	12.8		8.25	12.9	18	17.3	19.3	11.6	14.3	14.1
237	Magnesium	mg/l	5.66		4	3.72	3.8	4.79	3.23	4.5	4.59	4.96
241	Calcium	mg/l	122		78.9	121	126	120	117	88.7	116	111
729	Chlorophyll a	µg/l	4.6		12.1	13.1	4.2	13.7	20.3	20	3.6	4.7
1183	Weather : Precipitation		1		5	2	1	1	1	2	1	2
3267	Type of flow as description		3	7	4	3	3	3	3	4	3	3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	5.46		4.3	5.14	4.91	3.97	4.71	6.63	4.37	4.8
6450	Copper, Dissolved	µg/l	< 2.5		3.8	< 2.5	< 2.5	< 2.5	< 2.5	4.4	< 2.5	2.9
6455	Zinc	µg/l	16.9		27.9	15.6	7.4	18.7	17.1	40	14.7	19
6515	Action Taken		0	0	0	0	0	0	0	0	0	0
9901	Oxygen, Dissolved, % Saturation	%	90		89	87	86	88	83	85	90	95.9
9924	Oxygen, Dissolved as O2	mg/l	11.3		10.6	9.44	8.54	9.13	7.93	8.78	9.7	10.9

Sample on 19 Jan 2000

	Determinand	Units	19-Jan 2000 12:30
61	pH		8.15
76	Temperature of Water	°C	6.8
85	BOD : 5 Day ATU	mg/l	1.7
111	Ammoniacal Nitrogen as N	mg/l	0.19
116	Nitrogen, Total Oxidised as N	mg/l	6.4
117	Nitrate as N	mg/l	6.34
118	Nitrite as N	mg/l	0.057
119	Ammonia un-ionised as N	mg/l	0.0027
135	Solids, Suspended at 105 C	mg/l	11.7
158	Hardness, Total as CaCO3	mg/l	342
163	Hardness, Calcium	mg/l	322.5
164	Hardness, Magnesium	mg/l	19.762
180	Orthophosphate, reactive as P	mg/l	0.287
182	Silica, reactive as SiO2	mg/l	16.2
237	Magnesium	mg/l	4.82
241	Calcium	mg/l	129
729	Chlorophyll a	µg/l	1.6
1183	Weather : Precipitation		1
3267	Type of flow as description		3
3683	Nitrogen, Total Inorganic : (Calculated)	mg/l	6.59
6450	Copper, Dissolved	µg/l	3
6455	Zinc	µg/l	10.8
6515	Action Taken		0
9901	Oxygen, Dissolved, % Saturation	%	86
9924	Oxygen, Dissolved as O2	mg/l	10.5

Samples from 29 Oct 2019 to 12 Feb 2021

	Determinand	Units	29-Oct 2019 12:36	12-Nov 2019 12:48	14-Jan 2020 13:33	20-Feb 2020 10:30	17-Mar 2020 13:22	14-Oct 2020 12:46	10-Nov 2020 13:43	10-Dec 2020 13:01	05-Jan 2021 15:07	12-Feb 2021 12:47
61	pH		8	8.02	8.08	7.83	8.2	8.15	8.08	8.23	8.29	8.34
76	Temperature of Water	°C	9.9	7.8	8.5	8.5	9.4	11.6	12.1	8.1	5.9	4.2
77	Conductivity at 25 C	µs/cm	651	639	529	604	636	769	617	734	673	700
111	Ammoniacal Nitrogen as N	mg/l	0.047	0.085	0.081	0.037	< 0.03	< 0.03	0.056	0.053	0.057	0.039
116	Nitrogen, Total Oxidised as N	mg/l	5.4	5.45	3.9	4.2	3.9	4.9	3.6	4.3	4.7	4.7
117	Nitrate as N	mg/l	5.36	5.4	3.87	4.18	3.88	4.87	3.58	4.27	4.67	4.68
118	Nitrite as N	mg/l	0.044	0.0488	0.034	0.017	0.016	0.027	0.021	0.027	0.026	0.017
119	Ammonia un-ionised as N	mg/l	0.00085	0.00132	0.00132	0.00041	< 0.00052	< 0.00062	0.00119	0.00084	0.00077	0.00046
162	Alkalinity to pH 4.5 as CaCO3	mg/l	230	235	200	260	250	260	230	240	260	250
180	Orthophosphate, reactive as P	mg/l	0.16	0.147	0.14	0.11	0.11	0.27	0.21	0.16	0.14	0.15
9901	Oxygen, Dissolved, % Saturation	%	92	96.8	93.8	89.9	108.2	94.3	93.2	91.4	107.7	99.2
9924	Oxygen, Dissolved as O2	mg/l	10.4	11.5	11	10.5	12.4	10.2	10	10.8	13.4	12.9

Samples from 18 Nov 2016 to 13 Sep 2019

	Determinand	Units	18-Nov 2016 12:00	22-Nov 2016 11:11	06-Feb 2017 10:11	20-Feb 2017 12:43	29-Apr 2019 10:37	28-May 2019 12:56	11-Jun 2019 12:21	30-Jul 2019 14:37	30-Aug 2019 12:34	13-Sep 2019 13:59
61	pH		8.02	7.6	7.8	8.19	8.24	8.3	7.83	8.08	8.16	8.15
76	Temperature of Water	°C	8.1	8.4	5.2	9.9	11.2	13.9	12.4	18.1	16.5	16.3
77	Conductivity at 25 C	µs/cm	627	432	677	770	813	865	519	459	930	945
111	Ammoniacal Nitrogen as N	mg/l	0.293	0.046	0.129	< 0.03	< 0.03	< 0.03	0.69	0.088	< 0.03	< 0.03
116	Nitrogen, Total Oxidised as N	mg/l	5.32	6.44	6.07	5.56	6.11	5.24	3.3	3.3	4.8	5.2
117	Nitrate as N	mg/l	5.24	6.41	6.02	5.52	6.09	5.22	3.19	3.28	4.79	5.19
118	Nitrite as N	mg/l	0.0811	0.0267	0.046	0.039	0.0172	0.0176	0.11	0.025	0.011	0.0095
119	Ammonia un-ionised as N	mg/l	0.00465	0.0003	0.00105	< 0.00054	< 0.0006	< 0.00073	0.0102	0.00289	< 0.00088	< 0.00087
162	Alkalinity to pH 4.5 as CaCO3	mg/l	191	107	222	260	243	275	150	140	280	280
180	Orthophosphate, reactive as P	mg/l	0.323	0.212	0.147	0.184	0.226	0.398	0.29	0.18	0.4	0.35
9901	Oxygen, Dissolved, % Saturation	%	85	79.3	95.5	101.1	94.8	89.1	81.4	82	92.3	88.7
9924	Oxygen, Dissolved as O2	mg/l	10	9.29	12.1	11.4	10.4	9.18	8.67	7.73	8.99	8.68

Samples from 18 Jan 2016 to 31 Oct 2016

	Determinand	Units	18-Jan 2016 15:35	05-Feb 2016 11:30	21-Mar 2016 14:04	08-Apr 2016 14:11	04-May 2016 16:21	10-Jun 2016 13:09	27-Jul 2016 14:15	30-Aug 2016 11:41	26-Sep 2016 13:33	31-Oct 2016 12:17
61	pH		8.18	8.13	8.43	8.25	8.55	8.19	8.19	8.12	8.07	7.99
76	Temperature of Water	°C	7.1	9.4	9.1	9.7	13	16.8	16.9	16.4	14.1	11.9
77	Conductivity at 25 C	µs/cm	746	720	742	725	694	809	813	840	819	832
111	Ammoniacal Nitrogen as N	mg/l	0.081	0.074	0.126	0.064	< 0.03	0.038	< 0.03	0.03	0.049	< 0.03
116	Nitrogen, Total Oxidised as N	mg/l	5.16	5.5	5.91	5.42	5.02	5.59	5.05	4.77	7.48	5.71
117	Nitrate as N	mg/l	5.11	5.44	5.83	5.36	4.98	5.57	5.04	4.76	7.45	5.66
118	Nitrite as N	mg/l	0.0492	0.0553	0.0814	0.0607	0.0443	0.024	0.0122	0.0095	0.0269	0.0466
119	Ammonia un-ionised as N	mg/l	0.00119	0.00129	0.00215	0.00114	< 0.00068	0.00114	< 0.0009	0.00087	0.00121	< 0.00061
162	Alkalinity to pH 4.5 as CaCO3	mg/l	266	253	253	252	243	266	258	264	230	265
180	Orthophosphate, reactive as P	mg/l	0.138	0.17	0.177	0.15	0.213	0.375	0.365	0.457	0.412	0.395
9901	Oxygen, Dissolved, % Saturation	%	93.8	93.6	121.3	104.8	140.9	94.2	92.1	86	82.4	83.2
9924	Oxygen, Dissolved as O2	mg/l	11.3	10.7	14	11.9	14.8	9.12	8.9	8.39	8.45	8.97

Samples from 7 Apr 2015 to 7 Dec 2015

	Determinand	Units	07-Apr 2015 10:56	27-Apr 2015 14:04	27-May 2015 10:21	09-Jun 2015 12:12	17-Jul 2015 11:35	26-Aug 2015 15:00	24-Sep 2015 14:07	30-Oct 2015 10:50	25-Nov 2015 12:23	07-Dec 2015 14:16
61	pH		8.1	8.4	8.12	8.21	8.01	8.01	8.03	7.86	8.12	8.06
76	Temperature of Water	°C	10.9	10.9	13.5	12.8	16.7	16.1	13.9	13.3	9.3	11.9
77	Conductivity at 25 C	µs/cm	795	805	867	855	928	634	776	567	755	760
111	Ammoniacal Nitrogen as N	mg/l	< 0.03	< 0.03	0.082		0.055	0.033	0.04	0.071	0.096	0.048
116	Nitrogen, Total Oxidised as N	mg/l	5.17	5.11	6.2		4.5	3.72	4.33	3.63	4.48	5.05
117	Nitrate as N	mg/l	5.13	5.07	6.11		4.49	3.7	4.29	3.59	4.4	4.98
118	Nitrite as N	mg/l	0.0371	0.0406	0.0938		0.0128	0.0239	0.0351	0.045	0.0813	0.0666
119	Ammonia un-ionised as N	mg/l	< 0.00058	< 0.00058	0.00193		0.00163	0.00094	0.00097	0.0012	0.00166	0.00101
162	Alkalinity to pH 4.5 as CaCO3	mg/l	284	274	280		282	198	238	183	245	268
180	Orthophosphate, reactive as P	mg/l	0.177	0.192	0.336		0.311	0.226	0.393	0.233	0.214	0.228
9901	Oxygen, Dissolved, % Saturation	%	93.3	117.1	89.9	90.4	84.5	85.1	85.3	80.2	92.3	88.9
9924	Oxygen, Dissolved as O2	mg/l	10.3	12.9	9.34	9.55	8.2	8.36	8.79	8.37	10.6	9.58

Samples from 14 May 2014 to 24 Feb 2015

	Determinand	Units	14-May 2014 10:31	24-Jun 2014 11:13	17-Jul 2014 10:44	15-Aug 2014 13:04	19-Sep 2014 12:07	15-Oct 2014 14:06	07-Nov 2014 13:54	05-Dec 2014 11:37	21-Jan 2015 11:45	24-Feb 2015 10:15
61	pH		7.99	8.07	7.73	7.93	7.85	7.87	7.72	8.08	8.03	8.02
76	Temperature of Water	°C	12.2	16.8	16.8	14.8	17	12.6	11.4	7	5.9	5.4
77	Conductivity at 25 C	µs/cm	677	805	840	644	548	674	547	805	716	578
111	Ammoniacal Nitrogen as N	mg/l	0.203	0.035	< 0.03	0.061	0.1	0.068	0.057	0.253	0.195	0.1
116	Nitrogen, Total Oxidised as N	mg/l	4.6	5.91	6.52	4.46	6.59	9.46	3.96	6.06	4.2	2.92
117	Nitrate as N	mg/l	4.47	5.85	6.5	4.4	6.49	9.39	3.93	5.96	4.16	2.89
118	Nitrite as N	mg/l	0.129	0.058	0.0173	0.0646	0.0956	0.0709	0.0287	0.104	0.0432	0.0275
119	Ammonia un-ionised as N	mg/l	0.00425	0.00105	< 0.00049	0.00135	0.00217	0.00112	0.00061	0.0037	0.00263	0.0013
162	Alkalinity to pH 4.5 as CaCO3	mg/l	231	271	273	217	150	204	186	280	247	202
180	Orthophosphate, reactive as P	mg/l	0.194	0.226	0.247	0.215	0.194	0.223	0.231	0.16	0.124	0.095
9901	Oxygen, Dissolved, % Saturation	%	91.7	87.9	87.4	90.5	78.1	85	81.2	90.4	89.6	90.2
9924	Oxygen, Dissolved as O2	mg/l	9.82	8.51	8.46	9.14	7.53	9.02	8.85	11	11.2	11.4

Samples from 21 Aug 2013 to 16 Apr 2014

	Determinand	Units	21-Aug 2013 12:09	10-Sep 2013 12:08	01-Oct 2013 12:54	16-Oct 2013 11:57	07-Nov 2013 13:04	11-Dec 2013 10:29	13-Jan 2014 12:47	06-Feb 2014 13:35	13-Mar 2014 11:59	16-Apr 2014 11:39
61	pH		8.14	8.38	8.18	8.09	8.1	8.12	8.04	7.96	8.05	8.19
76	Temperature of Water	°C	15.7	13.7	14.8	11.2	11.4	7.5	7.4	6.2	8.4	10.9
77	Conductivity at 25 C	µs/cm	919	931	874	623	613	863	664	462	695	763
111	Ammoniacal Nitrogen as N	mg/l	0.036	0.04	0.046	0.05	0.057	0.049	0.115	0.079	0.088	0.068
116	Nitrogen, Total Oxidised as N	mg/l	6.07	6.08	6.57	4.56	4.53	4.9	4	2.35	4.92	5.75
117	Nitrate as N	mg/l	6.03	6.07	6.55	4.52	4.49	4.86	3.96	2.33	4.87	5.66
118	Nitrite as N	mg/l	0.0376	0.0129	0.0224	0.0438	0.043	0.0405	0.0375	0.0183	0.0511	0.0898
119	Ammonia un-ionised as N	mg/l	0.00099	0.00096	0.00119	0.001	0.00115	0.00074	0.00173	0.001	0.00143	0.00132
162	Alkalinity to pH 4.5 as CaCO3	mg/l	299	283	280	201	215	276	230	173	263	260
180	Orthophosphate, reactive as P	mg/l	0.378	0.261	0.267	0.222	0.151	0.186	0.111	0.127	0.106	0.171
9901	Oxygen, Dissolved, % Saturation	%	90.8	96.6	85.2	92.5	90.8	98.3	91	93.1	97.4	101.3
9924	Oxygen, Dissolved as O2	mg/l	9	10	8.61	10.1	9.9	11.8	10.9	11.5	11.4	11.2

Samples from 30 Aug 2012 to 17 Jun 2013

	Determinand	Units	30-Aug 2012 09:24	05-Oct 2012 10:43	06-Nov 2012 09:05	26-Nov 2012 10:52	31-Jan 2013 12:41	20-Feb 2013 11:58	28-Feb 2013 10:24	09-Apr 2013 12:09	07-Jun 2013 11:52	17-Jun 2013 10:12
61	pH		7.68	7.98	7.85	7.78	8.07	8.08	8.18	8.24	8.13	8.11
76	Temperature of Water	°C	14.6	12.4	6.4	8.6	7.9	5.6	5.1	7.2	14.6	13.5
77	Conductivity at 25 C	µs/cm	465	734	597	484	591	722	740	784	822	795
111	Ammoniacal Nitrogen as N	mg/l	0.06	0.048	0.084	0.087	0.077	0.204	0.099	0.185	0.102	0.099
116	Nitrogen, Total Oxidised as N	mg/l	3.74	5.77	3.99	3.27	3.85	5.23	6.36	7.08	5.56	5.28
117	Nitrate as N	mg/l	3.7	5.74	3.95	3.25	3.82	5.17	6.31	6.98	5.45	5.19
118	Nitrite as N	mg/l	0.0353	0.0312	0.0356	0.0214	0.0253	0.0575	0.0495	0.0956	0.114	0.0946
119	Ammonia un-ionised as N	mg/l	0.00074	0.001	0.00084	0.00087	0.0012	0.00269	0.00126	0.00275	0.0026	0.00233
162	Alkalinity to pH 4.5 as CaCO3	mg/l	159	216	233	167	216	264	258	258	264	263
180	Orthophosphate, reactive as P	mg/l	0.254	0.192	0.121	0.191	0.126	0.106	0.116	0.08	0.181	0.182
9901	Oxygen, Dissolved, % Saturation	%	75.1	88.9	86.2	87.1	105.5	99	96	104.4	80.4	84.5
9924	Oxygen, Dissolved as O2	mg/l	7.62	9.47	10.6	10.1	12.5	12.4	12.2	12.6	8.16	8.78

Samples from 31 Oct 2011 to 9 Aug 2012

	Determinand	Units	31-Oct 2011 12:10	21-Nov 2011 11:18	12-Jan 2012 13:26	31-Jan 2012 11:51	29 Feb 2012 09:52	04-Apr 2012 12:49	04-May 2012 13:52	03-Jul 2012 10:14	17-Jul 2012 13:08	09-Aug 2012 10:50
61	pH		8.04	8.09	8.03	8.09	8.22	8.28	7.79	8	8.03	7.9
76	Temperature of Water	°C	13.74	10.6	8.9	3.9	9.7	8.8	10	15	16.2	16.2
77	Conductivity at 25 C	µs/cm	756	822	833	815	849	890	571	783	723	757
111	Ammoniacal Nitrogen as N	mg/l	< 0.03	0.08	0.07	0.093	< 0.03	< 0.03	0.061	0.062	0.037	0.036
116	Nitrogen, Total Oxidised as N	mg/l	6.62	6.49	10.2	6.49	8.69	6.83	3.89	4.77	4.67	6.23
117	Nitrate as N	mg/l	6.6	6.46	10.1	6.42	8.66	6.78	3.86	4.73	4.62	6.18
118	Nitrite as N	mg/l	0.0213	0.0264	0.0728	0.0733	0.035	0.0468	0.0304	0.0371	0.0495	0.0474
119	Ammonia un-ionised as N	mg/l	< 0.00072	0.00152	0.00118	0.00108	< 0.00054	< 0.0005	0.00069	0.00163	0.00106	0.00082
162	Alkalinity to pH 4.5 as CaCO3	mg/l	227	247	237	238	255	245	199	242	266	246
180	Orthophosphate, reactive as P	mg/l	0.276	0.264	0.152	0.157	0.206	0.15	0.118	0.155	0.154	0.178
9901	Oxygen, Dissolved, % Saturation	%	82.2	86.5	92.7	92.7	91.4	93.9	87.7	84.7	101.6	90.4
9924	Oxygen, Dissolved as O2	mg/l	8.5	9.61	10.7	12.2	10.4	10.9	9.88	8.52	9.96	8.86

Samples from 2 Feb 2011 to 10 Oct 2011

	Determinand	Units	02-Feb 2011 14:52	25-Feb 2011 11:03	21-Mar 2011 11:29	12-Apr 2011 11:13	23-May 2011 11:31	06-Jun 2011 11:11	18-Jul 2011 11:33	22-Aug 2011 12:10	19-Sep 2011 11:36	10-Oct 2011 12:14
61	pH		7.72	8.11	8.11	7.97	7.79	7.92	7.62	8.27	8.05	8.06
76	Temperature of Water	°C	6.4	9.34	10.04	10.51	12.4	13.94	14.71	15.53	13.1	14.9
77	Conductivity at 25 C	µs/cm	765	692	806	772	789	703	791	876	813	1017
111	Ammoniacal Nitrogen as N	mg/l	0.17	0.071	0.059	< 0.03	0.065	0.516	0.216	0.048	0.042	0.03
116	Nitrogen, Total Oxidised as N	mg/l	8.5	5.19	7.29	6.16	5.73	6.57	6.11	4.23	11	10.3
117	Nitrate as N	mg/l	8.42	5.13	7.21	6.14	5.67	6.41	6.05	4.22	11	10.3
118	Nitrite as N	mg/l	0.0845	0.0563	0.084	0.0171	0.0639	0.16	0.0567	0.0103	0.0456	0.0327
119	Ammonia un-ionised as N	mg/l	0.00126	0.00123	0.00108	< 0.00053	0.00088	0.0105	0.00235	0.00131	0.00096	0.00078
162	Alkalinity to pH 4.5 as CaCO3	mg/l	246	238	242	253	238	188	204	255	219	252
180	Orthophosphate, reactive as P	mg/l	0.136	0.115	0.113	0.167	0.31	0.496	0.27	0.339	0.23	0.3
9901	Oxygen, Dissolved, % Saturation	%	99.5	100.6	110.2	108.8	81.5	78.8	81	93.7	85.1	81.7
9924	Oxygen, Dissolved as O2	mg/l	12.2	11.5	12.4	12.1	8.68	8.11	8.2	9.32	8.93	8.23

Samples from 10 Sep 2010 to 16 Nov 2010

	Determinand	Units	10-Sep 2010 11:28	06-Oct 2010 09:51	25-Oct 2010 12:06	16-Nov 2010 16:26
61	pH		7.79	7.75	7.33	8.01
76	Temperature of Water	°C	15.62	13.61	7.5	5.9
77	Conductivity at 25 C	µs/cm	767	650	754	716
111	Ammoniacal Nitrogen as N	mg/l	< 0.03	< 0.03	0.03	0.112
116	Nitrogen, Total Oxidised as N	mg/l	7.47	5.55	6.28	6.68
117	Nitrate as N	mg/l	7.45	5.51	6.25	6.59
118	Nitrite as N	mg/l	0.0182	0.045	0.0268	0.0924
119	Ammonia un-ionised as N	mg/l	< 0.00051	< 0.0004	0.0001	0.00151
162	Alkalinity to pH 4.5 as CaCO3	mg/l	243	204	223	216
180	Orthophosphate, reactive as P	mg/l	0.279	0.181	0.273	0.168
9901	Oxygen, Dissolved, % Saturation	%	84.9	82.5	88.1	96.1
9924	Oxygen, Dissolved as O2	mg/l	8.43	8.55	10.5	12

Biss At Trowbridge
Ultrasonic

Description	BISS AT TROWBRIDGE ULTRASONIC
Sampling point ID	SW-60100005
Type	Freshwater – Rivers
Status	open
Location	easting northing: 385355 157988 lat lon: 51.320801, -2.211534
Area	Wessex
Sub-Area	East Wessex
Summary	94 samples taken between 2021 and 2010

Samples from 8 Apr 2016 to 14 Mar 2017

	Determinand	Units	08-Apr 2016 13:43	10-Jun 2016 12:56	27-Jul 2016 14:00	30-Aug 2016 11:22	31-Oct 2016 11:53	22-Nov 2016 10:47	13-Dec 2016 15:08	26-Jan 2017 11:30	20-Feb 2017 12:29	14-Mar 2017 12:50
61	pH		8.17	7.99	7.76	7.76	7.7	7.45	8.05	7.54	8.1	8.18
76	Temperature of Water	°C	9.1	17.1	17.2	15.4	11.3	8.7	9.1	2.9	9.3	10.3
77	Conductivity at 25 C	µs/cm	707	776	757	598	696	506	794	813	772	703
111	Ammoniacal Nitrogen as N	mg/l	0.033	0.072	0.166	0.045	< 0.03	0.052	0.038	< 0.03	< 0.03	< 0.03
116	Nitrogen, Total Oxidised as N	mg/l	4.41	1.28	1.45	2.2	1.11	12.9	8	7.94	7.97	5.35
117	Nitrate as N	mg/l	4.39	1.25	1.4	2.18	1.1	12.9	7.97	7.92	7.94	5.33
118	Nitrite as N	mg/l	0.0162	0.034	0.0549	0.0165	0.0096	0.0311	0.0333	0.0183	0.0309	0.0178
119	Ammonia un-ionised as N	mg/l	0.00056	0.00215	0.00298	0.00071	< 0.0003	0.00025	0.00065	< 0.00011	< 0.00052	< 0.00056
162	Alkalinity to pH 4.5 as CaCO3	mg/l	265	283	259	200	246	113	233	261	246	241
180	Orthophosphate, reactive as P	mg/l	0.079	0.222	0.247	0.251	0.197	0.146	0.123	0.079	0.078	0.079
9901	Oxygen, Dissolved, % Saturation	%	102	89.8	60.3	64.4	58.4	78.9	87.8	92.4	101.2	120.8
9924	Oxygen, Dissolved as O2	mg/l	11.7	8.64	5.79	6.42	6.38	9.17	10.1	12.5	11.6	13.5

Samples from 4 Jun 2015 to 21 Mar 2016

	Determinand	Units	04-Jun 2015 12:35	09-Jun 2015 12:25	17-Jul 2015 11:16	22-Sep 2015 11:32	01-Oct 2015 14:41	29-Oct 2015 13:58	25-Nov 2015 12:10	07-Dec 2015 14:06	29-Jan 2016 12:30	21-Mar 2016 13:51
61	pH		7.94	7.79	7.59	7.87	7.99	7.87	8.05	7.97	7.95	8.3
76	Temperature of Water	°C	14	11.6	16.5	12.9	12.4	12	9.4	11.7	9.1	8
77	Conductivity at 25 C	µs/cm	624	729	736	432	751	633	710	720	647	757
111	Ammoniacal Nitrogen as N	mg/l	0.11	0.122	0.116	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.045	0.057
116	Nitrogen, Total Oxidised as N	mg/l	1.31	1.01	0.61	1.82	1.95	1.35	5.83	6.06	5.72	5.18
117	Nitrate as N	mg/l	1.27	0.97	0.571	1.8	1.94	1.34	5.81	6.03	5.7	5.16
118	Nitrite as N	mg/l	0.0403	0.0397	0.0394	0.0198	0.0139	0.0128	0.0233	0.0255	0.0184	0.0227
119	Ammonia un-ionised as N	mg/l	0.00235	0.00155	0.00135	< 0.0005	< 0.00064	< 0.00047	< 0.00052	< 0.00058	0.00069	0.0009
162	Alkalinity to pH 4.5 as CaCO3	mg/l	210	242	232	163	291	232	241	255	237	278
180	Orthophosphate, reactive as P	mg/l	0.179	0.21	0.297	0.103	0.129	0.155	0.104	0.103	0.091	0.081
9901	Oxygen, Dissolved, % Saturation	%	88.2	73.6	53.7	77.1	84.5	65.5	89.5	89.6	94.4	118.8
9924	Oxygen, Dissolved as O2	mg/l	9.07	7.99	5.23	8.12	9	7.04	10.2	9.7	10.9	14

Samples from 11 Jul 2014 to 15 Apr 2015

	Determinand	Units	11-Jul 2014 12:37	15-Aug 2014 12:53	17-Sep 2014 14:01	01-Oct 2014 11:42	07-Nov 2014 13:34	05-Dec 2014 11:24	21-Jan 2015 12:01	20-Feb 2015 10:49	20-Mar 2015 11:45	15-Apr 2015 10:48
61	pH		7.7	7.87	7.99	7.89	7.5	8.09	7.95	7.65	8.16	8.09
76	Temperature of Water	°C	17.5	14.7	15.7	14.8	11.4	6.2	5.1	5.8	7.7	11.1
77	Conductivity at 25 C	µs/cm	730	638	782	771	512	752	697	518	756	778
111	Ammoniacal Nitrogen as N	mg/l	0.081	0.032	< 0.03	< 0.03	0.083	< 0.03	0.067	0.13	0.054	< 0.03
116	Nitrogen, Total Oxidised as N	mg/l	0.7	10.6	0.91	0.83	8.72	5.67	4.83	3.79	3.74	1.83
117	Nitrate as N	mg/l	0.675	10.5	0.901	0.822	8.69	5.65	4.81	3.77	3.72	1.81
118	Nitrite as N	mg/l	0.0254	0.0568	0.009	0.0079	0.031	0.0218	0.0207	0.024	0.0234	0.0184
119	Ammonia un-ionised as N	mg/l	0.0013	0.00061	< 0.00081	< 0.00061	0.00054	< 0.00041	0.00076	0.00078	0.00083	< 0.00059
162	Alkalinity to pH 4.5 as CaCO3	mg/l	253	196	301	299	156	288	245	177	282	279
180	Orthophosphate, reactive as P	mg/l	0.183	0.13	0.169	0.19	0.246	0.088	0.107	0.114	0.088	0.08
9901	Oxygen, Dissolved, % Saturation	%	76.3	84.5	81.3	71.5	79.4	90.4	94.7	90.2	105.1	100.4
9924	Oxygen, Dissolved as O2	mg/l	7.28	8.55	8.05	7.22	8.66	11.2	12	11.3	12.5	11

Samples from 10 Sep 2013 to 12 Jun 2014

	Determinand	Units	10-Sep 2013 12:50	25-Oct 2013 10:13	13-Nov 2013 11:35	28-Nov 2013 12:25	13-Jan 2014 12:36	06-Feb 2014 13:15	11-Mar 2014 11:06	16-Apr 2014 11:27	14-May 2014 10:19	12-Jun 2014 13:09
61	pH		7.91	7.95	8.12	8.11	7.85	7.83	8.08	8.2	7.97	8.04
76	Temperature of Water	°C	13.2	13.8	8.3	8.2	6.6	6.6	7.1	9.6	10.7	15.8
77	Conductivity at 25 C	µs/cm	624	613	653	757	553	458	657	707	616	766
111	Ammoniacal Nitrogen as N	mg/l	0.036	< 0.03	< 0.03	< 0.03	0.1	0.061	0.044	< 0.03	< 0.03	0.041
116	Nitrogen, Total Oxidised as N	mg/l	1.55	8.03	6.56	5.75	3.28	2.28	2.36	1.59	1.46	1.1
117	Nitrate as N	mg/l	1.54	7.98	6.54	5.73	3.25	2.27	2.34	1.57	1.44	1.08
118	Nitrite as N	mg/l	0.0079	0.0517	0.0186	0.0226	0.0254	0.0142	0.0194	0.0212	0.0194	0.0227
119	Ammonia un-ionised as N	mg/l	0.00068	< 0.00065	< 0.00048	< 0.00048	0.00101	0.00059	0.00065	< 0.00053	< 0.00054	0.00114
162	Alkalinity to pH 4.5 as CaCO3	mg/l	203	188	234	275	206	176	274	274	210	294
180	Orthophosphate, reactive as P	mg/l	0.191	0.121	0.085	0.073	0.117	0.106	0.08	0.08	0.089	0.14
9901	Oxygen, Dissolved, % Saturation	%	93.1	87.2	93.2	98.7	93.4	94.3	102.1	110.9	89.2	92.1
9924	Oxygen, Dissolved as O2	mg/l	9.74	9	10.9	11.6	11.4	11.5	12.3	12.6	9.88	9.11

Samples from 6 Nov 2012 to 21 Aug 2013

	Determinand	Units	06-Nov 2012 09:16	26-Nov 2012 10:35	24-Jan 2013 12:07	13-Feb 2013 12:01	28-Feb 2013 10:16	09-Apr 2013 11:53	17-Jun 2013 10:01	18-Jun 2013 10:03	10-Jul 2013 11:02	21-Aug 2013 11:54
61	pH		7.78	7.61	7.86	7.88	8.07	8.2	7.84	7.87	7.74	7.86
76	Temperature of Water	°C	6.9	8.7	4.2	4.4	2.7	5.6	13.2	14.5	16.8	15.5
77	Conductivity at 25 C	µs/cm	611	443	600	660	755	754	560	664	762	689
111	Ammoniacal Nitrogen as N	mg/l	0.043	0.059	0.176	0.263	0.357	0.063	0.144	0.113	0.096	0.053
116	Nitrogen, Total Oxidised as N	mg/l	4.98	3.45	3.16	3.56	4.51	4.01	1.49	1.31	0.99	1.38
117	Nitrate as N	mg/l	4.96	3.44	3.14	3.54	4.48	3.98	1.43	1.27	0.96	1.36
118	Nitrite as N	mg/l	0.019	0.0134	0.019	0.0204	0.0325	0.0257	0.0564	0.0432	0.03	0.0241
119	Ammonia un-ionised as N	mg/l	0.00038	0.0004	0.00152	0.00242	0.00381	0.00083	0.00231	0.00214	0.0016	0.00105
162	Alkalinity to pH 4.5 as CaCO3	mg/l	246	176	217	257	289	284	188	233	264	234
180	Orthophosphate, reactive as P	mg/l	0.11	0.134	0.117	0.107	0.135	0.073	0.162	0.181	0.237	0.233
9901	Oxygen, Dissolved, % Saturation	%	86.4	84.8	90.4	97	95.7	105.3	66.2	71.5	70.8	84.9
9924	Oxygen, Dissolved as O2	mg/l	10.5	9.86	11.8	12.6	13	13.2	6.93	7.27	6.85	8.45

Samples from 3 Jul 2012 to 16 Oct 2012

	Determinand	Units	03-Jul 2012 10:31	17-Jul 2012 12:46	09-Aug 2012 10:36	04-Sep 2012 14:15	16-Oct 2012 12:34
61	pH		7.85	7.95	7.9	8.2	7.88
76	Temperature of Water	°C	14.6	16.5	16.5	16.7	11.3
77	Conductivity at 25 C	µs/cm	706	697	717	753	634
111	Ammoniacal Nitrogen as N	mg/l	0.06	0.055	0.068	0.045	0.059
116	Nitrogen, Total Oxidised as N	mg/l	3.13	2.84	2.96	2.98	4.36
117	Nitrate as N	mg/l	3.08	2.8	2.92	2.95	4.33
118	Nitrite as N	mg/l	0.0533	0.0403	0.0362	0.0271	0.0262
119	Ammonia un-ionised as N	mg/l	0.00109	0.00144	0.00159	0.00134	0.0009
162	Alkalinity to pH 4.5 as CaCO3	mg/l	270	284	284	315	244
180	Orthophosphate, reactive as P	mg/l	0.159	0.143	0.162	0.131	0.138
9901	Oxygen, Dissolved, % Saturation	%	75	103.4	91.8	97.5	99.3
9924	Oxygen, Dissolved as O2	mg/l	7.61	10.1	8.94	9.46	10.9

Lambrok At Brook Road

Description	LAMBROK AT BROOK ROAD
Sampling point ID	SW-A0340115
Type	Freshwater – Rivers
Status	open
Location	easting northing: 384096 157523 lat lon: 51.316586, -2.229579
Area	Wessex
Sub-Area	East Wessex
Summary	55 samples taken between 2017 and 2012

Appendix F Groundwater Quality Data

Appendix 9: Water Chemical Testing Results

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Analytical Report Number : 20-43438

Project / Site name:	Trowbridge WRC	**Samples received on:**	24/11/2020
Your job number:	BMG2109	**Samples instructed on/ Analysis started on:**	26/11/2020
Your order number:	POR032916	**Analysis completed by:**	02/12/2020
Report Issue Number:	1	**Report issued on:**	02/12/2020
Samples Analysed:	1 water sample		

Signed:

Rachel Bradley
Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-43438
Project / Site name: Trowbridge WRC

Your Order No: POR032916

Lab Sample Number				1695692
Sample Reference				BH03 (S)
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
General Inorganics				
pH	pH Units	N/A	ISO 17025	7.3
Total Cyanide	µg/l	10	ISO 17025	< 10
Complex Cyanide	µg/l	10	ISO 17025	< 10
Free Cyanide	µg/l	10	ISO 17025	< 10
Thiocyanate as SCN	µg/l	200	ISO 17025	270
Sulphate as SO4	µg/l	45	ISO 17025	104000
Sulphate as SO4	mg/l	0.045	ISO 17025	104
Elemental Sulphur	mg/l	0.02	NONE	< 0.02
Sulphide	µg/l	5	NONE	120
Chloride	mg/l	0.15	ISO 17025	22
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	4800
Total Nitrogen (Kjeldahl)	mg/l	0.1	NONE	6.6
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	11.3
Nitrate as N	mg/l	0.01	ISO 17025	0.09
Nitrate as NO3	mg/l	0.05	ISO 17025	0.41
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	1900
BOD (Biochemical Oxygen Demand) (Total) - PL	mg/l	1	ISO 17025	7.1
Total Phenols				
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10
Speciated PAHs				
Naphthalene	µg/l	0.01	ISO 17025	9.07
Acenaphthylene	µg/l	0.01	ISO 17025	4.83
Acenaphthene	µg/l	0.01	ISO 17025	6.53
Fluorene	µg/l	0.01	ISO 17025	5.93
Phenanthrene	µg/l	0.01	ISO 17025	25.9
Anthracene	µg/l	0.01	ISO 17025	9.81
Fluoranthene	µg/l	0.01	ISO 17025	52.6
Pyrene	µg/l	0.01	ISO 17025	40.1
Benzo(a)anthracene	µg/l	0.01	ISO 17025	28.7
Chrysene	µg/l	0.01	ISO 17025	22.7
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	30.1
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	14.2
Benzo(a)pyrene	µg/l	0.01	ISO 17025	29.3
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	15.8
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	5.69
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	16.4
Total PAH				
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	318

Analytical Report Number: 20-43438
Project / Site name: Trowbridge WRC

Your Order No: POR032916

Lab Sample Number				1695692
Sample Reference				BH03 (S)
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Heavy Metals / Metalloids				
Boron (dissolved)	µg/l	10	ISO 17025	420
Calcium (dissolved)	mg/l	0.012	ISO 17025	110
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.038
Magnesium (dissolved)	mg/l	0.005	ISO 17025	7.3
Potassium (dissolved)	mg/l	0.025	ISO 17025	12
Sodium (dissolved)	mg/l	0.01	ISO 17025	100
Chromium (total)	µg/l	0.2	ISO 17025	6.8
Lead (total)	µg/l	0.2	ISO 17025	7
Mercury (total)	µg/l	0.05	ISO 17025	< 0.05
Nickel (total)	µg/l	0.5	ISO 17025	80
Selenium (total)	µg/l	0.6	ISO 17025	4
Zinc (total)	µg/l	0.5	ISO 17025	6800
Antimony (dissolved)	µg/l	0.4	ISO 17025	4
Arsenic (dissolved)	µg/l	0.15	ISO 17025	2.98
Barium (dissolved)	µg/l	0.06	ISO 17025	68
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02
Manganese (dissolved)	µg/l	0.05	ISO 17025	1800
Vanadium (dissolved)	µg/l	0.2	ISO 17025	1.9
Copper (total)	µg/l	0.5	ISO 17025	11

Analytical Report Number: 20-43438
Project / Site name: Trowbridge WRC

Your Order No: POR032916

Lab Sample Number				1695692
Sample Reference				BH03 (S)
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Monoaromatics & Oxygenates				
Benzene	µg/l	1	ISO 17025	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	16
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	45
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	330
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	390
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	31
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	79
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	330
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	960
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	1400
Volatile free fatty acids				
Formic Acid	mg/l	10	NONE	< 10
Acetic Acid	mg/l	10	NONE	< 10
Propanoic Acid	mg/l	10	NONE	< 10
Isobutyric Acid	mg/l	10	NONE	< 10
Butyric Acid	mg/l	10	NONE	< 10
Isovaleric Acid	mg/l	10	NONE	< 10
Valeric Acid	mg/l	10	NONE	< 10
Hexanoic Acid	mg/l	10	NONE	< 10
Heptanoic Acid	mg/l	10	NONE	< 10
4-methyvaleric Acid	mg/l	10	NONE	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 20-43438
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (total)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Complex cyanide in water	Determination of complex cyanide by calculation. Accredited matrices SW, PW, GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry.Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Thiocyanate in water	Determination of thiocyanate in water by discreet analyser (colorimetry). Accredited matrices SW, GW, PW.	In house method based on SMWW 4500-CN-M. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025

Analytical Report Number : 20-43438
Project / Site name: Trowbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Kjeldahl nitrogen in water	Determination of total nitrogen using the Kjeldahl-digestion method and colorimetric determination.	In house method based on BS 7755-3.7:1995 & ISO 11261:1995.	L087-PL	W	NONE
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Volatile free fatty acids in Water	Determination of volatile free fatty acids in water by HPLC.	In-house method	L105B-PL		NONE
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K2Cr2O7 followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Elemental sulphur in water	Determination of elemental sulphur in water by extraction in dichloromethane followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	W	NONE
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report

Analytical Report Number : 20-43438
Project / Site name: Trowbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH03 (S)	None Supplied	W	1695692	a	None Supplied	None Supplied	None Supplied

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Analytical Report Number : 20-44136

Project / Site name:	Trwbridge WRC	**Samples received on:**	30/11/2020
Your job number:	BMG2109	**Samples instructed on/ Analysis started on:**	30/11/2020
Your order number:	POR033029	**Analysis completed by:**	07/12/2020
Report Issue Number:	1	**Report issued on:**	07/12/2020
Samples Analysed:	2 water samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-44136
Project / Site name: Trwbridge WRC

Your Order No: POR033029

Lab Sample Number				1699714	1699715
Sample Reference				BH03 (D)	BH02 (D)
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
General Inorganics					
pH	pH Units	N/A	ISO 17025	7.5	7.7
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10
Complex Cyanide	µg/l	10	ISO 17025	< 10	< 10
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10
Thiocyanate as SCN	µg/l	200	ISO 17025	330	240
Sulphate as SO4	µg/l	45	ISO 17025	497000	803000
Sulphate as SO4	mg/l	0.045	ISO 17025	497	803
Elemental Sulphur	mg/l	0.02	NONE	< 0.02	< 0.02
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Chloride	mg/l	0.15	ISO 17025	99	840
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	190	2600
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	33.7	13.5
Nitrate as N	mg/l	0.01	ISO 17025	0.07	0.05
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	350	120
BOD (Biochemical Oxygen Demand) (Total) - PL	mg/l	1	ISO 17025	34	56
Total Phenols					
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10
Speciated PAHs					
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16

Analytical Report Number: 20-44136
Project / Site name: Trwbridge WRC

Your Order No: POR033029

Lab Sample Number				1699714	1699715
Sample Reference				BH03 (D)	BH02 (D)
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Boron (dissolved)	µg/l	10	ISO 17025	1800	3900
Calcium (dissolved)	mg/l	0.012	ISO 17025	130	78
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Iron (dissolved)	mg/l	0.004	ISO 17025	0.11	0.17
Magnesium (dissolved)	mg/l	0.005	ISO 17025	8.8	21
Potassium (dissolved)	mg/l	0.025	ISO 17025	13	23
Sodium (dissolved)	mg/l	0.01	ISO 17025	380	920
Chromium (total)	µg/l	0.2	ISO 17025	8.4	6.8
Lead (total)	µg/l	0.2	ISO 17025	37	43
Mercury (total)	µg/l	0.05	ISO 17025	< 0.05	0.15
Nickel (total)	µg/l	0.5	ISO 17025	46	27
Selenium (total)	µg/l	0.6	ISO 17025	7.8	8.7
Zinc (total)	µg/l	0.5	ISO 17025	380	220
Antimony (dissolved)	µg/l	0.4	ISO 17025	3	1.3
Arsenic (dissolved)	µg/l	0.15	ISO 17025	3.98	5.56
Barium (dissolved)	µg/l	0.06	ISO 17025	46	37
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02
Manganese (dissolved)	µg/l	0.05	ISO 17025	220	120
Vanadium (dissolved)	µg/l	0.2	ISO 17025	1.2	5.5
Copper (total)	µg/l	0.5	ISO 17025	28	63
Volatile free fatty acids					
Formic Acid	mg/l	10	NONE	< 10	210
Acetic Acid	mg/l	10	NONE	< 10	< 10
Propanoic Acid	mg/l	10	NONE	< 10	< 10
Isobutyric Acid	mg/l	10	NONE	< 10	< 10
Butyric Acid	mg/l	10	NONE	< 10	< 10
Isovaleric Acid	mg/l	10	NONE	< 10	< 10
Valeric Acid	mg/l	10	NONE	< 10	< 10
Hexanoic Acid	mg/l	10	NONE	< 10	< 10
Heptanoic Acid	mg/l	10	NONE	< 10	< 10
4-methyvaleric Acid	mg/l	10	NONE	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 20-44136
Project / Site name: Trwbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (total)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Biological oxygen demand (total) of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B.	L086-PL	W	ISO 17025
Complex cyanide in water	Determination of complex cyanide by calculation. Accredited matrices SW, PW, GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry.Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Thiocyanate in water	Determination of thiocyanate in water by discreet analyser (colorimetry). Accredited matrices SW, GW, PW.	In house method based on SMWW 4500-CN-M. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025

Analytical Report Number : 20-44136
Project / Site name: Trwbridge WRC

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Volatile free fatty acids in Water	Determination of volatile free fatty acids in water by HPLC.	In-house method	L105B-PL		NONE
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K2Cr2O7 followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Elemental sulphur in water	Determination of elemental sulphur in water by extraction in dichloromethane followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	W	NONE
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report

Analytical Report Number : 20-44136
Project / Site name: Trwbridge WRC

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH02 (D)	None Supplied	W	1699715	a	None Supplied	None Supplied	None Supplied
BH03 (D)	None Supplied	W	1699714	a	None Supplied	None Supplied	None Supplied

Key: **a** - No sampling date **b** - Incorrect container
c - Holding time **d** - Headspace **e** - Temperature

Appendix G EQRA process

APPENDIX G

A EQRA DETAILED METHODOLOGY AND JUSTIFICATION

Overall EQRA Structure

The data input and calculations of the EQRA are carried out within MS Excel. Instructions for the use of the EQRA spreadsheet can be found within the 'Instructions' worksheet of the Excel document.

The EQRA within the Excel document is divided into eight worksheets. Of these, the first is the instruction sheet, four are question sheets (Storage Assets, Pipe Work Assets, Other Assets and Receptors), while the remaining three are the Summary Scorings sheets. There is one additional worksheet that contains the weightings for the EQRA, however this is locked to ensure that these weightings are not altered. The structure of each of these worksheets is described and justified below.

The general structure of the EQRA follows the source-pathway-receptor model. The source and pathway analysis is undertaken within the asset question sheets, while the receptor analysis is contained within the Receptors question sheet. As detailed above, these three scores are multiplied for each asset to give an overall 'Risk of Harm'.

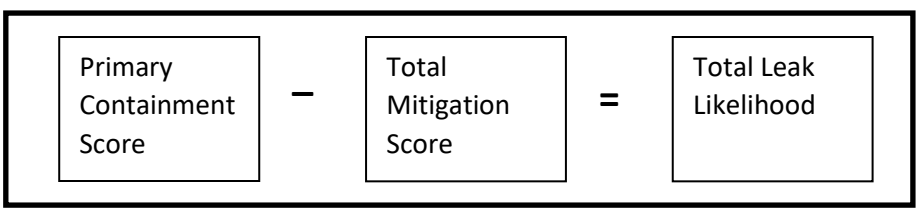
Storage Assets

Storage assets, as specified within the improvement programme condition, include all sumps, storage tanks, vessels and lagoons within the PPC installation, as identified in the process flow diagram of the permit application. Each of these types of storage asset is assessed within the storage assets worksheet.

Storage assets are first assessed based on their primary containment and condition to give an initial 'Primary Containment' score, which can be viewed as an unrefined potential for that particular asset to leak. The assets are evaluated on the material and condition of the tank, as well as whether it is aboveground or buried.

Assessment of the measures taken to manage this risk is undertaken based upon the presence of a variety of mitigating factors, based upon the EA's indicative BAT requirements for fugitive emissions to water. Each of the various mitigation measures is assigned a value based on how much it is considered to reduce the risk of fugitive emissions. Each additional mitigation measure is considered to further reduce the risk of fugitive emissions, as such the 'Total Mitigation' score is generated from the aggregate scores of the mitigating factors that are present.

The presence of mitigation measures at a storage asset will reduce the risk of any leaks reaching a pathway. As such, the 'Total Leak Likelihood' score is calculated by subtracting the 'Total Mitigation' score from the 'Primary Containment' score.

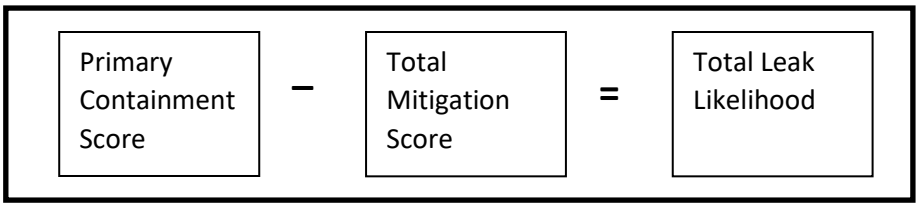


The severity of a leak is a function of the polluting potential of the contents and the volume of those contents. As such, the 'Leak Severity' score is calculated by multiplying the score of the contents by the score assigned to the capacity of the tank. The capacity of the tank is used in preference to the average contents in keeping with a 'worst case scenario' or 'precautionary principle' ideology. In a similar vein, should the storage asset contain a mixture of materials, the most contaminative is assessed, for example the contents of digesters should be assumed to be pre-digested sludge, rather than post digested sludge.

Pipe work Assets

The method of assessment for pipe work assets is similar to that used for storage assets.

As with storage assets, pipe work assets are assessed based on their leak risk (primary containment and any mitigation measures present), the potential severity of any leak that may occur and the pathways present around the pipe work. Again, the scores for these three sections are multiplied.



However, there are several key differences between the assessments of storage and pipe work assets, namely:

- The exact condition of underground pipe work is generally not known across the United Utilities portfolio. As such, age is used as a common and widely-known differentiator to identify higher risk pipe work assets. Older pipes are generally considered to be more likely to cause fugitive emissions, as such should be prioritised higher for further inspection by being given higher risk ratings.
- The severity of a potential leak is based on flow rates of material in the pipe work rather than capacity.
- There are fewer potential mitigation measures available for pipe work assets. Labelling and overflow prevention are not relevant to underground pipe work and are therefore not included.

Pathways

Pathway analysis is undertaken on an asset-by-asset basis and in conjunction with the assessment of leak likelihood for storage, pipe work and other assets. Assessing pathways on an individual asset basis allows changes in hydrogeology and varying distance to surface water features across larger installations to be identified.

The determination of the presence (and magnitude) of a pollution linkage is determined based upon two potential routes:

1. Groundwater – The potential of a groundwater pathway is determined by the type of aquifer underlying the asset. Non-Aquifer geology beneath an asset indicates an absence of a continuous, naturally occurring groundwater body beneath that asset, therefore no potential for groundwater flow exists, and no groundwater pathway is present. The presence of a Minor Aquifer beneath the asset would represent a potential

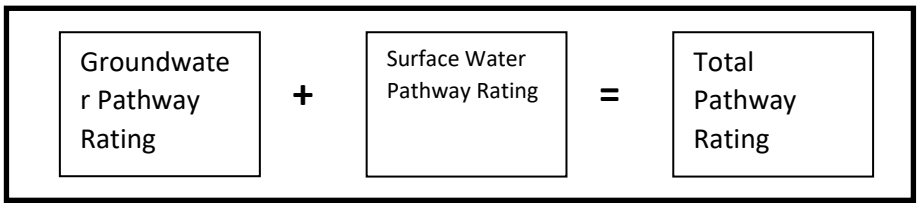
contaminative pathway and thus some risk of completing the source-pathway-receptor linkage, while Major Aquifer geology would provide a higher potential for contamination migration.

2. Surface water – Surface water pathway analysis is based on the distance to the nearest surface water feature that is likely to be in hydrogeological continuity with the groundwater of the area. Surface water features that are closer to the asset are considered to have greater potential to act as a pathway for contamination, as such given a higher risk rating.

Soil permeability is not included within pathway analysis. Soil permeability data obtained from EA hydrogeological maps does not indicate the depth at which soils can be found. On the whole, the protection that soils with low leaching potential would provide to above ground assets is not considered to be significant within the scope of this assessment. Furthermore, the risk of fugitive emissions from in or underground tanks would not be mitigated by the presence of soils with low leaching potential as the soils represent only a relatively thin layer of protection that the majority of buried tanks will extend beyond.

Pathways analysis for pipe work assets is based on the most sensitive pathway the pipe work encounters, i.e. should a pipe run through Minor and Major Aquifer geology, then its pathway score should be entered as if the entire pipe ran through the Major Aquifer, or the distance to the nearest surface water feature should be the distance at the closest point to the pipe. This is in keeping with the 'worst case scenario' or 'precautionary principle' ideology.

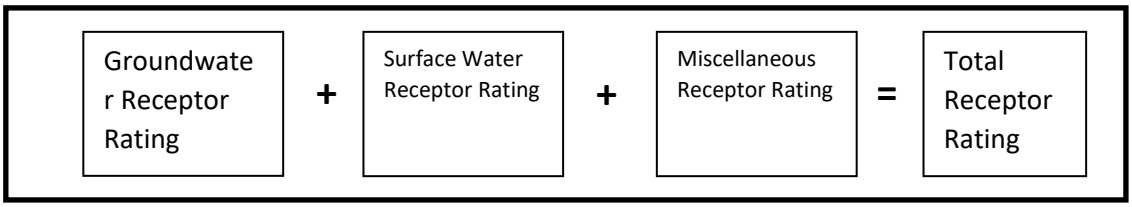
The scores for the groundwater and surface water pathways are added to give a 'Total Pathway Rating' for the asset.



Receptors

While pathway analysis is undertaken on an asset by asset basis, receptor analysis is undertaken on an installation-wide basis. It is considered that, should pathways be identified, these will lead towards the same receptors whichever asset is acting as the source. For example, where groundwater is present, flow direction will be generally uniform across an installation and thus all fugitive emissions that reach the groundwater will migrate towards the same receptors (such as a sensitive abstraction). As such it is the sensitivity of the receptor, rather than its proximity to individual assets, that is of importance at this stage of assessment.

The nature of this assessment means that there is some repetition of data input (type of aquifer and presence of surface water features). This duplication is considered necessary as surface water and groundwater represent both contaminative pathways *and* sensitive receptors in their own right.



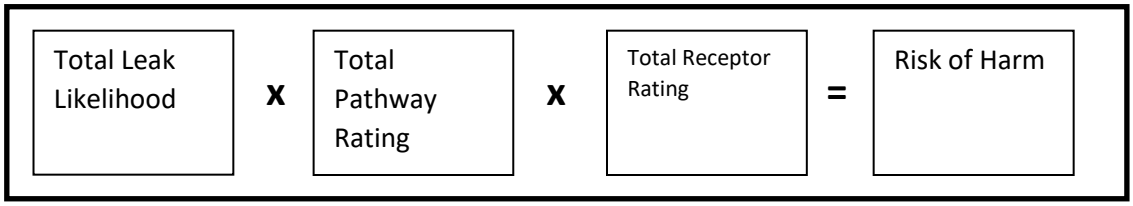
The combined results of the receptor and pathway portions of the EQRA were validated via comparison with an independently developed environmental sensitivity EQRA

Results generated by this portion of the EQRA were ranked and compared to rankings generated by the alternative environmental sensitivity model. The two sets of rankings were compared in an open forum discussion between the developers of each model. Through this discussion it was noted that in general the two models produced similar rankings, although some minor changes to the QRA model were agreed.

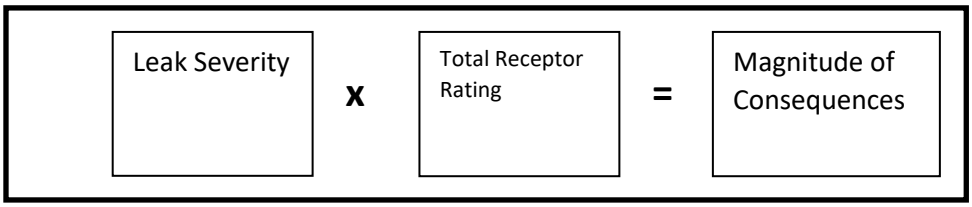
Summary Scorings

The results generated by the EQRA are displayed separately for storage, pipe work and other assets. Results for storage and pipe work assets are displayed in two ways.

1. For each asset, results according to the source-pathway-receptor model are displayed, with scorings for each element of the model as well as a final 'Risk of Harm' rating;



2. Results are displayed according to the magnitude and probability of consequences (as outlined by the DETR) for pipe work and for storage assets, but not for 'other' assets. Magnitude is calculated based on a function of the 'Leak Severity' score and the Receptors sensitivity rating. Probability of consequences is calculated based on the 'Leak Likelihood' and the 'Pathways' scores. Displaying this alternate method allows the separate identification of smaller tanks that are likely to leak, versus larger tanks that are less likely to leak, which would have been given similar 'Risk of Harm' scores. The probability and magnitude of harm are also displayed in a scatter graphs, one for storage assets and one for pipe work assets.



Weighting Justification

ASSETS

Primary Containment

Aboveground / below ground assets	A buried or partially buried asset is considered to pose a significantly higher risk of fugitive emissions than an asset that is entirely aboveground. Aboveground assets can be inspected and leakages or a deterioration of condition are more noticeable and can thus be dealt with before there is an impact upon the environment. Additionally, resolving issues that have been identified is simpler on assets to which access is easier. Additionally, a fugitive emission emanating from a buried asset is considered more likely to reach groundwater than an equivalent emission from an aboveground asset. As such, a significantly lower weighting is given to aboveground assets than to buried assets. The weighting awarded to partially buried assets is closer to that given to buried than to aboveground. This is considered appropriate as many of the factors that increase risk in underground assets are also present in partially buried assets (e.g. potential direct emissions to groundwater, or constrictions to access.
Construction material	The weighting awarded to the material from which the asset is constructed is based upon the usual design life - concrete has the longest design life (typically approximately 60 years), compared to metal (approximately 30 years) and plastic (approximately 20 years), so it is considered the lowest risk all other things being equal. A lining reduces risk of fugitive emissions by providing protection to chemical attack from asset contents and / or by providing an amount of physical reinforcement to the structure. As such assets with such a lining present are awarded a lower risk weighting.
Condition	The condition score awarded to an asset is based upon a visual inspection and consultation with site personnel. Possible responses are divided into four bands Actively Leaking – there is a known fugitive discharge, identified either during the site walkover, or from consultation with site personnel. Bad – there is widespread weathering (e.g. rust on a metal tank, or cracking on a concrete tank) posing some risk of a leak occurring, although none is known to have occurred. An asset is also considered ‘bad’ if it has exceeded its design life. Average - isolated weathering is identified but is not considered likely to cause a leak. Excellent - no signs of wear have been identified, the asset is ‘as new’. The weightings awarded to each of these options is based upon an exponential scale. Identification of fugitive emissions or the likelihood of such emissions in the near future is given a significantly higher risk rating that those assets where no problems were identified.

Mitigation Measures

Secondary Containment	If present, and in line with BAT, then a significant mitigation weighting is awarded. Allowances have been made for secondary containment that may not meet all BAT requirements, but which is still likely to provide some protection to controlled waters. These being, insufficient capacity of the bund or a bund which is in some way permeable to the contents of the asset. Should either of these situations be present a mitigating score is still awarded to the asset, but the value is significantly reduced.
Sealed drainage system	A sealed drainage system can act as a tertiary level of containment in the event that primary and secondary containment fails, or as secondary containment should there be none present. Therefore an additional mitigation weighting is applied for an asset if it has a sealed drainage system surrounding its secondary containment.
Condition Monitoring	The monitoring of an asset will aim to identify changes in its condition, thereby allowing site personnel to enact preventative measures to minimise the potential for future fugitive emissions. External visual inspection does not provide an assessment of the interior of the asset and therefore can only be used as a guide to the condition of non-visible portions of the asset condition. This limitation means it is given a low weighting. CCTV inspection allows in interior of the asset to be visually inspected in order to identify any degradation in condition and areas that may require repair / additional on-going monitoring. Integrity testing uses further techniques to categorically ensure that the asset provides a sealed environment for its contents. As this proves the integrity and that no fugitive emissions are occurring, it is awarded a higher weighting.
Leak detection	The presence of leak detection systems will identify fugitive emissions and enable site personnel to undertaken measures to stop these emissions. Such systems do not prevent the emissions in the first instance, and as such are not awarded a significant mitigation weighting, but will potentially reduce the scale of such an incident.
Labelling of storage asset	The labelling of assets with contents and capacity allows better management of leaks and spills. However, it is not considered to provide a significant level of risk mitigation.

Leak Severity

Contents	The relative weighting given to each material are based on a number of factors including: • The presence of List I / List II substances; • Viscosity (thinner materials such as liquors or condensates will tend to migrate more freely); and • The persistence of contaminants (materials containing metals and other accumulating contaminants are given a higher weighting than substances whose impacts are likely to be spatially and temporally constrained and thus less likely to impact upon controlled waters). The purpose of the digestion of sludge during the treatment process is to reduce the contaminative potential of the sludge through reduction in Biological Oxygen Demand. However, the reduction is not considered to be significant due to the continuing presence of persistent contaminants such as metals. Sewage sludge has been used in agriculture for many years and this is governed by the Sludge (Use in Agriculture) Regulations 1989. These regulations clearly identify which contaminants are of concern when sludge is released into the wider environment (during spreading on fields). The majority are metals (zinc, copper, nickel, cadmium, lead, mercury and chromium), although they also includes the organic content, pH, nitrogen and phosphorous levels. Given that agricultural use is extremely sensitive it is considered appropriate that the same suite of contaminants is viewed as those that have the potential to impact upon the environment in the event of fugitive emissions from sewage treatment works.

Through flow of pipe work / Capacity of storage assets	Larger assets / assets with a greater throughflow are awarded a higher weighting. For minor leaks it is assumed, ceteris paribus, that the larger the size / throughflow the asset has, the greater pressure will be exerted on a leak, resulting in a greater rate of release. The potential 'self-healing' effect of sludge material filling cracks in containment that could otherwise lead to leaks in smaller assets is also taken into account. Additionally, it is considered that in the event of a catastrophic failure the total emission will be greater for larger assets.

PATHWAYS

Presence of Low Permeability Drift Deposits	Low permeability drift deposits beneath assets can act as natural containment, effectively isolating assets from any underlying groundwater that may be present and minimising the potential for lateral migration to surface waters. As such the presence of such deposits can be viewed as a natural mitigating factor so weightings awarded by this question are subtracted from the total pathway score. The grading of weightings is based upon the thickness of the deposits that are known to be present. Data will inevitably require some extrapolation to determine this thickness, as such the extra weighting to thicker deposits takes into account the increased confidence that the layer will prevent migration. A minimum likely thickness of 5m is considered appropriate to allow for fluctuations and still provide protection from contamination migration. The thickness of the low permeability drift deposit strata is taken from the base of the asset in question to ensure the risk from buried assets that may pierce the layer are not awarded a lower score.
Aquifer Type	The type of aquifer beneath the site is used as a proxy for potential for contamination to migrate via groundwater. Major Aquifers are considered to be able to allow contamination to migrate further, faster and in greater quantities than a Minor Aquifer. If Non-aquifer geology is present then there is no groundwater pathway. Weightings are awarded accordingly.
Distance to nearest surface water feature	It is considered that the main pathway leading to a surface water feature will be groundwater migration. As such, the risk weighting decreases exponentially with distance as contaminants are dispersed, diluted and chemically altered as they pass through the ground. Should the installation be situated above a Non-Aquifer or on low permeability drift deposits then contaminants are more likely to pass over the surface (or within near-surface soils), where the same processes will reduce potential risk to more distant surface water features.
Direct Discharge	An alternate pathway for fugitive emissions to impact upon surface water features would be direct discharge to features in close proximity to the source. For instance if the asset is located adjacent to a lined drain that discharged directly to a river. This presents a significant, and direct, pathway that will not be subject to the same dispersal or degradation that would be seen in migration through the ground. As such, it is awarded an appropriately high weighting should it be present.
Flood Risk	Flooding (either tidal or fluvial) can provide a direct, albeit rare, pathway for significant fugitive emissions into surface water. The presence of a flood risk area also gives an indication of high groundwater levels.

RECEPTORS

Groundwater

Aquifer Type	A Major Aquifer is deemed to be more sensitive to contamination as they have the potential to provide water for sensitive abstractions over a significant distance. Non-aquifers are considered to have no sensitivity to contaminants due to the absence of significant quantities of groundwater contained within them.

Groundwater Source Protection Zone (SPZ)	A groundwater Source Protection Zone is an area identified by the EA as an area where contamination has the potential to impact upon drinking water supplies (from wells, boreholes, or springs). Three zones are used, dependant largely upon the length of time it is likely to take for contaminants to reach the protected water supply point. The presence of a groundwater protection zone presents a significant increase in the sensitivity of the underlying groundwater. The weighting is based on the zone type, as such a Zone I (Inner Zone) is given the greatest weighting, followed by Zone II (Outer Zone) and Zone III (Total Catchment).
Sensitive abstraction	The identification of a sensitive groundwater abstraction within 500m of the subject works introduces a specific receptor in addition to any groundwater SPZ that may be present. Potentially sensitive abstractions may not always be covered by a groundwater SPZ

Surface Water

Presence of surface water feature	The presence of a significant surface water feature, regardless of its particular attributes is given a base sensitivity rating. This is then increased based upon the presence of specific sensitivity features.
Sensitive surface water abstraction	The presence of a sensitive surface water feature abstraction in an area that could be impacted upon by the subject works (i.e. downstream) introduces an additional specific receptor. The weighting awarded is on a scale that reduces exponentially with distance to the abstraction point. This is to incorporate the dilution and degradation of contaminants as they travel along the river channel. Contamination reaching such an abstraction could have a direct impact upon human health and is awarded a relatively high weighting when located nearby to the installation.
Bathing water directive	The main objective of the Bathing Water Directive is to protect public health and the environment from faecal pollution in bathing waters. It required the identification of popular bathing areas. The presence of such an area in the receiving waters of the installation acts as an additional sensitive receptor, particularly given the nature of the pollution with which the directive is concerned.
Fresh Water Fish directive	The Freshwater Fish Directive stipulates that certain stretches of surface water meet standards that should allow fish (specifically salmonid or cyprinid fish) to live within that particular stretch. The presence of such a protected area in the receiving waters of the installation acts as an additional sensitive receptor.
Sensitive Areas (eutrophication)	The designation of a Sensitive Area (eutrophic) identifies waters that susceptible to the impacts of nutrients (particularly nitrogen and phosphorus) from sewage works discharge. Fugitive emissions from sewage treatment installations have the potential to introduce further such contaminants and therefore the presence of such a designated area increased the sensitivity of the surface water feature.

Miscellaneous

Statutory Protected Habitats	The presence of statutory protected habitats (SSSIs etc.) introduces additional sensitive receptors to the area. Additional weighting is given based upon the number of such habitats identified within a 500m radius (up to a maximum of three, beyond which is it not considered that additional habitats will increase environmental sensitivity). Areas that have been designated as SSSI due to non-ecological interest (such as geological) are not considered.

Nitrate Vulnerable Zone	A Nitrate Vulnerable Zone can apply to either groundwater and surface water that has, or could have if no mitigating works are undertaken, a nitrate level of greater than 50mg/l. Nitrogen is one of the contaminants of concern identified within the Sludge (Use in Agriculture) Regulations 1989. The presence of such susceptible zones at or close to the site is considered to increase the environmental sensitivity.

Appendix 7: Environmental Risk Assessment (including Bioaerosol Risk Assessment)

Wessex Water Services Ltd

Trowbridge Bioresources Centre

H1 Environmental Risk Assessment

June 2021

Revision	Date	Description	Author	Checked by	Reviewed by
01	July 2021	Environmental Risk Assessment	Josh Parsons	Peter Duncan	Peter Duncan

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1 INTRODUCTION

This Environmental Risk Assessment (ERA) has been completed for Wessex Water Services Limited (WW) for the site at Trowbridge Bioresources Centre (BC), Bradford Road, Trowbridge, Wiltshire, BA14 9BJ (the Site). This ERA has been completed in accordance with prevailing Environment Agency (EA) technical guidance (Environment Agency, 2020). It is noted that this guidance replaces previous EA H1 Guidance (Environment Agency, 2011), however, the H1 methodology is considered to remain appropriate.

Environmental Risk Assessments have been completed for:

- Emissions / discharges to water (surface water, groundwater and site drainage); [Table 3.1]
- Environmental accidents and incidents; [Table 3.2]
- Odour; [Table 3.3]
- Noise and vibration; [Table 3.4]
- Fugitive emissions (including dust, mud, litter, pests and pollutants) [Table 3.5)].

Environmental Risk Assessments are focused on the proposed biological treatment activities, as illustrated in Figure 1. The activities to which this Environmental Risk Assessment and the Environmental Permit application relate, are included in purple. Environmental risk is estimated using the 'risk matrix' provided in Section 2.

EA guidance for Bioaerosol monitoring at regulated facilities (Environment Agency, 2018) requires that bioaerosols are monitored if a biological waste treatment facility is located within 250 m of a sensitive receptor (a place where people live or work) for more than 6 hours at a time. Residential dwellings within the residential town of Trowbridge are located approximately 160 m east of the Site. Monitoring will therefore be carried out on the Site to ensure that bioaerosol emissions are at an acceptable level. At this stage, a qualitative bioaerosol risk assessment has been completed for the site and is provided as Appendix 1.

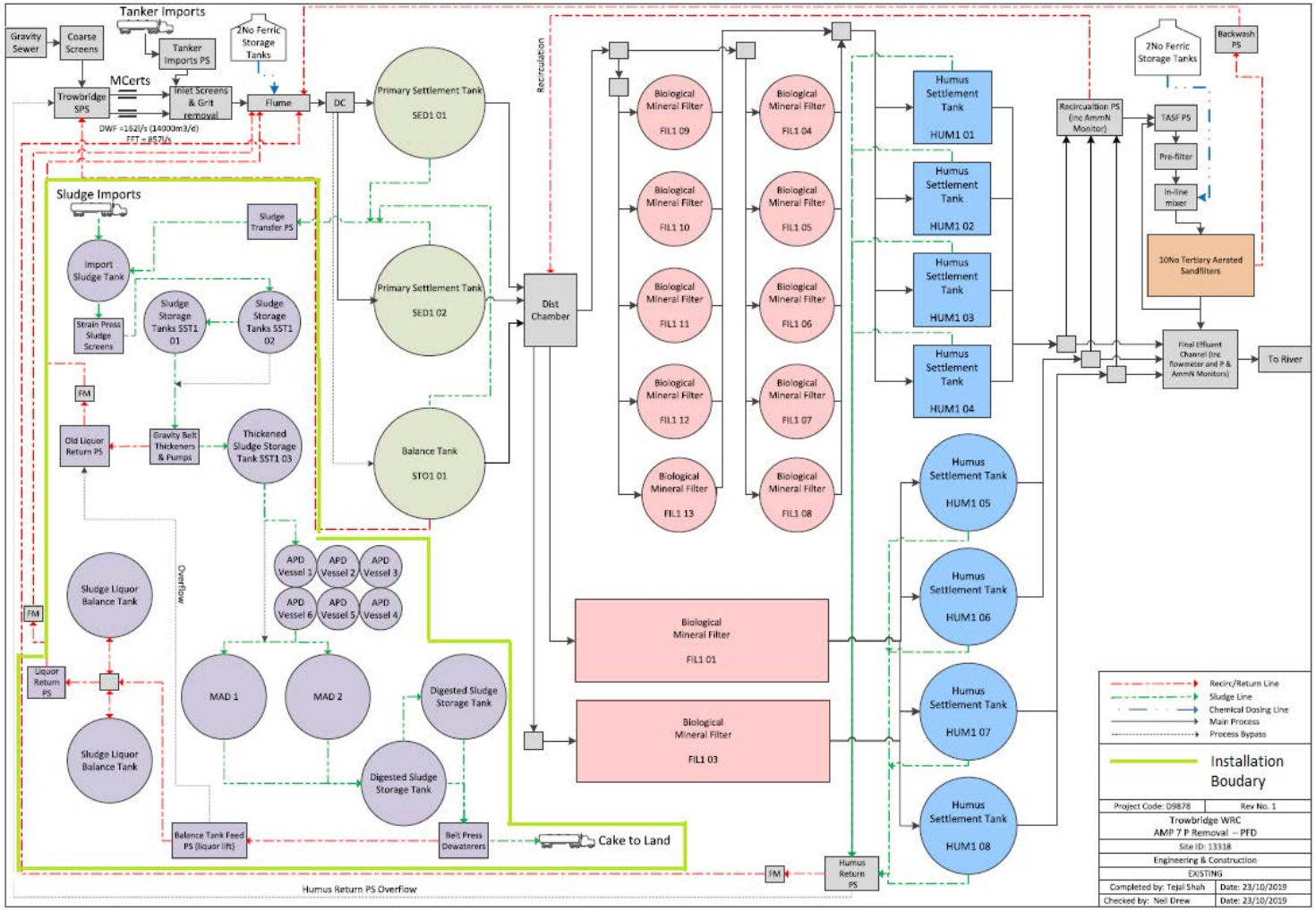
This ERA does not include specific reference to the training of staff, as this aspect of mitigation stretches across all aspects of risk management for the Site. WW staff are provided with training which is specific to their role and only suitably trained staff are involved in the biological treatment activities. WW have a training matrix which provides a record of staff training and prompts for refresher training, as required. WW have a Technically Competent Manager who will oversee the biological treatment activities.

This ERA does not include reference to risks associated with flooding. This is due to the Site not being located within a Flood Zone[1].

Given the planned changes associated with this EP application for a substantial variation to the existing EP (EPR/BB3934AG), this ERA concludes that, accounting for the implementation of the mitigation measures, it is not considered that the proposed activities will have a significant impact on the environment.

[1] Site not located within a Flood Zone, reference Flood Map for Planning, 2021 (https://flood-map-for-planning.service.gov.uk)

Figure 1 Waste Activities – Process Flow Diagram



Note – The Process Flow Diagram shows activities carried out within the installation boundary (green line) and activities within the wider site. Biogas assets and activities are excluded.

2 METHOD OF RISK ESTIMATION

Table 2.1 below has been used to demonstrate an estimation of risk from activities to be carried out within the proposed installation boundary. The estimation of risk is based on the magnitude of consequences from hazards associated with the activities carried out at the Site and the probabilities of these hazards occurring.

Table 2.1 Estimation of Risk

Risk →	*Consequences*			
	Severe	**Moderate**	**Mild**	**Negligible**
Probability				
High	High	High	Medium/low	Near Zero
Medium	High	Medium	Low	Near Zero
Low	High/medium	Medium/low	Low	Near Zero
Negligible	High/medium/low	Medium/low	Low	Near Zero

Although the above table is a simplification that cannot represent the true complexity of assessing risk on the Site, it has been used as a guide in preparing the Environmental Risk Assessment included in the subsequent sections of this report.

3 ENVIRONMENTAL RISK ASSESSMENT

Table 3.1 Emissions to Water (Surface Water, Groundwater and Sewage)

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
Contaminants from the biological treatment operations reaching surface water features	Surface water features (closest being River Biss located approximately 100m east of the Site, Kennet & Avon Canal and River Avon both located approximately 600m north of the Site, local flora and fauna.	Infiltration and surface water run-off	WW have an Environmental Management Plan, which has been prepared in accordance with prevailing EA Guidance (how to develop a management system: environmental permits). A copy of the Environmental Accident Management Plan is provided as part of this Environmental Permit application and prevalent points included below. A robust risk assessment process (EQRA) is provided as Appendix 6 of this application. The EQRA is based on the source-pathway-receptor model as prescribed by CIRIA C736, and in accordance with sector guidance. The EQRA allows for a determination of BAT or BAT equivalent measures for the containment of fugitive emissions to ground/groundwater. The nearest surface water feature is the River Biss, which is located approximately 100 m east of the Site. The Site is not located within a Groundwater Protection Zone; the nearest is over 2 km to the north east of the Site. The surfacing on the Site is impermeable surfacing with sealed drainage. The site is laid to falls, with water draining towards gullies/inlets. Kerbing and containment infrastructure are present to prevent infiltration and surface water run-off. Water from the biological treatment operations that enters drains is directed to the head of works at the	Negligible	Mild	Low
Contaminants from the biological treatment operations reaching groundwater	Surface water features (ultimately reaching groundwater) and groundwater.			Negligible	Mild	Low

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
			Water Recycling Centre (WRC). In this way, the drainage infrastructure acts as a 'closed loop' system.			
Uncontrolled emissions to sewer from biological treatment operations	Sewer	Drainage of final effluent to discharge point and foul sewer	Discharges (2 No.) are controlled by conditions of the existing wastewater discharge EP No. 102153. Discharges are monitored in accordance with this EP. As above, surface water management infrastructure is a 'closed loop' system.	Negligible	Medium/Low	Low

Table 3.2 Environmental Accidents and Incidents

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
Leaks and spills from plant/equipment, hazardous liquid containment facilities (e.g. polymer and fuel), tanks and pipework	Nearby land uses, surface water features (closest being River Biss located approximately 100m east of the Site), local flora and fauna.	Surface water run-off, infiltration.	As above, surface water management infrastructure is a 'closed loop' system. Any leaks and spills would ultimately reach the head of works at the WRC. All plant and equipment on the Site are fitted with process monitoring equipment, which will continuously monitor the process to detect any faults which could lead to an incident. This system will raise an alarm if a fault has, or is likely to, occur. As an example, an alarm will activate if levels within a tank exceed a trigger limit in order to minimise the risk of overfilling. Alarms notify key staff who will act to resolve the issue. All plant and equipment on the Site are checked and maintained as part of a maintenance regime. Checking for leaks is a specific item within the operational regime. This will act to reduce the likelihood of any loss of containment or leaks, alongside various control measures. Hazardous liquids e.g. polymer and fuel are stored appropriately in bunded tanks/containers. Provision of spill kits and incident response equipment to clean up leaks / spills. Supervision of all fuel deliveries. Fuel delivery will take place in a designated area.	Low	Negligible	Near Zero

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
Failure of plant / equipment e.g. from blockages, pressure, faulty pipework, valves, pumps etc. which could cause accidents / incidents e.g. injury, fire etc.	Staff on site (direct harm) and nearby solar farm located approximately 50 m north west of the Site, commercial uses (closest being 3pm model maker located approximately 500m north east of the Site) and the residential town of Trowbridge, with the closest dwelling being located approximately 185 m south east of the Site.	Direct – harm/injury, spread of fire. Air (air quality impact)	WW have an Environmental Management Plan, which has been prepared in accordance with prevailing EA Guidance (how to develop a management system: environmental permits). A copy of the Environmental Accident Management Plan is provided as part of this Environmental Permit application and prevalent points included below. All plant and equipment on the Site are fitted with process monitoring equipment, which will continuously monitor the process to detect any faults. This system will raise an alarm if a fault has, or is likely to, occur. As an example, an alarm will activate if pressure is low or the temperature of the pump exceed a pre-set limit. Alarms notify key staff who will act to resolve the issue. All plant and equipment on the site are checked and maintained as part of a maintenance regime. Alarms will trigger as part of a continuous monitoring system for all plant, which will ensure prompt response to faults. Actions will be taken to fix plant / equipment in the event of a failure / breakdown to address the incident as quick as possible. In some instances, a failure could have severe consequences i.e. a failure involving infrastructure managing biogas. An automated stop on assets will be initiated in the event that excess heat, low pressure or electricity anomalies are identified. Management may also make the decision to stop operations by utilising manual stops on	Low	Moderate	Medium/Low

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
			assets. This decision will be largely based on if the plant is integral to the operation and likely to pose a wider concern to the Site and/or the environment.			
Fire e.g. from a fault in plant / equipment or from arson	Staff on site (direct harm) and nearby solar farm located approximately 50 m north west of the Site, commercial uses (closest being 3pm model maker located approximately 500m north east of the Site) and the residential town of Trowbridge, with the closest dwelling being located approximately 185 m south east of the Site. Local amenity and flora/fauna e.g. agricultural land, River Biss and Wildbrook Wood.	Direct – spread of fire. Air (air quality impact)	WW have an Environmental Management Plan, which has been prepared in accordance with prevailing EA Guidance (how to develop a management system: environmental permits). A copy of the Environmental Accident Management Plan is provided as part of this Environmental Permit application and prevalent points included below. Waste accepted and treated on the Site is sludge and the resulting 'cake' and solids e.g. 'rags', which are not combustible in nature (as defined by EA Guidance for Fire Prevention). The majority of waste will have a high liquid content exceeding 95% by weight. Wessex Water have an 'Environmental Guidance - Fire Emergencies (Ref. ENVG008)' document which outlines their approach to dealing with fires on the site, which includes actions to be taken in the event of a fire and directions for managing contaminated fire water. A copy of the 'Environmental Guidance - Fire Emergencies' document is included as Appendix 2. Water is immediately available on the site for use by the emergency services to tackle a fire.	Low	Moderate	Medium/Low

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
			Biological treatment activities produce biogas which is flammable and if not properly managed could cause a fire or explosion. This biogas is managed by both WWSL and WWEL, as the proposed EP will be a multi-operator EP. Equipment involved in the management of biogas is checked and maintained as part of a maintenance regime.			
Flooding from blocked drains, burst pipes, and handling fire water (water used during firefighting)	Nearby land uses, surface water features (closest being River Biss located approximately 100m east of the Site), agricultural land and residential town of Trowbridge (closest dwelling located approximately 185 m south east of the Site)	Overwhelmed drainage system and resulting surface water-runoff.	WW have an Environmental Management Plan, which has been prepared in accordance with prevailing EA Guidance (how to develop a management system: environmental permits). A copy of the Environmental Accident Management Plan is provided as part of this Environmental Permit application and prevalent points included below. Drainage system unlikely to be overwhelmed, as it is directly linked to the WRC. Drains and drainage infrastructure are visually inspected on a daily basis to ensure they are operational e.g. no blockages. Kerbing and containment infrastructure is present on the site to prevent surface water run-off.	Negligible	Moderate	Medium/Low
Failure of services e.g. water, gas, electricity which could result in the failure of plant e.g. from overheating, which in turn could cause a fire	Staff on site (direct harm) and nearby solar farm located approximately 50 m north west of the Site, commercial uses (closest being 3pm model maker	Direct – spread of fire. Air (air quality impact)	WW have an Environmental Management Plan, which has been prepared in accordance with prevailing EA Guidance (how to develop a management system: environmental permits). A copy of the Environmental Accident Management Plan is provided as part of this Environmental Permit application and prevalent points included below.	Negligible	Moderate	Medium/Low

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
	located approximately 500m north east of the Site) and the residential town of Trowbridge, with the closest dwelling being located approximately 185 m south east of the Site. Local amenity and flora/fauna e.g. agricultural land, River Biss and Wildbrook Wood.		Risk management identified in above rows, specifically in relation to 'failure of plant' and 'fire'. Backup generators (on site and mobile) are available to ensure operations can carry on in the event of a failure in electricity. The telemetry system will inform WW staff in the event of a failure. Little water is used in the operations, with water being circulated on the site. It is therefore not anticipated that a temporary failure in water would have a significant impact. Nonetheless, if water was not available then activities would stop if necessary. Plant and equipment are fitted with process monitoring equipment. An alarm would be activated, and staff notified if plant/equipment failed e.g. pumps were overheating. Furthermore, the current of incoming water is monitored, which is regularly checked by members of the WW Water Team. Water levels are monitored and managed on a continuous basis. Boilers located on the Site will use biogas and can use natural gas if required. The boilers are not solely reliant on natural gas and would likely continue operation in the event of a gas failure. A diesel generator is available in the event of a power failure.			
Unauthorised entry and damage to plant and equipment e.g. from vandalism	Staff on site (direct harm) and nearby solar farm located approximately 50 m	Direct – harm/injury, spread of fire. Air (air quality impact)	WW have an Environmental Management Plan, which has been prepared in accordance with prevailing EA Guidance (how to develop a management system: environmental permits).	Low	Moderate	Medium/Low

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
	north west of the Site, commercial uses (closest being 3pm model maker located approximately 500m north east of the Site) and the residential town of Trowbridge, with the closest dwelling being located approximately 185 m south east of the Site. Local amenity and flora/fauna e.g. agricultural land, River Biss and Wildbrook Wood.		A copy of the Environmental Accident Management Plan is provided as part of this Environmental Permit application and prevalent points included below. Unauthorised entry could result in arson, see entry for 'fire' above. Unauthorised entry could result in tampering / vandalism of plant and equipment, see 'failure of plant' above. In addition, WW have a number of site security measures. Perimeter fence surrounds the Site, which is inspected on a weekly basis. There is a card entry barrier at the main entrance. CCTV is available near the tankered waste drop off point and is remotely viewable, with the Site Manager and other operational staff being able to view. The Regional Operations Centre (ROC) can also monitor remotely outside of working hours.			

Table 3.3 Odour

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
Odour from Biological Treatment activities	Staff on site (direct harm), commercial uses (closest being 3pm model maker located approximately 500m north east of the Site). Residential town of Trowbridge, with the closest dwelling being located approximately 185 m south east of the Site. Residential area of Trowle Common located approximately 350m south west of the Site. Local amenity and flora/fauna e.g. agricultural land, River Biss and Wildbrook Wood.	Air (Atmospheric Migration)	An Odour Management Plan (OMP) is available for the Site, which includes mitigation measures adopted by WW to minimise odour. This OMP requires that all plant on Site limits the risk of causing an odour nuisance. All new plant installed on the site is designed and operated to minimise the risk of causing odour nuisance. The OMP includes key contacts and responsible parties in relation to odour control. The Odour MP is regularly reviewed to ensure mitigation measures remain appropriate and that actions are taken as a result of any complaints are considered to improve mitigation measures. Odour complaints received for the Site to date have been relating to the liming operations. These operations have not taken place for a number of years. Therefore, no odour complaints have been received for other operations which are currently taking place on the Site. Biological treatment operations e.g. sludge screen, reception tanks, strain presses, digestors, thickeners and dewatering assets, are carried out within a building and/or containers/covered tanks. Any potential odour from belt presses (and skips), sludge thickening and dewatering activities is extracted and vented to atmosphere. All plant and equipment are fitted with process	Low	Moderate May present more risk of nuisance in the summer months.	Medium/Low

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
			monitoring equipment. This equipment monitors the performance of assets and will continuously monitor these performance metrics. An alarm is activated in the event that any plant / equipment is not functioning as expected. Actions will be taken to rectify the issue. This will act to reduce the likelihood of odour generation. A maintenance regime is followed for plant and equipment present on the site. Plant will be checked regularly to ensure they are in good working order. This will act to reduce the likelihood of breakdown, which could result in odour emissions. The WW website contains an area where the public can lodge a complaint and a site sign is present on site with contact details. Odour complaints will be recorded, and actions taken to resolve these complaints. Management will review these actions and amend the OMP and company procedures as appropriate to reduce the risk of future odour emissions.			
Odour from general site activities associated with the biological treatment activities.			Good housekeeping is enforced on the Site to minimise the likelihood of odour emissions leaving the Site boundary. Housekeeping will include keeping doors to buildings closed, sealing covers, cleaning Site surfacing and dealing with spillages.			

Table 3.4 Noise and Vibration

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
Noise and vibrations from biological treatment operations, notably: • Imported sludge screen • Pumps • Gravity belt thickeners • Dewatering units (belt presses) • Digester Boiler • Generator Boilers / CHP	Staff on site (direct harm), commercial uses (closest being 3pm model maker located approximately 500m north east of the Site). Residential town of Trowbridge, with the closest dwelling being located approximately 185 m south east of the Site. Residential town of Trowle Common located approximately 350m south west of the Site. Local amenity and flora/fauna e.g. agricultural land, River Biss and Wildbrook Wood.	Air (Atmospheric Migration)	WW have a company-wide Noise Management Plan (NMP). The purpose of the NMP is to ensure that impacts associated with noise and vibration are dealt with appropriately during the design, construction, maintenance and operation of WW assets. The NMP requires that WW conduct a noise survey to assess the impact of any new assets, during installation and commissioning, to determine whether a proposed development is at risk from creating noise nuisance. A Noise & Vibration Risk Assessment has been prepared as part of this Environmental Permit application. Points below draw upon information from this assessment. All plant and equipment on the Site are fitted with process monitoring equipment, which will continuously monitor the process to detect any faults which could lead to excess noise. This system will raise an alarm if a fault has, or is likely to, occur. Plant which has the potential to generate significant noise (listed in 'hazards' column) are contained within acoustic enclosures and/or are located within buildings. The doors to buildings containing assets that produce significant noise will be closed when plant is operational and have appropriate signage. All plant and equipment on the Site are checked	Medium	Mild	Low

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
			and maintained as part of a maintenance regime. This will act to reduce the likelihood of any fault / malfunction. The integrity of Site infrastructure, including acoustic enclosures and doors to buildings are checked to ensure the risk of noise leaving the boundary of the Site is being sufficiently minimised. No recent noise complaints have been received for the Site.			
Noise and vibrations caused by vehicle movements within the Site			A Noise & Vibration Risk Assessment has been prepared as part of this Environmental Permit application. Points below draw upon information from this assessment. Deliveries would take place during the daytime hours only when background sound levels are higher. No recent noise complaints have been received for the Site.	Medium	Negligible	Near Zero

Table 3.5 Fugitive Emissions (including dust, mud, litter, pests and pollutants)

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
Dust emissions from biological treatment activities leaving the Site boundary.	Staff on site (direct harm) and nearby solar farm located approximately 50 m north west of the Site, commercial uses (closest being 3pm model maker located approximately 500m north east of the Site). Residential town of Trowbridge, with the closest dwelling being located approximately 185 m south east of the Site. Residential town of Trowle Common located approximately 350m south west of the Site. Local amenity and flora/fauna e.g. agricultural land, River Biss and Wildbrook Wood.	Air (Atmospheric Migration)	Waste stored and treated on the Site is sludge waste and the resulting 'cake' and solids e.g. 'rags'. Due to its nature, this waste is not likely to generate significant dust emissions. Polymer used in the thickening and dewatering activities has the potential to generate dust. Polymer is used within a building and container, which will prevent dust emissions leaving the Site boundary. The Site is subject to regular visual inspections and a regular cleaning regime. This will ensure that mud/residues on the Site surfacing is managed.	Negligible	Mild	Low

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
Mud / residues reaching the public highway	Nearby public highway and roads within the residential town of Trowle Common.	Tracking of mud on wheels / undercarriage of vehicles.	As above. Waste stored and treated on the Site is not likely to generate mud/residues. Waste storage and treatment activities are largely contained, either within a building and/or containment e.g. tanks and skips.	Negligible	Negligible	Near Zero
Litter leaving the Site boundary		Air (windblown)	Waste stored and treated on the Site is unlikely to contain significant quantities of litter. Any solids within the waste are unlikely to become windblown, which could cause litter on the Site. There are skips located around the Site which contain general waste and screenings from different parts of the WRC wastewater treatment process. There is a low risk of litter associated with these skips. Fencing around the perimeter of the Site will act to prevent windblown litter crossing the Site boundary.	Negligible	Mild	Low
Pests and vermin infestation causing an amenity impact and potential damage to plant / equipment and infrastructure on Site.	Amenity impact – staff on site and nearby residential dwellings within the residential towns of Trowbridge and Trowle Common. Nearest residential dwelling is located approximately 185 m south east of the Site in Trowbridge.	Air transport and over land	The Site has a Pest Management Plan which WW follow to ensure that pests and vermin are controlled and managed on the Site. WW will conduct regular visual inspections to monitor potential pest/vermin infestations and will employ specialist contractors to manage pest/vermin infestations.	Low	Mild	Low
Storage of liquids (hazardous or potential to	Surface water features (closest	Infiltration and surface water run-off	The closest surface water feature is the River Biss, which is located approximately 100 m east	Negligible	Mild	Low

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
cause pollution) e.g. polymer, fuel	being River Biss located approximately 100m east of the Site, Kennet & Avon Canal and River Avon both located approximately 600m north of the Site, local flora and fauna.		of the Site. The Site is not located within a Groundwater Protection Zone. The surfacing on the Site is impermeable surfacing with drainage. The site is laid to falls, with water draining towards gullies/inlets. Kerbing and containment infrastructure is present to prevent infiltration and surface water run-off. Water from the biological treatment operations that enters drains is directed to the head of works at the WRC. In this way, the drainage infrastructure acts as a 'closed loop'.			

4 REFERENCES

Environment Agency. (2011). *Horizontal Guidance Note H1: Overview Document. H1 Annex A - Amenity & accident risk from installations and waste activities*.

Environment Agency. (2020, December). *Risk assessments for your environmental permit*. Retrieved from https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

Appendix 1

Bioaerosol Risk Assessment

Qualitative Bioaerosol Risk Assessment – Trowbridge Bioresources Centre

This Qualitative Bioaerosol Risk Assessment is in support of the Environmental Permit Application for a substantial variation at the Wessex Water Services Ltd (WW) Trowbridge BC.

The purpose of this Qualitative Bioaerosol Risk Assessment is to document potential bioaerosol emission sources and identify measures to minimise their release. The Trowbridge BC is within 250 metres of a sensitive receptor (a place where people live or work for more than 6 hours at a time) and therefore WW propose to meet the requirements the Environment Agency's Guidance: *M9 environmental monitoring of bioaerosols at regulated facilities* as required in a permit for the Trowbridge Bioresources Centre:

- monitor bioaerosols using M9: environmental monitoring of bioaerosols at regulated facilities
- do a site specific bioaerosol risk assessment

It is understood that permits issued after 1 April 2017 must meet these requirements from the date on the permit.

Table 1 provides a Qualitative Bioaerosol Risk Assessment for each sludge asset within Trowbridge BC.

Table 1 Qualitative Bioaerosol Risk Assessment

What do you do that can harm and what could be harmed			**Managing the risk**	**Assessing the risk**		
Asset	**Receptor within 250m of Trowbridge Bioresources Centre[1]**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
Post Digested Tanks 1 & 2	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Open top/above ground	Medium	Inhalation risk - Low	Medium
Acid Phase Digesters 1 - 6	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	All roofed	Low	Inhalation risk - Low	Low
Mesophilic Digesters 1 & 2	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	All roofed	Low	Inhalation risk - Low	Low
Post Thickened Tank	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Roofed tank	Low	Inhalation risk - Low	Low
Strained Transfer Tank	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Roofed tank	Low	Inhalation risk - Low	Low
Pre-thickened Tank	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Roofed tank	Low	Inhalation risk - Low	Low
Gravity Belt Thickeners 1 & 2	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Covered assets	Medium	Inhalation risk - Medium	Medium

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Asset	**Receptor within 250m of Trowbridge Bioresources Centre[1]**	**Pathway**	**Risk Management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
Strain Presses 1&2	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Auger system – on platform; spill response and clean-up procedures.	Medium	Inhalation risk - Low	Medium
Sludge Reception Tank	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Roofed tank	Low	Inhalation risk - Low	Low
Dewatering Building (x2 Belt Presses) with 2 extraction stacks	Employees working inside building. N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Spill response and clean-up procedures. PPE.	Medium-high	Inhalation risk - Medium	Medium
Cake Skips	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Removal from site promptly. Low aerosol risk due to high dry solid content of approx. 25%.	Low	Inhalation risk - Low	Low
Return Liquor Balance Tanks 1 & 2	N - Solar farm E - Residential S - Agricultural W - Agricultural	air	Roofed tank	low	Inhalation risk - Low	Low

[1] N – North; S – South; E – East; W - West

Appendix 2

Fire Emergencies Guidance Note

Environmental Guidance – Fire Emergencies

Purpose

This guidance note indicates details of how to minimise environmental impacts associated with fire emergencies affecting Wessex Water assets.

Guidance

Sites storing combustible material may require a Fire Prevention Plan as part of the Environmental Permit Management System. Refer to site specific Fire Prevention Plans where available.

On discovery of a fire affecting a Wessex Water asset, members of staff should immediately contact the Fire and Rescue Service and evacuate the workplace – see HSA25, Fire Safety.

The Fire and Rescue Service will be responsible for all actions to contain and control the fire and take appropriate steps to prevent pollution (as outlined in the Environment Agency's National Memorandum of Understanding with the Fire and Rescue Service[1]).

Wessex Water staff should identify any particular areas of concern where pollution may affect treatment infrastructure, particularly where this may affect drinking water quality and make the Fire and Rescue Service aware.

In the event of contaminated fire water being present on site, whilst the Fire and Rescue Service are primarily responsible for dealing with such water during the emergency, it may be necessary (where safe to do so) to:

- Divert contaminated water to storm tanks or storm storage (if available).
- Divert contaminated water to the foul sewer. Before discharging to the foul sewer, the Control Room must be advised so that the relevant Sewerage and Treatment Managers can be contacted to assess the impact on the receiving sewer. Do not discharge to the foul sewer without consent from relevant Operations Sewerage and Treatment manager. Evacuation of staff from the affected site (especially contractors) is also important. Further information is available in TRTWG111, Wastewater operational guide unauthorised discharges affecting STWs and NTKWG004 Guidance on spillage or discharge into sewer.
- Divert contaminated water to spill containment tanks (if available).
- If possible, block access of contaminated water to surface water drainage systems to prevent loss of fire water from site or divert surface water drainage so that fire water does not enter the environment. This can be

[1] http://www.cfoa.org.uk/11488

done by using drain seals, temporary sandbags, soil or sand bunds or absorbent booms in spill kits.
- Consider whether diversion of water to hard standing areas such as car parks is possible (use sandbags, soil or sand to form temporary bunds). Avoid diverting fire water to bare ground to ensure it is not allowed to soak away.

Waste Management

Waste is likely to be generated at incidents where pollution control measures have been employed. Waste types could include:
- Polluted fire water
- soiled materials (including clothing)
- used absorbents
- damaged containers
- contaminated equipment

This waste may be classified as hazardous and should be stored appropriately to prevent further pollution (for example, in a covered skip or on hardstanding with controlled drainage). All waste must be properly classified to determine if it is considered hazardous and disposed of correctly. If unsure of how to dispose of this, contact either the Waste Advisor or environmental team (or see guidance on Source Intranet).

If soil has become contaminated with pollutants, testing will be required to determine the appropriate disposal route or alternative mitigation. Water contaminated by hydrocarbons could be treated using oil/water separators.

Sites with Environmental Permits may have specific Fire Prevention Plans for fire emergencies and fire water as part of an accident management plan.

Where buildings or structures are affected by fire, potential asbestos contamination should be considered. Check the site Asbestos Management Plan to determine whether/where asbestos is present – a hard copy will be on site or available through the Site Information File.

Revision history

Issue	Date	Description	Prepared by	Approved by
1	September 2010	First issue	D Jones	Adrian Stoodley
2	December 2017	Updated with Fire Prevention Plan requirements and minor amendments	Dave Jones	Adrian Stoodley

Appendix 8: Odour Management Plan

Trowbridge Water Recycling Centre 13318

Odour Management Plan

(Version 2)

No changes or modifications are to be made to this Odour Management Plan without informing the Regional Process Scientist (Odour Management Co-ordinator).

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1.0 Introduction

Odour from the majority of sewage treatment works (called water recycling centres in Wessex Water) is regulated by local authority Environmental Health Practitioners under the statutory nuisance provisions of the Environmental Protection Act 1990.

"A statutory nuisance is defined as a premises which are deemed to be detrimental to health or a nuisance, or are emitting dust, steam, smells, effluvia or noise with this effect. Every Local authority has to inspect the area it covers to check for statutory nuisances, if a complaint of statutory nuisance is made by a resident then the local authority must investigate. If a statutory nuisance is deemed to exist, then a notice will be served requiring the abatement of the nuisance and this notice shall include a list of steps that should be taken to reduce the nuisance."

Under the statutory nuisance regime there is a defence available in the event of either an appeal against an abatement notice, or prosecution for having contravened, or failed to comply with, an abatement notice, for statutory nuisance on industrial, trade or business premises, of having used "best practicable means" to abate the nuisance.

The interpretation of "best practicable means" is described at section 79(9) of the Environmental Protection Act 1990:

a) "practicable" means reasonably practicably having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications:
b) the means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures:
c) the test is to apply only so far as compatible with any duty imposed by law;
d) the test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances:

Wessex Water has adopted the following Odour Policy (ENVS120/15)

Wessex Water shall ensure that new assets are assessed for odour risk and shall be designed and operated to minimise risk of causing odour nuisance to receptors in consultation with planning authorities and environmental regulators.

Existing assets with the potential to generate odours must comply with either generic or site-specific odour management plans to limit risk of causing an odour nuisance.

There are two types of odour management plan within Wessex Water to demonstrate "best practicable means" is being applied:

Generic odour management plan: Applicable to all sites which do not have a history of odour problems.

Site specific odour management plan: Applicable to sites with a significant history of odour complaints and/or sites which have odour control plant.

The odour management plan will define what odour management exists and ensure that "best practice" occurs to minimise odours. A copy of this odour management plan will be held on site and on the intranet

Site specific odour management plan sites are identified by an odour sensitive site poster being displayed on site.

The type of odour management plan given to a site is reviewed on an annual basis on the production of the Odour Management Co-ordinator's annual odour report which is compiled from Wessex Water odour complaint data. A change in type of odour management plan given to a site may occur if there has been a change in the number of odour complaints received by Wessex Water for the site or the process on site has been changed.

Site specific odour management plan sites are placed into one of three categories depending on history of odour complaints for the site. The specific category for a site is reassessed on a yearly basis on the production of the Odour Management Co-ordinator's annual odour report which is compiled from Wessex Water odour complaint data:

- Category 1: Review odour management plan twice a year and hold site meeting to discuss complaints received. Conduct H_2S survey once a year (>20 complaints per year, the site has an odour abatement order or previous complaint history deems it necessary)
- Category 2: Review odour management plan once a year and conduct H_2S survey once a year (>10 but <20 complaints per year or there has been a history of odour complaints)
- Category 3: Review odour management plan once a year and conduct H_2S survey once every 2 years (<10 complaints per year).

This site has been categorised as category 2

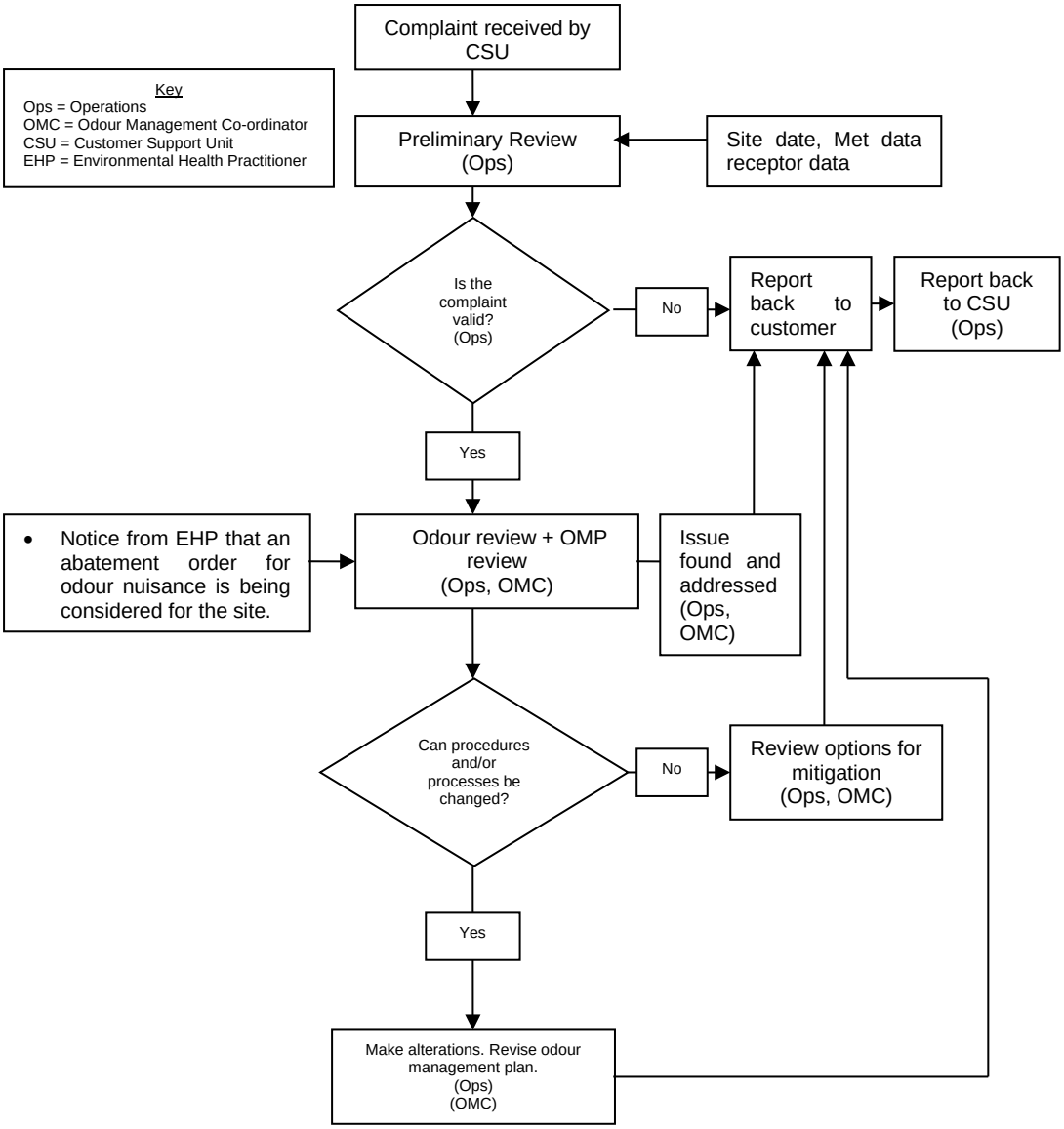
A review of a site's odour management will occur if:

- Notice is received from an Environmental Health Practitioner that an abatement order for odour nuisance is being considered for the site or an EA Officer has been in contact due to the area of the site being covered by an EA Environmental Permit.
- More than 2 odour complaints for the site per month are recorded on the Ops Contact Reporting system
- More than 9 odour complaints for the site in a rolling year are recorded on the Ops Contact Reporting system.
- If the is a requirement as part of an EA Environmental Permit.

This site has EA Environmental Permit areas please see chapter 4.

A full update of the OMP should be completed every 5 years.

Figure 1: The good practice approach for dealing with odour nuisance at WRCs



2.0 Background

There are four steps generally required to create an odour nuisance. These are:

1) The formation of odorous compounds
2) The transport of odorous compounds in the liquid phase
3) The transfer of odours to the atmosphere
4) The transport of odours to potential complainants.

The most common reason for the formation odours at a sewage treatment works is due to the formation of septicity. Septicity occurs as a result of the action of micro-organisms on a sewage or effluent (see Odour Control Operation Manual: TRTMAN007 section 2.1.1.1).

Dissolved sulphide, which forms when septic conditions occur, produces hydrogen sulphide (H_2S) gas. H_2S is a colourless gas which is highly odorous and smell like rotten eggs. It can be smelt at very low concentrations. H_2S is often the compound most responsible for odour nuisance from a sewage treatment works. The amount of sulphide which stays in solution and the amount which is released as H_2S gas are primarily determined by:

- The pH of the effluent or sludge: the lower the pH the more H_2S which will be formed
- The amount of turbulence: the greater the degree of turbulence the more H_2S (and other gases) will be released to atmosphere.

It is important to remember that there are many other odorous compounds and sometimes odours do not contain H_2S at all. Other odours could include:

- Mercaptans (cabbage-like odour)
- Ammonia (urine-like odour)
- Amines (urine, rotten fish-like odour)
- Organic Acids (vinegar-like odour).

The ability of the released odour to cause an odour nuisance will depend on:

- How much and where they are released
- The volume of air in which they become dispersed
- The proximity and sensitivity of potential complainants
- The frequency, duration and time of day of such a release.

3.0 Contacts

Customer Support Unit: **Wessex Water** **03456 004600**

(For direct contacts please request via main switch board)

Regional Manager:	Jim Wheeler
Technical Manager:	Wesley Wong
Area Scientist:	Mallory Revollon
Odour Management Co-ordinator:	Jim Humphries

Site Address

BRADFORD ROAD
TROWBRIDGE
WEST WILTSHIRE
BA14 9AX

4.0 Environmental permitting

A number of Wessex Water sites have areas which are subject to Environmental Permitting Regulations. This is regulated by the Environment Agency.

The following documents should be consulted in relation to Environmental Permitting in Wessex Water;

ENVS 120/7: Environmental Permit Plan
EPP001: Environmental Permit Procedure

The Environment Agency have produced H4 Odour Management Guidance.

H4 states the following:

'The current form of odour condition used in our environmental permits is shown below and usually consists of two elements:

- The odour boundary condition, which specifies the outcome which the operator must achieve (i.e. no pollution beyond the site boundary); and
- A condition requiring compliance with an OMP (where activities are considered likely to give rise to odour).

There may also be specific operational conditions relating to odour control which require certain techniques or specify emission limits.'

The odour boundary condition

'Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Agency, unless the operator has used appropriate measures, including, but not limited to those'

The odour management plan conditions

For the activities listed in Annex 2 of How to Comply with your Permit which are likely to give rise to odour problems an OMP has to be submitted for approval as part of the permitting process. There is a general operational condition (2A), in such permits, that requires that operator to comply with this plan and to submit revisions of the plan in the future, should this prove necessary.

2A

a) The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2 unless otherwise agreed in writing by the Environment Agency.

b) If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan specified in schedule 1, table S1.2 or otherwise required under this permit and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the agency.

Permits for sites carrying out activities that have a low odour risk will contain condition 2B below, which allow us to require an OMP should there be an unexpected odour problem aft the permit has been granted.

2B The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, a new or revised odour management plan;

(b) implement the approve odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

The provisions of your OMP are treated as part of your permit and must be complied with.

H4 informs that the effectiveness of the odour control measures should be review once a year.

Detailed in the H4 guidance an OMP should:

- Employ appropriate methods, including monitoring and contingencies, to control and minimise odour pollution:
- Prevent unacceptable odour pollution at all times; and
- Reduce the risk of odour releasing incidents or accidents by anticipating them and planning accordingly.

For Standard Permits the Standard Rules, which may have odour requirements, must be applied for these specific areas.

Standard Permits with Standard Rules applicable to Wessex Water are:

Standard Rules SR2008 No 19_250kte-non-hazardous sludge, biological, chemical and physical treatment site

Standard Rules SR2009 NO4 – Combustion of biogas in engines at a sewage treatment works

Bespoke Permits, which have specific odour requirements will be covered by a site-specific odour management plan.

All EA permit areas must have a Preliminary Odour Risk Assessment (PORA) and odour radius calculation completed as detailed in TRTWG669. The requirement of TRTWG669 is as follows:

The PORA assesses potential odour impact and odour risk of the EA permit area on sensitive receptors. The PORA appraises the following information:

- The type of Odour Management Plan in place.
- Specific odour prevention already in place.
- Historical odour complaints for the site (Taken from the Odour Management Co-ordinator monthly and annual odour complaint reports)
- The odour radius calculation for the site. The odour radius calculation will list the following information:
  - Each process stage of the site.
  - Indicates process stages with potential hedonic tones scores of -3/-4.
  - Number of units within each process stage.
  - The exposed surface area per unit.
  - Specific odour emission rate for each unit.

- Whether the emission rate is low, typical or high.
- Total odour emission rate.
- Expected radius and odour may be detectable.
- Details the % of total emission rate that has a hedonic tone score of -3/-4).

The odour radius calculation is a "worse case" prediction under normal operating conditions. It is a simple calculation not using meteorological data to predict potential odour risk. The higher the percentage emission rate at predicted hedonic tone -3/-4 the greater the risk of a sensitive receptor is of being impacted by odour if within the odour radius calculated contour.

The completion of the PORA identifies whether further odour modelling of the permit area with different scenarios is required. It also identifies to the business where there is potential odour risk and indicates where there is the potential for future odour improvements. The identified odour risks can be then placed on the Wastewater Asset Risk Management System (WARMS). The WARMS tool is used operationally to manage risk at sites and their related processes.

There are processes and plant at Trowbridge WRC within Environmental Permit areas. This section of the Odour Management Plan will detail the permits, odour management requirements, include a plan of the permit area, list the assets in that permit area. Chapter 6 will list the assets and the odour abatement in place and provide the date the PORA and odour radius calculation was completed and any requirements following the completion of the assessment. The PORA and odour radius calculation assessment can be requested for auditing purposes. The PORA and odour radius calculation assessment for the site should be reviewed on an annual basis.

1) **Trowbridge WRC Sludge Import: Permit Number EPR/BB3934AG (22/11/2011)**

This permit is soon to be replaced by the permit application for the Sludge Treatment Centre.

Processes/plant in the Sludge import permit area

Sludge Reception Tank
Pre Thickened Tank
Pre Thickened Tank

Permit Requirements

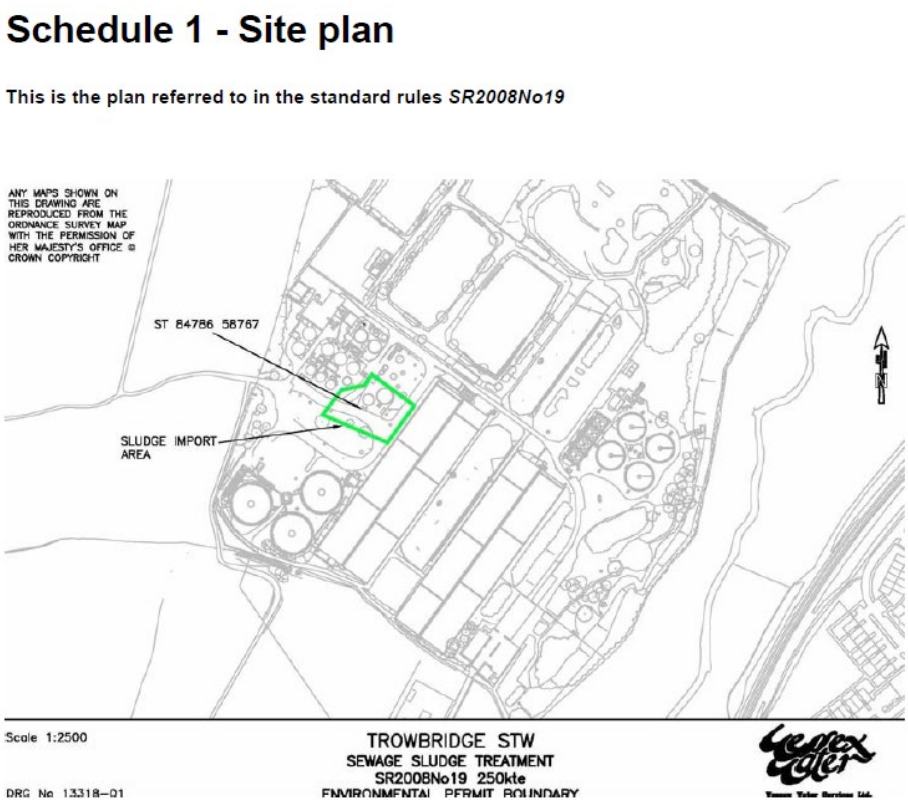
Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an
odour management plan which identifies and minimises the risks of pollution from odour

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

Figure 2**:** Plan of Sludge Imports permit area as contained in the actual permit EPR/BB3934AG



2) Trowbridge WRC CHP/G2G: Permit Number EPR/HB3602TR (01/11/2019)

Processes/plant in the Sludge import permit area
CHP
Siloxane plant (Planned to transfer to propose sludge treatment centre permit)
Flare stack (Planned to transfer to propose sludge treatment centre permit)
Biomethane plant

Permit Requirements

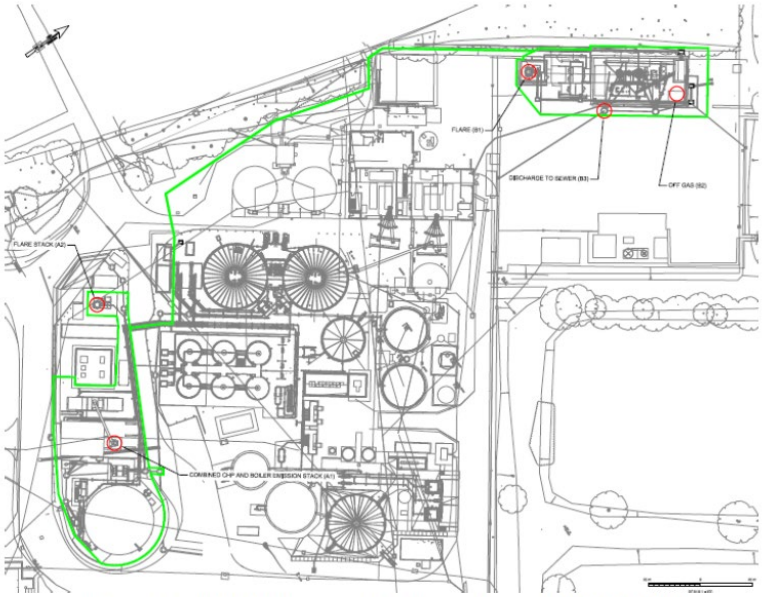
Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an
odour management plan which identifies and minimises the risks of pollution from odour;

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

Figure 3: Plan of CHP/G2G permit area as contained in the actual permit EPR/HB3602TR



END OF PERMIT

3) Trowbridge WRC Licensed Treatment Centre: Permit Number W940075WD

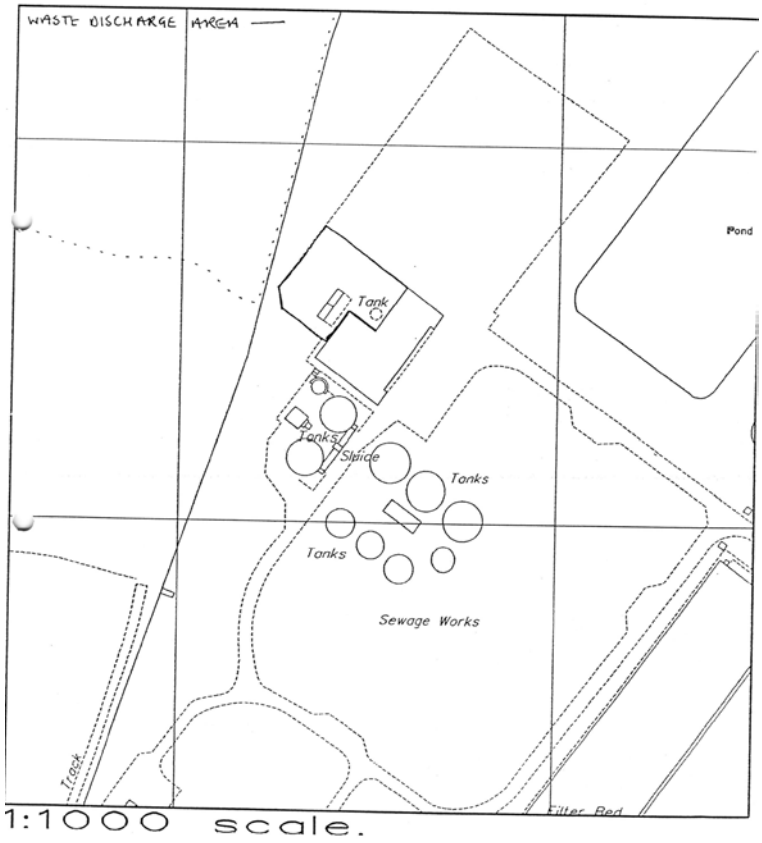
Processes/plant in the Licensed Treatment Centre

Tanker unloading area
Reception Tank

Permit Requirements

None specifically in association with odour.

Figure 4: Plan of Licensed Treatment Centre permit area as contained in the actual permit W940075WD



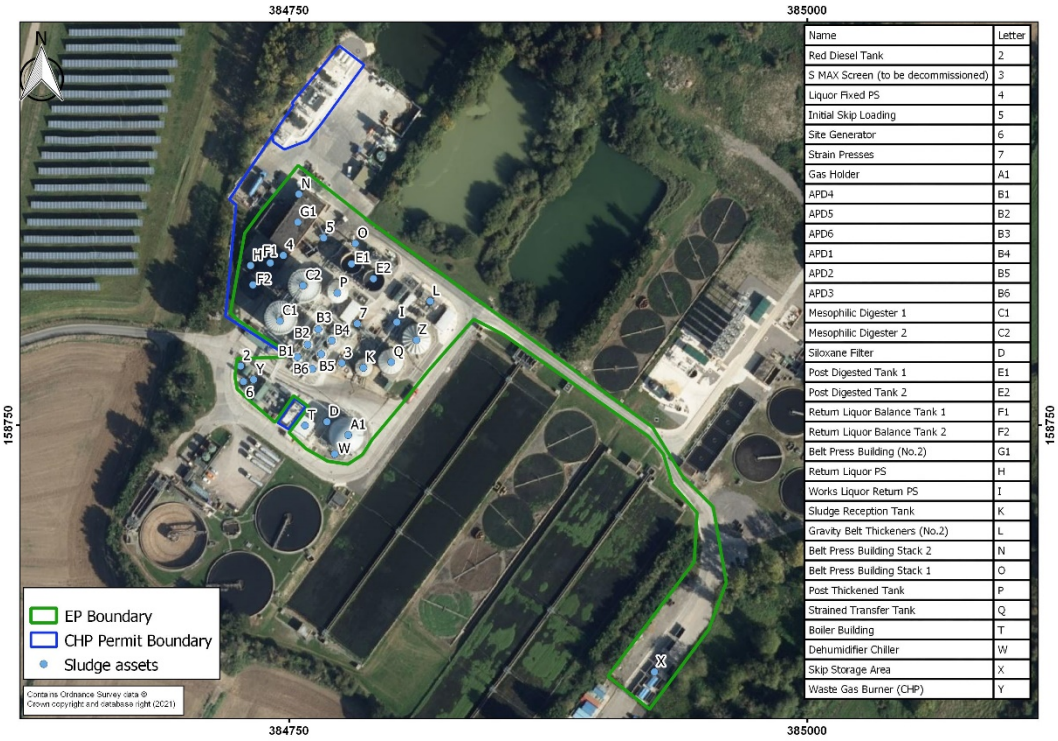
4) Sludge Treatment Centre Permit Number: Permit Application 2021

OMP to be updated once permit has been granted.

Processes/plant in the Sludge import permit area

SMAX sludge screen
Sludge reception tank
Strain press
Sludge tanks (x2)
GBT (x2)
Thickened sludge tanks
APD (x6) and MAD (x2) Digester tanks
Secondary digesters (x2)
Belt presses (x2)
Digested sludge skips

Figure 5: Proposed plan of Sludge Treatment Centre permit area.

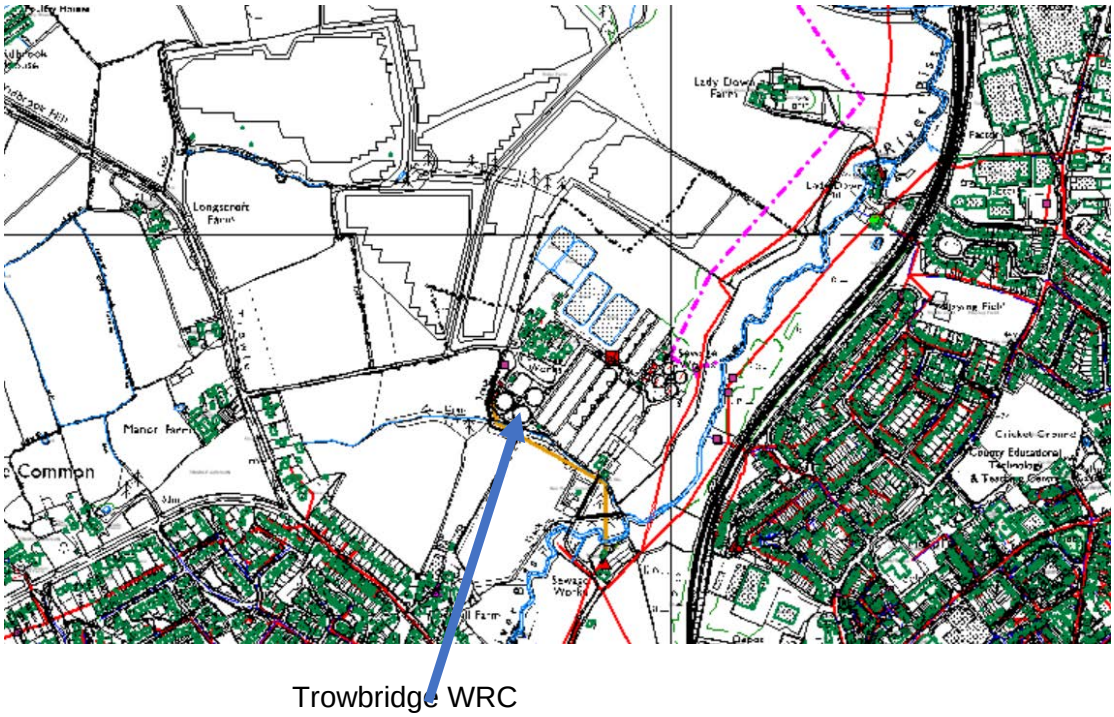


Name	Letter
Red Diesel Tank	2
S MAX Screen (to be decommissioned)	3
Liquor Fixed PS	4
Initial Skip Loading	5
Site Generator	6
Strain Presses	7
Gas Holder	A1
APD4	B1
APD5	B2
APD6	B3
APD1	B4
APD2	B5
APD3	B6
Mesophilic Digester 1	C1
Mesophilic Digester 2	C2
Siloxane Filter	D
Post Digested Tank 1	E1
Post Digested Tank 2	E2
Return Liquor Balance Tank 1	F1
Return Liquor Balance Tank 2	F2
Belt Press Building (No.2)	G1
Return Liquor PS	H
Works Liquor Return PS	I
Sludge Reception Tank	K
Gravity Belt Thickeners (No.2)	L
Belt Press Building Stack 2	N
Belt Press Building Stack 1	O
Post Thickened Tank	P
Strained Transfer Tank	Q
Boiler Building	T
Dehumidifier Chiller	W
Skip Storage Area	X
Waste Gas Burner (CHP)	Y

5.0 Location, population and odour complaint data.

Trowbridge is a filter bed plant with a sludge treatment facility, located in Wiltshire, approximately 12km south-east of central Bath. The Water Recycling Centre (WRC) is located at the north-westerly extent of the town with the closest receptors being located approximately 175m to the west of the site boundary.

Figure 6: Location of Trowbridge WRC.



Population data for WRC

Table 1: Population data.

Total Population	81,301
Resident Population	50,499
Non-Resident Population	329
Commercial Domestic Population	2,017
Trade Population	17,658
DUT (septic) Population	9,247
Population Last Amended	03/05/2018

Odour complaints received for Trowbridge WRC in recent years.

(Please note that odour complaints received may not be valid as being associated with the WRC and may be due to external reasons outside Wessex Water control. For further odour complaint information for the site please contact the Wessex Water Odour Management Co-ordinator).

Table 2: Number of odour complaints.

99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
27	3	5	22	4	0	0	1	0	0	0	0	0	3	2	2	1	0	2	13	0	0

6.0 Potential odour sources.

Figure 7: displays the layout of Trowbridge WRC.

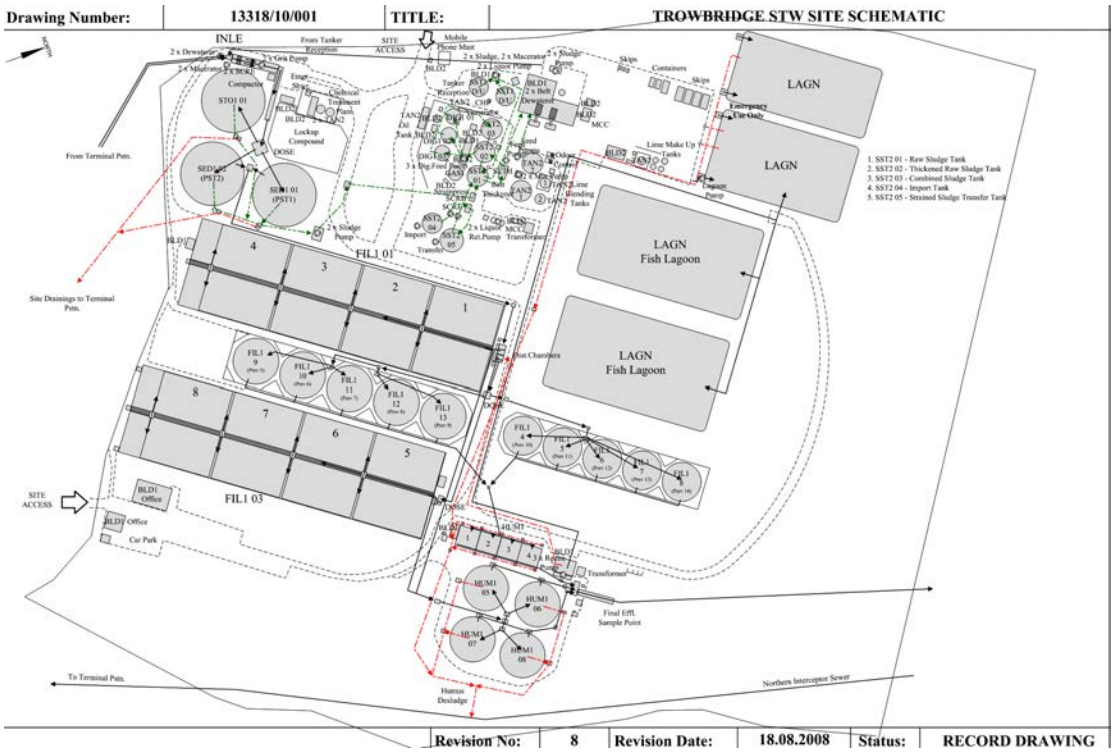


Figure 8: displays the layout of the sludge treatment area.

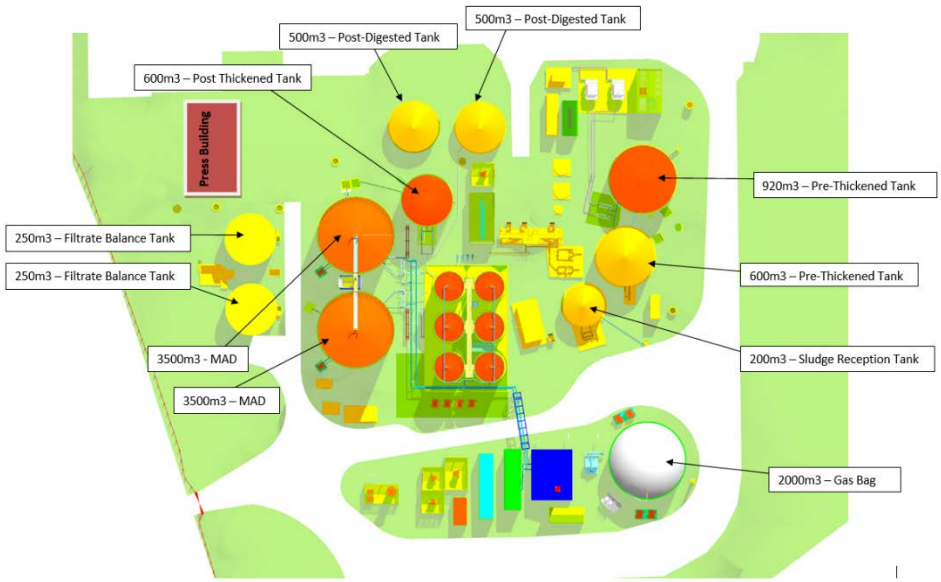
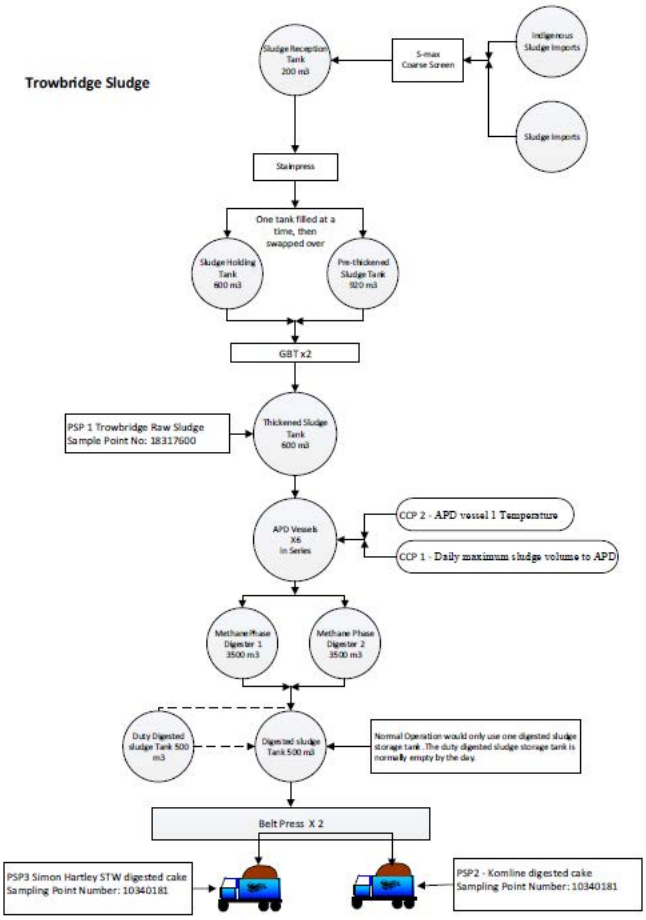


Figure 9: displays the layout of the sludge treatment area.



The table below lists the potential odour sources and type of material being dealt with. It also lists the odour abetment techniques in place to minimise odour emissions from each potential odour source that has been identified.

For a Site Process Guide see TRTF1-13318 in the Site Operation Manual (Red Book).

Asset dimensions are kept on the Wessex Water database and can be requested.

Table 3: Potential odour sources

Potential odour source	Reason for potential odour source	Odour abatement in place	EA Permit
Licenced Treatment Centre **Licensed Treatment Centre**  **Imported tanker waste.**	Odour generation at this stage is associated if tankers load is septic and turbulence is created. Odour release at this point is unlikely as tanker makes connection to sealed discharge pipe.	Tankers connects directly into site pipework so no potential for odour release. Underground tank (covered)	Y Permit Number) W940075WD PORA and Odour Risk Calculation carried out June 2021

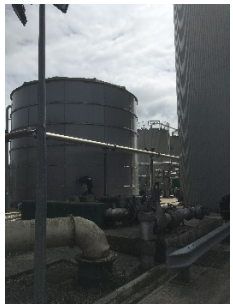
Potential Odour Source	Reason for potential odour source	Odour Abatement	EA Permit
Inlet works, balance tank, PSTs, filters, humus tanks, sand filters . **Inlet pumping station**  **Sewage effluent.**	Odour generation at this stage is associated with sewage turbulence and if the sewage is septic.	Odour abatement by Good Housekeeping. (See section 11). See Generic Odour Management Plan: Sewage Pumping Stations.	**N**
Inlet 	The inlet is where raw sewage enters the sewage treatment works. Odours released at the inlet works may be as a result of discharges of septic sewage, tankered wastes, sludge liquors, storm sewage or surplus biological sludges.	Odour abatement by Good Housekeeping. (See section 11).	**N**

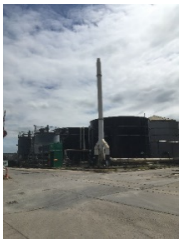
Sewage effluent.	Rising mains may cause an odour issue as the discharge may be turbulent and often might be septic.		
Inlet screens  For Sewage Treatment Basic Knowledge – Preliminary Treatment see TRTMAN028 **Sewage effluent.**	Screenings are large floating or suspended solids. They consist of a wide variety of objects and materials. The most common types of screenings are plastics and rags that are flushed down the toilet. Provision of screening protects downstream processes from blockage, which could give rise to dead areas and odour generation. Passage of sewage through screens will give emission of odours from the sewage. After the screenings have been removed from the main flow they are processed to help prevent nuisance and to prepare them to be transported to disposal at a landfill site. Stored screenings can also produce odorous emissions, particularly if not washed.	Odour abatement by Good Housekeeping. (See section 11).	**N**
Grit Removal (x2)  For Sewage Treatment Basic Knowledge – Preliminary Treatment see TRTMAN028	Grit is the name given to heavy mineral material that has entered the sewage system. Grit can contain silt, sand, gravel, ash, metal, and glass. If grit is not removed from the flow of sewage it can cause problems with silting up of channels, blockages in pipes and pumps and excessive wear of pumps and pipe work. Odour generation in the grit removal stage may be due to the sewage turbulence and the storage of odorous detritus contaminated with organic debris.	Odour abatement by Good Housekeeping. (See section 11).	**N**

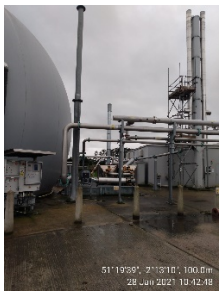
Sewage effluent.			
Primary tanks (x2)  For Sewage Treatment Basic Knowledge – Primary Treatment see TRTMAN027 **Post screened and grit removal effluent.**	The primary treatment plant has three main functions: 1) Removes Suspended Solids 2) Retains grease and scum 3) Balances the load to secondary treatment. Odours may be released predominantly from the overflow weirs. Odours can also be released from the surface of the tank, at distribution chambers and channels. Odour emissions may increase if the incoming sewage is septic or if septicity develops in the sewage during settlement. Odour emissions can be reduced by minimising retention of sewage and sludge: and minimising turbulence of crude and settled sewage and sludges.	Odour abatement by Good Housekeeping. (See section 11).	N
Balance Tank  For Sewage Treatment Basic Knowledge – Primary Treatment see TRTMAN027 **Post screened and grit removal effluent.**	When flows going into the works go over 550l/s the balance tank comes into operation which is next to the Primary Tanks. Flows from this are returned to the pumping station.	Odour abatement by Good Housekeeping. (See section 11).	N

Filter Beds (x18)  For Sewage Treatment Basic Knowledge – Biological Filtration see TRTMAN029 **Post settlement effluent.**	Biological secondary treatment purifies the settled sewage by removing dissolved organic material. Generally only a source of odour emissions if the feed sewage is odorous. The emission of odours is exacerbated by the natural ventilation of the filter, which draws air up through the filter and will strip odour from the surface of the filter. Odour generation may occur if overloaded, or if the media has deteriorated and areas of ponding occur if feed is septic.	Odour abatement by Good Housekeeping. (See section 11).	**N**
Humus Tanks (x8)  For Sewage Treatment Basic Knowledge – Activated Sludge plant see TRTMAN026 **Post biological treatment effluent**	At this stage effluent and waste sludges should be well oxidised and should not cause odour problems unless there are operational problems.	Odour abatement by Good Housekeeping. (See section 11).	**N**
Sand filters  **Tertiary treatment**	At this stage effluent and waste should be well oxidised and should not cause odour problems unless there are operational problems	Odour abatement by Good Housekeeping. (See section 11).	**N**

Potential Odour Source	Reason for potential odour source	Odour Abatement	EA Permit
Sludge screen, reception sludge tank, strain presses, sludge tanks, GBT, digesters, belt presses, liquor tanks.			
Reception sludge tank (x1) **Raw sludge.** **200m³**	Storage may allow odour generation, which may be emitted when the sludges are disturbed.	Tank covered. Odour abatement by Good Housekeeping. (See section 11).	Y Permit Number: EPR/BB3934 AG PORA and Odour Risk Calculation carried out June 2021
Strain press (x2) **Raw sludge.**	Potential for odour generation at this stage. The intensity of the odour will depend on the length of time that the sludge has been retained.	Plant has its own covers. Skips are open. Odour abatement by Good Housekeeping. (See section 11).	Y Permit Number: EPR/BB3934 AG PORA and Odour Risk Calculation carried out June 2021
Sludge holding tanks (x2) **600m³** **920m³**	Storage may allow odour generation, which may be emitted when the sludges are disturbed.	Tanks covered. Odour abatement by Good Housekeeping. (See section 11).	Y Permit Number: EPR/BB3934 AG PORA and Odour Risk Calculation carried out June 2021

GBT (x2)  For Sludge Thickening and Dewatering Operation Manual see TRTMAN001	Odour generation at this stage may be associated with the sludge being agitated and if the sludge is septic.	Covered. Odour abatement by Good Housekeeping. (See section 11).	Y Permit Number: Application due 2021 PORA and Odour Risk Calculation carried out June 2021
Raw sludge. Max 54m^3/hr **Thickened sludge tank**  **Thickened raw sludge. 600m^3**	Storage may allow odour generation, which may be emitted when the sludges are disturbed.	Covered. Odour abatement by Good Housekeeping. (See section 11).	Y Permit Number: Application due 2021 PORA and Odour Risk Calculation carried out June 2021
APD (x6) and MAD (x2) Digestion  **Digesting sludge.** **APD** **MAD 3,500m^3 (x2)**	Gas is being collected for energy generation. Therefore. unless emergency valves on top of digester in use there should be no odour release.	Plant is covered. Odour abatement by Good Housekeeping. (See section 11).	Y Permit Number: Application due 2021 PORA and Odour Risk Calculation carried out June 2021
Secondary Digesters (x2)	Odour emission rate much reduced from that of raw	Odour abatement by	Y

	sludge. Hedonic tone score has also increased from that of raw sludge.	Good Housekeeping. (See section 11).	Permit Number: Application due 2021 PORA and Odour Risk Calculation carried out June 2021
Belt press (x2) including skips  For Sludge Thickening and Dewatering Operation Manual see TRTMAN001 **Digested sludge. Max 56m^3/hr**	Potential for emissions of odour at this stage. This is due to the sludge being generally agitated at this point. Potential odour emission rate will have decreased compared to raw sludge as digested sludge is being processed. The hedonic tone will have increased meaning the odour is less offensive than raw sludge. Both belt presses are extracted and vented to atmosphere  	Plant is within a building but both belt presses extracted via vent stacks to atmosphere. Sludge cake skips are open. Odour abatement by Good Housekeeping. (See section 11).	Y Permit Number: Application due 2021 PORA and Odour Risk Calculation carried out June 2021
Sludge liquor balancing tanks.  **Sludge liquor**	Storage may allow odour generation, which may be emitted when the sludge liquors are disturbed.	Tanks covered. Odour abatement by Good Housekeeping. (See section 11).	Y Permit Number: Application due 2021 PORA and Odour Risk Calculation carried out June 2021

Potential Odour Source	Reason for potential odour source	Odour Abatement	EA Permit
CHP, Flare stack, siloxane plant, G2G, temporary liming plant			
CHP and flare stack. 	H_2S should be converted to SO_2 (odourless gas) in combustion.	CHP engines should be regularly checked to make sure they are running efficiently.	Y Permit Number: EPR/BB3934 AG
Siloxane plant 	The siloxane plant removes siloxanes from the biogas. The plant has to be recharged.	Timed to recharged via stack during a short period overnight.	Y Permit Number: EPR/BB3934 AG
Biomethane plant (G2G) 	Requires extraction to an odour control unit due to potential odours generated.	**Sealed process, which has air extraction to GAC odour control unit (see section 8).**	Y Permit Number: EPR/BB3934 AG

7.0 Odour dispersion modelling.

Odour modelling can be a way to establish a sensitive receptor(s) potential exposure to odours from a site. Dispersion modelling is inherently uncertain, but is nonetheless a useful tool to predict potential odour risk. Odour modelling is only likely to characterise normal conditions. It will not usually take into account unexpected events (e.g. breakdowns) and abnormal operations which can account for a number of odour episodes.

Results from previous odour modelling must be used with caution as they will only use source and emission data available at the time, which may be different to the current situation or of a different standard to current best practice. Wessex Water procedure TRTWG669 must be consulted when reviewing odour models or constructing them from new.

Table 4: Odour modelling completed for the site.

Model type and reason	**Date of model**
Model by Amec Foster Wheeler Type of model: Aermod Reason for model: Update in support of a biomethane plant planning application.	July 2017
Model by Amec Type of model: Aermod Reason for model: Revised future baseline assessment – inclusion of pumping station emissions.	February 2013
Model by Amec Type of model: Aermod Reason for model: Application of odour mitigation to proposed AD scheme.	February 2013
Model by Amec Type of model: Aermod Reason for model: Odour monitoring and modelling assessment.	October 2012
Model by Amec Type of model: Aermod Reason for model: Odour monitoring and modelling assessment.	September 2012

8.0 Specific odour abatement.

Ferric Dosing

The site has ferric sulphate dosing upstream of the primary tanks. The ferric sulphate is actually being dosed for phosphorus removal but it has given the advantage of also reducing odour levels across the site. The iron binds with any dissolved sulphide formed to produce ferric sulphide. This therefore reduces the potential for odorous emissions.

Figure 10: Ferric sulphate tanks at Trowbridge WRC.

Biomethane plant GAC odour control unit.

Potentially odorous air is extracted from the stripping column on the Trowbridge Gas to Grid Facility and passed through a granular activated carbon (GAC) unit. The GAC filter contains copper impregnated activated carbon type SA-70. The strengths of adsorption systems are that they are very good at odour removal in tailor made situations, especially where loading is low or intermittent.

Figure 11: Biomethane GAC odour control unit.

Figure 12: General arrange drawing: Mono CS8000 filter

General arrangement drawing: Mono CS8000 filter
CPL ICON
Drawing Number: C008.3001 Date: 03/11/2018

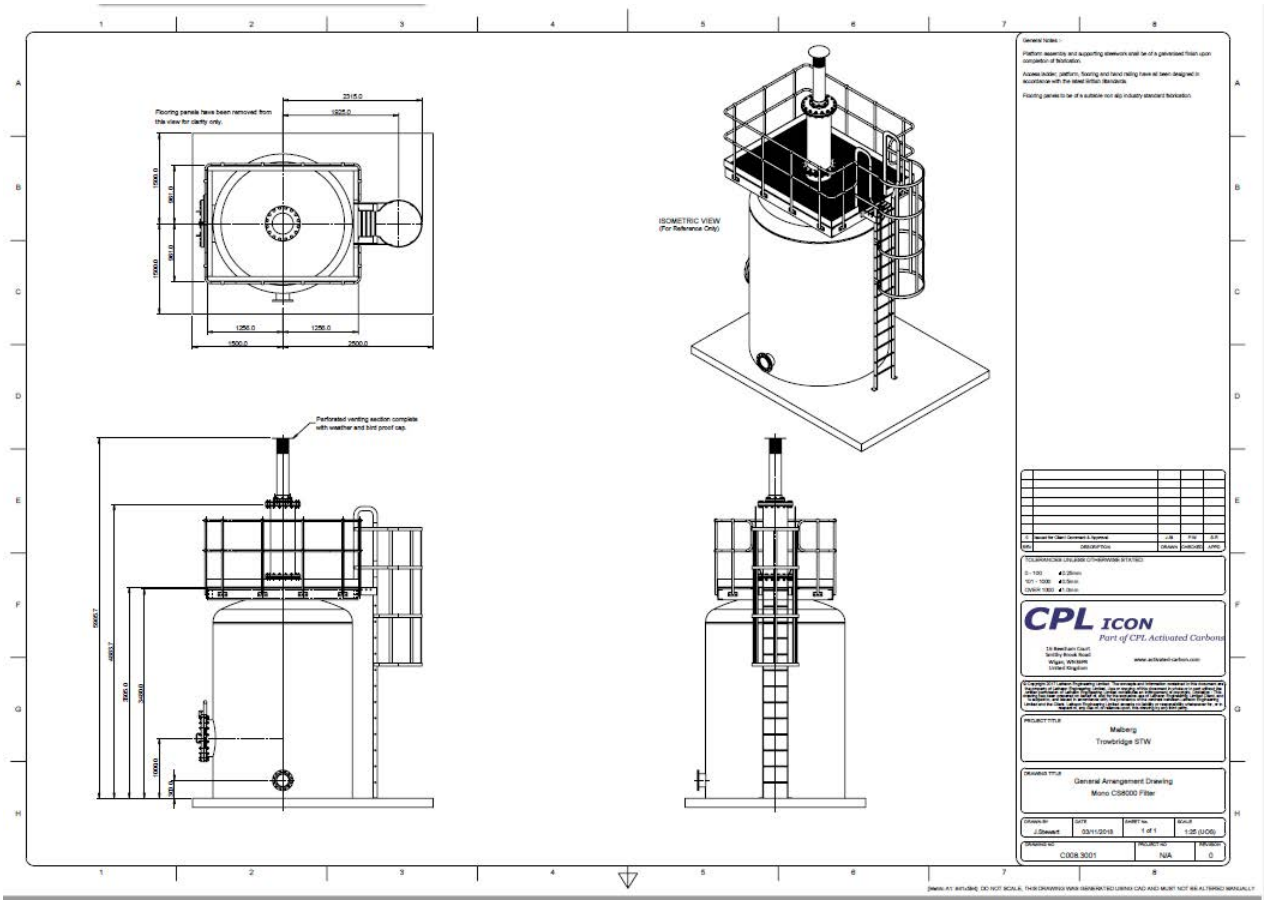
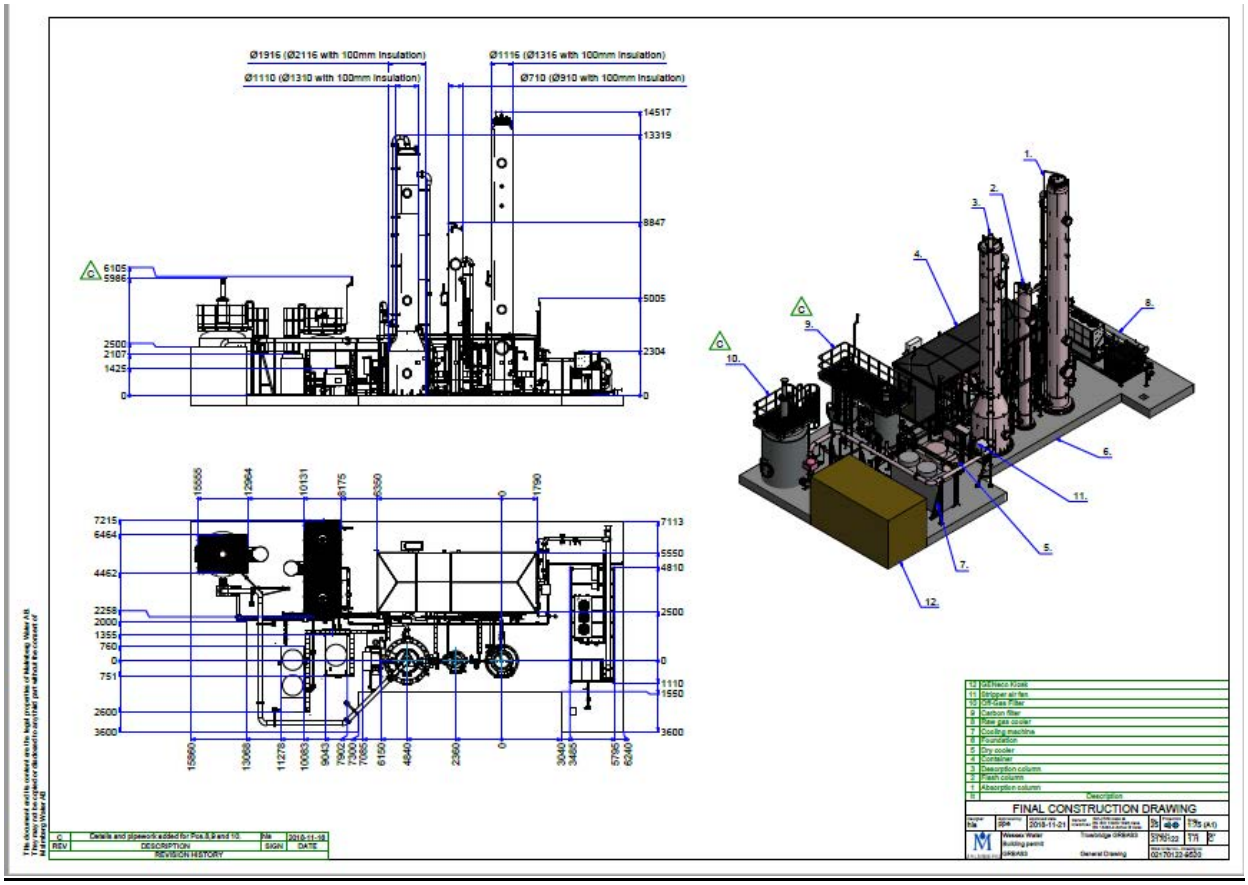


Figure 13: Final construction drawing

Malmberg
Drawing Number 02170122-9520 **Date: 21/11/2018**



9.0 Design performance specifications for the specific odour control.

Biomethane plant GAC odour control unit.

Table 5: Details design stack dimensions for the Biomethane GAC Odour Control Unit.

Stack diameter	Height	Design flow rate at inlet
200mm	6m (from the base of the GAC unit)	1,850m^3/h

Table 6: illustrates design emission concentrations for the Biomethane GAC Odour Control Unit.

Pollutants	Maximum emissions concentrations
H_2S inlet (max)	40 ppm (will depend on settings of air fan in the BUP and on incoming raw gas of 67 ppm)
H_2S inlet (average)	22 ppm (based on 67 ppm on incoming raw gas to BUP)
H_2S outlet	≤5ppm

10.0 Chemical replacement, consumable and media replacement for specific odour control.

It is important that adequate supplies of reagents and consumables should be kept on site, always subject to the practicability of shelf life and providing the appropriate storage conditions. Delivery records of every reagent and consumable are kept with procurement.

Table 7: Chemical and consumable replacement.

Chemical/Consumable	How often levels and stocks should be checked	Responsibility
Ferric	Check Daily (low level tank alarm on telemetry)	Duty Operator
Gastec tubes	Biannual	Duty Operator

Media replacement will be initiated by the Treatment Manager. The Treatment Manager will liaise with the Assistant Treatment Manager, Senior Operator, Odour Management Co-ordinator, Asset Manager and the Contractor on a suitable date for the media replacement to take place. This will be scheduled to minimise impact.

Table 8: Media replacement.

Media	Predicted Lifespan: Taken from manufacture guidance but is dependent on actual loadings which may decrease or increase life expectancy accordingly.	Responsibility
Biomethane GAC odour control unit	GAC: Manufacture guidance indicates every 3 years on typical loadings. Media	Treatment manager

change requirements will be dependent on loadings onto the media and therefore media could last a shorter or longer time than manufacture guidance. (requires checking who is responsible)

(Installed 2019)

11.0 General housekeeping:

A lack of good housekeeping can result in elevated levels of residual odour, and at times more serious emissions. Measures constituting Best Practicable Means for housekeeping include (This is not an exhaustive list):

General

- Ensure that doors to buildings that may contain odours are kept closed except for access. Maintain signage on doors for operational, visiting and contract personnel.
- Ensure that inspection covers or hatches fitted to contain odours are closed immediately after use.
- Where possible covers should be sealed.
- Where sealing strips are fitted to covers check for integrity.
- Retention of sewage and sludge should be minimised as much as possible.
- Aim to minimise turbulence at the inlet of the works.
- Spillages must be avoided. Ensure the immediate clear up of any spillage.
- Where plant failures may lead to increase in odour emissions repairs should be done as soon as possible.
- Temporary plant should be assessed for odour. A Process Risk Assessment must be completed before temporary plant is used on site. This Process Risk Assessment must consider possible odour nuisance that could be caused by the temporary plant in question.
- The Odour Management Co-ordinator must be contacted if the temporary plant is connected with sludge dewatering, thickening or liming.
- Odour control equipment should be maintained regularly. (See section 13).
- Report any raised odour levels to the Treatment Controller immediately who will liaise with the Area Scientist.

Pumping Stations

- Refer to Generic Odour Management Plan: Sewage Pumping Stations.

Screw Pumps

- Minimise as much as possible septicity of effluent before screws pumps.

Storm Tanks

- Only fill storm tank when it is essential to do so.
- Where possible aim to minimise retention of sewage and sludges in storm tanks as much as possible.
- Storm water tanks should be emptied and cleaned as soon as possible after use.

Screens/Grit Systems

- Ensure that screenings and grit systems are working correctly.
- Ensure regular cleaning and flushing of screens and influent channels.
- Skips that contain clean screenings or grit must be covered before being removed from site.
- Ensure the regular cleaning of scum and grease removal equipment.
- Ensure regular cleaning and flushing of screens and influent channels.
- Ensure baffles on grit systems are positioned correctly and flow is evenly distributed.
- Remove any build-up of rag from baffles and scraper on grit systems.
- Ensure skips containing screenings and grit are removed from site as soon as is practicable.

Primary Treatment

- Ensure primary tanks are cleaned on a regular basis to prevent long-term accumulation of sewage, sludge or debris, which could become septic and give rise to the generation and emissions of odours. Draining of tanks for maintenance should be scheduled to minimise possible impact.
- Sludge levels in primary tanks should be checked on a regular basis and the sludge level within the tanks should not be allowed to get to high. The desludging system should be adjusted as necessary.
- On a regular basis the scum box on the primary tank should be cleaned to prevent blockages. Excess scum from the tank surface should be cleared. The build-up of scum or foam on tank surfaces can at times lead to odour and should generally be avoided. If there is build-up of scum or foam on primary tank surfaces the Duty Operator must contact the Area Scientist for advice.
- The stilling box on a primary tank should be kept free of debris.

Biological Treatment

- Biological filters should not be overloaded. Ensure even distribution of flow across the filter. Aim to minimise splashing of sewage at the surface.

- Weeds should be removed from filter beds.

- The sparge holes on the distribution of the biological filter should be regularly cleared.

- The discharge from the biological filter should be checked to ensure the under drains are clear.

Final Tanks

- Ensure final tanks are cleaned on a regular basis to prevent long-term accumulation of sewage, sludge or debris, which could become septic and give rise to the generation and emissions of odours. Draining of tanks for maintenance should be scheduled to minimise possible impact.

- Sludge levels in final tanks should be checked on a regular basis and the sludge levels within the tanks should not be allowed to get to high. The desludging system should be adjusted as necessary.

- On a regular basis the scum box on the final tanks should be cleaned to prevent blockages. Excess scum from the tank surface should be cleared. The build up of scum or foam on tank surfaces can at times lead to odour and should generally be avoided. If there is build up of scum or foam on humus tank surfaces the Duty Operator must contact the Area Scientist for advice.

- The stilling box on the final tank should be kept free of debris.

Sludge Storage and Treatment

- Sludge storage, particularly of primary or mixed primary and biological sludges: allows odour generation, which will be emitted when the sludges are disturbed by a discharge into the tanks, mixing or during subsequent treatment. Therefore, sludge should be processed as soon as is possible. Any mixing should be at low speed and operated continuously. Where possible sludges should be discharged at low level in the tank and, wherever possible, below normal liquid level.

- Equipment for mechanical thickening and dewatering should if possible be operated continuously. This is to ensure that sludges are rapidly handled and provide a continuous stream of return liquor, rather than intermittently with consequent high odour emissions. If not continuous operation, the plant should be cleaned after use. This will remove sludges retained on equipment that may continue to produce malodours.

- Returned liquors can be highly odorous. Aim to minimise turbulence when discharging or discharge under liquor level.

- Aim at balancing the flow of sludge liquors to even the load over the day where process loading allows.

- Aim to minimise turbulence when sludge pumping. Where possible discharges to sumps should be at low level to minimise turbulence and hence odour emissions.

- Ensure that skips containing dewatered sludge cake are not overfilled and removed from site as soon as is practicable.

- Vehicles for skip removal must be kept as clean as is practicable.

- It is important there is the correct dose and mixing on lime plants at all times.

Digesters

- Ensure within digesters that there is good mixing. This is to ensure all sludge is digested and that no short-circuiting occurs.

- The whessoe (type) valves on the digesters should be checked for leaks on a regular basis.

- Siloxane removal plants which have automatic thermal regeneration of media should have this to set to run during a non sensitive time. In Wessex Water regeneration on these plants is usually set to run at midnight.

Biosolids and Food Digestate Fibre to Land

- Please see Generic Odour Management Plan

Odour Control Equipment

- Check fans and drive belts on a regular basis.
- Check media condition on a regular basis.

12.0 Routine monitoring:

Biomethane plant GAC odour control unit

Monthly gas samples are taken by an external contractor. These are sent to the Gas to Grid Engineer for review.

Biannual monitoring of the belt press extraction stacks.

A biannual Gastec sample for H_2S and NH_3 is carried out on the belt press extraction stacks.

Annual H_2S survey.

On an annual basis the Odour Management Co-ordinator will conduct a H_2S survey of Trowbridge WRC/STC. If there is wet weather or low temperatures when the H_2S survey is due to be completed the survey will be conducted at a later date when conditions have improved. Sampling will only be completed if it is safe to complete. The results of this survey will be used to identify potential odour sources. The completed survey will be forwarded to the Treatment Manager and Area Process Scientist for the site. An H_2S survey will be completed if odour complaints are received for the site and not reason can be detected for the odour complaints being generated.

Figure 14: Jerome 613X meter used by Odour Management Co-ordinator to measure hydrogen sulphide (H_2S) concentration.

Further onsite odour monitoring identified by PORA due to change of process or unexpected event.

If there has been a change of process or unexpected event that is not considered normal operation or different to that of the Odour Management Plan a PORA is to be completed and this may identify and require further monitoring to be completed (such as “simple sniff tests”) to assess the ongoing risk. If this requirement occurs this must be recorded on site by the Treatment Manager.

Olfactometry sampling.

An olfactometry sampling survey of the site was last completed in 2012. Routine olfactometry sampling is not routinely undertaken due to the low level of “valid” odour complaints received at this site. An olfactometry sampling survey may be completed if there is an increase in number of odour complaints being received for the site and this would be triggered by the customer complaint procedure set out in Chapter 15 if no reason for the increase in odour complaints can be referred from other monitoring assessments . The PORA will assess the requirement for future olfactometry sampling to be carried out on an annual basis. Olfactometry sampling must be carried out to the procedure set out in TRTWG669 and only if it is safe to do so. Odour modelling should not be using olfactometry sample results that are greater than 10 years old unless samples are unable to be taken from the assets due to lack of access or H&S reasons.

13.0 Routine maintenance:

Problems with WRC/STCs and odour control plant operations can be a cause of odour emissions

- The frequency of site checks and maintenance is dependent on site sensitivity, site priority and whether duty/standby equipment is provided.

- Task lists for maintenance jobs at Poole WRC are completed on a daily, weekly and monthly basis by the Duty Operators.

- A record of maintenance allocated to EMI department will be held on the WAM system.

Operator maintenance on specific odour control plant.

Daily Maintenance Schedule:

- Check that the duty fan is running.

Monthly Maintenance Schedule:

- Inspect all the odour extracting ductwork and repair as necessary.

- Fans: Grease fan motor
  Check running current
  Check air is being pulled into the unit.

6 monthly maintenance schedule:

- Check integrity of seals on hatches, covers and doors of areas where air is extracted from.

- Remove and clean all condensate traps in ducting.

- Open and close any slide dampers ensuring they return to original position.

EMI Maintenance

The frequency of checks will vary from site to site depending on priority and whether duty/standby equipment is provided. The checks referred to in this section are generic, for site specific guidance refer to the site maintenance manuals.

3 Monthly Maintenance Schedule:

Fans

- Visual check for earthing and bonding
- Visual check for damage
- Check bearing noise
- Check running current
- Check panel indication

- Check oil levels if gear box fitted
- Check for oil leaks if gear box fitted
- Check fan belt condition and tension and adjust if necessary
- Clean motors and check impeller and shaft for corrosion
- Check guards
- Check fan case and clear drain point
- Check lubrication
- Test run

6 Monthly (in addition to 3 monthly)

Fans

- Check pressure switch operation and ensure alarm activated
- Check emergency stop operation

Annual (in addition to 3 and 6 monthly)

Fans

- Check telemetry
- Check fuse size
- IR test motor
- Check panel heaters
- Check motor connections
- Check over current devices
- Check stop buttons/interlocks
- Visual check of cable glands
- Check drive coupling
- Check fixings
- Check bearing housings
- Check corrosion
- Check gear box, if fitted
- Check structure
- Grease bearing

12.5% as Iron Ferric Sulphate Solution Dosing Unit.

Daily/Weekly

- Check dosing pumps are in operation
- Check dosing pump, pipework, tanks for leakage
- Check storage tank levels
- Check if ferric dose is within design parameters
- Check point of application
- Check bund integrity
- Operate safety shower

Monthly

- Check inline filters prior to dosing pump
- Calibration of dosing pump (Process Technician)

14.0 Emergency response:

The following safeguards have been incorporated for failures that might give rise to odour for the specific odour control on site.

Event	Safeguard
Power failure	Standby generator on site.
Failure of duty ferric dosing pump.	Standby pump would start.

Any pre-arranged shut down of the odour control units, if they would normally be running, requires a Process Risk Assessment to be completed. This Process Risk Assessment must consider odour nuisance that could be caused by shut down and put in place measures to keep odours to a minimum on site. The Process Risk Assessment must be forwarded to the Odour Management Co-ordinator to be reviewed before shutdown is to be commenced.

All failures of a site process should be reported to the Operation and Maintenance Manager and Area Scientist. If the failure of the site process has the potential to cause an odour impact the Odour Management Co-ordinator and the Technical Manager must be informed.

In the event of a failure of a site process or an odour control system, that may give rise to odour, it is the Treatment Managers responsibility to inform the Environmental Health Practitioner/EA Permit Officer for the area.

If the event is a critical failure of plant/process a PORA is required to be ran to assess the potential odour impact. It may be that the PORA indicates that the critical failure and change of process is low impact due to the potential odour emission rate and hedonic tone score. Therefore, further odour impact mitigation may not be required. The Environmental Health Practitioner/EA Permit Officer are to be informed of the outcome of the PORA and whether further odour impact mitigation is to be put in place and likely timeframes involved. This may include the following:

- Updating potential sensitive receptors.
- Informing Wessex Water CSU department that odour complaint may be received so correct information can be relayed.
- Setting up odour monitoring.
- If critical failure is a spillage report how quickly repair can be made and clean up ASAP.
- Temporary covering of plant (H&S risk must be assessed before any covering is completed).
- Temporary odour control plant installed.
- Further odour modelling odour risk assessment required.
- Raise risk on WARMS.

At each stage it must be documented by the Treatment Manager for the site the actions put in place to minimise the odour impact.

15.0 Procedure for complaints:

Complaints are the primary indicator of nuisance and other community dissatisfaction. It is important that complaints are properly and systematically recorded and acted upon.

Complaints of odour are dealt with and recorded by the Customer Support Unit (CSU). The complaint details are placed onto the Ops Contact Reporting system. CSU forward

the complaint details to the Regional Manager for the site via email and text alert. It is the Regional Manager's responsibility to make sure there is liaison with the local authority, local stakeholders (including the complainant) and CSU on progress. Any complaints made directly to site staff must be reported to CSU so they can be placed on the Ops Contact Reporting system. It is important that communication between all interested parties at all times is maintained.

The initial action following a complaint will be as follows:

- The Duty Operator will perform a general check of the site.
- The Duty Operator will check that there are no on going process issues or activities that would give rise to odour emissions.
- The Duty Operator will check that levels of 'Good Housekeeping' are being maintained.
- The Duty Operator will check the working of the odour control equipment.
- The Duty Operator will perform a sensory evaluation down wind of discharge or sensory evaluation in proximity to discharge point.
- The Duty Operator will consider if the sewage treatment works itself is the source of the problem, or whether the odour at the sewage treatment works results from a problem further upstream, or in a remote part of network, or at a 3rd party.
- The results of this initial action will be reported to the Regional Manager.

From the initial action it must be decided if the complaint is valid. Complaints may be considered non-valid if:

- The wind was not blowing towards a complainant at the relevant time.
- There were other known sources of odour in the vicinity at the time.
- There are good grounds for believing a complaint is frivolous or vexatious.

Where there is doubt, however, complaints should be given the benefit of the doubt.

If the complaint is valid it must be decided whether the odour management plan is being followed. If it is not being followed, then the procedures set out in the odour management plan should be followed. If it is being followed, then further investigation may be required. This will be initiated by the Regional Manager, Area Scientist and Odour Management Co-ordinator.

Follow up investigations could involve the following:

- Operation and Maintenance Manager and Odour Management Co-ordinator perform general check of the site.
- "Sniff test" survey
- H_2S Survey.
- Measure the performance of abatement equipment.

- Process diagnosis.
- Asset investigations.
- Olfactometry survey

Following investigation further action may be required to abate odour emissions. It may require the following.

- Operational Solutions.
- Process Solutions.
- Maintenance Procedures.
- Investment Solutions.

Summary

It is important that at all times the Regional Manager is in liaison with the local authority, EA Permit Officer and with local stakeholders (including the complainant). It is important that all parties are informed on the outcome of the assessment of the complaint and whether or not any action is to be taken. At each stage of the complaint procedure documentation of the decisions and findings will be made by the Regional Manager to justify the measures chosen to resolve the odour nuisance. The Regional Manager will forward any action taken to the Customer Support Unit to be recorded on the Ops Contact Reporting System for future reference. Any further investigation or further action taken may result in a revision of the odour management plan.

16.0 Training:

Each operator, manager and scientist is trained on all processes with which they are associated. The training is supported by a number of process manuals. Upon completion of the training, every operator is assessed on each process of every site they work on, as well as a 'basic' site assessment.

Staff at all levels having duties related to the management, operation, maintenance or repair of odour-critical plant will be trained, competent and have documented training records. All Wessex Water staff involved with odour-critical plant will have access to the Wessex Water Operating Manual on Odour Control and undertake associated training and competency assessments.

A copy of the Odour Control Operation Manual is kept on the odour page of the Wessex Water intranet for reference. Odour Control Operation Manual: TRTMAN007

17.0 Site development/expansion

TRTWG669 is a procedure that provides guidance on how to assess the potential odour impact from a proposed development/expansion scheme during the design phase. It seeks to identify schemes where the risk of the development/expansion creating an odour impact is high and where odour control technology, changes to plant handling or other odour mitigation methods need to be built into project design.

The procedure applies to capital works projects that include permanent or temporary works

The need for a PORA will be identified in the Environment and third-party management plan (E3MP) procedure. If a PORA is required than TRTWG669 and WECEP004 procedure should be followed.

The assessment will determine whether the scheme is at a Low or High risk of creating an odour nuisance at sensitive receptors and the appropriate action required. For example, this may include the undertaking of an odour survey and/or model, alter mode of operation or install odour control equipment.

It is important as part of the PORA that the Odour Management Co-ordinator is contacted to confirm current Odour Management Plan status for the site, current operational issues and odour complaint history.

18.0 Encroachment by external developers

Where potential new development falls within the Wessex Water consultation zone TRTWG669 is to be followed. The potential developer must request a copy of the procedure from Wessex Water Planning Liaison Team. The procedure provides guidance on how to assess the odour impact from Sewage Treatment Works (STW) or Sewage Pumping Stations (SPS). The following policies and guidance below must also be consulted.

The National Planning Policy Framework (NPPF) (2012)

The NPPF describes the policy context in relation to pollutants, including atmospheric pollution.

'The Government's objective is that planning should help to deliver a healthy natural environment of the benefit of everyone and safe places which promote well being.

To achieve this objective, the planning system should aim to conserve and enhance the natural and local environment by:

[…]preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of land, air, water or noise pollution or land instability.'

Where pollution is defined as:

'Any consideration of the quality of land, air, water, soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam and odour.'

The NPPF specifically requires consideration of pollution on health and the natural environment as part of the planning decision process:

'To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account.

The Institute of Air Quality Management (IAQM): Guidance on the assessment of odour for planning

The Institute of Air Quality Management (IAQM) published guidance on the assessment of odour for planning in 2014 (updated 2018). The guidance is for assessing odour impacts for planning purposes.

The guidance states that "*IAQM is of the opinion that the practitioner should observe, from the various scientific studies, case law and practical examples of the investigation of odour annoyance cases that in any specific case, an appropriate criterion could lie somewhere in the range of 1 to 10$ou_E m^{-3}$ as a 98th percentile of hourly mean odour concentrations."*

The guidance states that *"Loss of amenity or disamenity does not equate directly to nuisance and significant loss of amenity will often occur at directly lower levels of emission then would constitute a statutory nuisance"*

CIWEM Policy Position Statement (2011)

"*CIWEM considers that the following framework is the most reliable that can be defined on the basis of the limited research undertaken in the UK at the time of writing:*

• C98, 1-hour >10 ou_E/m^3 - complaints are highly likely and odour exposure at these levels represents an actionable nuisance;

• C98, 1-hour >5 ou_E/m^3, - complaints may occur and depending on the sensitivity of the locality and nature of the odour this level may constitute a nuisance;

• C98, 1-hour <3 ou_E/m^3, - complaints are unlikely to occur and exposure below this level are unlikely to constitute significant pollution or significant detriment to amenity unless the locality is highly sensitive or the odour highly unpleasant in nature."

EA Horizon Guidance Document H4 (2012)

Benchmark levels

"The benchmarks are based on the 98th percentile of hourly average concentrations of odour modelled over a year at the site/installation boundary. The benchmarks are:

- *1.5 odour units for **most offensive** odours:*
- *3 odour units for **moderately offensive** odours;*
- *6 odour units for **less offensive** odours.*

(caution should be used as these benchmarks were not from a sewage treatment works and the benchmarks were designed to be applied to those industrial processes regulated by an Environmental Permit. It is generally considered that sewage treatment works odours fall into the middle category (3 ou_E/m^3) unless there is septic wastewater or sludge on the site, in which case the most stringent criterion may apply).

Examples of previous decisions in statutory nuisance cases and planning appeals are listed below (caution should be exercised as decisions will have been based solely on

the evidence presented at the time, which may have been incomplete or of a different standard to current best practice).

- Newbiggin appeal (1993) reference APP/F2930/A/92/206240; adoption of a level of 5ou/m^3 ($C_{98,1hr}$) (caution required as units are given as ou/m^3 and not ou_E/m^3) is both reasonable and cautious.

- Leighton Linslade appeal (2010) reference APP/P0240/A/09/2110667. At a threshold of 5, evidence of no harm is not convincing and there could be a risk of regular and unacceptable odour annoyance to such an extent that it would detract from the future resident's living conditions.

- Mogden case (statutory nuisance) [2011] EWHC 3253 (TCC). Nuisance certainly established at $5ou_E/m^3$

- Cockermouth appeals (2012) references APP/G0908/E/11/2152403 and A/11/2151737. $3ou_E/m^3$ for medium offensiveness.
- Stanton appeal (2012) reference APP/E3525/A/11/2162837. More appropriate threshold 3-$5ou_E/m^{3.}$

- Gillingham (Dorset) (2016) appeal APP/N1215/W/15/3005513. I conclude that the appropriate parameter to apply in this case is the $3ou_E/m^3$ contour line.

References

Wessex Water Documents

- DS464 - Odour Management
- DS 540 - Sewage Pumping Stations and Pumping Mains
- TRTWP102 – Generic Odour Management Plan
- TRTMAN007 - Odour Control
- TRTWG669 - Odour impact and odour risk assessment procedure for existing WRCs/STC/SPSs, proposed new expansion/development of a site and potential encroachment around/near a site.
- WECEP004 - Preliminary Odour Risk Assessment
- NTKWP222 – Pumping Station Generic Odour Management Plan

Applicable regulation

- Environmental Protection Act 1990
- Public Health Acts 1936, 1961, 1969
- The National Planning Policy Framework (NPPF) (2012)

Further Guidance

- Best Practical Means (BPM), A Guidebook for Odour Control at Wastewater Treatment Works, UKWIR 06/WW/13/8
- BS – EN 12255-9:2002 – Waste Water Treatment Plants – Part 9: Odour Control and Ventilation
- Code of Practice on Odour Nuisance from Sewage Treatment Works (DEFRA, 2006) (withdrawn September 2017)
- Guidance on the assessment of odour for planning (Institute of Air Quality Management, 2014)
- H4 Odour Management Guidance (How to comply with your Environmental Permit), Environment Agency

Revision history

Issue	Date	Description	Prepared by
1	June 2019	Original Version	Jim Humphries
2	June 2021	**Update:** General update. Addition Sludge treatment centre permit area. General reformat	Jim Humphries

Appendix 9: Noise & Vibration Risk Assessment

TECHNICAL NOTE

Job Name: Trowbridge Bioresources - Wessex Water Environmental Permitting

Job No: 331101341/100.010104

Note No: ACO01

Date: June 2021

Prepared By: Matthew Barlow

Subject: **Noise and Vibration Risk Assessment**

1. Introduction

1.1. Stantec (UK) has been commissioned by Wessex Water (WW) to undertake a noise and vibration risk assessment to support a permit application for Trowbridge Bioresources (TB).

1.2. The application is being made due to changes to the Environment Agency (EA) interpretation of the environmental permitting exclusion for Urban Wastewater Activities (under Environmental Permitting (England and Wales) Regulations 2016 (EPR) Schedule 1, Part 2, Chapter 5, Section 5.4).

1.3. This technical note summarises the results of our review of the activities associated with the TB having regard to statutory guidance relating to noise and vibration.

2. EA Permitting Requirements - Noise

2.1. When applying for a permit, the Environment Agency may require a noise management plan to be submitted if:

- They consider there may be a risk of noise and vibration pollution beyond the site boundary; or
- A noise impact assessment has been prepared as part of a risk assessment.

2.2. The findings of any noise impact assessment should be considered as part of the wider environmental risk assessment.

2.3. If a noise and vibration management plan is required, it should be prepared following the guidance in Environmental Permitting: H3 part 2 Noise Assessment and Control[1].

Guidance on Risk Assessments

2.4. Risk assessments for permitting purposes should be undertaken in accordance with the Guidance on the preparation of risk assessments[2].

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Reviewed	Approved
331101341/100.010104 /ACO01	-	June 2021	MB	MM	

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[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/298126/LIT_8291_337647.pdf

[2] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

Horizontal Guidance Note for Noise Part 2 – Noise Assessment and Control

2.5. This guidance provides supplementary information to assist Applicants in preventing and minimising emissions of noise and vibration.

2.6. The assessment methodology is based primarily on the requirements detailed in BS4142:1997 Method for rating industrial noise affecting mixed residential and industrial areas. This standard has been superseded by BS4142:2014+A1:2019, but the principles of the assessment methodology remain broadly similar.

2.7. The guidance document also provides an overview of the application of Best Available Techniques (BAT) to sites and processes.

Requirements for Quantitative Noise Impact Assessments

2.8. The information requirements of the EA with regards to what must be submitted if an assessment uses computer modelling or spreadsheet calculations are detailed in guidance 'Noise impact assessments involving calculations or modelling'[3]. This requirement is not applicable in this instance as a qualitative review methodology has been selected.

Basic Pre-Application Advice Note (v1)

2.9. A basic pre-application advice note[4] relating to Industrial Emission Directive (IED) permits for water and sewage companies has been provided by the Environment Agency.

2.10. With respect to noise, the note states that if the risk assessment indicates the operation is likely to cause noise or vibration beyond the site boundary then a noise impact assessment based on BS4142:2014+A1:2019 should be provided.

2.11. The assessment should be accompanied by a noise and vibration management plan informed by the results of the assessment and the H3 guidance.

3. Best Applicable Techniques (BAT)

3.1. In addition to the BAT detailed in the Horizontal Guidance Note for Noise Part 2, further information on BAT is detailed in the 'Commission Implementing Decision (EU) 2018/1147 of 10 August 2018'[5]. With respect to noise, section 1.4 states:

> ***BAT 17****. In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:*
>
> *1. A protocol containing appropriate actions and timelines;*
>
> *2. A protocol for conducting noise and vibration monitoring;*
>
> *3. A protocol for response to identified noise and vibration events, e.g. complaints;*
>
> *4. A noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures.*

[3] https://www.gov.uk/guidance/noise-impact-assessments-involving-calculations-or-modelling

[4] Water and sewage companies IED permits: Basic pre-application advice – supporting information (v1, March 2021)

[5] https://www.legislation.gov.uk/eudn/2018/1147

Applicability

The applicability is restricted to cases where a noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated

***BAT 18.** In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below.*

Technique		***Description***	***Applicability***
a.	*Appropriate location of equipment and buildings*	*Noise levels can be reduced by increasing the distance between the emitter and the receiver, by using buildings as noise screens and by relocating building exits or entrances.*	*For existing plans, the relocation of equipment and building exits or entrances may be restricted by a lack of space or excessive costs.*
b.	*Operational measures*	*This includes techniques such as:* *(i) inspection and maintenance of equipment;* *(ii) closing of doors and windows of enclosed areas, if possible;* *(iii) equipment operation by experienced staff;* *(iv) avoidance of noisy activities at night, if possible;* *(v) provisions for noise control during maintenance, traffic, handling and treatment activities.*	*Generally applicable.*
c.	*Low-noise equipment*	*This may include direct drive motors, compressors, pumps and flares.*	
d.	*Noise and vibration control equipment*	*This includes techniques such as:* *(i) noise reducers;* *(ii) acoustic and vibrational insulation of equipment;* *(iii) enclosure of noisy equipment;* *(iv) soundproofing of buildings.*	*Applicability may be restricted by a lack of space (for existing plants).*
e.	*Noise attenuation*	*Noise propagation can be reduced by inserting obstacles between emitters and receivers (e.g. protection walls, embankments and buildings).*	*Applicable only to existing plants, as the design of new plants should make this technique unnecessary. For existing plans, the insertion of obstacles may be restricted by a lack of space.* *For mechanical treatment in shredders of metal wastes, it is applicable within the constraints associated with the risk of deflagration in shredders.*

4. Project Proposals

4.1. Reference should be made to Section II of the full permit application for a technical description of the site activities covered by the permit variation application. A site layout and plan of the current TB assets is included as part of the application.

5. Noise and Vibration Risk Assessment

5.1. A preliminary noise risk assessment has been undertaken based on information provided by WW.

5.2. In considering the risks associated with the operations covered by the permit application, the following site-specific factors have been considered:

- The proximity and sensitivity of nearby receptors
- The existing environmental sound climate at the receptors
- The operational characteristics of the source
- The historical lack of noise complaints arising in respect of the operations carried out under the scope of the permit variation.

Noise and Vibration Sensitive Receptors

5.3. The sensitivity of a particular receptor depends on a variety of factors, but the following table provides examples of the types of receptors likely to be considered either high, medium or low sensitivity.

Table 1: Summary of Receptor Sensitivity

Sensitivity to Noise and Vibration	Description	Example Receptor
High	Receptors where people or operations are particularly sensitive to noise or vibration	Residential, including private gardens Quiet outdoor areas used for recreation Theatres/Auditoria/Studios Schools and Nurseries during the daytime Hospitals/residential care homes Places of worship
Medium	Receptors where noise or vibration may cause some distraction or disturbance	Offices Retail areas and other commercial developments Bars/Cafes/Restaurants where external noise may be intrusive Sports ground where quiet conditions are necessary (e.g. tennis, golf, bowls)
Low	Receptors where distraction or disturbance from noise and vibration is minimal	Industrial areas Sports ground with no specific requirement for quiet conditions Night clubs

5.4. For the purposes of this assessment, noise and vibration sensitive receptors are considered to be any existing occupied premises within 1km of the site which may be adversely affected by noise or vibration and has a high sensitivity. Receptors beyond this distance are unlikely to be significantly affected by noise or vibration from the TB.

5.5. In this instance the following receptors have been identified. Where appropriate, receptors have been grouped where they are within the same area. Due to the large number of receptors within 1km of the site, we have only identified those closest to the site boundary.

Table 2: Noise and Vibration Sensitive Receptors

Receptor Reference	Receptor Description	Receptor Type	Distance/Direction from Site Boundary (m)
A	Dwellings on Langford Road	Residential	390 E
B	Dwellings on Francis Street	Residential	395 SE
C	Dwellings on Farm Close	Residential	360 SSW
D	Dwellings on Trowle	Residential	440 W
E	Dwellings on Brick Lane	Residential	530 NE

5.6. Due to the nature of the sources present on site, the distance between the identified receptors and the site boundary, vibration from the operations at the site is unlikely to have an impact and is considered to be low risk. Vibration is therefore not considered further.

Existing Environmental Sound Climate

5.7. The site lies close to a number of sources of noise including the A369.

5.8. A limited environmental sound survey was undertaken in 2014 as part of a permit application for the CHP. Limited information is provided but the survey suggests that background sound levels at Receptor C are in the region of 26 dBA $L_{A90,T}$.

5.9. In addition to the above, a review of the strategic noise mapping data provided by Defra[6] has been undertaken. The noise mapping data is based on contributions from road sources.

5.10. A review of Defra's strategic noise mapping indicates that with the exception of Receptor D, sound levels are likely to fall below 50 dB $L_{Aeq,16hours}$ during the daytime (07:00 – 23:00 hours) and below 45 dB $L_{Aeq,8hours}$, during the night-time (23:00 – 07:00 hours).

5.11. Background sound levels in the vicinity of the site are therefore considered to be relatively low.

Operational Characteristics

5.12. The sources of noise associated with the permit include:

- The movement of vehicles around the site.
- The operation of plant items including the standby generator and the mixers associated with the Mesophillic digesters.

5.13. All of the activities described within the permit variation application are existing and will continue to operate in the same manner as their established use (e.g. hours of operation and load). There are no changes to activities or additional plant or equipment included as part of the permit variation.

Risk Matrix

5.14. Based on the Preliminary Noise Risk Assessment set out in Section 5, Table 3 details a risk matrix setting out overall risk levels associated with the IED related operations with regards to noise.

5.15. The combined assessment of the proposals in noise and vibration terms is that the probability of exposure and consequence are both low, with the overall risk level being low.

[6] https://www.gov.uk/government/publications/strategic-noise-mapping-2019

5.16. As there have been no noise complaints associated with PBC, and there are no significant changes proposed to the existing installation, BAT 17 as defined in 'Commission Implementing Decision (EU) 2018/1147 of 10 August 2018' is not considered to be applicable.

5.17. On the basis of the qualitative risk assessment carried out above and reported in Table 3, and in light of the operating history of the plant, no further controls are considered necessary in respect of the permitted operations. Site management practices included within WW's Environmental Management Systems (EMS), which include provisions for noise control and plant maintenance, will continue to be applied; no specific permit Noise Management Plan is considered necessary at this time. In the event of material changes to the local noise environment, or location or sensitivity of nearby receptors, or should substantiated complaints arise, this position should be reviewed as part of normal site management reviews and controls.

Table 3: Risk Matrix

Hazard	Receptor	Pathway	Risk Management Techniques	Probability of Exposure	Consequence	Overall Risk
Noise: Vehicular movements around site	Residential	Airborne	Vehicles will be screened from receptors. Deliveries would take place during the daytime hours only when background sound levels are higher.	Low - The risk management actions will prevent significant impact at nearest receptors	Low – Minor nuisance impacts	Low
Noise: Standby Generator	Residential	Airborne	The equipment is containerised in a high performance acoustically treated enclosure and designed for external applications. Tested yearly. Very occasional use	Low - The risk management actions will prevent significant impact at nearest receptors	Low – Minor nuisance impacts	Low
Noise: Mixers Associated with Mesophilic Digesters	Residential	Airborne	Plant is located a significant distance from receptors. Good maintenance of plant to ensure that excessive noise levels are not generated, under Operations & Maintenance contract Regular checks of noise mitigation measures fitted to items of plant. Where repair or replacement is required, the plant will, where possible, be taken out of service until repair or replacement of parts has been undertaken.	Low - The risk management actions will prevent significant impact at nearest receptors	Low – Minor nuisance impacts	Low
Noise: CHP & Exhaust	Residential	Airborne	The equipment is containerised in a high performance acoustically treated enclosure and designed for external applications. The equipment is controlled under Section 3.4 or permit EPR/HB3602TR/V001 which includes a noise condition to minimise impacts on nearby noise sensitive receptors.	Low - The risk management actions will prevent significant impact at nearest receptors	Low – Minor nuisance impacts	Low

Appendix 10: Energy Management Plan

Wessex Water

Trowbridge

Energy Management Plan

June 2021

Revision	Date	Description	Author	Checked by	Reviewed by
01	June 2021	Energy Management Plan	Josh Parsons	Luke Gimblett	Peter Duncan

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2 ENERGY MANAGEMENT 2

1 INTRODUCTION

This document is an Energy Management Plan for Wessex Water Services Limited (WWSL), which is required as part of the Environmental Permit application for Trowbridge Bioresources Centre, Off Bradford Road, Trowbridge, BA14 9AX (the Site).

This Energy Management Plan (EMP) is provided in response to Environment Agency (EA) application form Part C2, Questions 6a and 6b. These Questions require the following information:

- Description of the basic measures for improving energy efficiency; and
- Breakdown of any changes to the energy the activities use and/or create.

This EMP has also been prepared to demonstrate how WWSL complies with the Industrial Emissions Directive 2010/75/EU (IED). The EMP will therefore address appropriate Best Available Technique (BAT) conclusions, as referenced in the Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing BAT conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council.

This EMP considers the following BAT conclusions to relate directly to energy:

BAT Conclusion 11

> *"BAT 11 is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and waste water, with a frequency of at least once per year."*

BAT Conclusion 23

> *"In order to use energy efficiently, BAT is to use both of the techniques given below." (see Reproduced Table 1.1)*

Table 1.1 BAT 23

Technique		Description
a.	Energy efficiency plan	An energy efficiency plan entails defining and calculating the specific energy consumption of the activity (or activities), setting key performance indicators on an annual basis (for example, specific energy consumption expressed in kWh/tonne of waste processed) and planning periodic improvement targets and related actions. The plan is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc.
b.	Energy balance record	An energy balance record provides a breakdown of the energy consumption and generation (including exportation) by the type of source (i.e. electricity, gas, conventional liquid fuels, conventional solid fuels, and waste). This includes: (i) information on energy consumption in terms of delivered energy; (ii) information on energy exported from the installation; (iii) energy flow information (e.g. Sankey diagrams or energy balances) showing how the energy is used throughout the process. The energy balance record is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc.

2 ENERGY MANAGEMENT

WWSL have a dedicated Energy Team, whose focus it is to manage energy use at the Site. WWSL use a continuous monitoring system, named 'Chellow', which tracks energy usage and energy generation from the Combined Heat & Power (CHP) facility. This information is sent to the Operations Manager for the Site on a monthly basis. The Chellow system allows WWSL staff to monitor energy usage and generation at any time.

It is considered that the use of the Chellow system meets the requirements of BAT conclusion 11, as identified in Table 1.1. The Chellow system provides an 'energy balance' which includes the energy consumption on the Site and energy generated by the CHP.

Four-yearly energy audits are undertaken on behalf of WWSL as part of the Energy Savings Opportunity Scheme (ESOS). These audits identify areas of improvement for energy efficiency on the Site. It is considered that these ESOS audits meet the requirements of BAT conclusion 23, as identified in Table 1.1. The ESOS Audits cover the following:

- Breakdown of activities and energy usage
- Energy consumption, including a breakdown of:
    - Electricity imported;
    - Electricity generated by the CHP; and
    - Electricity exported from the Site.
- Energy consumption throughout the year.

Furthermore, it is considered that the ESOS Audits provide a description of the basic measures undertaken to improve energy efficiency on the Site (EA Form Part C2, Q6a). A summary of these measures is included below:

- Energy is generated on the Site by the CHP (17% of energy);
- Assets / equipment using electricity are monitored continuously using the Chellow system, with one aim of monitoring being to identify the waste of energy; and
- Pumps run depending on flows into the Site and are controlled by ultrasonic level transducers which send a signal to a Programmable Logic Controllers (PLC), which will act to alert relevant WWSL staff in the event of a failure. This 'control system' will ensure that the flow of the pumps is at the maximum point of the duty point (most efficient point) for as long as possible, which will act to lower power usage.

In response to Question 6b from EA Form Part C2; there have been no changes to the activities carried out on the Site and therefore no changes to the energy used by or created by these activities.

It is noted that the CHP and Gas to Grid activities are currently permitted under the environmental permit EPR/HB3602TR and operated by Wessex Water Enterprises Ltd. The CHP and Gas to Grid activities are directly associated activities to the anaerobic digestion activity.

Appendix 11: Accident Management Plan

Wessex Water Services

Accident prevention and management plan

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1.0 Introduction

For waste environmental permits, there is an Environment Agency requirement for an accident prevention and management plan, for dealing with any incidents or events that could result in pollution, as a part of a written management system. Develop a management system: environmental permits - GOV.UK (www.gov.uk). As a part of the Industrial Emissions Directive implementation for digesters in the water industry; the five digestion Bioresources Centres (BC) within the Wessex Water will each receive an environmental permit through IED from mid-2021. Four of the BCs are covered by this document OPSP275. The fifth site Avonmouth BC will have an individual accident prevention and management plan, due to site size and complexity.

The four BCs covered are:

Site Name	Wessex Water Site ID	IED permit date
Berry Hill BC	13018	October 2021
Poole BC	11795	April 2021
Taunton BC	11798	January 2022
Trowbridge BC	11799	July 2021

Table 1: list of Bioresources Centres (BCs) covered by this Accident Management Plan

Please note: this document OPSP275 will be developed as each site is incorporated in line with the application timeline.

Sections 2 to 5 and Appendixes 1 to 2 are general sections and apply to all BCs. Section 6 is separated into site specific sections, and contains details of individual site plans, spill kit locations, and lists of substances present at the BC.

2.0 Plan Detail

This plan identifies potential accidents, for example equipment breakdowns, enforced shutdowns, fires, vandalism, flooding, or any other incident which causes an unexpected change to normal operations, such as bad weather, and the measures taken to reduce impact.

This plan only covers the sludge treatment installation permit assets at the relevant BC and does not extend into the adjoining Water Recycling Centres (WRC) and other waste activities on each site.

A breakdown of the risks and mitigations in place is in Appendix 1.

Appendix 1 uses Wessex Waters Risk Management Process (AMP002). Appendix 2 refers to AMP002 and details the probability/likelihood tables (Table 1) and environmental (Table 4) which are used to provide the ratings given in Appendix 1.

3.0 Plan Review

This plan will be reviewed as a minimum:

- every 5 years as per Wessex Water review policy
- in event of a new capital scheme at the sites affecting the parts of the IED process.
- following a major or significant accident or incident.

At the time of writing of this plan, the next minimum date for review will be 01/07/2026.

4.0 Recording, Investigating, and Responding to accidents

Your accident plan must also say how you will record, investigate and respond to accidents or breaches of your permit.

- Recording
  - Health and Safety accidents are recorded through either the phone or desktop app
    - Health and safety observation/incident reporting application (sharepoint.com)
  - Pollution incidents are recorded through the pollution register app either via laptop or a mobile phone power application. A customer service record (RAPID) is also required to be raised. Based on permission levels, at the minimum all staff are able to view pollution register and RAPID entries. Different groups of staff will also be able edit and update records.
    - Pollution Register
    - Customer Service (RAPID) call 0345 600 4 600
  - All Engineering & Sustainable Delivery (E&SD) Incidents must be notified by using QF107 (Incident Reporting Form) in line with the Emergency Pollution Incident Response procedure (QP024).
  - Incidents requiring Environmental support, notify via instructions:
    - Incidents affecting the Environment, pollution reporting & support (sharepoint.com)
  - Security breach and incident reporting form (sharepoint.com)
  - EA notification form (Schedule 5) (EPF002)

- Responding
  - The overarching GENG012 Management of an Incident in Operations is designed to complement the knowledge and experience possessed by operational staff and can be used as a framework. This document will provide advice and guidance at any level. All operational staff who may involved in an accident or incident should familiarise themselves with GENG012.
  - Environmental
    - Pollution Response guidance (OPSG165)
    - CMP018 Major oil/fuel pollution incident response (sharepoint.com)
    - Sites with oil and chemical spill kits available (Production and Waste) (ROCG019).pdf (sharepoint.com)
    - CMP002 Pollution of a designated bathing beach, recreational water, or shellfish water (sharepoint.com)
    - CMP004 Response to Chemical Ingress into sewer or WRC
  - Site – General
    - CMP005 Inundation of a WRC or SPS by a major flood event (sharepoint.com)
    - CMP006 Response to major failure of bulk storage tanks on wastewater sites (sharepoint.com)

- Investigating and Reviewing
  - Operations investigate and review any accidents or incidents and make changes to management systems and other documentation such as maintenance schedules accordingly. Other departments such as health & safety, compliance & regulation and mechanical-electrical are to be involved as required. GENG808 Debrief Guidance and Procedures is available to assist in effective debriefs to identify good practice and areas for improvement.

5.0 Emergency Contacts

Your accident plan must also include:

- *a list of emergency contacts and how to reach them*

  - The Wessex Water Business Continuity policy regarding key external contacts is GENG001:
    - GENG001 (Key External Contacts for Use With CMPs and LEPs) (sharepoint.com)
    - Including police, oil clean up contractors, mobile centrifuge contractors, tankering contractors, local council contacts, etc
  - For incidents affecting the environment, see Source page
    - See Incidents affecting the Environment, pollution reporting & support (sharepoint.com)
    - A copy of the key information is contained in the table below, but refer to the Source webpage for the master information.

Body	**When to Contact**	**Contact Info.**
Internal (WW)	For any accident/pollution, requiring a response or ecological survey	environmental.incident@wessexwater.co.uk
Internal OHES (WW)	Out of hours ecological survey	OHES 0333 600 2424 **and** email: Response@ohes.co.uk **copy in** environmental.incident@wessexwater.co.uk and the Regional Pollution Manager
Internal (WW)	Non-urgent environmental queries	environmental@wessexwater.co.uk
Environment Agency	Any pollution incident to watercourse. Incidents resulting in fish/eel death. Breach of environmental permit conditions. Land pollution suspected to be CICS[1] Category 1 or 2. Air pollution suspected to be CICS Category 1 or 2.	0800 80 70 60 (24hrs) **And** EA Notification form (Schedule 5) (EPRF002)
Natural England	For incidents affecting (or for works within) **Sites of Special Scientific Interest (SSSI)**, Special Areas of Conservation (SAC), **Special Protection Areas (SPA)** and/or legally protected species (such as Great Crested Newts, Water Voles, Badgers, Bats) You should ensure any works to deal with the incident cause as little	Inform Natural England as soon as possible (and within 24 hours) by email to: protectedsites@naturalengland.org.uk Main Contact Number - 0300 060 6000

[1] CICS = Common Incident Classification Scheme

Body	When to Contact	Contact Info.
Internal (WW)	For any accident/pollution, requiring a response or ecological survey	environmental.incident@wessexwater.co.uk
Internal OHES (WW)	Out of hours ecological survey	OHES 0333 600 2424 **and** email: Response@ohes.co.uk **copy in** environmental.incident@wessexwater.co.uk and the Regional Pollution Manager
Internal (WW)	Non-urgent environmental queries	environmental@wessexwater.co.uk
	damage to the special features as possible.	

Table 2: Key environmental agencies to notify in event of an accident affecting the environment

6. 0 Online security risks

There is an information security management manual which provides guidance for Wessex Water to demonstrate compliance with the Information Security Policy. Wessex Water's Information Security Management System (ISMS) is accredited to ISO27001:2013.

Wessex Waters information security is taken seriously and there is an ongoing programme of ensuring operational technology (OT) such as outstations, telemetry, and control systems on sites; is aligned with the NIS (Network and Information Systems) Regulations. This involves increased monitoring and improved response to potential cyber security incidents, plus increased segregation of OT networks and devices and addressing security risks present due to legacy OT equipment. A cyber safe training module on iLearn is being rolled out for all staff.

7. 0 Site specific

7.1 Poole BC (11795)

Appendix 3 details the sensitive receptors surrounding Poole BC.

Note that Poole Harbour is a SSSI, SPA, RAMSAR and a Shellfishery. There are also designated bathing waters within Poole Harbour area.

Body	When to Contact	Contact No.
Marine Management Organisation	Where emergency works are below Mean High Water Springs (MHWS) they will require emergency Marine Licencing	0300 123 1032 (Emergency Marine Licence - 24hrs)
BCP Council	Issues affecting Poole Harbour	environment@poole.gov.uk 01202 261700 Environmental services contact information - Services in Poole
CEFAS	Issues affecting shellfishery	08459335577
Coastguard and Marine Offices	Significant or Major pollution to Poole Harbour	0203 8172000 MCA Head Office, Southampton

- Responding
  - LEP054 Loss of Poole STW Site Offices Response Plan (sharepoint.com)
  - LEP001 Response to pumping station or inlet works failure Poole STW 13242 (sharepoint.com)
  - CMP017 Loss of UV site or major reduction in capacity (sharepoint.com)

- Spill Kit use is governed by TBT055 Toolbox Talk - Use of Spill Kits
  - Poly make up room
  - Sludge tanker import area
  - Boiler house

- List of substances stored at site:

Treated sludge and storm effluent are also stored at site as a part of the WRC sewage treatment process and is not referenced in this section.

List of substances stored at site:	Storage facilities
Polyelectrolyte (for sludge stability)	Garage, drum room, by centrifuge
Oil for boiler and CHP maintenance	Boiler house
Antifreeze	In containers in boiler house
Diesel	One tank and a fuel cube
Antifoam	Burst dosing kiosks

Table 3: list of substances stored at Poole BC.

Note: Poole WRC Site Plan for the whole WRC site is detailed in (WRG006 Site Waste Plan Poole).

7.2 Trowbridge BC (11799)

Appendix 4 details the sensitive receptors surrounding Trowbridge BC.

- Spill Kit use is governed by TBT055 Toolbox Talk - Use of Spill Kits
  - Garage
  - Belt press building

- List of substances stored at site:

List of substances stored at site:	Storage facilities
Polyelectrolyte (for sludge stability)	Garage, GBT kiosk, belt press building
Oil for boiler	Boiler house
Antifreeze	In containers in boiler house
Diesel	Diesel tank adjacent to flare
Antifoam	Burst dosing kit adjacent to digestion plant and in garage.

Table 4: List of substances stored at Trowbridge BC

Note: Trowbridge WRC Site Plan for the whole WRC site is detailed in (WRG001 Site Waste Plan Trowbridge).

8.0 Revision history

Issue	Date	Description	Prepared by
1	March 2021	First Issue	Carolyn Dewhirst
2	May 2021	Second issue – review to include multiple sites.	Carolyn Dewhirst

Appendix 1 – Breakdown of the risks and mitigations

Risk Likelihoods and Impacts are assessed using Wessex Water AMP002

Category	Likelihood of impact	Magnitude of Potential Impact	Risk rating prior to mitigation	Measures to minimise the impact if the accident does happen / Measures to avoid the accident happening	Residual risk following mitigation
Equipment breakdowns	Medium	High	High	• Regular maintenance of critical plant • Monitoring on critical plant, linked to manned control room • Established consequence management plans to deal with incident. • Inhibits on tanks to prevent overfilling • Tank level monitors • Pump failure telemetry alarms • CMP018 Major oil/fuel pollution incident response (sharepoint.com) • Pollution Response guidance (OPSG165) • Guidance on response to telemetry alarms (ROCP200)	Low
Spillages / leaks / loss of containment / overfilling of tanks	Low	High Spillage and leakage could occur during fuel deliveries, vehicle refuelling (outside BC permit area), vehicle breakdowns/ accidents and or damage to tanks or bunds. Loss of containment could result in potentially polluting liquids (including oils) being discharged to drainage system or land outside permitted area.	High	• Monitoring linked to control room installed on key tanks • Tanks are inspected regularly by site staff • Spillages are all self-contained via drainage system to RSPS1 (Return Pumping Station) • Minor spills cleaning up immediately • Established consequence management plans to deal with incident. • TRTWG768 11795 Poole Best Tankering Practice • TRTWG801 11799 Trowbridge Best Tankering Practice • CMP018 Major oil/fuel pollution incident response (sharepoint.com)	Medium

Category	Likelihood of impact	Magnitude of Potential Impact	Risk rating prior to mitigation	Measures to minimise the impact if the accident does happen / Measures to avoid the accident happening	Residual risk following mitigation
				• Pollution Response guidance (OPSG165)	
Fires	Low	High	High	• HSA25 Fire safety (sharepoint.com) • Fire management for Operational sites (TBT059).pdf (sharepoint.com) • ENVG008 Environmental Guidance Fire Emergencies (sharepoint.com) • Response to telemetry alarm about fire (ROCP208) (sharepoint.com)	Low
Vandalism	Low	Medium Site could be subject to intentional vandalism by intruders, causing leaks or spills	Medium	• On site security measures (CCTV / security fencing / lockable gates) • Repairs undertaken as required • Requirement for visitors to sign in • Health & safety and security documentation - three yearly review plan (sharepoint.com)	Low
Flooding	Low	Medium Site located within rivers and sea zone rating low risk[2]. Medium Site located in high risk zone for surface water flooding[1].	High	• Established consequence management plans to deal with incident. • CMP005 Inundation of a WRC or SPS by a major flood event (sharepoint.com)	Medium
Other - Power supply loss	Low	High	High	• On site back-up generators • Mobile back-up generators • Liaison with power supply providers • Regular maintenance of generators • Telemetry for mains failure linked to manned control room	Low

[2] Environment Agency – Long term flood risk - GOV.UK (flood-warning-information.service.gov.uk):

Category	Likelihood of impact	Magnitude of Potential Impact	Risk rating prior to mitigation	Measures to minimise the impact if the accident does happen / Measures to avoid the accident happening	Residual risk following mitigation
				• Established consequence management plans to deal with incident. • CMP014 (Significant Broad Area - Power Supply Failures) (sharepoint.com) • Microsoft Word - BCIRP01 Widespread loss of power response plan (sharepoint.com) • Response to telemetry alarm about electricity failure (ROCP203)	
Staff Operations	Medium	Medium	Medium	• Tank level monitors • Pump failure telemetry alarms • Training and development via Operator passport Treatment Operator Passport (TRTMAN059) and onsite training.	Low

Appendix 2 – Wessex Water Risk Management Tables

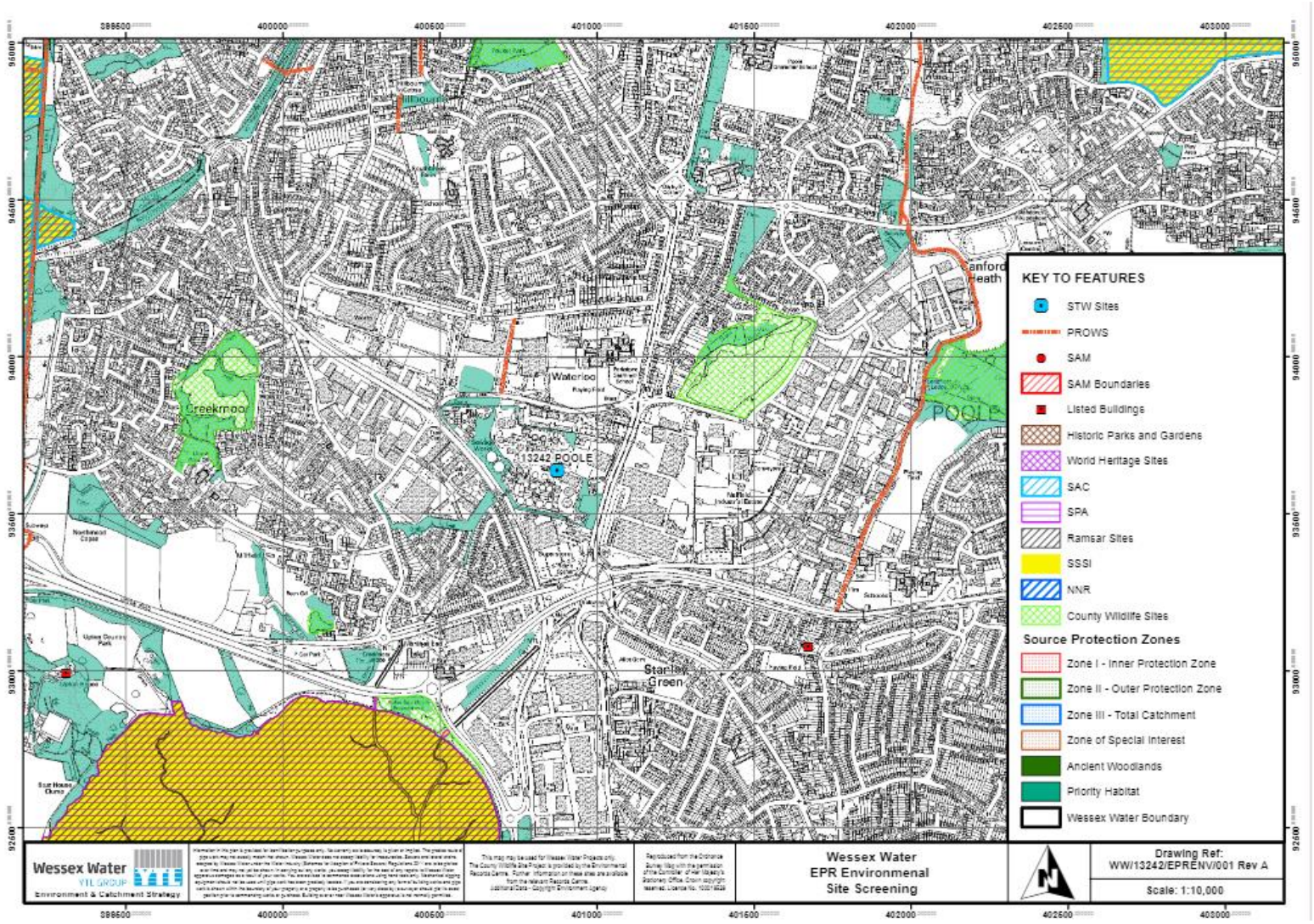
Table 1: Probability/ likelihood of occurrence

		Description	Likelihood
Very High	**5**	It is **almost certain** that the event will occur if the situation continues as it is	> 90%
High	**4**	It is **very likely** that the event will occur if the situation continues as it is	60 - 90%
Medium	**3**	It is **foreseeable** that circumstances may exist which result in the event occurring	40 - 60%
Low	**2**	It is **unlikely** that circumstances will combine to result in the event occurring	10 - 40%
Very Low	**1**	It is **most unlikely** that the event will occur it would require exceptional conditions	< 10%

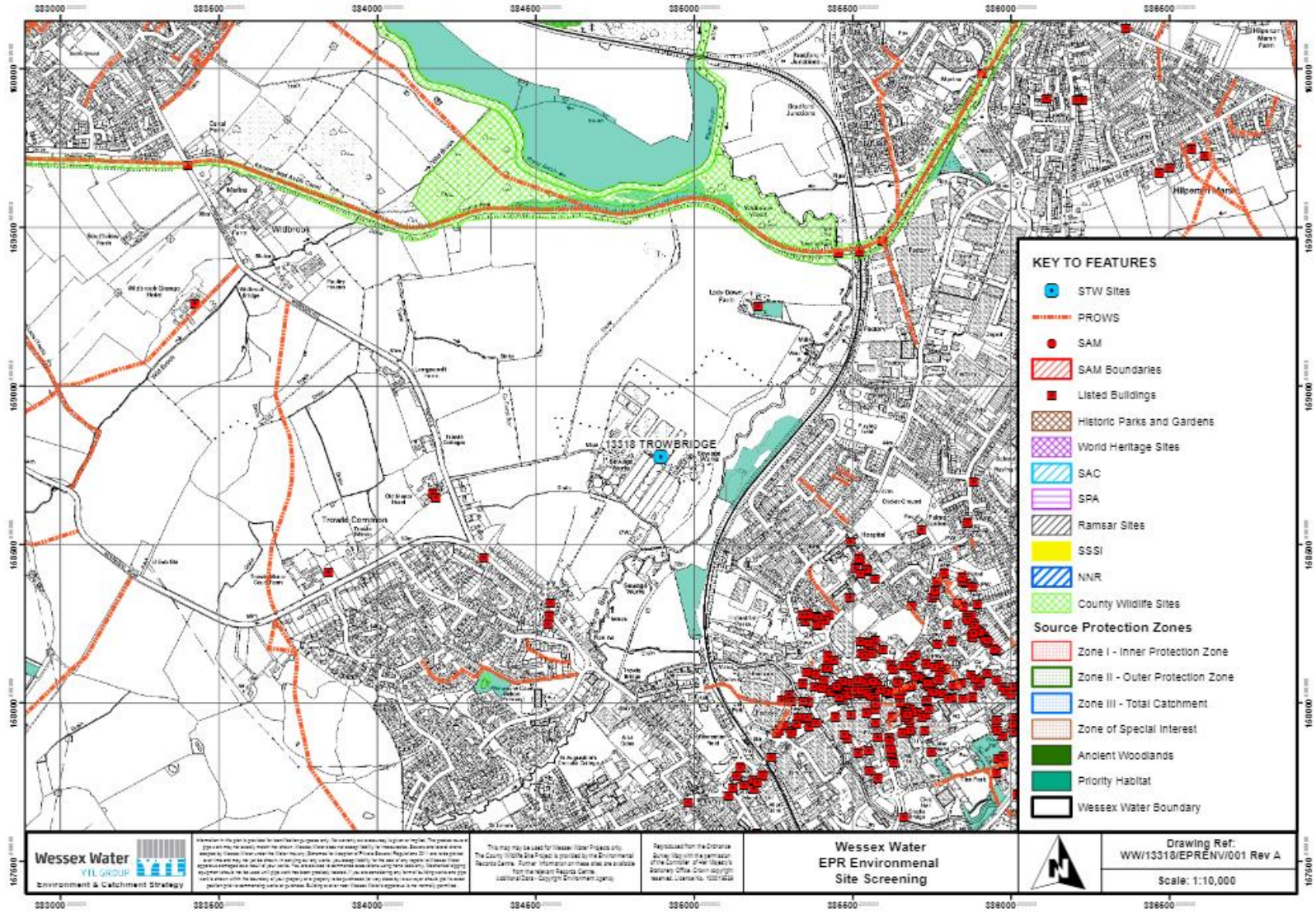
Table 4: Environmental

Very High	**5**	Extreme environmental incident, resulting in irreversible or long-term widespread harm to environment; resulting in > 1 Cat 1 pollution incident
High	**4**	Major environmental incident resulting in significant impact requiring management by external authorities (EA,DWI) and high level of resources for response and remedy; resulting in 1 Cat 1 pollution incident
Medium	**3**	Moderate environmental impact requiring management response to aid recovery -reportable to authorities (e.g. fuel tank spillage); resulting in 1 or more Cat 2 pollution incident
Low	**2**	Local impact requiring management response, but from which there is natural recovery (e.g. recovery of fly-tip waste, silt into spawning river); resulting in 1 or more Cat 3 pollution incidents
Very Low	**1**	Minimal environmental impact (e.g. minor oil drips); resulting in 1 or more Cat 4 pollution incidents

Appendix 3: Poole BC Sensitive Receptors



Appendix 4: Trowbridge BC Sensitive Receptors



Appendix 12: Trowbridge BC Photolog

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 1 **Asset Name:** Cake Skip Storage Area **Survey Date:** 28-Jan-21 **Comments:** The site generates approximately 4 to 5 skips of cake per day, which is stored on the Cake Skip Storage Area. The dry solids content of the sludge cake is on average 23%. The area is provided with impermeable surfacing with drainage that discharges to the head of the works.	
Photograph ID: 2 **Asset Name:** Sludge Reception Tank **Survey Date:** 28-Jan-21 **Comments:** The Sludge Reception Tank with import sludge pipelines serving the tank. WWSL have identified that the asset is life expired and are due to replace the tank by 2022 under project D14620. The tank is located on impermeable surfacing with associated drainage to the head of the works.	

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 3 **Asset Name:** Strained Transfer Tank **Survey Date:** 28-Jan-21 **Comments:** The Strained Transfer Tank is currently scheduled for refurbishment by 2022 as part of ongoing improvement works. Both the current and the future tank will be on impermeable surfacing with associated drainage to the head of the works.	
Photograph ID: 4 **Asset Name:** Strain Presses (2no.) **Survey Date:** 28-Jan-21 **Comments:** Strain Presses are located over impermeable surfacing with associated drainage to the head of the works. The skip is to collect the rag that the strain presses remove from the sludge.	

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 5 **Asset Name:** Pre-Thickening Tank **Survey Date:** 28-Jan-21 **Comments:** The Pre-Thickening Tank is currently scheduled for refurbishment by 2022 as part of ongoing improvement works. The tank is located on impermeable surfacing with associated drainage to the head of the works.	
Photograph ID: 6 **Asset Name:** Post Thickening Tank **Survey Date:** 28-Jan-21 **Comments:** The Post Thickening Tank is currently scheduled for detailed inspection and any required refurbishment will be carried out as part of ongoing improvement works.	

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 7 **Asset Name:** Gravity Belt Thickeners (2no.) **Survey Date:** 28-Jan-21 **Comments:** The Gravity Belt Thickeners are located over impermeable surfacing with associated drainage to the head of the works.	
Photograph ID: 8 **Asset Name:** Acid Phase Digesters (6no.) **Survey Date:** 28-Jan-21 **Comments:** Acid Phase Digester (APD) tanks (6no.) are located on impermeable surfacing with associated drainage to the head of the works.	

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 9

Asset Name:
Post Digested Tank (2no.)

Survey Date:
28-Jan-21

Comments:
Post Digested Tank is in good condition with no immediate improvement works scheduled.

Photograph ID: 10

Asset Name:
Dewatering Building Stack 1

Survey Date:
28-Jan-21

Comments:
Dewatering Building Stack 1. Extracting air from the dewatering building.

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 11 **Asset Name:** Dewatering Building Stack 2 **Survey Date:** 28-Jan-21 **Comments:** Dewatering Building Stack 2. Extracting air from the dewatering building.	
Photograph ID: 12 **Asset Name:** Liquor Fixed Pumping Station **Survey Date:** 28-Jan-21 **Comments:** Wessex Water Services Limited has identified a build-up of struvite in the pipeline serving the PS. Currently the pipeline is a temporary arrangement until the investigation is complete and the preferred permanent solution is confirmed.	

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 13 **Asset Name:** Return Liquor Balance Tanks (2no.) **Survey Date:** 28-Jan-21 **Comments:** The Liquor Balance Tanks are currently scheduled for detailed inspection and any required refurbishment is to be implemented as part of ongoing improvement works. The tank has low and high level sensors.	
Photograph ID: 14 **Asset Name:** Return Liquor Pumping Station **Survey Date:** 28-Jan-21 **Comments:** The Return Liquor Pumping Station discharges liquors to the head of the works. Due to a blockage caused by struvite, temporary pumps have been installed until a permanent solution can be implemented.	

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 15

Asset Name:
Gas Holder

Survey Date:
28-Jan-21

Comments:
Gas Holder showing above ground biogas pipelines; Siloxane Removal Unit in foreground.

Photograph ID: 16

Asset Name:
Combined CHP and Boiler Stack

Survey Date:
28-Jan-21

Comments:
Combined CHP and boiler stack - this is a shared asset between WWEL and WWSL.

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 17 **Asset Name:** CHP - containerised unit **Survey Date:** 28-Jan-21 **Comments:** The CHP is permitted under EPR/HB3602TR/V002, operated by Wessex Water Enterprises Limited and is a DAA to the AD activity.	
Photograph ID: 18 **Asset Name:** CHP Waste Gas Burner **Survey Date:** 28-Jan-21 **Comments:** The CHP Waste Gas Burner is permitted under EPR/HB3602TR/V002, operated by Wessex Water Enterprises Limited and is a DAA to the AD activity.	

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 19 **Asset Name:** Gas to Grid Waste Gas Burner **Survey Date:** 28-Jan-21 **Comments:** The Gas to Grid Waste Gas Burner is permitted under EPR/HB3602TR/V002, operated by Wessex Water Enterprises Limited and is a DAA to the AD activity.	
Photograph ID: 20 **Asset Name:** Gas to Grid Plant **Survey Date:** 28-Jan-21 **Comments:** The Gas to Grid Plant is permitted under EPR/HB3602TR/V002, operated by Wessex Water Enterprises Limited and is a DAA to the AD activity.	

Client:	**Wessex Water Services Limited**	**Project:**	**Environmental Permitting**
Site Name:	**Trowbridge BC**	**Site Location:**	**Trowbridge Wiltshire**

Photograph ID: 21

Asset Name:
Gas to Grid Propane Tank

Survey Date:
28-Jan-21

Comments:
The Gas to Grid Propane Tank is permitted under EPR/HB3602TR/V002, operated by Wessex Water Enterprises Limited and as part of the gas to grid operation, is a DAA to the AD activity.

Appendix 13: Nature and Heritage Conservation Screening Report: Bespoke Installation

Nature and Heritage Conservation

Screening Report: Bespoke Installation

Reference	**EPR/BB3934AG/V002**
NGR	**ST 84783 58767**
Buffer (m)	**30**
Date report produced	**21 April 2021**
Number of maps enclosed	**5**

The nature conservation sites identified in the table below must be considered in your application.

Nature and heritage conservation sites	Screening distance (km)	Further information
Special Areas of Conservation (cSAC or SAC) **Bath & Bradford on Avon Bats (SAC)** **Salisbury Plain (SAC)**	10	Joint Nature Conservation Committee
Special Protection Area (pSPA or SPA) **Salisbury Plain (SPA)**	10	Joint Nature Conservation Committee
Local Wildlife Sites (LWS) **Kennet & Avon Canal** **Bristol Avon River** **Great Bradford Wood** **Lynwood Drive Pond** **Widbrook Wood WWT Reserve Biss Meadows Country Park**	2	Appropriate Local Record Centre (LRC)
Ancient Woodland **Great Bradford Wood**	2	Woodland Trust Forestry Commission Natural England

Protected Species	Screening distance (m)	Further Information
European Eel Code 2 European Eel migratory route	up to 500m	Natural England National Biological Network (NBN) Environment Agency. Dial 03708 506 506 for your local Fisheries and Biodiversity team

Unfortunately we cannot provide you with the details of all protected species. This is because we either have not been given permission by the owner of the species data, or they have asked us not to identify the species as they are vulnerable. In these instances you must contact the relevant organisation listed above. A small administration charge may be incurred for this service.

Where protected species are present, a licence may be required from Natural England or the Welsh Government to handle the species or undertake the proposed works.

The relevant Local Records Centre must be contacted for information on the features within local wildlife sites. A small administration charge may also be incurred for this service.

Please note we have screened this application for protected and priority sites, habitats and species for which we have information. It is however your responsibility to comply with all environmental and planning legislation, this information does not imply that no other checks or permissions will be required.

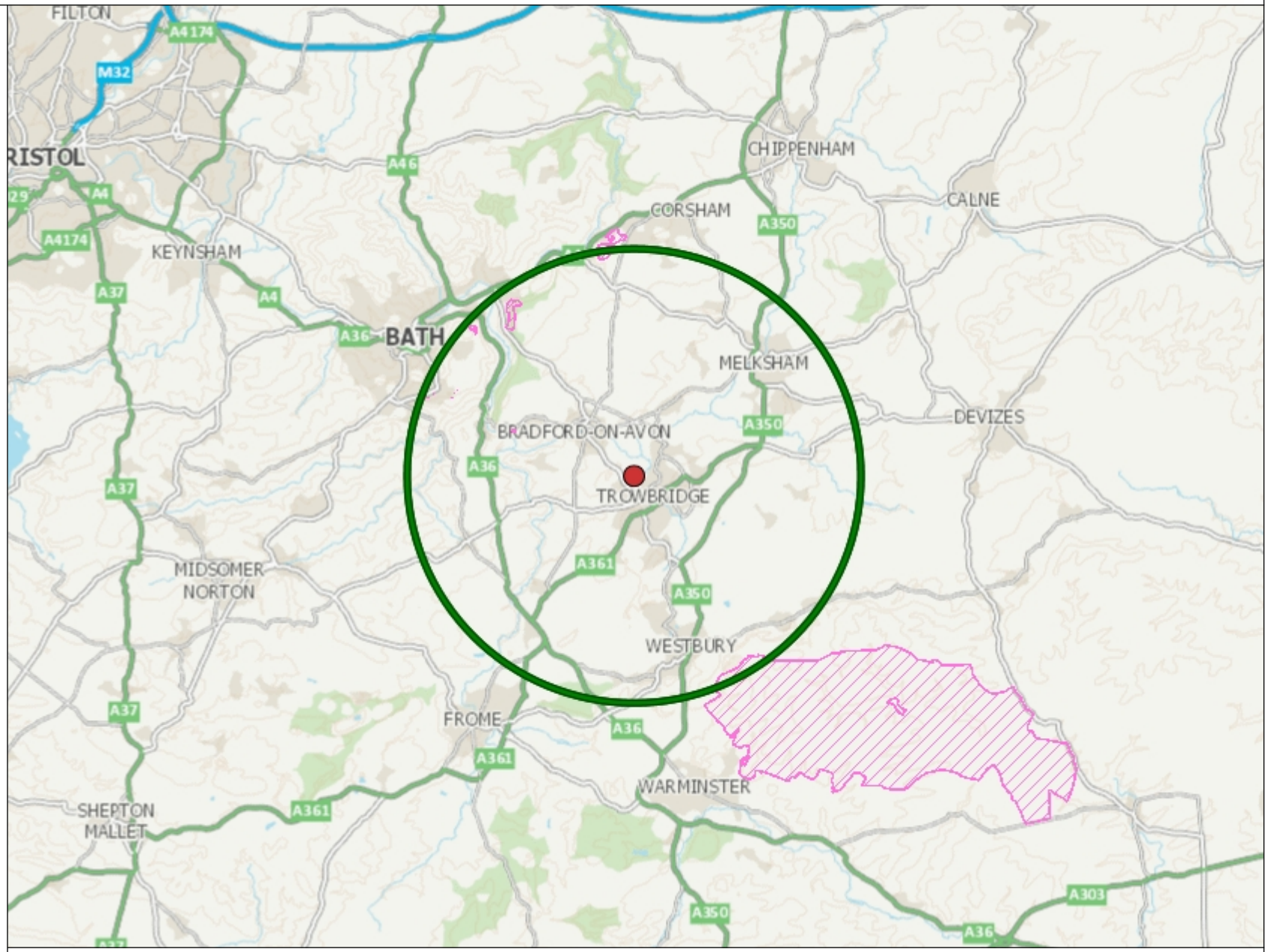
Please note the nature and heritage screening we have conducted as part of this report is subject to change as it is based on data we hold at the time it is generated. We cannot guarantee there will be no changes to our screening data between the date of this report and the submission of the permit application, which could result in the return of an application or requesting further information.

Special Areas of Conservation

Environment Agency

Legend

SAC (England)



1: 250,000

0 6,250

Metres

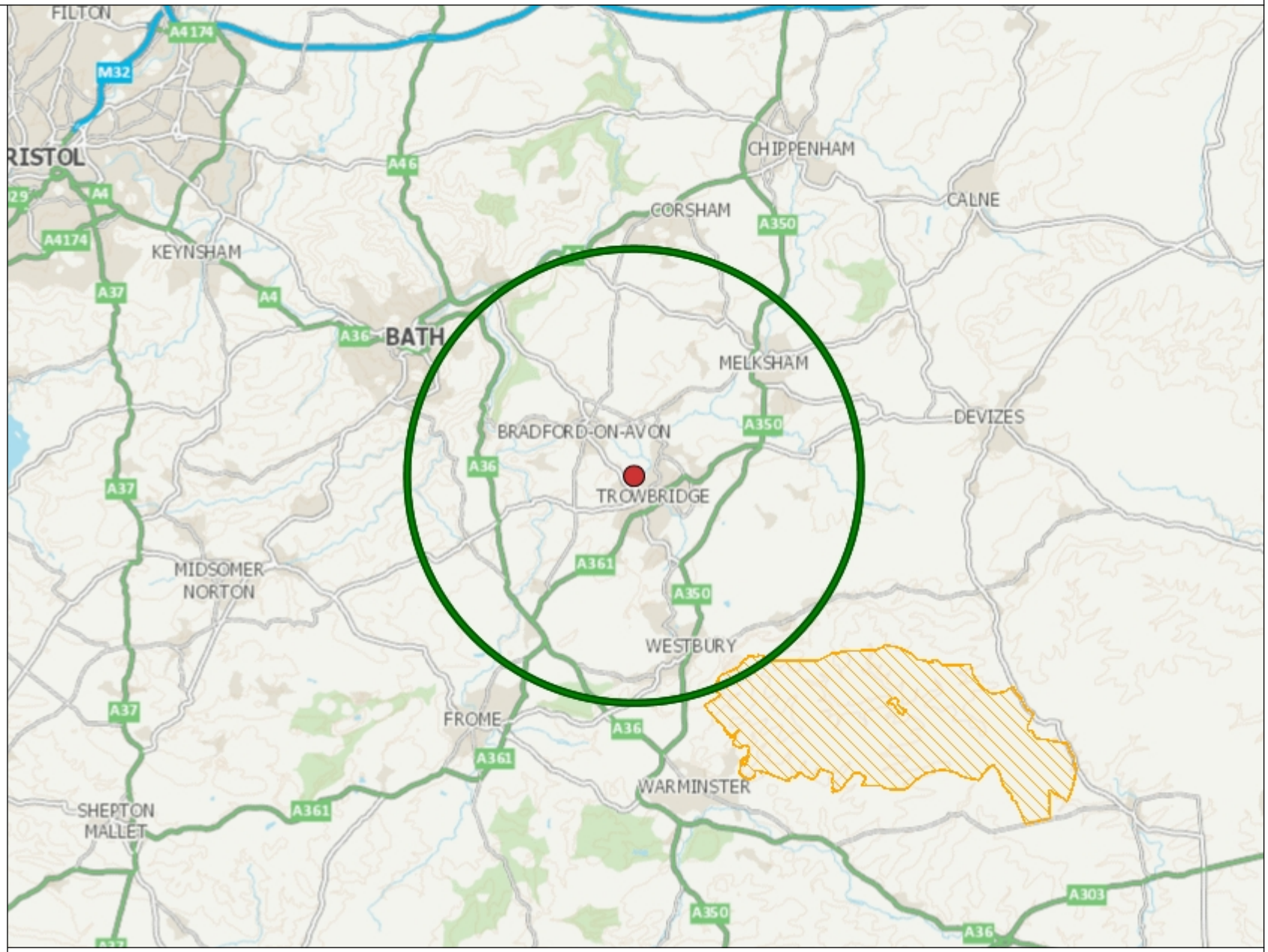
N W E S

Special Protection Areas

Environment Agency

Legend

SPA (England)



1: 250,000

0 6,250

Metres

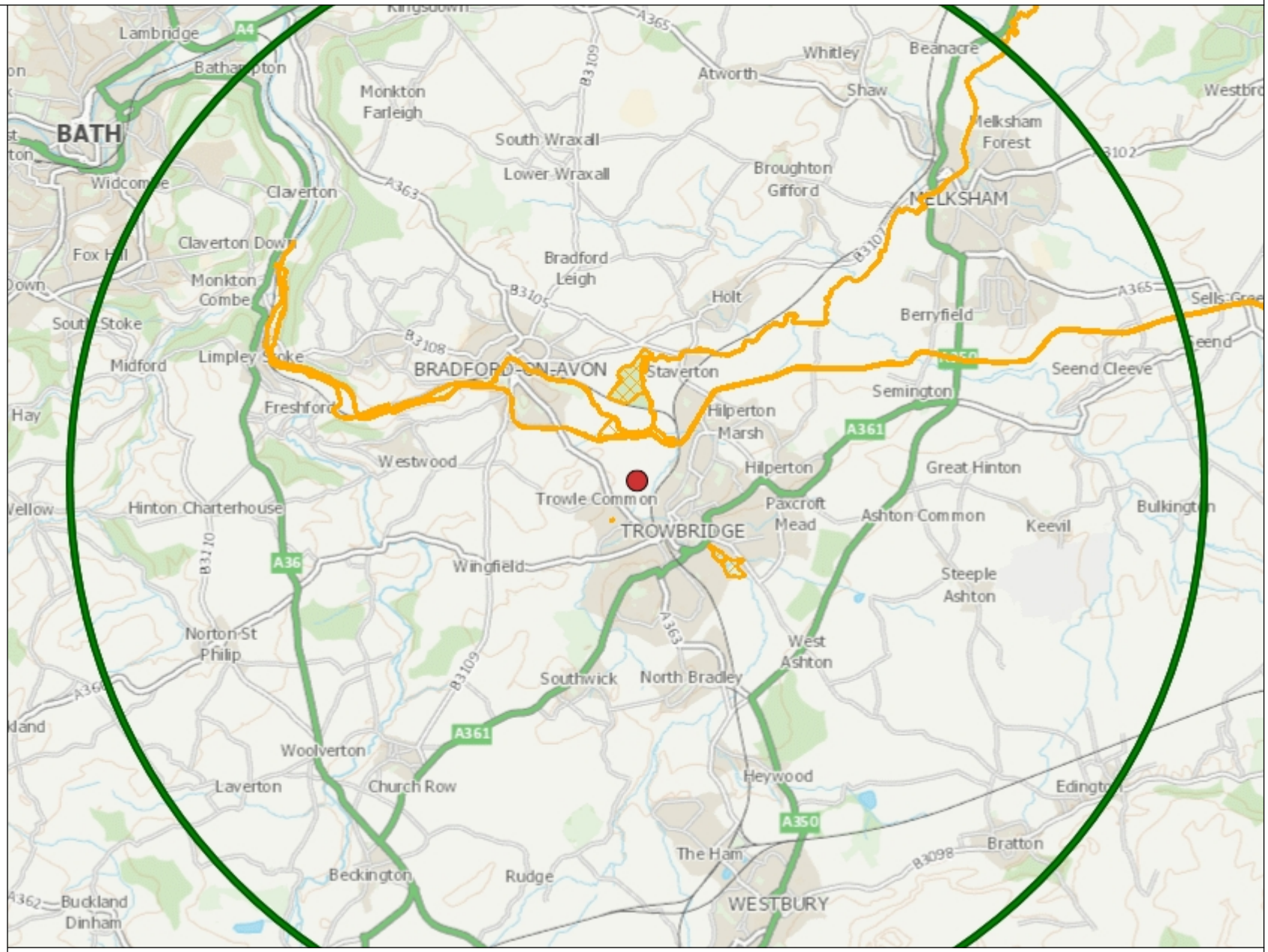
N W E S

Local Wildlife Sites

Environment Agency

Legend

Local Wildlife Sites



1: 100,000

0 2,500

Metres

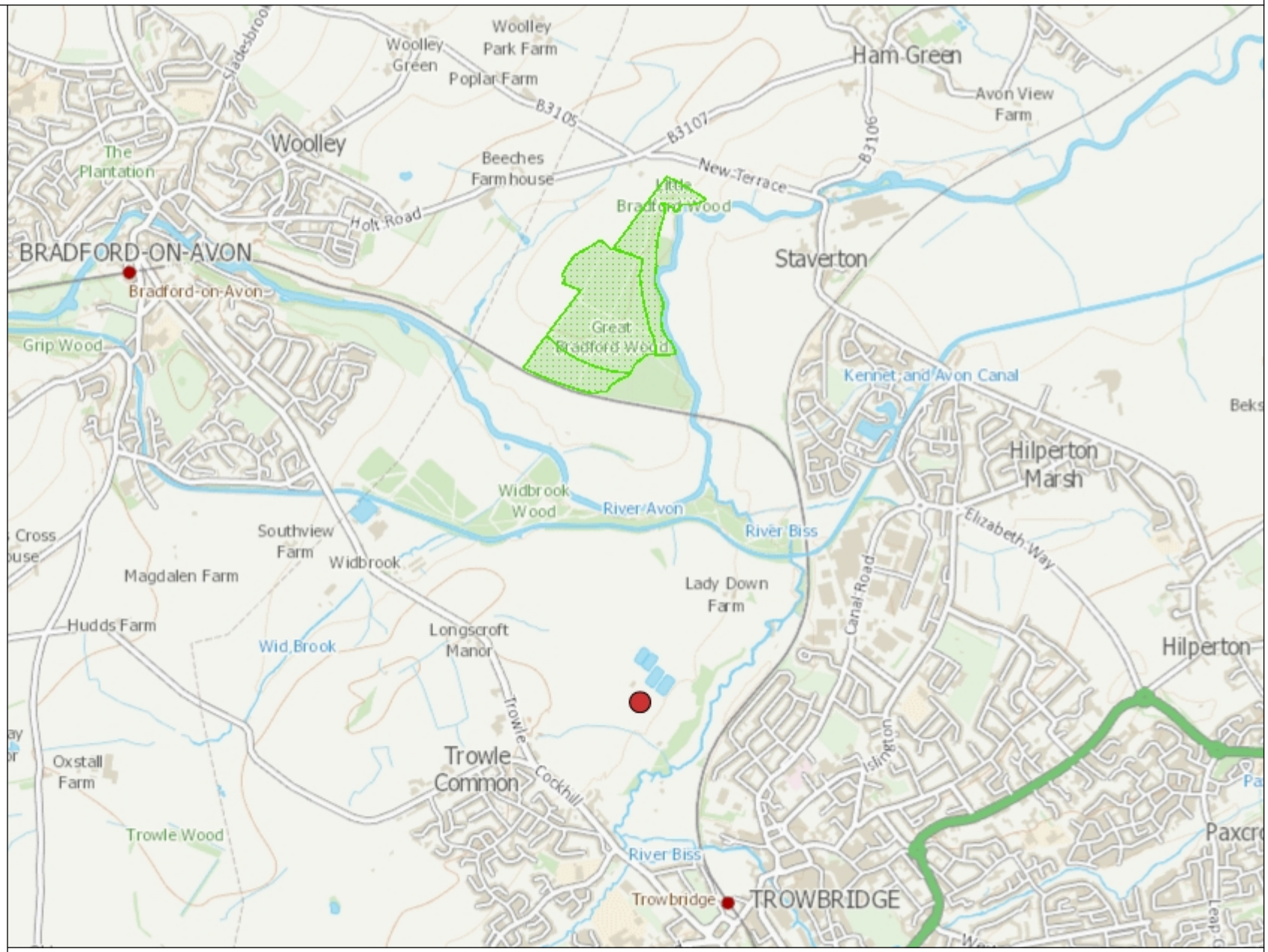
N W E S

Ancient Woodland

Environment Agency

Legend

Ancient Woodland (England)



1: 25,000

0 625

Metres

N

W E

S

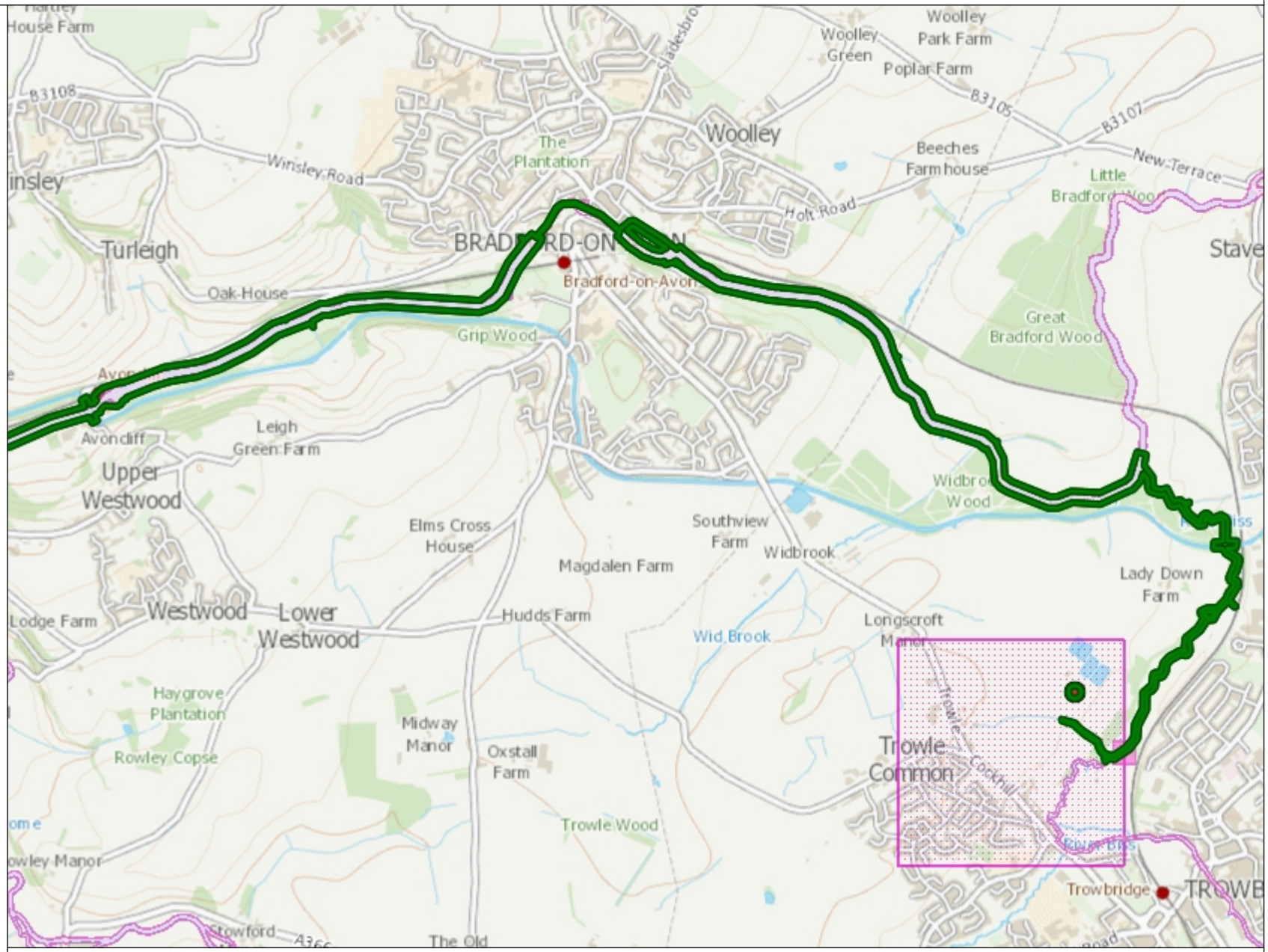
Protected Species

Environment Agency

Legend

Protected species screened for Env Permits - complete set

- Protected species, non fish
- Protected fish
- Protected fish migratory route



1: 25,000

0 625

Metres

N W E S