Yorkshire Water Services Limited

Woodhouse Mill Sludge Treatment Facility (STF)

Application for Environmental Permit Variation

December 2023

Permit Reference: EPR/DP3092ZJ/V003

Stantec

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Project Name	Environmental Permitting Support
Project No	331001762 100.2301
Report Reference	331001762 100.2301-1

Revision	Date	Description	Author	Check	Review
FINAL	30/09/2021	FINAL	E. Stewart	P. Smith	P. Duncan
FINAL v2	20/12/2023	FINAL	E. Stewart	P. Smith	P. Duncan

Non-technical Summary

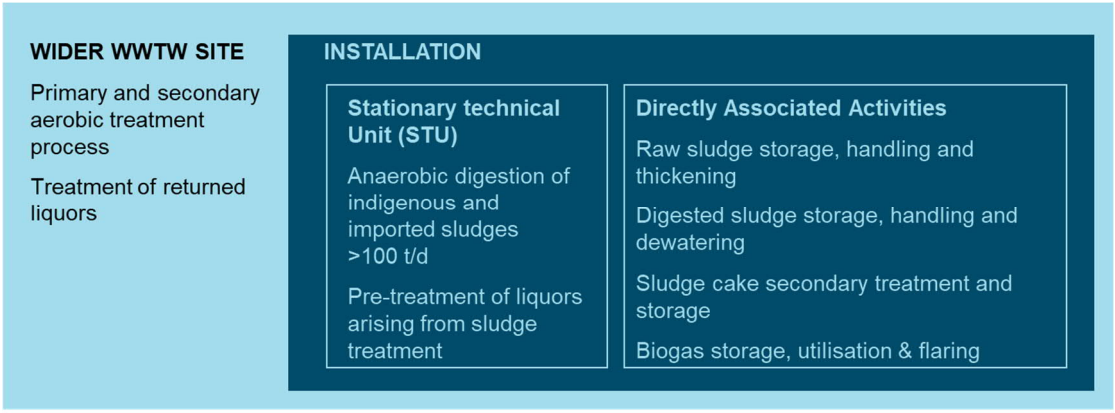
Summary of changes

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 digestor capacity, there should be no distinction between imported or indigenous sludges.

The Yorkshire Water (YW) Woodhouse Mill Sludge Treatment Facility (STF), part of the wider Woodhouse Mill Wastewater Treatment Works (WwTW), exceeds the 100t/d throughput limit and therefore 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 currently operated on site and also Section 5.4 A(1) (a)(i) for a return liquor treatment process to be constructed.

The revised permit installation will comprise the following:

Figure 1 Installation schematic

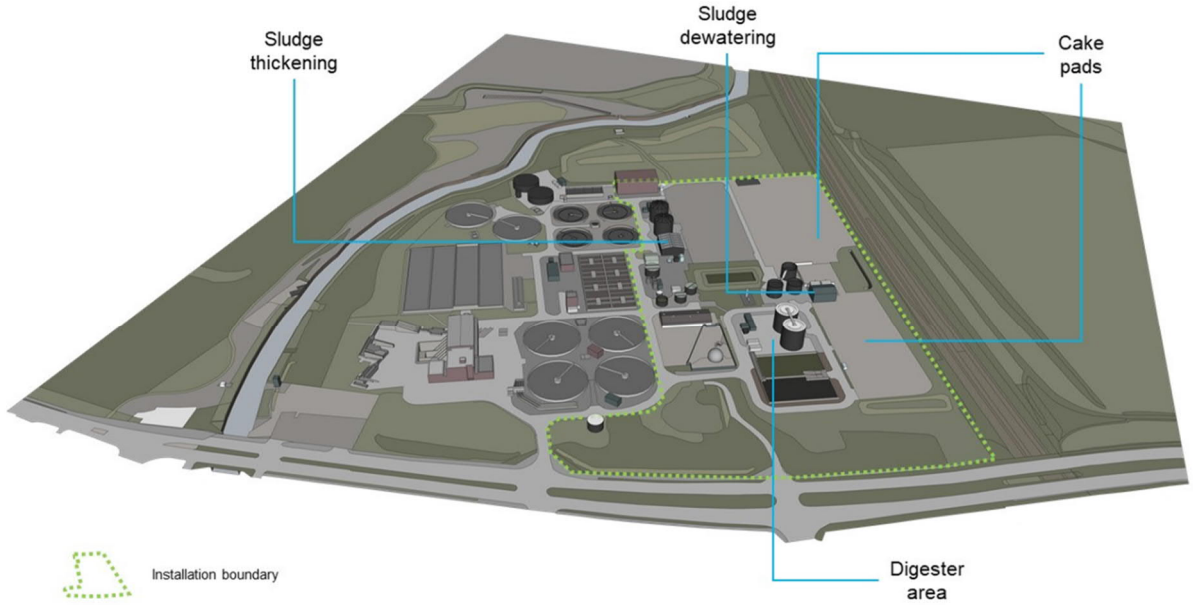


Overview of activities

The Woodhouse Mill STF treats indigenous sewage sludges arising from sewage treatment processes operated within the wider Woodhouse Mill WwTW and may occasionally receive sewage sludges generated by smaller YW WwTW. The principal activities undertaken within the installation includes:

- Raw sludge dewatering,
- Anaerobic digestion,
- Biogas collection and storage (including flaring if operationally necessary),
- Use of biogas (a renewable energy source) to fuel combined heat and power (CHP), generating electricity and heat,
- Digested sludge dewatering,
- Temporary storage of digested sludge prior to transfer off site for landspreading as an agricultural soil conditioning agent,
- Raw material storage and use,
- Surface water and process liquor collection and transfer to Woodhouse Mill WwTW for treatment, and
- Waste storage and transfer off site.

Figure NTS-1 Illustration showing main activity areas



Impact assessment

A detailed assessment of emissions from the process and their potential effects on the environment, including local human and ecological sensitive receptors has been carried out. This is reported in this variation application and concludes that there are no significant negative environmental impacts predicted to arise as a result of activities covered within the scope of this permit variation application.

An odour impact assessment has been undertaken. This assessment has concluded that the majority of sensitive receptors are exposed to either a negligible or slight adverse odour effect. One of the thirteen sensitive receptors are assessed as being exposed to a moderately adverse effect. In addition, a site-specific odour survey was undertaken, including boundary monitoring and sniff tests at key locations on site. The results of this survey indicate that it is unlikely that the STF odours have an adverse effect on surrounding sensitive receptors. For the overall site, taking into consideration the findings of the odour survey and the odour risk assessment, it is considered than Woodhouse Mill STF does not have an adverse odour effect on its surrounding receptors. However, it is recognised that there is a residual risk arising from odour from any STF process, therefore YW has developed an Odour Management Plan (OMP), which is submitted with this application.

A noise impact assessment has been undertaken. The risk of noise and vibration at nearby sensitive receptors is predicted to be low; more detailed assessment and further mitigation is not required, nor is a specific noise management plan. Noise will continue to be managed through operational controls and good practice.

A fugitive emissions/bioaerosol risk assessment has been undertaken, supported by a quantitative bioaerosol survey. The risk assessment, supported by the measured survey results, concludes that Woodhouse Mill STF installation is unlikely to be a significant source of bioaerosols.

An Air Emission Risk Assessment (AERA) utilising atmospheric dispersion modelling has been undertaken to support this application. The scope of the assessment is limited to the point source combustion emissions to air at the Installation, specifically biogas combustion plant comprising two Combined Heat and Power (CHP) plant units and one boiler. The assessment concludes that, in relation to human health, where impacts are not classified as ‘insignificant’ (i.e. PC less than 1% of the EAL for long-term concentrations or 10% for short-term) the predicted impacts of the Installation do not lead to any exceedances of EALs and do not constitute ‘significant pollution’. In relation to the impact of the Installation on ecologically sensitive sites, there are no international or national designated sites within the distances requiring assessment under the Environment Agency’s Air Emissions Risk Assessment Guidance. At all local designated sites, the predicted PCs from the Installation are less than 100% of the applicable annual CLe or CLo. Therefore, the impacts of the Installation are considered ‘insignificant’ at all designated ecological sites.

A secondary containment risk assessment has been undertaken to assess whether measures to protect the environment in the event of a failure of containment of primary storage tanks are adequate. Whilst the overall risk assessment indicates that the installation presents an acceptable risk, recommendations are made to consider enhancements to containment in several discrete areas.

Site operational controls

The Woodhouse Mill STF installation is operated in accordance with an Environmental Management System (EMS), which includes controls to minimise point source and fugitive emissions to air, water and land. The YW EMS is certified to ISO 14001 and a planned maintenance and inspection programme is in place to optimise the operation of plant.

A leak detection and repair plan is in place to minimise fugitive emissions to air.

An accident management plan has been prepared to assess risks and identify controls associated with accidents and other unplanned events.

A review of compliance Best Available Techniques (BAT) requirements contained in Best Available Techniques (BAT) Reference Document for Waste Treatment, 2018 has been undertaken. Where it has been identified that BAT is applicable and is not met (either by the stated techniques or alternative techniques) improvements are proposed. These are listed in the Proposed Improvement Programme.

Section I: Application Forms

Form 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.

Contents

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

Yorkshire Water Services Limited

5b Company registration number

02366682

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: 5c Details of Company Directors (follows Form Part A)

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)

First name: Company Secretary

Last name

Address: Western House
Western Way
Halifax Road
Bradford, West Yorkshire

Postcode: BD6 2SZ

Contact numbers, including the area code

Phone: 01274 691111

Fax

Mobile

Email: kathy.smith@yorkshirewater.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) Mrs

First name Hazel

Last name Morgan

Address Western House

Western Way

Halifax Road

Bradford, West Yorkshire

Postcode BD6 2SZ

Contact numbers, including the area code

Phone

Fax

Mobile 07790 616 942

Email hazel.morgan@yorkshirewater.co.uk

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): Mrs

First name: Hazel

Last name: Morgan

Address: Western House
Western Way
Halifax Road
Bradford, West Yorkshire

Postcode: BD6 2SZ

Contact numbers, including the area code

Phone:

Fax:

Mobile: 07790 616942

Email: hazel.morgan@yorkshirewater.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

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: Refer to enclosed sheet '5c Details of company directors'

Date of birth (DD/MM/YY)

Name

Date of birth (DD/MM/YY)

Name

Date of birth (DD/MM/YY)

Document reference

5c Details of company directors

SMITH, Katharine Olivia Helen (Ms)	Company Secretary
AUTY, Scott (Mr)	Company Director
BARNES, Wendy Jacqueline (Mrs)	Company Director
DENCH, Andrew James (Mr)	Company Director
HOULDEN, John Russell (Mr)	Company Director
INMAN, Paul Sybray (Mr)	Company Director
MERRICK, Andrew David (Mr)	Company Director
MURRAY, Vanda	Company Director
SHAW, Lucy Nicola (Mrs)	Company Director
UNWIN, Julia (Dame)	Company Director
WYLLIE, Andrew (Mr)	Company Director

[redacted]

Source:

https://find-and-update.company-information.service.gov.uk/company/02366682/officers

Accessed 07.09.2023

Environment Permitting Team
Yorkshire Water
Western House, Halifax Road
Bradford
BD6 2SZ

Form 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.

Contents

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/DP3092ZJ

1c Site details

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

Site name

Woodhouse Mill WwTW

Address

Retford Road

Woodhouse Mill

Sheffield

Postcode

S13 9WD

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.

The Yorkshire Water (YW) Woodhouse Mill Sludge Treatment Facility (STF), which forms part of the wider Woodhouse Mill WwTW, exceeds the 100t/d throughput limit and it has therefore been agreed that a variation to an existing permit (reference number DP3092ZJ) is required to add Schedule 5.4 Part A(1)b(i) for AD treatment activities and Section 5.4 A(1) (a)(i) liquor treatment 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.

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: Refer to Section II: Technical Description

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							
Refer to Section III:	Section 5.4,	AD of UWWT derived					
Supporting information	Part A(1) (b) (i)	sludges and					
Table C2: 1		associated activities					
	Section 5.4	Liquor treatment					
	Part A(1) (a)(i)						

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: Refer to 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	David
Last name	Shaw
Phone	07790 616 149
Mobile	07790 616 149
Email	david.shaw@yorkshirewater.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
	Refer to Section III: Supporting Information	

Document reference: Refer also to Appendix 2: Technical Competence

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: Refer to Section III: Supporting Information

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: Refer to Section IV: Figures

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: Refer to Appendix 5: Site Condition Report

5c Provide a non-technical summary of your application

Document reference of the summary: Refer to 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: Refer to Appendix 5: 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: Refer to Section III: Supporting Information

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.)

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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: Not applicable - no individuals convicted of relevant offences

Date of birth (DD/MM/YY):

3 Technical ability - date of birth information

Name: Matt Ashford

Date of birth (DD/MM/YY): [redacted]

Form 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.

Please read through this form and the guidance notes that go 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 three hours to fill in this part of the application form.

Contents

1 What activities are you applying to vary?

Fill in Table 1a below with details of all the activities listed in schedule 1 or other references (see note 1) of the Environmental Permitting Regulations (EPR) and all directly associated activities (DAAs) (in separate rows), that you propose to vary.

Note: if you want to add a Medium Combustion Plant or Specified Generator (MCP/SG) to your installation please use part C2.5 instead. If you want to vary an intensive farm permit please use part C3.5 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: Refer to Section III: Supporting Information

1 What activities are you applying to vary?, continued

Table 1a – Types of activities

Schedule 1 listed activities						
Installation name	Schedule 1 or other 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)
If there are not enough rows, send a separate document and give the document reference number here	Put your main activity first			For installations that take waste only	For installations that take waste only	For installations that take waste only
Refer to Section III: Supporting information	Section 5.4, Part A(1) (b) (i)	AD of UWWT derived sludges and associated activities				
Directly associated activities (See note 4)						
Name of DAA If there are not enough rows, send a separate document and give the document reference number here		Description of the DAA (please identify the schedule 1 activity it serves)				
		Refer to Section III: Supporting Information Table C3: 1a - 1				
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 EPR part 2 of schedule 1.
2. Use the description from schedule 1 of EPR. 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 capacity (cubic metres) for the recovery of hazardous waste on land
- 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 Directly Associated Activities (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 (see https://www.gov.uk/government/publications/waste-classification-technical-guidance).

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 — Refer to Section III: Supporting Information Table C3 - 1b

1 What activities are you applying to vary?, continued

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

1c Recovery of hazardous waste on land

Are you applying for a waste recovery activity involving the permanent deposit of inorganic hazardous waste on land for construction or land reclamation?

No ☑ Now go to question 2

Yes ☐

Have you written a waste recovery plan (WRP) that shows that you will use waste to perform the same function as non waste materials you would have used?

No You must write a WRP to support your application.

Yes

Have we advised you during pre-application discussions that we believe the activity is waste recovery?

No

Yes

Have there been any changes to your proposal since the discussions?

No

Yes

Please send us a copy of your current waste recovery plan that complies with our guidance at https://www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits/waste-recovery-plans-and-deposit-for-recovery-permits. You need to highlight any changes you may have made since your pre-application discussions.

Document reference

Please note that there is an additional charge for the assessment or re assessment of a waste recovery plan that must be submitted as part of this application. For the charge see https://www.gov.uk/government/publications/environmental-permitting-charges-guidance/environmental-permitting-charges-guidance

2 Point source emissions to air, water and land

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

Fill in one table for each installation, continuing on a separate sheet if necessary.

Table 2 – Emissions (releases)

Installation name	Woodhouse Mill Sludge Treatment Facility (STF)			
Point source emissions to air				
Emission point reference and location	Source	Parameter	Quantity	Unit
Refer to Section III: Supporting Information				
Table C3:2 - 1				
Point source emissions to water (other than sewers)				
Emission point reference and location	Source	Parameter	Quantity	Unit
Not applicable				
Point source emissions to sewers, effluent treatment plants or other transfers off site				
Emission point reference and location	Source	Parameter	Quantity	Unit
Refer to Section III: Supporting Information				
Table C3: 2 - 2				
Point source emissions to land				
Emission point reference and location	Source	Parameter	Quantity	Unit
Not applicable				

You will also need to complete application form part C6 if your variation includes changing or adding a point source emission(s) to:

- water
- groundwater or
- sewer

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.

For Part A(2) activities refer to https://www.gov.uk/government/collections/integrated-pollution-prevention-and-control-sector-guidance-notes and for Part B and Schedule 14 activities see https://www.gov.uk/government/collections/local-air-pollution-prevention-and-control-lappc-process-guidance-notes

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		
Description of the schedule 1 activity or directly associated activity	Best available technique (BATC, BREF or TGN reference) (see footnote below)	Document reference (if appropriate)
Section 5.4 A(1)(b)(i)	BAT Reference Document for Waste Treatment, 2018	Section II Technical Description
Section 5.4 A(1)(b)(i)	Appropriate measures for the biological treatment of waste, consultation draft July 2020	Section II Technical Description
Section 5.4 A(1)(b)(i)	H4 Odour Management	Section V: Appendix 8, 10
Section 5.4 A(1)(b)(i)	H5 Site Condition Reports	Section V: Appendix 5
Section 5.4 A(1)(b)(i)	Noise & vibration management: Environmental permits	Section V: Appendix 9
DAA	TGN M1	Section III: Q4

* 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: Refer to Section II Technical Description, Section IV Figures

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

3b General requirements

Fill in a separate Table 4 for each installation.

Table 4 – General requirements

Name of the installation	Woodhouse Mill STF
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 Refer to Section III:Supporting Informatio
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 Refer to Section V: Appendix 10
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 Not required - see risk assessment

For guidance on risk assessments for your environmental permit see https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

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		Woodhouse Mill STF - Refer to Section III: Supporting Information		
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)
See Section III: Table C3:3c - 1				

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: Refer to Section III: 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 and recovery of hazardous waste on land	See the questions in appendix 4

General information

Complete section 4 if you are proposing to change or add an emission point(s).

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: Refer to Section III: Supporting Information

4b Point source emissions to air only

4b1 Has the sampling location been designed to meet BS EN 15259 clause 6.2 and 6.3?

No ☐
Yes ☑

4b2 Are the sample ports large enough for monitoring equipment and positioned in accordance with section 6 and appendix A of BS EN 15259?

No ☐
Yes ☑

4b3 Is access adjacent to the ports large enough to provide sufficient working area, support and clearance for a sample team to work safely with their equipment throughout the duration of the test?

No ☐
Yes ☑

4b4 Are the sample location(s) at least 5 HD from the stack exit

No ☐
Yes ☑

4b5 Are the sample location(s) at least 2 HD upstream from any bend or obstruction?

No ☐
Yes ☑

4b6 Are the sample location(s) at least 5 HD downstream from any bend or obstruction?

No ☑
Yes ☐

4b7 Does the sample plane have a constant cross sectional area?

No ☐
Yes ☑

4b8 If horizontal, is the duct square or rectangular (unless it is less than or equal to 0.35 m in diameter)

No ☑
Yes ☐

4b9 If you have answered 'No' to any of the questions 4b1 to 4b8 above, provide an assessment to how the standards in BS EN 15259 will be met.

Document reference of the assessment: Refer to Section III: Supporting Information

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 question 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 or a recovery of hazardous waste on land activity, you only need to fill in this section if the application includes gas engines.

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

Document reference of the description: Refer to Section III: Supporting Information

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

Document reference of the description: Refer to Section III: Supporting Information

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: Refer to Section III: Supporting Information

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: Refer to Section III: 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: Refer to Section III: Supporting Information

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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 ☐

Crystal Mark 19107
Clarity approved by Plain English Campaign

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Date received (DD/MM/YYYY)

Payment received?

No ☐

Yes ☐ Amount received

Our reference number

£

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			
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)	☐	☐	☐
Landfill gas	☐	☐	☐
Other	☐	☐	☐

Notes

1. Not covered by Industrial Emissions Directive 2010/75/EU.
2. 'Biomass' is referred to The Renewables Obligation Order 2002 (https://www.legislation.gov.uk/uksi/2002/914/contents/made)

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

Document reference

Appendix 1 – Specific questions for the combustion sector, continued

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, continuing on a separate sheet if necessary

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?

No ☐ Now fill in application form 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 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

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)	

Appendix 1 – Specific questions for the combustion sector, continued

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 question 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

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

No ☐

Yes ☐ Document reference

11 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 12

12 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 of this evidence

Yes ☐ Please submit a copy of your CBA

Document reference 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) (see https://www.gov.uk/government/collections/technical-guidance-for-regulated-industry-sectors-environmental-permitting); 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 complete your answer to question 3a 'Technical standards' with reference to relevant parts of our healthcare waste appropriate measures guidance (see https://www.gov.uk/guidance/healthcare-waste-appropriate-measures-for-permitted-facilities)

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'). See https://www.gov.uk/government/collections/technical-guidance-for-regulated-industry-sectors-environmental-permitting.

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

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

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/m3), 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).

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

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

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

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

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/m³ as an hourly average, as allowed by IED Annex VI, Part 3?

No ☐

Does not apply ☐

Yes ☐ Please give your reasons for doing this

14 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 15

Document reference of the CHP-ready assessment

15 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 of this evidence

Yes ☐ Please submit a copy of your CBA

Document reference of the CBA

Appendix 4 – Specific questions for the landfill sector and recovery of hazardous waste on land activities

1. For the landfill sector, provide your Environmental Setting and Installation Design (ESID) report and any other risk assessments to control emissions.

For recovery of hazardous waste on land activities, provide your Environmental Setting and Site Design (ESSD) report and any other risk assessments to control emissions

Document reference

2. For recovery of hazardous waste on land activities, provide your Waste Acceptance Procedures (including Waste Acceptance Criteria)

Document reference

Refer to our guidance at
https://www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits/waste-acceptance-procedures-for-deposit-for-recovery

3. Provide your hydrogeological risk assessment (HRA) for the site

Document reference

4. Provide your outline engineering plan for the site

Document reference

5. Provide your stability risk assessment (SRA) for the site

Document reference

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

Document reference

We have developed guidance on these assessments and their reports which can be found at
https://www.gov.uk/government/collections/environmental-permitting-landfill-sector-technical-guidance

7. For recovery of hazardous waste on land activities, have you completed a monitoring plan for the site?

No ☐ Please refer to the section of your ESSD that explains why this is unnecessary for your site

Document reference of this evidence

Yes ☐ Document reference

8. Have you completed a proposed plan for closing the site and your procedures for looking after the site once it has closed?

No ☐ If you have answered 'no' for recovery of hazardous waste on land activities, refer to the section of your ESSD that explains why this is unnecessary for your site

Document reference of this evidence

Yes ☐ For landfill you must provide a closure and aftercare plan

Document reference

Form C6

Application for an environmental permit Part C6 – Variation to a bespoke water discharge activity or groundwater activity (point source discharge), or point source emission to water from an installation

Environment Agency

Fill in this part of the form, together with part C2 and part F1, if you are applying to vary (change) the conditions or any other part of the permit for a water discharge or groundwater activity.

Fill in this part of the form, together with parts C2, C3 and F1 if you are applying to vary or add a point source emission to water, groundwater or sewer from an installation.

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.

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.**
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

About the effluent – details and type

From the list below, choose which type of effluent you are applying for on this form and answer the questions shown in Table 1.

You must fill in a separate copy of this form and the appropriate appendix or appendices for each type of effluent you plan to discharge.

Table 1 – About the effluent

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Sewage effluent (non-water company)	1.3.3 Sewage effluent discharge with a volume up to and including 5 m^3/day to surface water from domestic household or organisation operating for charitable purposes		All	a, b, c, d	b, f	-	a, b	All	-	b*, f*	a, b, c, f*, h, i	All
	1.3.4 Sewage effluent discharge with a volume up to and including 5 m^3/day to groundwater from domestic household or organisation operating for charitable purposes		All	a, b, c, d	b, f	-	a, b	All	-	d, f*	a, b, c, f*, h, i	All
	1.3.5 Sewage effluent discharge with a volume up to and including 5 m^3/day to surface water (not requiring specific substances assessment)		All	a, b, c, d	b, f	-	a, b	All	-	b*, f*	a, b, c, f*, h, i	All
	1.3.6 Sewage effluent discharge with a volume up to and including 5 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b, c, d	b, f	-	a, b	All	-	d, f*	a, b, c, f*, h, i	All
	1.3.7 Sewage effluent discharge with a volume greater than 5 m^3/day up to and including 15 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b, c, d	b, f	-	a, b	All	-	d, f*	a, b, c, f*, h, i	All

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Sewage effluent (non-water company)	1.3.8 Sewage effluent discharge with a volume greater than 15 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b, c, d	b, f	-	a, b	All	-	d, f*	a, b, c, d*, e*, f*, h, i	All
	1.3.9 Sewage effluent discharge to groundwater requiring specific substances assessment (any volume)		All	a, b, c, d	b, f	-	a, b	All	b, c, d, e	d, f*	a, b, c, d*, e*, f*, h, i	All
	1.3.10 Sewage effluent discharge with a volume greater than 5 m^3/day up to and including 50 m^3/day to surface water (not requiring specific substances assessment)		All	a, b, c, d	b, f	-	a, b	All	-	b*, f*	a, b, c, f*, h, i	All
	1.3.11 Sewage effluent discharge with a volume greater than 50 m^3/day to surface water (not requiring specific substances assessment)		All	a, b, c, d	b, f	-	a, b	All	-	b*, f*	a, b, c, d*, e*, f*, h, i	All
	1.3.11 Sewage effluent discharge to surface water requiring specific substances assessment (any volume)		All	a, b, c, d	b, f	-	a, b	All	b, c, d, e	b*, c, f*	a, b, c, d*, e*, f*, h, i	All
Water company WwTW treated sewage effluent	1.3.5 Sewage effluent discharge with a volume up to and including 5 m^3/day to surface water (not requiring specific substances assessment)		All	a, b	a, f (b is optional)	-	-	All	-	a, b*, f*	a, b, c, f*, h, i	All
	1.3.6 Sewage effluent discharge with a volume up to and including 5 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b	a, f (b is optional)	-	-	All	-	a, d, f*	a, b, c, f*, h, i	All

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Water company WwTW treated sewage effluent	1.3.7 Sewage effluent discharge with a volume greater than 5 m^3/day up to and including 15 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b	a, f (b is optional)	-	-	All	-	a, d, f*	a, b, c, f*, h, i	All
	1.3.8 Sewage effluent discharge with a volume greater than 15 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b	a, f (b is optional)	-	-	All	-	a, d, f*	a, b, c, d*, e*, f*, h, i	All
	1.3.9 Sewage effluent discharge to groundwater requiring specific substances assessment (any volume)		All	a, b	a, f (b is optional)	-	-	All	a, b, c, d, e	a, d, f*	a, b, c, d*, e*, f*, h, i	All
	1.3.10 Sewage effluent discharge with a volume greater than 5 m^3/day up to and including 50 m^3/day to surface water (not requiring specific substances assessment)		All	a, b	a, f (b is optional)	-	-	All	-	a, b*, f*	a, b, c, f*, h, i	All
	1.3.11 Sewage effluent discharge with a volume greater than 50 m^3/day to surface water (not requiring specific substances assessment)		All	a, b	a, f (b is optional)	-	-	All	-	a, b*, f*	a, b, c, d*, e*, f*, h, i	All
	1.3.11 Sewage effluent discharge to surface water requiring specific substances assessment (any volume)		All	a, b	a, f (b is optional)	-	-	All	a, b, c, d, e	a, b*, c, f*	a, b, c, d*, e*, f*, h, i	All
Settled storm sewage	1.3.19 Combined sewer overflow		All	a, b	-	a, b, c, d, f, g, h, i, j, k	-	All	-	a, b*, d*, f*	b, g, h, i	All

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Storm sewage	1.3.19 Combined sewer overflow		All	a, b	-	a, b, c, e, f, g, h, i, j, k	-	All	-	a, b*, d*, f*	b, g, h, i	All
Emergency overflow	1.3.20 Emergency overflows		All	a, b	-	a, l, m, n, o	-	All	-	a, b*, d*, f*	b, g, h, i	All
Trade and/or non-sewage – known volume	1.3.12 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume up to and including 5 m^3/day (not requiring specific substances assessment)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	b*, d*, f*	b, f*, h, i	All
	1.3.13 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5 m^3/day (not requiring specific substances assessment)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	b*, d*, f*	b, d*, e*, f*, h, i	All
	1.3.14 Trade and/or non-sewage effluent discharge to surface water or groundwater requiring specific substances assessment (any volume)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	b*, c, d*, f*	b, d*, e*, f*, h, i	All
Trade and/or non-sewage – rainfall-dependent	1.3.12 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume up to and including 5 m^3/day (not requiring specific substances assessment)		All	a, b	b, e, f	-	-	All	b, c, d, e	b*, d*, f*	b, f*, h, i	All
	1.3.13 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than m^3/day (not requiring specific substances assessment)		All	a, b	b, e, f	-	-	All	b, c, d, e	b*, d*, f*	b, d*, e*, f*, h, i	All

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Trade and/or non-sewage – rainfall-dependent	1.3.14 Trade and/or non-sewage effluent discharge to surface water or groundwater requiring specific substances assessment (any volume)		All	a, b	b, e, f	-	-	All	b, d, e	b*, c, d*, f*	b, d*, e*, f*, h, i	All
Mixed effluent (sewage combined with trade and/or non-sewage) – known volume	1.3.5 Sewage effluent discharge with a volume up to and including 5 m^3/day to surface water (not requiring specific substances assessment)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	b*, f*	a, b, c, f*, h, i	All
	1.3.6 Sewage effluent discharge with a volume up to and including 5 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	d, f*	a, b, c, f*, h, i	All
	1.3.7 Sewage effluent discharge with a volume greater than 5 m^3/day up to and including 15 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	d, f*	a, b, c, f*, h, i	All
	1.3.8 Sewage effluent discharge with a volume greater than 15 m^3/day to groundwater (not requiring specific substances assessment		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	d, f	a, b, c, d*, e*, f*, h, i	All
	1.3.9 Sewage effluent discharge to groundwater requiring specific substances assessment (any volume)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	d, f*	a, b, c, d*, e*, f*, h, i	All

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Mixed effluent (sewage combined with trade and/or non-sewage) – known volume	1.3.10 Sewage effluent discharge with a volume greater than 5 m^3/day up to and including 50 m^3/day to surface water (not requiring specific substances assessment)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	b*, f*	a, b, c, f*, h, i	All
	1.3.11 Sewage effluent discharge with a volume greater than 50 m^3/day to surface water (not requiring specific substances assessment)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	b*, f*	a, b, c, d*, e*, f*, h, i	All
	1.3.11 Sewage effluent discharge to surface water requiring specific substances assessment (any volume)		All	a, b, c, d	b, c, f	-	a, b	All	b, c, d, e	b, c, d	a, b, c, d*, e*, f*, h, i	All
Mixed effluent (sewage combined with trade and/or non-sewage) containing rainfall-dependent effluent	1.3.5 Sewage effluent discharge with a volume up to and including 5 m^3/day to surface water (not requiring specific substances assessment)		All	a, b	b, c, d, e, f	-	a, b	All	b, c, d, e	b*, f*	a, b, c, f*, h, i	All
	1.3.6 Sewage effluent discharge with a volume up to and including 5 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b	b, c, d, e, f	-	a, b	All	b, c, d, e	d, f*	a, b, c, f*, h, i	All
	1.3.7 Sewage effluent discharge with a volume greater than 5 m^3/day up to an including 15 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b	b, c, d, e, f	-	a, b	All	b, c, d, e	d, f*	a, b, c, f*, h, i	All
	1.3.8 Sewage effluent discharge with a volume greater than 15 m^3/day to groundwater (not requiring specific substances assessment)		All	a, b	b, c, d, e, f	-	a, b	All	b, c, d, e	d, f*	a, b, c, d*, e*, f*, h, i	All

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Mixed effluent (sewage combined with trade and/or non-sewage) containing rainfall-dependent effluent	1.3.9 Sewage effluent discharge to groundwater requiring specific substances assessment (any volume)		All	a, b	b, c, d, e, f	-	a, b	All	b, c, d, e	d, f*	a, b, c, d*, e*, f*, h, i	All
	1.3.10 Sewage effluent discharge with a volume greater than 5 m^3/day up to and including 50 m^3/day to surface water (not requiring specific substances assessment)		All	a, b	b, c, d, e, f	-	a, b	All	b, c, d, e	b*, f*	a, b, c, f*, h, i	All
	1.3.11 Sewage effluent discharge with a volume greater than 50 m^3/day to surface water (not requiring specific substances assessment)		All	a, b	b, c, d, e, f	-	a, b	All	b, c, d, e	b*, f*	a, b, c, d*, e*, f*, h, i	All
	1.3.11 Sewage effluent discharge to surface water requiring specific substances assessment (any volume)		All	a, b	b, c, d, e, f	-	a, b	All	b, c, d, e	b*, c, f*	a, b, c, d*, e*, f*, h, i	All
Trade – returned abstracted water (including ground source heating and cooling)	1.3.15 Cooling water or thermal discharge to surface water or groundwater (not requiring specific substances assessment)		All	a, b, c, d	b, c, f	-	-	All	b, c, d, e, f, g	b*, d*, f*	a*, b, d*, e*, f*, h, i	All
	1.3.16 Cooling water or thermal discharge to surface water or groundwater requiring specific substances assessment		All	a, b, c, d	b, c, f	-	-	All	b, c, d, e, f, g	b*, c, d*, f*	a*, b, d*, e*, f*, h, i	All
	1.3.17 Aquaculture (not requiring specific substances assessment)		All	a, b, c, d	b, c, f	-	-	All	b, c, d, e	b*, d*, f*	a*, b, d*, e*, f*, h, i	All
	1.3.18 Aquaculture requiring specific substances assessment		All	a, b, c, d	b, c, f	-	-	All	b, c, d, e	b*, c, d*, f*	a*, b, d*, e*, f*, h, i	All

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Effluent and/or contaminated surface water run-off arising from the operation of an installation	No additional charge, as already included as part of the installation variation application charge	✔	a, b, d	c	b, c, d, f		a, b2	a, b, c	b, c, d, e, f, g	d*, e*, f	a, b, d, e, f, h, i	a, b, c

* Check the relevant question and our guidance notes on part C6 to see if you need to give an answer.

1 About the variation you are applying for

1a Give a brief description of the changes you want to make to your permit

The Yorkshire Water (YW) Woodhouse Mill Sludge Treatment Facility (STF), which forms part of the wider Woodhouse Mill WwTW, exceeds the 100t/d capacity limit and it has therefore been agreed that a variation to an existing permit (reference number DP3092ZJ) is required to add Schedule 5.4 Part A(1)b(i) for AD treatment activities.

1b Give this effluent a unique name

Woodhouse Mill Sludge Treatment Facility

You must use this name to identify this effluent throughout this application and all associated documents.

1c Is this a release from a dam, weir or sluice ('reservoir release') under Schedule 21 of the EPR meaning of water discharge activity?

☐ Yes

☐ No

1d Have you obtained all the necessary permissions in addition to this environmental permit to be able to carry out the discharge (see C6 guidance notes for more details)?

✔ Yes

No

N/A

2 About the effluent – how long will you need to discharge the effluent for?

2a What date do you want the permit for this effluent to start?

(DD/MM/YYYY)

Please note that charges will start on this date, even if you have not started to discharge, unless you contact us to change (delay) the start date (see the guidance notes on part C6). The start date cannot be before the permit is issued and cannot be changed (delayed) after it has already passed.

2b Is the discharge time limited?

☐ Yes Please give the date you expect the discharge to end but please note that your permit will not end on that date and you will still need to notify us to surrender the permit

(DD/MM/YYYY)

☐ No

2c Will the discharge take place all year?

✔ Yes

No Please give details of the months when you will make the discharge

2d Will the discharge take place on more than six days in any year?

☐ Yes

☐ No

3 How much do you want to discharge?

3a What is the daily dry weather flow?

1807 cubic metres

3b What is the maximum volume of effluent you will discharge in a day?

1823 cubic metres

Show how you calculated the figure given in the box below and continue on a separate sheet if necessary, giving a reference for the extra sheet

Refer to Section III: Supporting Information

Document reference

Refer to Section III: Supporting Information

3c What is the maximum rate of discharge?

21.1 litres a second

3d What is the maximum volume of non-rainfall dependent effluent you will discharge in a day?

1807 cubic metres

3e What is the maximum rate of rainfall dependent discharge?

21.1 litres a second

3f For each answer in question 3, show how you worked out the figure on a separate sheet

Document reference

Refer to Section III: Supporting Information

4 Intermittent sewage discharges

4a For each answer to b to o below, show how you worked out the figure on a separate sheet

Document reference

4b What is the total volume of the off-line/storm tank storage?

cubic metres

4c What is the total volume of on-line storage?

cubic metres

4d What is the pass forward flow at the settled storm overflow setting?

litres per second

4e What is the pass forward flow at the storm overflow setting?

litres per second

4f Is the discharge screened?

☐ Yes Answer the relevant questions from 4g to 4j

☐ No Now go to 4k

4g What is the mesh screen spacing?

millimetres

4h What is the minimum screen capacity flow through the mesh screen?

litres per second

4i What is the bar screen spacing?

millimetres

4j What is the minimum screen capacity flow through the bar screen?

litres per second

4k Is the overflow constructed to good engineering design?

☐ Yes

☐ No On a separate sheet explain what standards the overflow has been constructed to

Document reference

4l What is the emergency storage capacity of the sewer and wet well?

cubic metres

4m What is the storage time within the sewer and the wet well above the top water level at dry weather flow?

hours and minutes

4n What is the pass forward flow at the pumping station?

litres per second

4o For intermittent emergency overflows you must provide a document setting out the key protection measures you will provide

Document reference for pumping station key protection measures

5 Should your discharge be made to the foul sewer?

Foul sewer means public or private foul sewer.

Before answering these questions, you must read the guidance notes to part C6.

You will also need to contact your sewerage undertaker (usually your local water company) and you may need to check if it is possible to connect to a private foul sewer.

5a How far away is the nearest foul sewer from the boundary of the premises?

Refer to Section III metres

5b To assess whether it is reasonable to discharge your effluent into the foul sewer, please answer 5b1 or 5b2

5b1 Discharges from domestic properties

Multiply the number of properties served by the sewage treatment system by 30 metres.

Number of domestic properties served by the sewage treatment system

x 30 metres =

0 metres

5b2 Discharges from all other premises including trade effluent

Divide the volume of the discharge (in cubic metres) by 0.75 and then multiply this figure by 30 metres

Volume of the discharge (answer to question 3b)

cubic metres / 0.75 =

0 x 30 =

0 metres

Is your answer to question 5b1 or 5b2 above greater than the distance to the nearest foul sewer (answer to 5a)?

☐ No You do not need to explain why you cannot discharge your effluent into the foul sewer at this point. However, we may request this information from you when we determine your application. Now go to question 6.

☐ Yes You must explain on a separate sheet why you cannot discharge your effluent into the foul sewer, giving a reference for the extra sheet. Before you submit the application, you must explore the possibility of connecting to the foul sewer, and send us evidence that you have approached the sewerage undertaker, including their formal response regarding connection, if relevant. You must also show the extra cost of connecting to a sewer compared with the treatment system you propose, and details of any physical obstacles such as roads, railways, rivers or canals.

We will only agree to the use of private treatment systems within sewered areas if you can demonstrate that:

- the additional cost of connecting to the foul sewer would be unreasonable
- connection is not practically feasible, or
- the proposed private treatment system can be shown to significantly benefit the environment

We are unlikely to grant a permit for a discharge of treated domestic sewage in circumstances where a private sewerage system is being proposed due to a lack of capacity in the nearest public sewerage network.

The guidance notes to part C6 will help you understand what information you need to provide in order to answer this question.

Document reference for where you have given this justification

6 How will the effluent be treated?

6a Do you treat your effluent?

Yes Now go to question 6b

✔ No You must explain why the effluent will not be treated

Document reference for where you have given this justification

Refer to Section III: Supporting Information

6b Fill in Table 2 for each stage of the treatments carried out on your effluent in the order in which they are carried out

For installations with point source emission to water or sewer, there is no need to duplicate information already provided in part C3 form. Where this information is already provided, give the document reference and go to question 7.

Document reference

Refer to Section III: Supporting Information

Table 2 – Treatments carried out on your effluent

Order of treatment	Code number	Description
First		
Second		
Third		
Fourth		

Continue on a separate sheet if you need more rows. If you prefer, you can also send us an overall design for the whole treatment process.

Document reference

Refer to Section III: Supporting Information

7 What will be in the effluent?

For all applications, whether to surface water, or onto or into ground, you should still check to see if your discharge is likely to contain any of the specific substances listed in the guidance documents on 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' (see https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit).

Answer the relevant questions for your discharge below.

7a Are any of the specific substances listed in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' likely to enter the sewerage system upstream of the discharge through any authorised or known inputs?

☐ Yes

☐ No

7b Are any of the specific substances listed in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' added to or present in the effluent as a result of the activities on the site?

☐ Yes

☐ No

7c Have any of the specific substances listed in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' been detected in samples of the effluent or in the sewerage catchment upstream of the discharge?

☐ Yes

☐ No

7d Are there any other harmful or specific substances in your effluent not mentioned in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater'?

☐ Yes

☐ No

7e If you have answered 'No' to any of questions 7a to 7d provide details on a separate sheet of how you have established that the effluent is not likely to contain specific substances.

Document reference

Refer to Section III: Supporting Information

7f What is the maximum temperature of your discharge?

Refer to Section III degrees Celsius

7g What is the maximum expected temperature change compared to the incoming water supply?

Refer to Section III increase in degrees Celsius

_____ decrease in degrees Celsius

8 Environmental risk assessments and modelling

You may need to carry out an environmental risk assessment or modelling to support your application. Please answer all the questions that are relevant to your discharge. If an environmental risk assessment or modelling is required, you must send it to us with your application.

8a Sewer modelling report (for discharges of final effluent from a water company WwTW or intermittent sewage discharges)

You must carry out sewer modelling following the guidance 'Surface water pollution risk assessment for your environmental permit' at https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit.

Send us details of how the modelling was carried out and the outcome.

Document reference for the sewer modelling report

8b Discharges to lakes, estuaries, coastal waters or bathing waters

You must carry out modelling following the guidance 'Surface water pollution risk assessment for your environmental permit' at https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit. Send us details of how the modelling was carried out and the outcome.

Document reference for the modelling report

8c Discharges to freshwater (non-tidal) rivers

If the discharge contains, or potentially contains, any specific substances, you must carry out screening following the guidance 'Surface water pollution risk assessment for your environmental permit' at https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit. The guidance notes on part C6 outline the information you must provide.

Have you answered yes to any of 7a to 7d?

☐ Yes Send us the completed screening tool, along with the raw data used to create the summary statistics

Document reference for the screening tool and raw data

☐ No

8d Discharges to groundwater

You must carry out a groundwater quantitative risk assessment following the guidance in 'Groundwater risk assessment for your environmental permit' at https://www.gov.uk/guidance/groundwater-risk-assessment-for-your-environmental-permit. Send us details of how the modelling was carried out and the outcome.

For groundwater remediation schemes you must send us a site-specific remediation strategy that has been agreed with the local Environment Agency Groundwater and Contaminated Land Team.

Document reference for the groundwater remediation report

N/A

8e Discharges to freshwater (non-tidal) rivers from an installation, including discharges via sewer

If the discharge contains, or potentially contains, any specific substances, you must carry out screening following the guidance (see https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit). The guidance notes on part C6 outline the information you must provide.

Have you answered yes to any of 7a to 7d?

☐ Yes Send us the completed screening tool, along with the raw data used to create the summary statistics. Where the discharge is via sewer, include sewage treatment reduction factors in the calculations.

Document reference for the screening tool and raw data

Refer to Section III: Supporting Information

There is no need to duplicate information already provided in part C3 form. Where this information is already provided, give the document reference above.

8f Environmental impact assessment

Have you carried out an environmental impact assessment?

Yes Send us details of how the assessment was carried out and the outcome

Document reference for the environmental impact assessment

✔ No

9 Monitoring arrangements

Note: If your effluent has a maximum volume of no more than 50 cubic metres a day you do not need to complete question 9d or 9e.

9a What is the national grid reference of the inlet sampling point? (for example, SJ 12345 67890)

N/A

9b What is the national grid reference of the effluent sample point?

Refer to Section III: Supporting Information

9c Do you have an Urban Waste Water Treatment Directive final effluent sampling point?

☐ Yes Please provide the national grid reference

☐ No

9d What is the national grid reference of the flow monitoring point?

Refer to Section III: Supporting Information

9e Does the flow monitor have an MCERTS certificate?

Yes Please give the certificate number

✔ No

9f Do you have a UV disinfection efficacy monitoring point?

Yes Please provide the national grid reference

✔ No

9g Do you have an event duration monitoring point(s)?

☐ Yes Please provide the national grid reference

☐ No

9h You should clearly mark on the plan the locations of any of the above that apply to this effluent

Document reference for the plan

Refer to Section III: Supporting Information

9i Do you intend to do your own effluent monitoring?

Yes

✔ No

10 Where will the effluent discharge to?

10a Mark in Table 3 where this effluent discharges to and fill in the relevant appendix or appendices.

You must use the name you gave to this effluent in answer to question 1b of this form when filling in your relevant appendix or appendices.

Table 3 – Where the effluent discharges to

Receiving environment		Relevant appendix
Borehole or well	☐	1
Into land (for example, through a drainage system)	☐	2
Onto land	☐	3
Tidal river, tidal stream, estuary or coastal waters	☐	4
Non-tidal river, stream or canal	☐	5
Lake or pond	☐	6

10b Is this effluent discharged through more than one outlet?

Yes Give details, on a separate sheet, of the circumstances under which each outlet would be used by this effluent

Document reference

✔ No

10c If you answered yes to question 10b above make sure you show clearly on your discharge point appendix or appendices and site plan that this one effluent can discharge to more than one discharge point.

You must give us all the details we need for each of the discharge points used by this effluent.

11 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: https://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 6.

Appendix 1 – Discharges to a borehole or well (or other deep structure)

If you are discharging the effluent to a borehole or well or other deep structure (such as concrete rings, natural swallow hole or deep soakage pit) you must ensure that the discharge is indirect to groundwater. Direct discharges to groundwater cannot be permitted. We will undertake a groundwater quantitative risk assessment on your behalf in line with the guidance 'Groundwater risk assessment for your environmental permit' at https://www.gov.uk/guidance/groundwater-risk-assessment-for-your-environmental-permit.

For us to do this you must answer the following questions relevant to your application and provide us with additional information as summarised in Table 4.

Without this information we will be unable to complete the risk assessment and it is likely your application will be rejected.

Answer all the questions below. Use a separate line for each effluent if more than one effluent discharges using this discharge point. Remember, when linking your effluent to a discharge point you must use the name you gave to your effluent in answer to question 1b in the effluent form.

1.1 Give the discharge point a unique name

For example, 'Outlet 1' (you must use this name to identify the discharge point on the plan)

1.2 Give the national grid reference of the discharge point

1.3 Is the discharge to ground via a

- ☐ Well
- ☐ Borehole
- ☐ Other deep structure Please give details (e.g. concrete ring structure, shaft, natural swallow hole, soakage pit etc.)

1.4 What is the diameter of the borehole, well or other deep structure that the effluent will be discharged into?

metres

1.5 Is the borehole, well or other structure already constructed?

- ☐ Yes Now answer questions 1.6 to 1.9
- ☐ No Now answer questions 1.10 to 1.12

Existing borehole, well or other deep structure

1.6 What is the total depth to the bottom of the existing well, borehole or other structure?

_____ metres below ground level

If you are unaware of the actual depth please estimate the depth based on the following categories:

☐ 0–5 metres

☐ 5–10 metres

☐ Greater than 10 metres

☐ Uncertain

What evidence is the estimated depth above based on?

_____

1.7 Does the well, borehole or other structure extend into groundwater?

☐ Yes – always contains water

☐ Sometimes – water is present occasionally

☐ No – never contains water

If groundwater is always, or sometimes, present, what is the highest level that the standing water reaches?

☐ Measured

_____ metres below ground level

☐ Estimated

_____ metres below ground level

1.8 Please provide any records, diagrams or borehole logs you may have that could help us understand:

- the method of construction (including any solid casings or linings used)
- the likely depth of the deep structure
- the local groundwater conditions

Please provide photocopies where possible. If it is not possible (for example, if the documents are large or bulky) please summarise any additional information you have on a separate sheet.

Document reference for the records, diagrams, or borehole logs

_____

1.9 If any maintenance has been carried out on your well, borehole or other deep structure (for example, to aid effective drainage), please give details below

Please now answer question 1.13

Proposed borehole, well or other deep structure that has not yet been constructed

1.10 Please tell us why you are unable to install a shallow engineered drainage system. This information forms an important part of our permit determination process. Which methods of shallow disposal have you considered, and why did you decide these were not feasible to take forward? Please answer questions 1.10a and 1.10b to provide the results of soakage tests and summarise in the box any relevant information supporting your decisions (for example, permission refusals from landowners or physical constraints, or land availability or proximity to buildings).

1.10a What was your percolation value (Vp) result?

⌊_____⌋ seconds per millimetre

You must show in Table 4 how you worked out the percolation value.

Table 4 – Percolation value

	Trial 1	Trial 2	Trial 3	Average
Hole 1				
Hole 2				
Hole 3				
Hole 4				

1.10b If a shallow engineered drainage system were feasible, what would be the required surface area of your infiltration system?

square metres

Supporting information to explain why you are unable to install a shallow engineered drainage system can be appended to your application.

Document reference for these details

1.11 Please tell us the type of deep structure (for example, borehole, well, deep soakage pit) you propose to install

What will the total depth be?

metres below ground level

1.12 Please tell us the reason this depth has been selected and, if you are aware of any relevant existing information on local water levels, please also tell us the depth to groundwater (in metres below ground level). What measures will you undertake to ensure the discharge is not direct into groundwater? If the discharge will be direct to groundwater explain why you cannot make it indirect. Direct discharges to groundwater cannot be permitted.

Proximity of your discharge to other receptors

1.13 Is the borehole, well or other deep structure where the discharge is being/will be made within 50 metres of any other well, spring or borehole used to supply water for drinking water or food production purposes?

☐ Yes Please show the location of the well, spring or borehole you identified in answer to question 1.13 on the plan you have provided for section 4 of the main application form. Please now answer question 1.14

☐ No Please now answer question 1.15

1.14 Please tell us about the water supply (or supplies) used for drinking water or food production purposes identified in question 1.13 above; for example, the name of the property or properties served by the water supply, what they use the water for (drinking water, food production) and where they are in relation to your discharge

1.15 What is the distance to the nearest watercourse (for example, surface water, river, stream or ditch)?

⌊_____⌋ metres

Please tell us whether you have considered discharging to surface water and why this is not feasible

In Table 5 please provide any further information required for us to complete a groundwater quantitative risk assessment on your behalf in line with the guidance 'Groundwater risk assessment for your environmental permit' at https://www.gov.uk/guidance/groundwater-risk-assessment-for-your-environmental-permit. Without this information we will be unable to carry out a hydrogeological risk assessment on your behalf.

Table 5 summarises the information required to allow us to undertake a hydrogeological risk assessment of your discharge to a deep infiltration system. Without this information your application will be rejected. You will already have provided some of this information earlier in this application form. We also need you to provide additional information indicated by a tick (✓) in Table 5. For further guidance on the additional information required please search for 'Groundwater risk assessment for your environmental permit' at https://www.gov.uk/guidance/groundwater-risk-assessment-for-your-environmental-permit and the guidance notes on part C6. You may require the advice of an environmental consultant to collate this information.

For some of the risk assessment inputs we are better placed to provide the information and will do so for those parameters indicated by an asterisk (*) as far as possible. However, if you wish to provide site-specific information for those parameters with an asterisk you are welcome to do so.

Table 5 – Further information required for the Environment Agency to complete a groundwater quantitative risk assessment on your behalf

Information	Description	Existing structure	Proposed structure	Information supplied?
Information supplied by the applicant This has already been requested earlier in the application form				Information you have already supplied on the application form
National grid reference of the discharge point		Appendix 1 Q2	Appendix 1 Q2	
Volume of effluent (m^3 per day)		Q3b	Q3b	
Type of effluent treatment	Septic tank, package treatment plant, other	Q6	Q6	
Type of deep infiltration system	Borehole, well, concrete ring structure, other	Appendix 1 Q3	Appendix 1 Q3	
Diameter of deep infiltration system (metres)		Appendix 1 Q4	Appendix 1 Q4	
Depth to the base of deep infiltration structure (metres)		Appendix 1 Q6	Appendix 1 Q11	
Depth to water table (metres)	Is discharge above or below water table?	Appendix 1 Q7, Q8	Appendix 1 Q12	
Justification for a deep infiltration system	Why are you unable to install a shallow infiltration system? What other options for disposal have been considered? Provide full details of the infiltration tests undertaken plus results	Appendix 1 Q8 if available	Appendix 1 Q10	
Information supplied by the applicant This is additional information we need from you that is not provided elsewhere on the application form. Site data should be given where it is already available. If not, you can submit the relevant literature values quoting the source of the data and justification of the values you have selected. Please tick the right-hand column to confirm you have provided this essential information.				

Information	Description	Existing structure	Proposed structure	Information supplied?
Concentration of relevant substances entering the infiltration system	For discharges of domestic effluent we will routinely assess the concentration of nitrogen species, particularly the ammonium concentration	✓	✓	☐
Length of screened borehole section below the water table (metres)	Depth in metres of the borehole screened section that is below the water table (This applies only to boreholes that have groundwater in the base)	✓	✓	☐
Calculated area of infiltration system (square metres)	Explain how the area of the infiltration system has been calculated – this is especially relevant if a non-circular system is used	✓	✓	☐
Unsaturated zone parameters	The following represent the strata above the water table: • hydraulic conductivity (metres per day) • water-filled porosity (per cent) • bulk density (grammes per cubic centimetre)	✓	✓	☐
Saturated zone parameters	The following represent the strata above the water table: • hydraulic conductivity (metres per day) • water-filled porosity (per cent) • bulk density (grammes per cubic centimetre) • hydraulic gradient of the water table (fraction)	✓	✓	☐
Information provided by the Environment Agency where possible You are free to provide this information if you wish, or in some specific cases we may need to ask for this at a later stage. Please tick if you have provided this information (optional).				

Information	Description	Existing structure	Proposed structure	Information supplied?
Environmental standard	The relevant environmental standard or compliance value against which we will assess your effluent discharge	*	*	☐
Half-life for degradation of the substance (days)	If you wish to know more about these parameters see 'Groundwater risk assessment for your environmental permit' at https://www.gov.uk/guidance/groundwater-risk-assessment-for-your-environmental-permit	*	*	☐
Soil water partition coefficient (litres per kilogramme)		*	*	☐
Mixing zone thickness (metres)		*	*	☐
Distance to compliance point (metres)		*	*	☐

Appendix 2 – Discharges into land

Answer the questions below. Use a separate line for each effluent if more than one effluent discharges using this discharge point. Remember, when linking your effluent to a discharge point you must use the name you gave to your effluent in answer to question 1b in the effluent form.

2.1 Give the discharge point a unique name

For example, 'Outlet 1' (you must use this name to identify the discharge point on the plan)

2.2 Give the national grid reference of the discharge point

2.3 Is your infiltration system new or existing?

☐ New Now go to question 2.5

☐ Existing Now go to question 2.4

2.4a When was it built?

2.4b Now answer questions 2.5–2.8 if you are able to, if not leave them blank and go to question 2.9

2.5 Is your infiltration system designed and built to British Standard 6297:2007 + A1:2008 or the British Standards in force at the time of installation?

☐ Yes

☐ No Please provide details, on a separate sheet, of the design criteria used for your infiltration system

Document reference

2.6 On what date did you carry out a percolation test and dig a trial hole in line with British Standard 6297:2007 + A1:2008?

(DD/MM/YYYY)

2.7 What is your percolation value (Vp) result?

seconds per millimetre

You must show in Table 6 how you worked out the percolation value. Please also provide your test sheets and any field notes or observations made regarding ground conditions.

Table 6 – Percolation value

	Trial 1	Trial 2	Trial 3	Average
Hole 1				
Hole 2				
Hole 3				
Hole 4				

2.8 Please show us how you have calculated the area (A) of your infiltration system

p ⌊_____⌋ x

Vp ⌊_____⌋ x

0.25 for septic tanks =

A ⌊0_____⌋ square metres

or

p ⌊_____⌋ x

Vp ⌊_____⌋ x

0.20 for package treatment plants =

A ⌊0_____⌋ square metres

p Population based on maximum occupancy

Vp Percolation value in seconds/mm

2.9 If known, mark on the plan you have provided the extent of the infiltration system. Please write on the plan the length and width of the sides in metres.

2.10 Is any part of your infiltration system within 50 metres of a well, spring or borehole?

☐ No

☐ Yes Identify the location of the well, spring or borehole on the plan you have provided and answer question 2.11

2.11 Is the well, spring or borehole you have identified used to supply water?

☐ No

☐ Yes You must describe what the water supplied is used for

2.12 Is any part of your infiltration system within 10 metres of a watercourse?

☐ No

☐ Yes Identify the location of the watercourse on the plan you have provided for section 4 of part C2

Appendix 3 – Discharges onto land

Answer all the questions below. Use a separate line for each effluent if more than one effluent discharges using this discharge point. Remember, when linking your effluent to a discharge point you must use the name you gave to your effluent in answer to question 1b in the effluent form.

3.1 Give the discharge point a unique name

For example, 'Outlet 1' (you must use this name to identify the discharge point on the plan)

3.2 Give the national grid reference of the discharge point

3.3 Select from the table below the type of area where the effluent is disposed of

Area type		
Unlined reed bed	☐	
Unlined grass plot	☐	
Unlined wetland	☐	
Other	☐	Please specify below

3.4 What is the surface area of the land used for your disposal?

square metres

3.5 Is any part of your infiltration system within 50 metres of a well, spring or borehole?

☐ No

☐ Yes Identify the location of the well, spring or borehole on the plan you have provided and answer question 3.6

3.6 Is the well, spring or borehole you have identified used to supply water?

☐ No

☐ Yes You must describe what the water supplied is used for

3.7 Is any part of your infiltration system within 10 metres of a watercourse?

☐ No

☐ Yes Identify the location of the watercourse on the plan you have provided for section 4 of part C2

Appendix 4 – Discharges to tidal river, tidal stream, estuary or coastal waters

Answer all the questions below. Use a separate line for each effluent if more than one effluent discharges using this discharge point. Remember, when linking your effluent to a discharge point you must use the name you gave to your effluent in answer to question 1b in the effluent form.

4.1 Give the discharge point a unique name

For example, 'Outlet 1' (you must use this name to identify the discharge point on the plan)

4.2 Give the national grid reference of the discharge point

4.3 Give the name of the tidal river, tidal stream, estuary or area of coastal water if you know it

4.4 Is the discharge into a

- ☐ Tidal river
- ☐ Tidal stream
- ☐ An estuary
- ☐ Coastal water

4.5 Does the discharge reach the watercourse by flowing through a surface water sewer?

- ☐ Yes Give the national grid reference where the discharge enters the surface water sewer
- ☐ No

4.6 Is the discharge point above the mean low water spring tide mark?

- ☐ Yes Please explain, on a separate sheet, why the discharge cannot be made below this point

  Document reference
- ☐ No

4.7 How is the effluent dispersed?

For example, open pipe or diffuser system

If diffuser system go to question 4.8

4.8 Give details, on a separate sheet, of the design of the diffuser system

Document reference

4.9 Is the discharge made to a roadside drain or ditch?

☐ No

☐ Yes If yes, it is your responsibility to ascertain whether the relevant highways authority is responsible for the roadside drain or ditch. If it is, you need to secure the appropriate permissions from the relevant highways authority before submitting an application for an environmental permit to the Environment Agency. A copy of the written permission from the relevant highways authority must be submitted with the environmental permit application.

Document reference for the written permission from the relevant highways authority

Appendix 5 – Discharges to non-tidal river, stream or canal

Answer all the questions below. Use a separate line for each effluent if more than one effluent discharges using this discharge point. Remember, when linking your effluent to a discharge point you must use the name you gave to your effluent in answer to question 1b in the effluent form.

5.1 Give the discharge point a unique name

For example, 'Outlet 1' (you must use this name to identify the discharge point on the plan)

5.2 Give the national grid reference of the discharge point

5.3 Give the name of the watercourse, canal or the main watercourse it is a tributary of if you know it

5.4 Is the discharge into a

- ☐ Non-tidal river
- ☐ Stream
- ☐ Canal

5.5 Does the discharge reach the watercourse or canal by flowing through a surface water sewer?

- ☐ Yes Give the national grid reference where the discharge enters the surface water sewer
- ☐ No

5.6 Does the watercourse dry up for part of the year?

- ☐ No
- ☐ Yes How many months per year is the watercourse dry?

Do you agree to install perforated pipe work before the discharge point?

The discharge must be made via a perforated pipe. Any section of that pipe which lies within 10 metres of the bank of any watercourse shall be perforated, but this perforated section shall not extend more than 10 metres from the bank of any watercourse.

- ☐ Yes
- ☐ No

5.61 If the watercourse does dry up for part of the year can you indicate a typical period when the surface water runs dry each year – start and finish (in months)

Watercourse typically becomes dry in:

January	☐	May	☐	September	☐
February	☐	June	☐	October	☐
March	☐	July	☐	November	☐
April	☐	August	☐	December	☐

Watercourse typically flows again in:

January	☐	May	☐	September	☐
February	☐	June	☐	October	☐
March	☐	July	☐	November	☐
April	☐	August	☐	December	☐

5.6.2 If the watercourse does dry up for part of the year, how many metres downstream of the discharge is it before the discharged effluent soaks in?

5.7 Is the discharge made to a roadside drain or ditch?

☐ No

☐ Yes If yes, it is your responsibility to ascertain whether the relevant highways authority is responsible for the roadside drain or ditch. If it is, you need to secure the appropriate permissions from the relevant highways authority before submitting an application for an environmental permit to the Environment Agency. A copy of the written permission from the relevant highways authority must be submitted with the environmental permit application.

Document reference for the written permission from the relevant highways authority

Appendix 6 – Discharges to a lake or pond

Answer all the questions below. Use a separate line for each effluent if more than one effluent discharges using this discharge point. Remember, when linking your effluent to a discharge point you must use the name you gave to your effluent in answer to question 1b in the effluent form.

6.1 Give the discharge point a unique name

For example, 'Outlet 1' (you must use this name to identify the discharge point on the plan)

6.2 Give the national grid reference of the discharge point

6.3 Give the name of the lake or pond if you know it

6.4 Select from the following table the type of lake or pond you will be discharging to and answer the relevant questions

Type of lake or pond		Relevant questions
Lake or pond which is not connected to a river or watercourse	☐	Permit not required*
Lake or pond which is not connected to a river or watercourse, where you have had a notice served under paragraph 5 of Schedule 21 of the Environmental Permitting (England and Wales) Regulations 2016	☐	6.5, 6.6, 6.7
Lake or pond that discharges into a river or watercourse	☐	6.5, 6.6, 6.7

* Unless a Notice has been served under paragraph 5 of Schedule 21 of the Environmental Permitting (England and Wales) Regulations 2016

6.5 What is the surface area of the lake or pond?

square metres

6.6 What is the maximum depth of the lake or pond?

metres

6.7 What is the average depth of the lake or pond?

metres

Form F1 (including letter of authorisation)

Application for an environmental permit Part F1 – Charges and declarations

You will need to use an Adobe Acrobat reader product to complete this form. The form may not work properly if you use a different pdf reader, such as the one built-in to your internet browser.

Fill in this part for all applications for:

- installations (excluding new permit and variation applications for intensive farming. Use application form Part B3.5 or C3.5 instead)
- waste operations
- mining waste operations
- medium combustion plant
- specified generators
- water discharges (excluding small discharges of 23m^3 per day if using Part B6.5)
- groundwater activities (excluding small discharges of 15m^3 per day or less if using Part B6.5 OR existing small discharges to Source Protection Zone1 if using Part B6.6)

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.
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

You must fill in this section.

You have to submit an application fee with your application. For guidance on the fee and how to pay your charges, please see our charging guidance (**https://www.gov.uk/government/publications/environmental-permitting-charges-guidance**) and associated links to the current charging scheme. You can also contact us for pre-application to help work out charges

Please that there is an annual subsistence charge to cover the costs we incur in the ongoing regulation of the permit.

1 Working out charges, continued

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	Groundwater activity
1					

Table 2 – Charge type (A)

Charge activity reference	Charge activity description	What are you applying to do? For example, a new permit, minor variation, normal variation, substantial variation, surrender, low risk surrender, transfer	Amount
e.g. 1.17.3	e.g. Section 5.2 – landfill for hazardous waste	e.g. transfer application	e.g. £5,561
1.16.2.1	Sect 5.4 (a)(i) and (b)(i) - Non	New application (100% charge)	£13,984
	hazardous waste installation -		
	biological treatment AD (recovery)		
Total A			£13,984

1 Working out charges, 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			

Total charges

Total A plus total B

£16471

2 Payment

Tick below to show how you have paid.

☐ Cheque

☐ Credit or debit card

✔ Electronic transfer (for example, BACS)

Cheques

You should make cheques 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. We will not accept cheques with a future date on them.

2 Payment, continued

Credit/debit cards

If you are paying by credit or with debit card we will call you. We can accept payments by Visa, MasterCard or Maestro card only.

☐ Call me to arrange payment by debit or credit card

Electronic transfer BACS

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.

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

If you are making your payment from outside the United Kingdom, it must be in sterling. Our IBAN number is GB23NWBK60708010014411 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

PSCAPPYYORKSWI006

State who is paying (full name and whether this is the agent/applicant/other)

Yorkshire Water

Fee paid

£ 17869.40

Date payment sent (DD/MM/YYYY)

29/09/2021

3 Privacy notice

The Environment Agency runs the environmental permit application service.

See **https://www.gov.uk/guidance/environmental-permits-privacy-notice** for how we use your personal information in services to services to support environmental permitting.

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 at **https://www.gov.uk/government/publications/environmental-permitting-guidance-core-guidance--2**.

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

☐ Please treat the specified 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 at **https://www.gov.uk/government/publications/environmental-permitting-guidance-core-guidance--2**

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.

5 Declaration, continued

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.

✔ 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)

☐ 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 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)

Name

Title

Mrs

First name

Hazel

Last name

Morgan

on behalf of (if relevant; for example, a company or organisation and so on)

Yorkshire Water Services Limited

Position (if relevant; for example, a company or organisation and so on)

Environmental Lead Advisor

Today's date (DD/MM/YYYY)

20/12/2023

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)

5 Declaration, continued

Name

Title

First name

Last name

on behalf of (if relevant; for example, a company or organisation and so on)

Position (if relevant; for example, 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, contact us before you submit your application. For further information on pre-application advice, see **https://www.gov.uk/guidance/get-advice-before-you-apply-for-an-environmental-permit.**

You must do the following:

- ✔ Complete legibly all parts of the application 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 permit applications 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
Form F	Payment reference	BACS reference PSCAPPYYORKSWI006
All	Woodhouse Mill STF permit variation app.	Supporting Information document
Form A, C2, C3, C6, F1	Woodhouse Mill permit variation applicatio	Section I Forms (A, C2, C3, C6, F1)
Form C2, C3, C6	Woodhouse Mill permit variation applicatio	Section II Technical Description
Form C2, C3, C6	Woodhouse Mill permit variation applicatio	Section III Supporting Information
Form C2, C3, C6	Woodhouse Mill permit variation applicatio	Section IV Figures (nos. 1 to 4)
Form C2, C3, C6	Woodhouse Mill permit variation applicatio	Section V Appendices (nos. 1 to 15)

7 How to contact us

If you have difficulty 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 and supporting documents to:

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

For waste, installations, medium combustion plant and specified generators by email to
PSC@environment-agency.gov.uk

For large electronic documents (too large for email attachment) you can upload your applications to file sharing sites and send us a link to download the documents. Alternatively, you can send more than one email with documents attached.

Or by post to:

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 (£)

From Kathy Smith
Company Secretary, Yorkshire Water

To Iain Wolsey
Adele Burns
Hazel Morgan

17th February 2023

Strategy and Regulation Sub Delegation

In accordance with the Yorkshire Water Services Limited Delegation Scheme, the following specific sub delegation will now apply within Strategy and Regulation.

I authorise Iain Wolsey, Environmental Regulation Manager, Adele Burns, Lead Advisor, Hazel Morgan, Lead Advisor power to submit applications for:

Environmental Permits
Environmental Permitting Exemptions;
And variations, transfers and surrenders to the same

Abstraction Licenses;
Transfer Licenses;
Impounding Licenses;
And variations and surrenders to the same.

On behalf of the company.
This Sub Delegation is authorised by the Company Secretary.

Kathy Smith
Company Secretary, Yorkshire Water

Section II: Technical Description

This section of the application provides a Technical Description of the activities to be operated at the site.

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

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

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. The Yorkshire Water (YW) Woodhouse Mill Sludge Treatment Facility (STF), part of the wider Woodhouse Mill Wastewater Treatment Works (WwTW), exceeds the 100t/d throughput limit and therefore 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 currently operated on site and also Section 5.4 A(1) (a)(i) for a return liquor treatment process to be constructed. The site has been operating until now within the scope of a registered T21 permit exemption (reference: WEX233125) and Regulatory Position Statement (RPS) 109 in respect of Combined Heat and Power (CHP) operations burning biogas.

YW currently holds a permit for sludge conditioning and phyto conditioning activities at Woodhouse Mill WwTW. The permit (reference number EPR/ DP3092ZJ/V002) was issued as a waste operation permit on 13th October 2013. Sludge conditioning / phyto conditioning is no longer carried out on site and therefore this application will vary the permit to remove this activity and add anaerobic digestion and its directly associated activities. A limited quantity of legacy waste material remains on site (stored on the concrete slab to the south of the dewatering centrifuges). This is awaiting removal from site for appropriate recycling/disposal. There is no technical connection between this material and the sludge digestion activities that are the subject of this permit variation application. This permit variation application therefore includes provision for a standalone waste storage activity (activity codes R13 and D15).

YW has submitted an application for partial surrender of some areas of land included within the conditioning permit that is the subject of this variation application. This will be undertaken as a 'low risk' surrender as waste management activities did not take place in these areas. In some cases, these areas were incorporated into the WwTW (undertaking urban wastewater treatment activities), with the addition of activated sludge tanks, final settlement tanks and screening equipment. In other parts of the site the areas have remained inactive and unoccupied. This intention was communicated to the Environment Agency's permitting team who requested that a separate surrender application be submitted to be determined concurrently.

Description of Site Activities

A summary description of all activities carried out at Woodhouse Mill STF is provided below.

Figure A Installation schematic

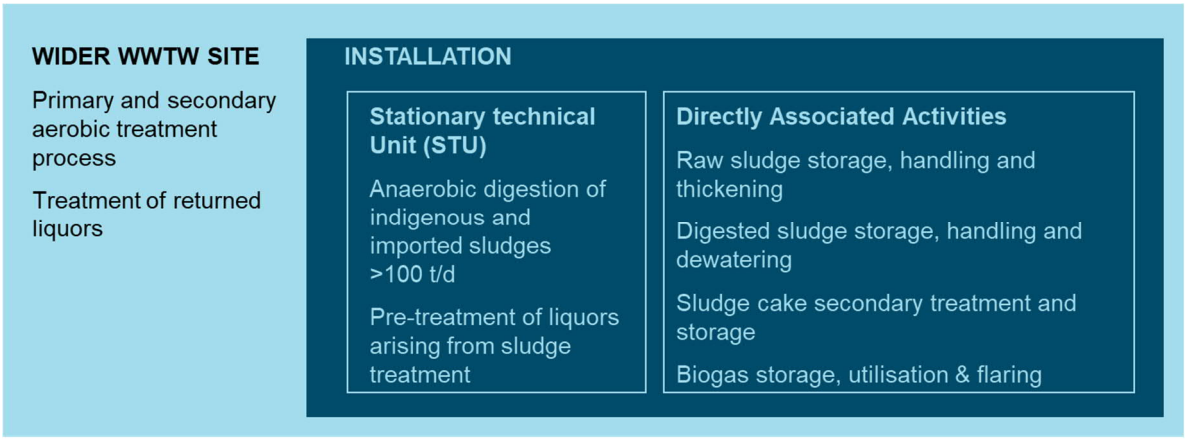


Figure B Installation overview

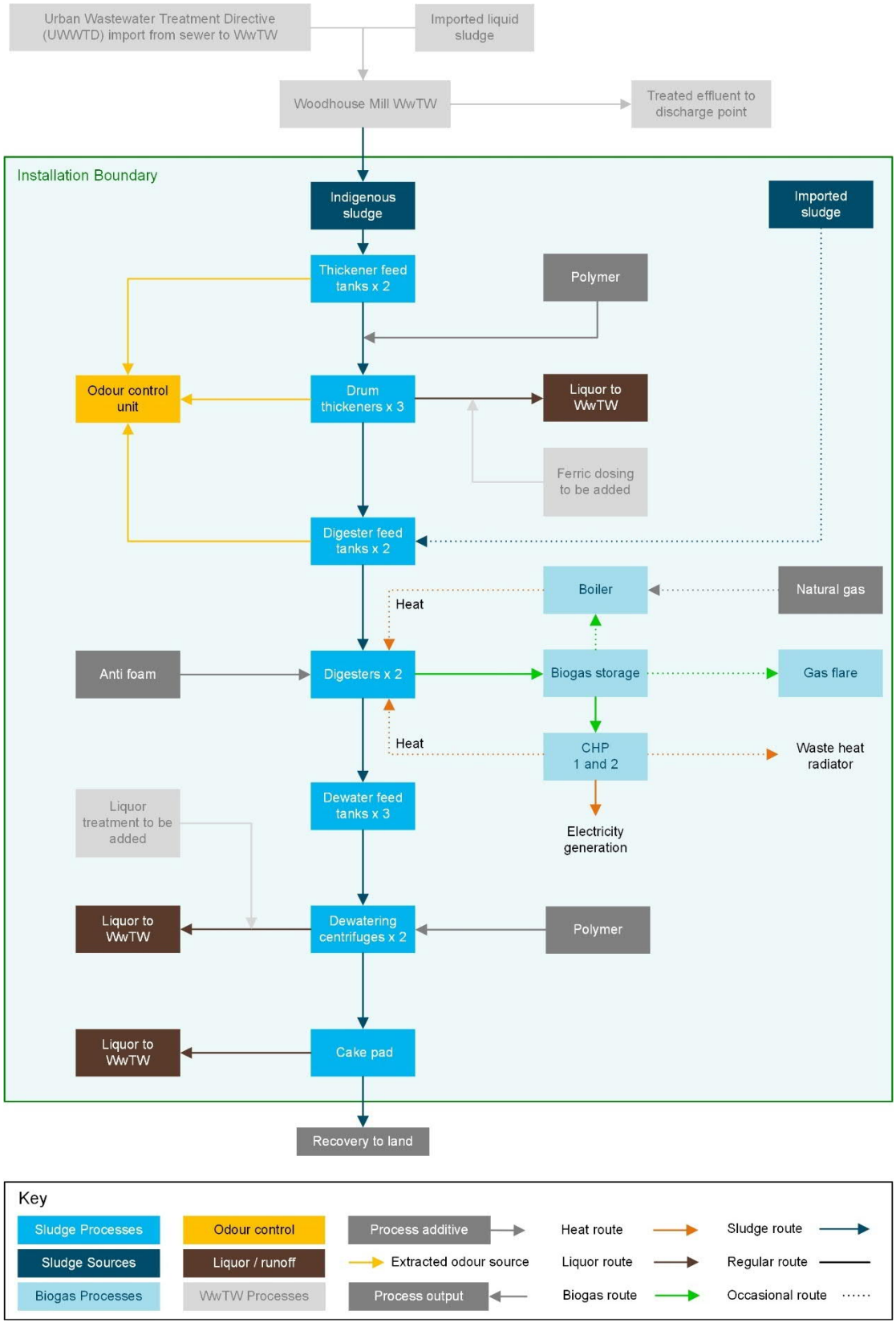
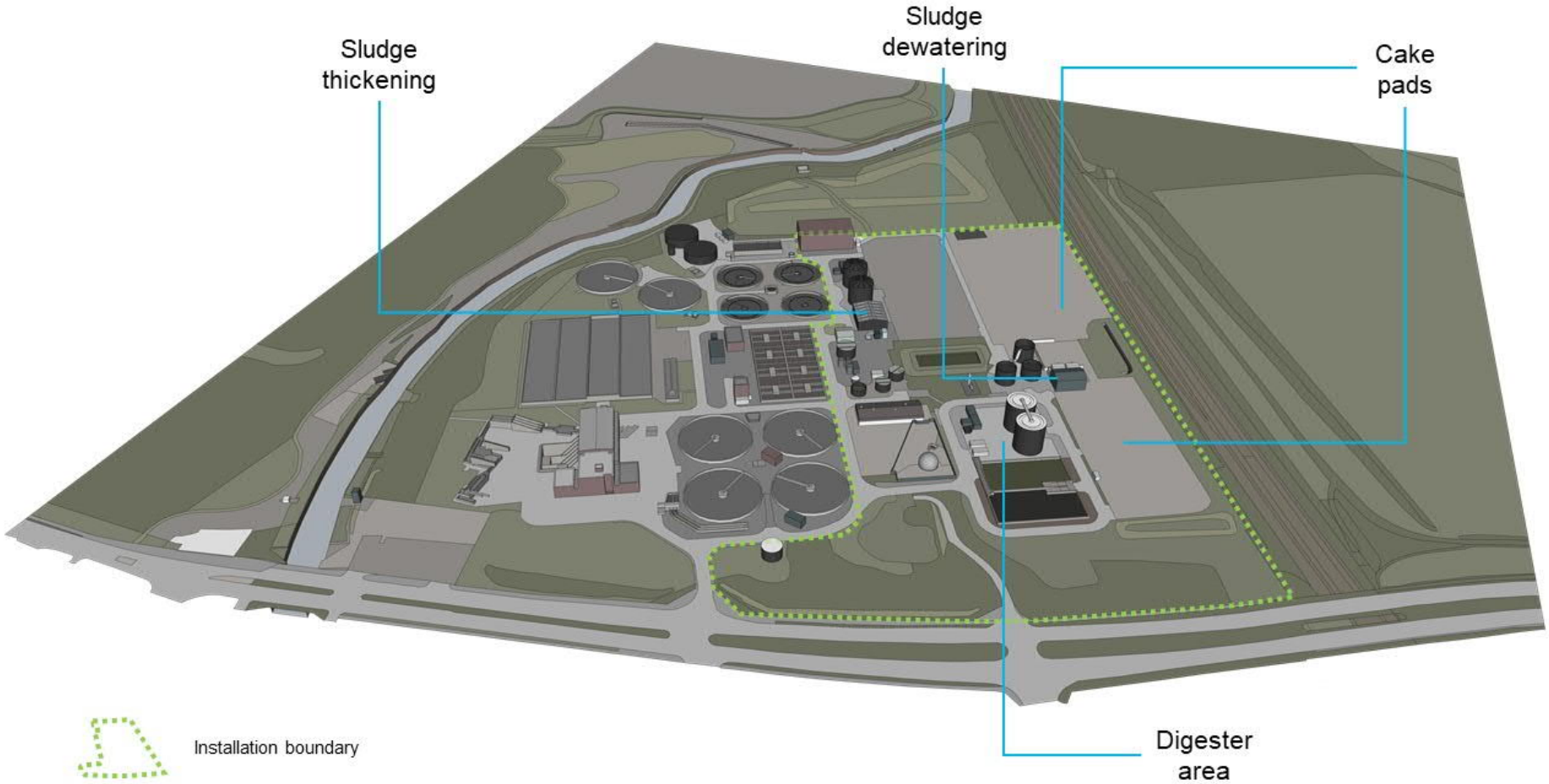


Figure C Installation illustration



Sludge reception, treatment and handling

Woodhouse Mill STF treats indigenous sewage sludges arising from sewage treatment processes operated within the co-located Woodhouse Mill WwTW. Indigenous sludge is pumped via sub-surface pipework from the WwTW to the two thickener feed tanks (2 no. 1,427 m^3 steel tanks with GRP roofs) where sludge is blended and mixed; the tanks operate in fill / draw mode with 24 hour changeover. Headspace air from these tanks is routed to an Odour Control Unit (OCU) (see further detail below).

Sewage sludges are also imported from smaller YW sewage works to Woodhouse Mill WwTW where the sludges enter WwTW inlet. This import facility is outside of the scope of this application by virtue of materials passing wholly through the UWWT process.

As a contingency, there is the facility to receive imported sewage sludges generated by smaller YW sewage works (with lower capacity or capability for treating sludges on-site) directly to the STF; this import provision is therefore within the installation boundary. This material may be delivered to digester feed tank 2, although in practice this facility is very rarely used. In the event that this is required, liquid sludge is delivered by tanker with a maximum load of approximately 28 tonnes. Unloading is controlled using 'WaSP' loggers; valves on the discharge pipework will only open when a driver presents appropriate authentication to this system. The WaSP loggers record the source of the sludge, the time and date of delivery, the total volume discharged and average percentage dry solids of the load. Only appropriately authorised vehicles can discharge at the site. A macerator is located within the import delivery line to break up solid materials in the imported sludge.

There are waste acceptance procedures that deal with the trade waste that is being treated through the WwTW. Some traders may also be subject to trade effluent consents. With regard to the potential for septic sludge imports to be received into the STF, a pre-acceptance process is in place to ensure that it is only received at sites that are capable of processing it without impacting the process (Refer to 'Waste Characterisation (Pre-acceptance & Acceptance' in 3d Management systems and Appendix 12).

Figure D Thickener feed tanks

Sludge from the thickener feed tanks is then transferred to the thickener building via a dedicated pipeline serving each of three thickening streams. Within the thickener building, liquid polymer is first diluted with potable water, then mixed with final treated effluent as a carrier and introduced to the sludge via in-line injection. After injection of polymer, the sludge passes through a shear valve to break up large pieces of sludge before transfer into a flocculation tank. The flocculation tank gives time for the sludge and polymer to mix prior to entry into one of the three drum thickeners. Two drums normally provide sufficient thickening capacity with the third drum providing back up capacity. The polymer encourages separation of water and sludge as the thickened sludge is rotated in the drum to remove excess liquid. These liquors are transferred to the 'top water and return liquors' sump located within a building at the northern end of the site prior to transfer to the WwTW for full treatment.

The drum thickeners are equipped with spray bars which provide continual self-cleaning, and manual cleaning is also undertaken periodically using a power washer; both systems utilise potable water.

The liquid polymer tanker delivery point and liquid polymer IBC delivery point are located in the roadway outside the thickener building; polymer is pumped from here to a 10 m^3 bunded bulk storage tank located within the thickener building. Located above the same concrete sump bund as the bulk storage tank is the 2 m^3 capacity polymer solution storage tank containing the diluted polymer solution.

Odour extracted from each of the three drum thickener units is discharged to atmosphere after treatment in the OCU.

Best Available Techniques (BAT) Summary: Sludge reception, treatment & handling

- Trace heating reduces the risk of loss of containment from pipe fracture on freezing.
- The drum thickeners have a cleaning in place (CIP) system installed to ensure they operate effectively, efficiently and with reduced odour generation potential.
- Sludge thickener processing capacity includes standby plant provision to minimise potential for reduced process control in the event of mechanical or other breakdowns.
- Final treated effluent is used as a diluted polymer carrier reducing potable water demand.
- In-line dosing of polymer ensures levels are controlled and raw materials used efficiently.
- Headspace air from the thickener and digester feed tanks and drum thickeners is directed to the OCU.
- Tank mixing using air injection to avoid settlement, blockage or gas production.
- PLC controlled plant and largely automated. PLC includes level sensors to reduce risk of tank overtopping, resulting in contamination and potential odour generation. Tanks also have an emergency overspill facility connected to site drainage (that is discharged back to the WwTW inlet) as a last line of defence to prevent overtopping.

Figure E Site view to the east

Odour control

An odour control unit (OCU) is operational on site. This two stage OCU comprises a biotrickling filter followed by activated carbon polishing unit. Air extracted from the following sources is transferred for treatment in the odour control unit prior to discharge to atmosphere via a 4m (approx.) high stack:

- Thickener feed tanks;
- Drum thickeners; and
- Digester feed tanks.

Figure F Odour control unit

Sludge digestion

The thickened sludge is transferred to the digester feed tanks, one of which has a capacity of 250 m^3 and the other 554 m^3. These tanks are mixed and covered, with headspace air routed to the OCU. Thickened mixed sludges are then pumped from the digester feed tanks to the anaerobic digesters (2 no. 1,733 m^3 concrete tanks). The anaerobic digesters operate as a continuous process with sludge being added and treated sludge extracted. The digesters have a typical feed rate of around 218 m^3/day per digester; the maximum feed rate is 270m^3/day giving a 12-day retention time as required by Hazard Analysis and Critical Control Points (HACCP) controls. The digesters are mixed by gas mixing systems, which utilise biogas from the headspace of each digester; the gas is compressed and then reintroduced using an array of mixing nozzles on the floor of the digester.

A hot water circuit provides heating to ensure optimum conditions for digester microbial activity. Potable water is heated to around 70°C by the CHP or boiler. This hot water then heats the digester using tube-in-tube, counter-current heat exchangers. Sludge in the digesters is continually recirculated around the heat exchangers using 2 no. (duty/standby) recirculation pumps per digester. A 3-way modulating valve on the water side moderates the amount of hot water that passes into the heat exchanger, depending on the heat demand of the digesters.

Grit build up within digesters is a normal feature of operation; the digesters are cleaned out (including accumulated grit) every 10 years as part of the planned periodic inspection which also includes an internal and external inspection of tank integrity and replacement of instrumentation and gas mixing equipment as required.

An automatic anti-foam dosing system is in place to control digester foaming. This system uses a radar level probe in the digester headspace and compares this to the pressure level sensor at the bottom of the digester to determine the depth of foam. Upon detection of foam, final treated effluent is sprayed into the digester head space through nozzles in the digester roof. If this is not effective in breaking up the foam, a chemical anti-foam is mixed with final treated effluent and dosed into the headspace of the digester via the same spray nozzles. This system includes operator-adjustable dosing setpoints and failsafe systems; if the foam level continues to increase mixing systems are inhibited and if this continues the digester feed will be inhibited. Antifoam is stored in 1m^3 IBCs.

Sludge extracted from the digesters is passed forward to the dewater feed tanks (see below for further information).

Best Available Techniques (BAT) Summary: Sludge digestion (*BAT 38*)

- Sludge pumps are on inverters where appropriate for energy efficiency, and typically operate around 75% speed.
- The plant operates under PLC and is largely automated.
- YW 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 (Refer to Section III, Form C2 Q4a for further information on process monitoring).
- 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 testing programme for above and below ground vessels, pipes and valves is in place. This incorporates a combination of visual examinations and non-destructive testing (e.g. ultrasonic thickness measurements).

Biogas storage and use

Biogas generated by the digestion process is collected within the digesters (approximately 200 m^3 capacity in the headspace of each digester) and/or piped to the biogas holder (300m^3 capacity). The biogas holder provides gas buffering capability in order to allow for fluctuations in gas production.

Excess liquids within the biogas are removed via three condensate traps on the biogas system. These are located within a condensate chamber adjacent to the biogas holder and treat biogas in each of the pipelines leading to the biogas holder, the flare and the CHP/Boiler. The collected condensate liquid is transferred to Woodhouse Mill WwTW for treatment.

Pressure relief valves are located on the roofs of the digesters (2 no. at each digester), and on the inlet to the biogas holder. These valves are an essential safety mechanism and will release gas to atmosphere in the emergency event of a build of pressure preventing damage to equipment e.g. the gas holder. The valves are also an 'anti-vacuum' design to prevent tank damage from negative pressures.

Biogas, via a gas booster, is used as the sole fuel source for the site CHPs. The CHP facility comprises two reciprocating engine generator sets. Each engine has a thermal input of approximately 610kW and generates electricity which is used to power essential site processes. Heat from the combustion process is used to maintain the required temperature in the anaerobic digesters, with any excess being discharged using air cooled radiators. The CHPs typically operate in parallel.

Each CHP set is located within its own dedicated housing with engine combustion products discharged via separate 6m high (approximately) stacks located on the roof of each CHP unit.

Figure G CHP units (with digesters behind)

A single boiler is available for use as an alternative heat source for the digesters. The boiler can be fired by either biogas or natural gas and has a thermal input of approximately 620 kW. In normal operations boiler use is limited as heat recovery from the CHP engines meets the digester heat demand.

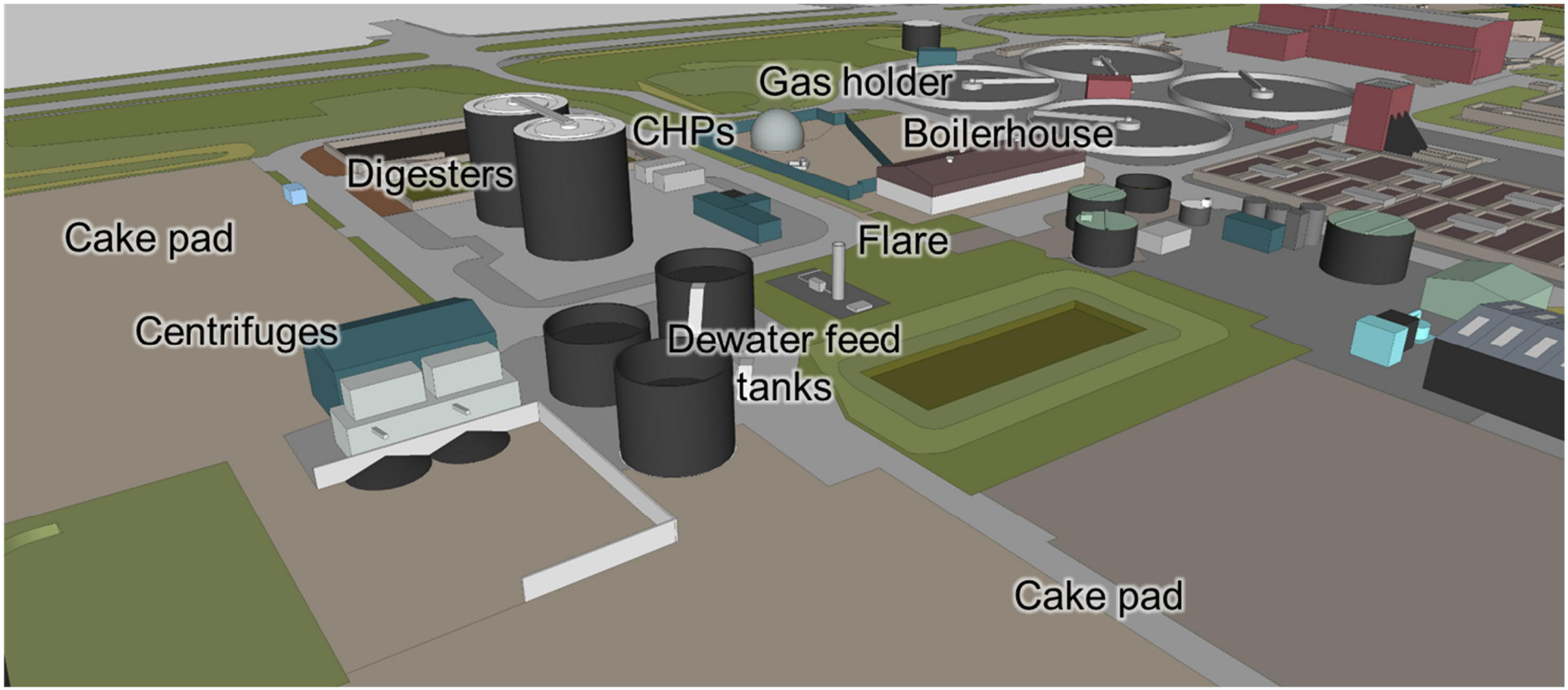
In periods where the CHP engines and boiler are unavailable, biogas is directed to the waste gas burner. This burner, although a purpose built closed flare system installed in 2004, is not capable of achieving a minimum of 1,000°C with 0.3 seconds retention time at this temperature. The flare facility is located at a safe distance from the digesters and other biogas handling and treatment activities. Flare stack operation is automated based on gas level within the biogas holder. If the gas level is high then the flare will operate, however utilisation of the gas is preferred over flaring.

The areas around the digesters and gas storage are classified as a potentially explosive atmosphere, with strict provisions on the control of potential ignition sources in line with requirements of the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).

Best Available Techniques (BAT) Summary: Biogas utilisation and flares
(*BAT 15 and 16*)Flame arrestors are fitted to the biogas flare system to reduce the risk of fire / explosion.

- The flare is regularly checked to ensure that it ignites correctly when required and gas flow to the flare is constantly monitored using inline meters.
- Biogas holder provides gas buffering and allowance for fluctuations in gas production.
- Flow meters installed on gas utilisation under PLC control to maximise utilisation efficiency.
- The plant operates under PLC and is largely automated.
- YW procedures are in place covering biogas management.

Figure H Site view to the south west



Digested sludge treatment, handling and disposal

Digested sludge is gravity fed from the digesters to the adjacent dewater feed tanks (1 steel open topped tank with capacity of 500m³ and 2 steel open topped tanks with capacity of 606m³). These tanks are mixed to prevent settlement and to inhibit generation of methane. Powdered polymer stored in 750kg bags are dispensed via a hopper dosing system which feeds a make-up tank where the powdered polymer is mixed with potable water and transferred to a storage tank. The polymer solution is injected into the sludge stream and taken to one of two centrifuges where the sludge coagulates and supernatant liquor is removed by centrifugal forces. Dewatered liquor is transferred to the top water and return liquors sump located within a building at the northern end of the site prior to transfer to the WwTW for full treatment.

The final digested and dewatered sludge cake is transferred via conveyers from the centrifuges up over a push-wall and onto the cake pad. The whole area under the conveyer and adjacent sludge cake pad is an engineered impermeable surface, with water runoff collected in drains running along the centre and perimeter of the pad. These liquids are pumped back to the WwTW for full treatment.

Figure I Sludge cake conveyors and pad

Once on the cake pad, sludge cake is moved by mechanical loaders into storage rows. There is no lime addition at Woodhouse Mill STF; instead, cake is stored in piles according to age and is left to mature for a minimum of six weeks in accordance with HACCP requirements. Approximately 2,000 tonnes sludge cake will normally be held on site at any one time. However, the maximum storage capacity of the cake pad is significantly greater than this, up to 25,000 tonnes; greater volumes may be stored on site in emergency/abnormal conditions such as following processing problems at other YW sites or in extreme weather conditions when landspreading operations are temporarily paused. Once maturation is complete, sludge cake is removed from site and landspread in accordance with legislative requirements. Samples of digested, matured cake are taken every 3 months, or whenever a Critical Control Point (CCP) is not within specification, and analysed for metals and pathogens to ensure HACCP standards are being met.

The cake pad may also on very rare occasions serve certain contingency functions, for both operations at Woodhouse Mill STF and to other YW sites. The cake pad may, under exceptional circumstances (such as the failure of assets or non-availability of normal disposal routes on a temporary basis) be used for the interim storage of treated or untreated thickened or dewatered sludge on the cake pad, where that sludge originates from other YW sites (or from Woodhouse Mill WwTW or STF operations), before that material then undergoes AD treatment in the STF at Woodhouse Mill. It is recognised that such operations are abnormal and would require initiation of site contingency operating procedures, with the intention of minimising any potential short term adverse environmental effects and returning to normal operations as soon as practicable. It should be noted that the cake pad area at Woodhouse Mill STF is small in comparison to certain other YW STFs; these larger sites would generally be selected preferentially over Woodhouse Mill STF in the event that off-site materials need to be stored.

Best Available Techniques (BAT Summary)

- Engineered cake pad with leachate and washwater collected for treatment at the WwTW.
- An inspection and testing programme for pipes and valves is in place. This includes biennial surveys using in-pipe crack detection technology.
- A leachate treatment plant is proposed, which will serve to reduce phosphorus concentrations in the final effluent produced by the co-located Woodhouse Mill WwTW.

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, and the questions numbers are 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

Proposed changes to current activities within this installation are provided in C2: Table 1 below. A full summary of activities it is proposed will be included within this installation are provided in response to Form C3, Table 1a later in this section.

Table C2: 1 - Changes to existing activities

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
Woodhouse Mill STF	Section 5.4 A(1) (b)(i) 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	None –previously regulated as a waste operation	**Removal** from permit: Sludge conditioning, phyto conditioning and processing, including storage prior to conditioning / phyto conditioning, blending, shredding, conditioning, screening and storage for maturation after conditioning / phyto conditioning.	N/A	N/A	N/A
		Addition to permit: Anaerobic digestion of UWWT-derived sludges.	None – would be regulated as part of an installation level permit	N/A	N/A	N/A
		Addition to permit: DAAs associated with anaerobic digestion: • Treatment of sludge prior to digestion (including reception, bulking, blending, physical handling, screening and thickening). • Treatment of digested sludge produced at Woodhouse Mill STF or other YW sites (including physical handling and dewatering). • Biogas storage and combustion in gas engines, boiler and auxiliary flare • As a contingency measure, interim storage of digested and undigested sludge produced at Woodhouse Mill WwTW or other YW sites, before AD treatment at Woodhouse Mill STF.	None – would be regulated as part of an installation level permit	N/A	N/A	N/A

3 Your ability as an operator

3b Technical ability

YW have relevant technical competence to operate the activities at the site, including those included in this permit variation.

Technical management is currently provided by David Shaw, YW; his primary and continuing competency assessment certificates can be found in Appendix 2. Technical management will be transferring to Matt Ashford, who is currently working on the necessary WAMITAB qualifications.

The environmental permit numbers and site address for all other waste activities that David Shaw provides technical competence for are provided in Table C2: 3b below (noting that this represents an interim position; a number of individuals with YW are currently working on the necessary qualifications and will be taking over TCM roles at some of these sites).

Table C2: 3b Sites under the technical competence of David Shaw

Permit number	Site address	Postcode
KP3036LW	Lemonroyd STF Fleet Lane Oulton Leeds	LS26 8AB
VP3130GZ	Esholt Waste Water Treatment Works CHP Plant Ainsbury House Idle Bradford West Yorkshire	BD10 0TW
KP3536LL	Neiley STF Newmill Road Brockholes	HD9 7AL
KP3836LT	South Elmsall STF Chapel Lane South Elmsall	WF9 2SW
FB3809MM	Knostrop STF Knowsthorpe Lane Leeds	LS9 0PJ
YP3092ZR	Caldervale WwTW Caldervale Road Wakefield	WF15 5PJ
WP3030GC	Hull Sludge Treatment Facility Hull Waste Water Treatment Works Hull Road Kingston upon Hull	HU12 8EY
DP3092ZJ	Woodhouse Mill WwTW Retford Road Woodhouse Mill Sheffield	S13 9WD

Permit number	Site address	Postcode
YP3992ZZ	Old Whittington W W T W Station Lane Chesterfield Derbyshire S41 9HY	S41 9HY
UP3634LF	Halifax Copley Sludge Treatment Facility Halifax Copley WwTW Wakefield Road Salterhebble Halifax West Yorkshire	HX3 0TL
CP3897LT	Blackburn Meadows STF Alsing Road Sheffield South Yorkshire	S9 1HF

3d Management systems

YW has an established EMS, which is certified to the ISO 14001 standard. A copy of the YW ISO 14001 certificate is provided as Appendix 3. The EMS forms part of a wider corporate Integrated Management System (IMS) which also incorporates quality management, health and safety management, asset management, organisational resilience and business continuity requirements. The management system follows an asset life cycle approach, from design through to decommissioning.

Corporate level management system processes are in place, which are supplemented by site-specific documented procedures and processes. YW's IMS is structured as shown in Table C2: 3d-1 below.

Table C2: 3d-1 Overall IMS structure

Level 1 - IMS Manual	
	YW's IMS manual is a set of documents including records which describe the scope, policy, objectives and overall management responsibility within YW and specifically addresses the requirements of ISO 9001, ISO 14001, ISO 55001 and ISO 45001.
Level 2 - Generic Manuals	
	The level 2 generic manuals detail policies and procedures, concerning the operation and maintenance of systems giving the purpose, scope, responsibilities and operational requirements.
Level 3 - Site Specific Manuals	
	The level 3 site specific manuals detail site specific information and procedures, concerning operations, giving the purpose, scope and responsibilities. Document control procedures are in place to ensure IMS and associated documents and records are identified, controlled, maintained and retained appropriately. Key records maintained in accordance with IMS procedures include training records, internal audit reports, waste transfer and consignment notes, complaint records, risk assessments, legislative records, permits, consents and associated documentation, accident and incident records and monitoring and measurement data.

A summary of the EMS is provided on the following pages, focusing in more detail on how this is applied to the management of sludge treatment operations.

Scope and Policy

The YW EMS has been certified to ISO 14001 since 2004. The certified EMS scope covers:

"The management and operation of clean and waste water assets and associated services".

YW's top level commitment to environmental and quality performance can be found in the Quality & Environmental Policy; a copy of the policy is provided as Appendix 3.

Quality and Environmental Policy

Chief Executive of Yorkshire Water Services Ltd approves and is **accountable** for implementation

Responsibility of **all employees** to comply

Covers **all YW activities**, including the Woodhouse Mill STF site, and applies to all individuals who are employed by, or carry out work on behalf of YW including contractors, temporary staff and agency workers

Key Roles and Responsibilities

YW has a central team responsible for the implementation of the overall IMS; the YW Bioresources team are responsible for maintaining ongoing compliance and managing the Woodhouse Mill STF.

YW personnel have role statements which provide details of the responsibilities and accountability of individual roles.

Planning Actions

YW has established appropriate forums and mechanisms for the identification and management of risk, including senior leadership teams and governance groups. Actions are cascaded throughout the organisation as appropriate.

In relation to environmental issues, climate change risk assessments are carried out as well as consideration of extreme weather and climate resilience work. Environmental aspects and impacts have been identified and are recorded using the company's software platform for recording risks (currently the '4Risk' system).

YW is committed to comply with all relevant legislation, regulations and any other requirements to which the organisation subscribes. Legislation is analysed so that its relevance to the activities, aspects, products and services of YW are understood, communicated and applied. Registers of relevant legislation and other requirements are maintained and managed via the Evaluation of Compliance (EoC) process held on SharePoint.

Management requirements that arise from risk assessments and evaluation of compliance processes are taken into account in planning operational control and emergency preparedness procedures.

General Operational Controls (Environmental)

Operational facilities, including Woodhouse Mill STF, are managed in accordance with procedures laid down within the EMS. This includes procedures to identify and control environmental issues arising from YW's activities, including specific environmental permit requirements.

Procedures specify environmental best practice requirements, including for example storage of chemicals and oils within a bund (with 110% capacity) which must be maintained in good condition, located inside a building wherever possible, on hardstanding and away from watercourses and site drains. Waste must be segregated appropriately, and waste containers must be located on impermeable hardstanding.

YW has developed a biodiversity policy, underpinned by specific processes and procedures, to deliver programmes of work that aim towards a biodiversity net gain. This policy is applicable to contractors delivering work on behalf of YW.

Maintenance (Planned)

A planned maintenance system is in operation at Woodhouse Mill STF covering all electrical and mechanical equipment and calibration of instrumentation and control system. A list of all plant items is stored on the Asset Inventory System (AI2) and the frequency, scope and records of planned maintenance and calibration are stored on SAP. Job cards for planned maintenance are produced through the SAP system giving the necessary work instruction. Planned maintenance requirements are initially based on recommendations provided in Operations and Maintenance (O&M) manuals.

Total Care Plans (TCPs) are produced for all sites and are reviewed at set intervals. TCP reviews set future planned maintenance frequency, the work to be carried out during the planned maintenance and identifies critical and life expired plant items. This is based on the review of the plant item's history and on condition monitoring results.

An inspection and testing programme for above and below ground vessels, pipes and valves is in place. This programme of work to detect any deterioration or weakness of assets typically incorporates a combination of visual examinations and non-destructive testing (e.g. ultrasonic thickness measurements). The frequency of inspection is in accordance with risk-based requirements, which also varies according to the condition of the asset. A clear process to address any identified defects, with assigned responsibilities, is in place.

In addition to planned maintenance activities described above, a programme of daily, weekly and monthly visual inspections and checks are undertaken. This includes, for instance, visual inspections of general site condition and housekeeping including spills and biogas leaks, checks for abnormal heat, noise and vibration, checking the operation of pumps and monitoring instrumentation, checking calibrations are in date etc. Any abnormal observations are recorded in the site logbook.

Odour checks are carried out in accordance with the Odour Management Plan (see Appendix 10).

The designated Technically Competent Manager (TCM) also undertakes monthly inspections of the site to identify any potential issues and arrange resolution as necessary. These inspections are recorded and the information is retained by YW.

Maintenance of the CHP, boilers and de-watering plant are undertaken by specialist contractors. All activities are closely managed from site to ensure that all YW H&S and environmental policies are met. Regular maintenance of plant such as CHP engines are undertaken in accordance with requirements specified by the equipment manufacturer including routine planned inspections and more in-depth servicing. The frequency of servicing is based on a combination of running hours and condition monitoring data. CHP contractors are on site regularly whilst boiler maintenance normally requires attendance on a less frequent basis. Maintenance contracts include provision for reactive/emergency activities and management of spares.

Processes on site operate continuously, 24-hours per day, 7-days per week, apart from maintenance periods. The plant is designed to operate unattended with process parameters being monitored continuously. Operating logs are stored electronically.

Plant breakdowns are responded to on the basis of a risk assessment matrix (RAM) and prioritised according to consequence of failure and likely time to failure occurring. Amongst other attributes, the RAM takes into account impact to environment, health and safety, cost and flooding.

Site operational staff are responsible for requesting breakdown maintenance and repairs. Any reactive work that achieves a high priority on the RAM is called through to the Engineering Service Desk for progression. These jobs are treated as ‘schedule busters’ and are progressed accordingly.

Records of all maintenance (planned and reactive) and calibration are retained on the SAP work management system.

Waste Characterisation (Pre-acceptance & Acceptance)

Woodhouse Mill STF treats indigenous primary and secondary sludges arising from the Woodhouse Mill WwTW; liquid sludge generated by other YW sites is currently imported to the STF only rarely. As a result, the composition of the sludge is very stable, consistent, and is well understood. On the rare occasions that liquid sludge is received, the volume and source of the imports to the site is recorded by WaSP loggers. These also ensure that only appropriately authorised drivers can discharge at Woodhouse Mill STF. Sites supplying sludge to Woodhouse Mill have been reviewed to ensure that the typical sludge they produce is suitable and safe for anaerobic digestion. Sludge production problems are rare, but operators and tanker drivers are trained to identify contaminated sludges at source and stop them being transferred to the digestion site. Spot checks are carried out on imported sludges to ensure they are within acceptable parameters and safe for the digestion process.

All cake (digested sludge) exported from Woodhouse Mill has to meet stringent HACCP requirements, including regular sampling to assess safety.

Emergency Preparedness and Response

YW has developed processes to identify, respond to and control emergency situations that may cause adverse environmental consequences. Spill kits are readily accessible at locations where there is a risk of spillage (e.g. delivery, storage and areas of use). Spill control toolbox talks are provided to staff. This includes information about how to prevent and control pollution incidents from accidental spills of oils, fuels, sludge and chemicals.

Contingency plans help minimise potential environmental impacts; this includes emergencies arising from breakdowns, enforced shutdowns, abnormal circumstances such as flooding as well as major fire and spill/loss of containment events. Refer also to the Accident management plan (see Section III; C2, Q6-5) and the Secondary Containment Risk Assessment (Appendix 11).

The YW Business Continuity Plan is in place to define and prioritise critical business functions, details the immediate response requirements for a critical incident and details strategies and actions to be taken to ensure business continuity. All Bioresources sites, including Woodhouse Mill STF, have the capability of remote monitoring and remote operation of key functions. A security guard is present on site 12 hours per day Monday to Friday and CCTV security cameras are located across the site with monitoring provided 24/7 by the YW Service Delivery Centre. All buildings are alarmed and high-risk equipment is provided with secondary fencing for added security.

Monitoring

Process monitoring is undertaken for all key processes on site. This includes monitoring of operational parameters of plant and equipment to ensure it is operating effectively and efficiently. Further details are provided in Section II Technical Description.

Air emissions monitoring, including emissions from the CHPs, is undertaken in accordance with permit requirements. Further details are provided in Section III, Form C3, Question 4a. Odour monitoring is described in Appendix 10: Odour Management Plan.

Environmental performance monitoring includes monitoring electricity and gas use, biogas generation, electricity generation, water use and waste arisings. Further details are provided below in Section III, Form C3, Questions 6a, b, c, d and e.

Training, Awareness and Competence

YW maintains processes to ensure that all those working for or on behalf of YW are suitably trained to fulfil their roles efficiently. Assessment of competence and identification of individual training needs is carried out through mutual discussion between the individual and their manager as part of the company performance management process, a fundamental part of which is the competency framework and progression plans which are available for every role in the organisation.

All YW employees receive IMS awareness training, delivered online at induction and periodically thereafter. This includes awareness of the environmental policy and understanding key environmental hazards and risks and the need to comply with IMS requirements.

Staff who work at Woodhouse Mill STF receive specific training in the plant's operation and the potential environmental impact of the process as well as health and safety. Plant operators have a detailed understanding of the operational procedures for the site for both normal and abnormal operation. As part of the training, operators will receive specific instructions relating to those aspects of plant operation that have the potential for a negative impact on the environment. Toolbox talks are used to provide information and training to site staff, including information about environmental requirements/activities and legislative and compliance requirements. Training records for programmes and courses managed centrally are held on the company Learning Management System. Records for specific training managed locally at the Woodhouse Mill site is held by individual managers and/or on the Leaning Management System.

Communication

Communication plans are in place to communicate business performance based on the company's 'Big Goals', company objectives and performance commitments, aligned to the quality, safety, environmental and asset management requirements.

The company intranet, called the Hive, provides regular news updates for YW personnel and holds a wide range of information that employees can access. Other key communication channels include regular corporate newsletters, business unit-specific newsletters, and update sessions and events held by senior business leaders. 'Safeguard' communications are used to issue notifications such as Safety Alerts, Toolbox Talks and Lessons Learned from incident investigations to personnel across the business.

At a Woodhouse Mill STF site level environmental information is communicated primarily via toolbox talks and noticeboards.

Contractors

YW has specific procedures in place for the management of contractors regarding health, safety and environmental requirements. This includes procedures to ensure contractors have the required skills and environmental competencies to carry out works at this site. Initially, contractors are assessed by the procurement department for inclusion on the approved supplier list, which includes health and safety and environmental criteria for example, waste documentation such as waste carrier's licence/training certificates. Even when the contractors are on the approved supplier list, they are still further assessed for each specific contracted activity. The contractor is required to submit a risk assessment method statement (RAMS) prior to any commencement of work, identifying how work is to be undertaken and the associated risks. The RAMS must be approved by the Site Manager or an assessor who is competent at reviewing a RAMS, who will also identify any site hazards and issue an Authorisation to Work/Enter the site, following a site induction. When on-site, the contractor must carry this Authorisation to Work at all times. Contractors must also complete a site induction, which remains valid for up to a year, covering health, safety and environmental requirements whilst on site.

Environmental Improvement

Yorkshire Water's IMS objectives are documented with the 'Big Goals' and 'Performance Commitments' which are available and communicated via the company intranet. Planning to achieve IMS objectives is monitored and reported internally (via Performance Zone) and externally (via the Annual Report).

Woodhouse Mill STF has daily and weekly performance targets including sludge throughput, gas quality, electricity generation and electricity consumption targets. Performance against these targets is reviewed at daily meetings and corrective actions taken as required.

The EMS is subject to a Senior Management Review twice a year to consider environmental performance, objectives and targets and continual improvement.

The Innovations Team at YW undertakes regular monitoring and review of new and innovative technologies and equipment to ensure the business continually improves its operations and activities. This includes consideration of cleaner technologies and improved environmental performance. Sectoral and cross-section benchmarking also takes place as required.

Incidents, non-compliance and complaints

Processes have been developed by YW to identify, respond to and control situations that may cause actual or potential non-conformities. Non-conformities may be identified through internal audits/inspections or may be detected through other means. Incidents are managed in accordance with the Incident Management policy and procedures and Emergency Planning manual. In the event of a significant incident a root cause analysis is conducted. Actions are identified, reported, recorded and communicated to prevent reoccurrence.

Complaints are typically received by YW central Customer Services team, where all complaints are logged on the ICE system. Complaints relevant to Woodhouse Mill STF are passed on to the Site Manager for further investigation. The Site Manager is responsible for ensuring that any complaint is investigated and, if found to be justified, that work is undertaken to resolve the issue, including liaising with the relevant regulatory bodies where appropriate. The Customer Service Team ensure an appropriate response to the complainant in a timely manner including, if and as appropriate, detailing the reason behind the issue and the actions taken to resolve the matter.

All complaints information is recorded on the ICE system in order that this can be monitored, reviewed and analysed.

Auditing

YW operates an internal audit programme delivered by trained internal auditors or suitably qualified external consultants or contractors. This includes the following:

- IMS auditing/inspections undertaken by the IMS Team.
- Regular combined quality, health and safety and environmental inspections performed at all operational sites, including Woodhouse Mill STF.
- Assurance and improvement programme to ensure the health, safety, environmental and technical compliance of contractors delivering capital schemes.
- Audits of contractors delivering repair and maintenance activities.

YW is also subject to regular audits by external auditors to ensure continuing adherence to ISO 14001 requirements.

Management Review

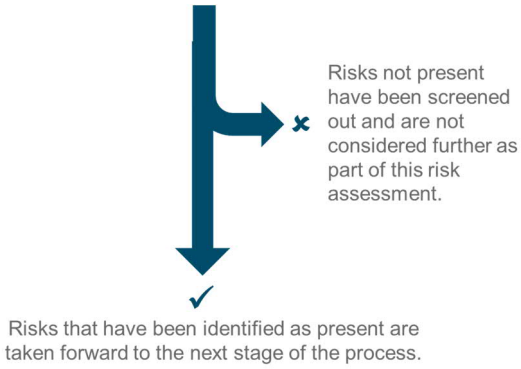
A formal Management Review of YW's IMS is undertaken and recorded at least once a year. The purpose of these meetings is to ensure the IMS' continuing suitability, adequacy and effectiveness as well as to assess opportunities for improvement and the need for changes to the management system, including the policy and objectives.

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[1] and adopts the approach outlined below:

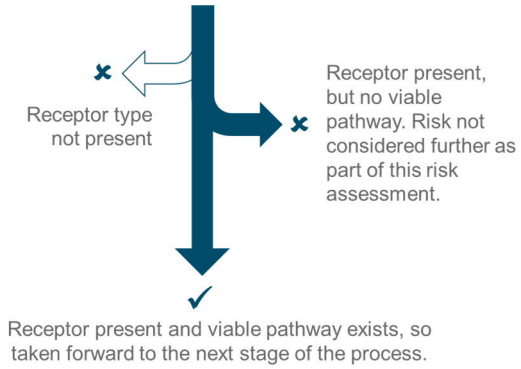
1. Identify and consider risks, and the sources of the risks, and assess whether these require further assessment or can be screened out. Only risks arising from processes that are within scope of this permit variation application have been considered.

⇨**Table C2: 6-1**



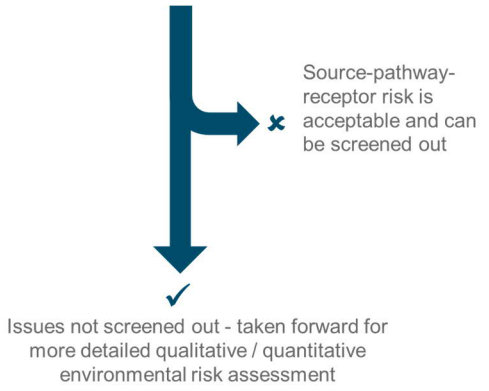
2. Identify and review the receptors (people, animals, property, vegetation and anything else that could be affected by the hazard) at risk. Within each receptor category, the closest receptor(s) has been identified along with possible pathways to link the receptor to the credible site risks from Stage 1.

⇨**Table C2: 6-2**



3. Assess risks relevant to the specific activity and check they are acceptable and can be screened out –provides a summary of the risk-pathway-receptor assessment.

⇨**Table C2: 6-3**



4. Qualitative and quantitative risk assessments for risks which cannot be screened out.

⇨**Q 6-1 to 6-9**

⇨**Appendices 7, 8 and 9**

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

Table C2: 6-1: Identification of Environmental Risks

Identified risk area		Sources on site	Discussion	Identified risk
	Odour	Odour extraction stacks, fugitive releases from tanks, screenings and sludge/cake import, conditioning pad	Raw sludge is contained to minimise odour generation potential. Displaced air (odour) from tanks and drum thickeners is extracted and treated in a two-stage OCU comprising a biotrickling filter followed by activated carbon polishing unit prior to release to air via a stack. Digested sludge has reduced odour generation potential and tanks containing digested sludge as well as dewatering facilities and the cake pad are not covered or treated.	✓ Further review
	Point source emissions to air from biogas combustion	CHPs, boiler, waste gas burner (flare)	Biogas generated by the digester is used as the sole fuel source for the site CHPs; a dual fuel boiler (biogas and natural gas) is available for use as an alternative heat source for the digesters. In periods where the CHP engines and boiler are unavailable, biogas is directed to the waste gas burner.	✓ Further review
	Point source emissions to air. Emissions deposited from air to land	Odour control unit	Processing of sewage sludges can result in emissions of various compounds with potential human health or ecological impacts. These include Volatile Organic Compounds (VOCs), hydrogen sulphide (H_2S), ammonia, and other organics including mercaptans. Adopting a precautionary approach, these emissions have been further reviewed. These compounds can also be highly odorous; this aspect is considered separately.	✓ Further review
	Noise	Motors, pumps, blowers, compressors, conveyors, vehicle movements, site personnel CHP, Boiler, waste gas burner	Noise sources on site include the CHPs, boiler, waste gas burner, vehicle movements (for sludge cake handling), draught fans associated with odour extraction, rotating screens, compressors and air-cooled radiators. Procedures are in place to ensure effective planned maintenance and minimisation of noise and vibration from noise sources associated with sludge treatment and handling facilities.	✓ Further review

Identified risk area		Sources on site	Discussion	Identified risk
	Fugitive and diffuse emissions	Tanks, pipework and containers used for storage, treatment and digestion of sludge	Fugitive emissions (e.g. due to leaks) and diffuse emissions (e.g. from uncovered sources) include Volatile Organic Compounds (VOCs), hydrogen sulphide (H_2S), ammonia, methane and other organics including mercaptans. These compounds can also be highly odorous; this aspect is considered separately. Raw sludge is contained in order to reduce potential for emissions. Displaced air from covered tanks and processing facilities are captured and transferred to an odour control unit prior to discharge to the environment (see point source emissions to air).. Planned maintenance and leak detection and repair programme in place in respect of fugitive emissions.	✓ Further review
	Bioaerosols	Storage and handling of sludge	Raw sludge is contained in order to reduce potential for emissions with displaced air being extracted and treated in a two-stage OCU. Digested sludge has been subject to high temperatures and treatment to kill pathogens, and disturbance of cake on the cake pad is minimal, other than initial delivery to the pad and subsequent removal from the pad. Raw and digested sludge have a high water content (approx. 60% after thickening). Potential for generation of dust and bioaerosols from these sources is limited but further review is required.	✓ Further review
	Accidental Releases	All areas / all activities	Emergency/unplanned events have the potential to result in abnormal emissions of odour, noise, or emissions to air, land or water. This includes spillages of potentially contaminative liquids e.g. sludge, chemicals, oils and releases of biogas.	✓ Further review
	Point source emissions to sewer	Process liquids	All process liquids, cleaning washwater and surface water runoff is returned to Woodhouse Mill WwTW (outside of the scope of this permit application) for treatment prior to discharge to the River Rother. Further detail is provided in response to Form C3, Question 2 Point source emissions to water.	✓ Further review
	Point source emissions to surface, groundwater and land	None	There are no point source emissions to surface water, groundwater or land within the scope of the permit , other than clean surface water runoff from a limited area of site (refer to Figure 4: site drainage plan and Form C3, Question 2 Point source emissions to water). All process liquids and surface water runoff is returned to Woodhouse Mill WwTW for treatment prior to discharge to the River Rother. Risks associated with accidents and other planned incidents are considered separately.	✗ Not considered further

Identified risk area		Sources on site	Discussion	Identified risk
	Visible plumes	CHP, Boiler, waste gas burner	The nature of the combustion sources is such that plume moisture levels will be low and thus in normal operations, and for the majority of weather conditions, plume visibility is expected to be very low.	✘ Not considered further
	Adapting to climate change	All areas / all activities	Required only for new bespoke permit applications.	✘ Not considered further
	Litter	Storage and handling of sludge in open air	The nature of waste treated on site does not result in litter.	✘ Not considered further
	Vermin and Pests	Storage and handling of sludge in open air	The activities within the installation do not give rise to significant pest or vermin issues.	✘ Not considered further
	Dust	Storage and handling of sludge in open air	The facility handles wet wastes which do not result in dusts.	✘ Not considered further
	Global warming potential	CHP, Boiler, waste gas burner	Anaerobic digesters generate biogas which is used in CHPs to generate electricity used within the installation as well as heat required for the digesters. Further energy information is provided in a detailed response to Q6 of Form C3.	✘ Not considered further

Table C2: 6-2: Identification of sensitive receptors and pathways

Receptor type	Receptor description and distance	Pathway	Possible pathway from source							
			Odour	Air (combustion)	Air (non combustion)	Noise	Fugitive / diffuse	Bioaerosol	Accidental releases	Sewer
Human										
Residential housing - North	Nearest residential property located more than 1km to the north.	Airborne	✗	✓	✓	✗	✗	✗	✓	✗
Residential housing – East	Nearest residential property located approximately 175m to the east.	Airborne	✓	✓	✓	✓	✓	✓	✓	✗
Residential housing – South	Nearest residential property located approximately 200m to the southeast and 215m to the southwest.	Airborne	✓	✓	✓	✓	✓	✓	✓	✗
Residential housing – West	Nearest residential property located approximately 385m to the west.	Airborne	✓	✓	✓	✓	✓	✗	✓	✗
Public amenity areas	Playing fields approximately 225m to the west, including children's playpark approximately 375m to the west	Airborne	✓	✓	✓	✓	✓	✓	✓	✗
Schools	There are 10 schools within approximately 2km of the site. The nearest of these is 550m to the southeast.	Airborne	✓	✓	✓	✗	✗	✗	✓	✗
Hospitals / healthcare facilities	There are two hospitals/healthcare facilities within 2 km of the site. The nearest of these is approximately 1750m to the east.	Airborne	✗	✗	✗	✗	✗	✗	✓	✗
Industrial/commercial sites	There are a number of industrial / commercial sites within close proximity of the installation. This includes industrial premises and the Princess Royal Hotel on the opposite side of Retford Road, less than 50m to the south of the installation boundary. In addition, a hand car wash is located approximately 100m to the west of the installation, a petrol station 300m to the west and an industrial estate (under construction) 125m to the southeast.	Airborne	✓	✓	✓	✓	✓	✓	✓	✗

Receptor type	Receptor description and distance	Pathway	Possible pathway from source							
			Odour	Air (combustion)	Air (non combustion)	Noise	Fugitive / diffuse	Bioaerosol	Accidental releases	Sewer
Ecological										
Habitat sites – statutory designations	There are no internationally designated sites (e.g. SAC, SPA, Ramsar) within 10km of the installation. There are no nationally designated sites (e.g. SSSIs) within 2km of the installation.	Airborne Surface water Groundwater	✘	✘	✘	✘	✘	✘	✘	✘
Habitat sites – non statutory designations	Sites include: Woodhouse Washlands local wildlife site located 75m to the south and Treeton Dyke local wildlife site 75m to the northeast.	Airborne Surface water Groundwater	✘	✓	✓	✓	✓	✓	✓	✓
Protected species	Possible presence of protected species on or off site.	Airborne Surface water Groundwater	✘	✓	✓	✓	✓	✓	✓	✓
Environment – Other										
Global atmosphere	Local, regional and global atmosphere.	Airborne	✘	✓	✓	✘	✓	✘	✓	✘
Ground / groundwater	Underlying groundwater classed as a Secondary A aquifer; groundwater vulnerability classed as medium-high.	Unmade ground / infiltration / percolation	✘	✘	✘	✘	✘	✘	✓	✓
Surface water	River Rother directly adjacent to installation boundary. Likely hydraulic continuity between underlying groundwater and river.	Overland runoff / infiltration / percolation	✘	✘	✘	✘	✘	✘	✓	✓

Table C2:6-3: Assess risks: screening assessment

Table C2.6-3 below sets out the screening assessment for environmental risks.

Source	⇨	Pathway	⇨	Receptor	Discussion	Further assessment required?
Odour	⇨	Airborne	⇨	Residential housing – east, south, west Public amenity areas Schools Industrial /commercial sites	There are a number of odour sources on site including uncovered digested sludge tanks, dewatering centrifuges, dewatering liquor handling and sludge cake storage. All raw sludge odour sources are covered, with odour extracted and treated in a two-stage odour control unit prior to dispersion to atmosphere. However, residual odour risks remain and therefore further assessment is required.	**Yes – odour impact assessment is summarised in response to Q 6-2 below. Full assessment is included as Appendix 8.**
Point source emissions to air (combustion)	⇨	Airborne	⇨	Residential housing – north, east, south, west Public amenity areas Schools Industrial /commercial sites Habitat sites – non statutory designations Protected species Global atmosphere	Biogas generated by the digesters is used as the sole fuel source for the site CHPs. The CHPs generate electricity for use on site and waste heat is used to maintain the temperature of the digesters. In periods when the CHPs are not available a boiler (dual fuel biogas or natural gas) may be used to provide heat for the digesters. Any excess biogas which cannot be used by either the CHPs or boilers is sent to the waste gas burner (flare). The site is not located within an air quality management area. No existing air quality impact assessment has been identified for the site. An air quality impact assessment, including air dispersion modelling is therefore required in order to assess the significance of emissions to air from the process on potentially sensitive receptors, against relevant air quality standards and assessment levels.	**Yes – air quality impact assessment is summarised in response to Q 6-3 below. Full assessment is included as Appendix 7.**

Source	⇨	Pathway	⇨	Receptor	Discussion	Further assessment required?
Point source emissions to air from OCU – ammonia / H_2S / other organics	⇨	Airborne	⇨	Residential housing – north, east, south, west Public amenity areas Schools Industrial /commercial sites Habitat sites – non statutory designations Protected species Global atmosphere	Off gases and vapours collected from tank headspace and displacement air can contain substances potentially harmful to human health (e.g. H_2S) and also substances which can contribute to nutrification of habitat sites (ammonia) potential. The effective operation of the OCU serves as the primary control for these emissions.	**A summary review of the abatement plant has been provided in response to Q 6-4 below.**
Noise	⇨	Airborne	⇨	Residential housing – east, south, west Public amenity areas Industrial /commercial sites Habitat sites – non statutory designations Protected species	There are fixed and mobile noise sources within the installation. Whilst these are not considered to represent a significant contribution to off-site noise levels, there remains some potential to affect the identified off-site receptors and therefore further assessment is required.	**Yes – qualitative risk assessment is summarised in response to Q 6-5 below. Full assessment is included as Appendix 9**
Fugitive and diffuse emissions	⇨	Airborne	⇨	Residential housing – east, south, west Public amenity areas Industrial /commercial sites Habitat sites – non statutory designations Protected species Global atmosphere	It is recognised that this a potentially significant issue in the sector, a leak detection and repair plan is in place covering the installation.	**Yes – qualitative risk assessment is summarised in response to Q 6-6 below. Leak detection and repair plan in place – see Appendix 13 and Form C3 Q3b**

Source	⇨	Pathway	⇨	Receptor	Discussion	Further assessment required?
Bioaerosols	⇨	Airborne	⇨	Residential housing – east, south Public amenity areas Industrial/commercial sites Habitat sites – non statutory designations Protected species	There is residential housing located within 250m of the site to the east and south. Other receptors within 250m of the installation include public amenity areas, local wildlife sites and a number of industrial and commercial sites. Whilst EA guidance does not consider AD as a significant source it is recognised that there are some potential low-level sources within the installation (e.g. uncovered tanks and cake pad). As a precautionary principle a risk assessment has been undertaken.	**Yes – qualitative screening assessment is provided in response to Q6-7 below.**
Accidental Releases	⇨	Airborne Overland runoff / infiltration / percolation	⇨	Residential housing – north, east, south, west Public amenity areas Schools Hospitals Industrial /commercial sites Habitat sites – non statutory designations Protected species Global atmosphere Ground / groundwater Surface water	Pollution prevention infrastructure, operational control and management techniques (including as part of the EMS) are in place to prevent accidents and other unplanned events with environmental consequences, or, in the event that these do occur to minimise or mitigate the environmental impacts.	**Yes – accident management plan is provided in response to Q6-8 below**
Point source emissions to sewer	⇨	Release to River Rother via WwTW	⇨	Habitat sites – non statutory designations Protected species Ground / groundwater Surface water	All process liquids, cleaning washwater and surface water runoff is returned to Woodhouse Mill WwTW (outside of the scope of this permit application) for full treatment prior to discharge to the River Rother.	**Yes - YW is committed to undertaking a period of monitoring in order to characterise the liquors returned to the WwTW. Further detail is provided in response to Q 6-9 below.**

Q 6-1 Habitats risk assessment requirements

There are no European designated habitat sites within 10km of the installation. There are no nationally designated conservation sites within 2km of the installation.

Therefore, no impacts on designated habitat sites are expected as result of permitted activities at Woodhouse Mill STF. A habitats risk assessment is not required.

Q 6-2 Summary of the Odour Impact Assessment

A qualitative odour risk assessment has been undertaken to assess the risk of odours from Woodhouse Mill STF on the surrounding area. This assessment has indicated that only one considered sensitive receptor is exposed to a moderate adverse odour effect with the remaining thirteen receptors, including the residential areas to the south-west, east and west, are exposed to either a slight adverse or negligible adverse odour effect. The receptor that is potentially exposed to a moderately adverse odour effect is located adjacent to the works south boundary. The moderately adverse odour effect is attributed to the high pathway risk due to the close distance to the site boundary and being in a high wind frequency direction.

Whilst the Woodhouse Mill WwTW has received odour complaints over the past 5 years, YW site operational staff have indicated that these have been related to the WwTW inlet works and not associated with sludge treatment activities. Complaints have been relatively infrequent (27 complaints over the past 5 years) and reported sporadically throughout the year, which suggest that are likely to be attributed to ad-hoc events and are not associated with normal operation.

A site-specific odour survey local to the STF was undertaken which included boundary monitoring and sniff tests around key locations on site. As part of the odour survey, hydrogen sulphide was identified above the recognition concentration threshold of 0.0047 ppm around centrifuges and dewater feed tanks located in the east and south parts of the site. However, the survey identified that the hydrogen sulphite concentrations are diluted when they reach the site boundary. The odour survey also identified that the majority of samples were assessed as “no odour” or “faint”. Only 2 samples around the dewater feed tanks and cake pad were associated with a “distinct” odour which has been attributed to odour from the centrifuge discharges, located in the east and south-east part of the works. However, no odour was subjectively noted at or close to downwind boundaries. The results of the boundary monitoring and sniff tests indicate that it is unlikely that the STF odours have an adverse effect on surrounding sensitive receptors.

For the overall site, taking into consideration the findings of the odour survey and the odour risk assessment, it is considered than Woodhouse Mill STF does not have an adverse odour effect on its surrounding receptors.

Q 6-3 Summary of the Air Emissions Risk Assessment

An Air Emission Risk Assessment (AERA) utilising atmospheric dispersion modelling has been undertaken to support this application; the full AERA report is provided as Appendix 7.

The scope of the assessment is limited to the point source combustion emissions to air at the Installation, specifically biogas combustion plant comprising two Combined Heat and Power (CHP) plant units and one boiler. Consistent with Environment Agency (EA) guidance (Environment Agency, 2021), for a gas engine fired on biogas, the principal release of oxides of nitrogen (NOx) have been assessed alongside sulphur dioxide (SO_2) due to the potential sulphur content of biogas.

The assessment concludes that, in relation to human health, where impacts are not classified as 'insignificant' (i.e. Process Contribution (PC) less than 1% of the EAL for long-term concentrations or 10% for short-term) the predicted impacts of the Installation do not lead to any exceedances of EALs and do not constitute 'significant pollution'.

In relation to the impact of the Installation on ecologically sensitive sites, there are no international or national designated sites within the distances requiring assessment under the Environment Agency's Air Emissions Risk Assessment Guidance. At all local designated sites, the predicted PCs from the Installation are less than 100% of the applicable annual CLe or CLo. Therefore, the impacts of the Installation are considered 'insignificant' at all designated ecological sites.

Q 6-4 Summary review of abatement plant

YW operates an OCU at Woodhouse STF, this represents a key abatement asset within the permitted installation. The use of effective controls in respect of odour at the installation is evidenced by the site's operational history and lack of odour complaints.

In line with the findings of the qualitative environmental risk assessment (Tables C2: 6-1, 2 and 3 above), a review of odour emissions from the OCU abatement plant has been carried out on behalf of YW by a specialist contractor. The findings of this study have been reviewed in order to determine the need for any additional assessment or works. The findings are summarised below in Table C2: 6-4, which sets out the results of monitoring of inlet, midpoint (after the biofilter but prior to the carbon scrubber) and outlet measurements taken at the OCU.

Table C2:6-4 Risk based review of abatement plant effectiveness

OCU inlet and outlet odour results		Discussion
Emissions: Olfactometric results (mean of 4 samples over 2 days)		
Inlet odour (ou_E/m^3)	23,567	Equipment operating effectively with very low outlet odour emissions. Direct air samples and air were collected via by either the lung method (for OCUs) or by Lindvall hood (for cake samples) in accordance with BS EN 13725:2003 Air Quality - Determination of odour concentration by dynamic olfactometry. Analysis was undertaken within 30 hours of collection at a UKAS accredited laboratory.
Midpoint odour (ou_E/m^3)	488	
Stack outlet odour (ou_E/m^3)	56	
Emissions: H_2S – Hydrogen Sulphide (mean of 4 samples over 2 days)		
Inlet H_2S (ppm)	1.6	Equipment operating effectively with H_2S not present or below Limit of Detection (LOD) at stack outlet. Sampling methodology using Jerome Hydrogen Sulphide analyser
Midpoint H_2S (ppm)	0.02	
Stack outlet H_2S (ppm)	0	
Emissions: NH_3 – Ammonia (mean of 4 samples over 2 days)		

OCU inlet and outlet odour results		Discussion
Inlet NH_3 (ppm)	<0.1	Ammonia concentrations not present or below Limit of Detection (LOD) at all locations. Sampling methodology using Gastec hand operated gas detection tubes.
Midpoint NH_3 (ppm)	<0.1	
Stack outlet NH_3 (ppm)	<0.1	
Emissions: Total VOC (mean of 4 samples over 2 days)		
Inlet TVOC (ppm)	2.1	Equipment operating effectively with TVOC emissions not present or below Limit of Detection (LOD) at stack outlet. Sampling methodology using Phocheck Tiger PID.
Midpoint TVOC (ppm)	0.1	
Stack outlet TVOC (ppm)	<0.1	
Emissions: Thiols (RSH) / Mercaptans (mean of 4 samples over 2 days)		
Inlet R-SH (ppm)	0.4	Equipment operating effectively with R-SH emissions not present or below Limit of Detection (LOD) at stack outlet. Sampling methodology using Gastec hand operated gas detection tubes.
Midpoint R-SH (ppm)	<0.1	
Stack outlet R-SH (ppm)	<0.1	
Emissions: Dimethyl Sulphide (mean of 4 samples over 2 days)		
Inlet DMS (ppm)	<0.1	CH_3 concentrations not present or below Limit of Detection (LOD) at all locations. Sampling methodology using Gastec hand operated gas detection tubes.
Midpoint DMS (ppm)	<0.1	
Stack outlet DMS (ppm)	<0.1	
Process monitoring: OCU Airflow Rate (mean of 4 samples over 2 days)		
Inlet air volume (m^3/hr)	4,296	Equipment operating effectively
Midpoint air volume (m^3/hr)	4,296	
Stack outlet air volume (m^3/hr)	4,296	
Covered tank pressure measurements		
Thickener feed tank 1 (Pa)	-79	The differential pressure measurements show that there is extremely effective extraction from the two sludge blend tanks and that the digester feed tanks achieve a high level of odour containment. No odour was detectable around the assets served by the OCU during the survey visits
Thickener feed tank 2 (Pa)	- 100	
Digester feed tank 1 (Pa)	-7	
Digester feed tank 2 (Pa)	-7	

Results of measurements taken indicate that the OCU is working extremely effectively and it has been concluded that no further assessment is required in respect of point source emissions from the OCU.

Q 6-5 Summary of the Noise Impact Assessment

Potential sources of noise resulting from the activities proposed in this variation application, have been identified and assessed in Table C2: 6-5. Further detail is provided in Appendix 9. For scoring mechanism refer to Q 6-10.

Table C2:6-5: Noise risk assessment

Hazard	Receptor	Pathway	Risk Management Techniques	Probability of Exposure	Consequence	Overall Risk
Noise: CHP	Residential / Ecological	Airborne	The equipment is containerised in a high performance acoustically treated enclosure and designed for external applications. The door is kept closed at all times, except for maintenance. Plant is located a significant distance from receptors. Plant is located such that surrounding structures provide some acoustic screening of noise sources. 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.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: CHP Exhaust	Residential / Ecological	Airborne	Enclosure mounted exhaust silencer. Plant is located a significant distance from receptors. 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.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: Fans on air cooled radiators	Residential / Ecological	Airborne	Fans subject to regular checks and maintenance. Plant is located such that surrounding structures provide some acoustic screening of noise sources. Plant is located a significant distance from receptors. Good maintenance of plant to ensure that excessive noise levels are not generated from equipment breakdown or wear and tear (e.g. fan motor bearing failure), under Operations & Maintenance contract.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: Digesters (Gas Mix Compressors)	Residential	Airborne	Good maintenance of plant to ensure that excessive noise levels are not generated. 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.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: Mixing Pumps	Residential	Airborne	Good maintenance of plant to ensure that excessive noise levels are not generated Plant is located a significant distance from receptors and located such that surrounding structures provide some acoustic screening of noise sources.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: Vehicular movements around site	Residential / Ecological	Airborne	Vehicles will be partially screened from receptors by buildings/structures and topography. Deliveries would take place during the daytime hours only when background sound levels are higher.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low

Q 6-6 Review of emissions of substances from diffuse and point sources (excluding odour and combustion)

It is recognised that emissions of organic compounds may arise from uncovered sludge sources (including uncovered tanks and the cake pad) as well as from the OCU on site. This includes ammonia, hydrogen sulphide, volatile organic compounds (VOCs) and methane. Odour is considered separately (refer to Appendix 10 – Odour Management Plan). Furthermore, it is noted that BAT conclusion 14d specifies that diffuse emissions should be contained, collected and treated. Table C2: 6-6 summarises the BAT assessment undertaken.

Table C2: 6-6: Review of diffuse and point source emissions

Sludge source	Existing emissions controls	BAT assessment
Screening skip	Due to the small footprint, skips are not thought to give rise to odour issues arising at the boundary.	BAT not in place – skips will be covered
Thickener feed tanks x 2	Tank is covered and headspace air is extracted and treated – see below for comments in relation to the OCU.	BAT in place – see below for comments in relation to the OCU.
Drum thickeners	Thickener units are enclosed and located within a building. Air from thickener units is extracted and treated in OCU.	BAT in place – see below for comments in relation to the OCU.
Digester Feed tanks x 2	Tank is covered and headspace air is extracted and treated – see below for comments in relation to the OCU.	BAT in place – see below for comments in relation to the OCU.
Odour control unit	Tank and thickener headspace air is extracted and treated in an OCU. The OCU is working effectively - refer to Q6-4 above. OCU will be managed and monitored in accordance with the Odour Management Plan (Appendix 10).	BAT in place
Dewatering Feed Tanks x 3	Tanks are not covered.	Tanks will be covered. It is noted that digested sludge sources are inherently lower emissions generation potential and therefore residual biogas potential and emissions testing will be undertaken to determine the most appropriate type of cover, including emissions capture or abatement if required. Refer to proposed improvement programme.
Centrifuges	Centrifuge units are enclosed and located within a cabin.	No further mitigation is proposed due to small footprint of this source and inherently lower emissions generation potential of digested sludge sources.

Sludge source	Existing emissions controls	BAT assessment
Screening skip	Due to the small footprint, skips are not thought to give rise to odour issues arising at the boundary.	BAT not in place – skips will be covered
Top water and return liquors sump	Sump located within a building.	No further mitigation is proposed – sump is located within a building. The building is not regularly accessed and doors are kept closed.
Cake storage and maturation pad	Not covered.	No further mitigation is proposed - digested sludge sources have inherently lower emissions generation potential; the use of enclosed buildings for cake storage is constrained by the volume of waste.

Q 6-7 Bioaerosol screening assessment

Bioaerosols are defined as micro-organisms suspended in the air and can include bacteria, fungi and viruses, or parts of living organisms, such as spores and plant pollen. Bioaerosols are usually smaller than 10µm in diameter and can cause human health impacts such as allergic responses and inflammation. Bioaerosols are naturally present in the air, but they are also associated with organic waste treatment processes including composting, mechanical biological treatment, and potentially some aspects of anaerobic digestion (AD) which are widely used in the UK.

There is minimal regulatory guidance available for assessing bioaerosol emissions from AD facilities. Regulatory Position Statement 031[2], states that bioaerosol concerns would normally be associated with composting activities, and in particular:

'Operations…likely to result in the uncontrolled release of high levels of bioaerosols' are defined as including '*the shredding of waste and the turning of waste in the sanitisation, stabilisation and maturation stages of composting where these operations are not contained or are not subject to exhaust ventilation and scrubbing/filtering'*.

These activities do not take place at Woodhouse Mill STF. Furthermore, Environment Agency guidance (2012)[3] states that:

"We do not consider that bioaerosols from anaerobic digestion are a serious concern.

However, the most recent guidance[4] requires that biological waste treatment facilities provide a site-specific bioaerosol risk assessment if there are sensitive receptors within 250m of activities, regardless of the specific processes carried out at a site. It is noted that the consensus from various studies is that bioaerosols from composting activities decline rapidly within the first 100 metres from a site and generally decline to background levels within 250m[5]. Technical Guidance Note M9[6] states that receptors located more than 250m away should be discounted as they are not likely to be affected.

The nearest residential housing is located approximately 175m to the east, with other residential housing approximately 200m to the southeast and 215m to the southwest. There are local amenity areas located within 250m of the installation boundary including playing fields, which are located, at their closest point, approximately 225m to the west, Woodhouse Washlands local wildlife site located 75m to the south and Treeton Dyke local wildlife site located 75m to the northeast. There are industrial / commercial receptors located closer to the site including industrial premises and the Princess Royal Hotel on the opposite side of Retford Road, less than 50m to the south of the installation boundary. A hand car wash is located approximately 100m to the west of the installation and an industrial estate (under construction) 125m to the southeast. Risks associated with industrial/commercial receptors are likely to be less significant due to the relatively shorter duration of exposure.

A review of the potential for impact from bioaerosols as a result of activities at Woodhouse Mill STF has been undertaken. 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. This is summarised in Table C2: 6-7 overleaf.

[2] Environment Agency. 2011. Composting and potential health effects from bioaerosols: our interim guidance for permit applicants. Regulatory Position Statement 031.
[3] Environment Agency. 2012. Guidance for developments requiring planning permission and environmental permits.
[4] Environment Agency, consultation draft July 2020, Appropriate measures for the biological treatment of waste.
[5] Environment Agency. 2011. Composting and potential health effects from bioaerosols: our interim guidance for permit applicants. Regulatory Position Statement 031.
[6] Environment Agency TGN M9 'Environmental Monitoring of Bioaerosols at Regulated Facilities', July 2018.

Table C2: 6-7: Review of potential bioaerosol sources and associated risk

Source	Source controls	Pathway	Receptors	Overall risk
Raw sludge handling, including storage/mixing, thickening and digestion	Sludge is fully enclosed within tanks or pipework at all times. Displaced air is extracted and dispersed to atmosphere via a two-stage odour control unit (OCU) (see separate entry below).	None	Residential housing within 250m to the east / southeast and west / southwest. Amenity areas within 250m including playing fields to the west and local wildlife sites to the south and to the northeast. Industrial / commercial sites within 250m including industrial premises and the Princess Royal Hotel less than 50m to the south, a hand car wash to the west and an industrial estate (under construction) to the southeast.	No risk present – sludge is fully enclosed
Odour control unit	Air from thickener feed tanks, drum thickeners and digester feed tanks is treated via a two-stage OCU comprising biofilter and activated carbon filtration prior to discharge to atmosphere. OCU subject to monitoring programme and planned maintenance to ensure effective operation.	Airborne dispersion		Low
Emergency scenario – biogas venting	As the sludge digestion process is a wet process, biogas is unlikely to contain significant concentrations of bioaerosols. Venting events infrequent and short-lived.	Airborne dispersion		Low
Emergency scenario – Sludge spillage	Sludge is wet, does not produce dust and is not readily susceptible to airborne dispersion. Events occur infrequently and in almost all cases will involve small quantities of sludge. Major/catastrophic loss is highly unlikely to occur. Emergency response procedures are in place to ensure such incidents are responded to promptly and spilt material is cleaned up.	Airborne dispersion		Low
Digested sludge dewatering feed tanks (uncovered) x 3	Sludge is wet, does not produce dust and is not readily susceptible to airborne dispersion. Sludge contained within the dewatering feed tanks has been processed at high temperature in the digesters, achieving high levels of pathogen kill. Bioaerosols generation potential is therefore very low.	Airborne dispersion		Low to moderate
Digested sludge dewatering centrifuges	Digested sludge has been processed at high temperature in the digesters, achieving high levels of pathogen kill. Bioaerosol generation potential is therefore very low. Sludge cake is wet (approximately 25% solids content), does not produce dust and is not readily susceptible to airborne dispersion.			Low to moderate

Source	Source controls	Pathway	Receptors	Overall risk
Digested sludge cake handling (and, as a contingency measure, possible short-term storage) – cake pad	Digested sludge has been processed at high temperature in the digesters, achieving high levels of pathogen kill. Bioaerosol generation potential is therefore very low. Sludge cake is wet (approximately 25% solids content), does not produce dust and is not readily susceptible to airborne dispersion. The cake is delivered to the cake pad, moved into windrows for storage and is then left undisturbed until removal from site.	Airborne dispersion	Residential housing within 250m to the east / southeast and west / southwest. Amenity areas within 250m including playing fields to the west and local wildlife sites to the south and to the northeast. Industrial / commercial sites within 250m including industrial premises and the Princess Royal Hotel less than 50m to the south, a hand car wash to the west and an industrial estate (under construction) to the southeast.	Low to moderate
As a contingency measure handling and possible short-term storage of undigested sludge cake – cake pad	Sludge cake is wet (approximately 25% solids content), does not produce dust and is not readily susceptible to airborne dispersion. The cake is delivered to the cake pad and is then left undisturbed until treatment and/or removal from site.	Airborne dispersion		Low to moderate (depending on the frequency of occurrence)
Vehicle tracking of materials around on the cake pad and roads, which could dry out and disperse	Regular washdown and wetting in order to reduce dust and keep pad area clean.	Airborne dispersion		Low
Emergency scenario – Sludge cake spillage	Sludge is wet (approximately 25% solids content), does not produce dust and is not readily susceptible to airborne dispersion. Events occur infrequently and in almost all cases will involve small quantities of sludge. Major/catastrophic loss is highly unlikely to occur. Emergency response procedures are in place to ensure such incidents are responded to promptly and spilt material is cleaned up.	Airborne dispersion		Low

Bioaerosol monitoring

As there are residential, amenity and workplace receptors within 250m of the installation boundary, YW has undertaken quantitative bioaerosols monitoring in accordance with Technical Guidance Note M9 'Environmental Monitoring of Bioaerosols at Regulated Facilities'. This monitoring exercise was carried out by Element Materials Technology Environmental UK Ltd on 17th August 2022. Sampling was undertaken at eight locations on site, with three parallel samples collected per location. The median concentration of total bacteria and of *Aspergillus fumigatus* was found to be below the guidance limit (1000 and 500 CFU/m^3 respectively) at all of the sampling locations.

Bioaerosol Risk Assessment - conclusions

The bioaerosol risk assessment undertaken concludes that the Woodhouse Mill STF installation is unlikely to be a significant source of bioaerosols. This is due to:

- All potential bioaerosol sources at Woodhouse Mill STF are wet, do not produce dust and are not readily susceptible to airborne dispersion.
- Digested sludge has been processed at high temperature via the digesters achieving high levels of pathogen kill. Bioaerosol generation potential from digested sludge sources is therefore very low.
- Undigested sludge sources are fully contained with displaced air extracted and treated in a two-stage biofilter prior to release to atmosphere.

The consensus of studies is that bioaerosols decline to background levels within 250m and guidance states that receptors located more than 250m away should be discounted as they are not likely to be affected. However, there are a significant number of potential bioaerosol receptors located within 250m of Woodhouse Mill STF. This includes residential housing, industrial and commercial sites and local amenity areas. Therefore, as a precautionary measure given the proximity of potential receptors, YW has undertaken quantitative bioaerosol monitoring in accordance with Technical Guidance Note M9 'Environmental Monitoring of Bioaerosols at Regulated Facilities'. The median concentration of total bacteria and of *Aspergillus fumigatus* was found to be below the guidance limit (1000 and 500 CFU/m^3 respectively) at all sampling locations.

On this basis, further bioaerosol monitoring at Woodhouse Mill is not deemed necessary as adequate control measures are already in place to minimise the release of bioaerosols as a result of permitted activities. This conclusion is consistent with Environment Agency guidance which states that this topic is not typically a material consideration for AD activities such as that carried out at Woodhouse Mill STF.

Q 6-8 Accident Management Plan

The potential for accidental releases resulting from the activities proposed in this variation application are identified and assessed in Table C2: 6-8 below. This includes a summary of measures in place to manage/reduce accident risks. Refer to Q 6-10 for the scoring mechanism.

Table C2: 6-8: Potential accidental releases and associated risk

What harm can be caused and who can be harmed			**Managing the risk**	**Assessing the risk (after preventative controls)**		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Site Wide - general						
Flooding leading to damage to site processes and/or mobilisation of polluting materials	Ground / groundwater / surface waters	Floodwaters / Infiltration	**Preventative controls** • Flood risk review undertaken. Parts of the STF installation lie within Flood Zone 2 (land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding), and parts lie within Flood Zone 3 (Land having a 1 in 100 or greater annual probability of river flooding). • Materials are stored in appropriately sealed containers (bulk or semi-bulk), or proprietary secondary containment cabinets, such that the risk of contents being mobilised or containers being washed away in a flood event is low. • Vulnerable Asset Protection Plan specifically details flooding actions including how river levels should be monitored and what actions are required. • **In the event of an incident/accident** • Initiate site emergency plan. • Remove mobile fuel/ chemical sources away from flood risk, if appropriate and safe to do so.	Likely	Medium	Moderate risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Flooding due to drain blockages and/or excessive rainfall causing localised on-site surface water flooding leading to damage to site processes and/or mobilisation of polluting materials	Ground / groundwater / surface waters	Floodwaters / Infiltration	**Preventative controls** • Drains are monitored for blockages and cleaned as required. • Materials are stored in appropriately sealed containers (preferably bulk or semi-bulk), or proprietary secondary containment cabinets, such that the risk of contents being mobilised or containers being washed away in a flood event is low. • Vulnerable Asset Protection Plan specifically details flooding actions. • Planned maintenance / inspection of site drainage systems. **In the event of an incident/accident** • Initiate site emergency plan. • Remove mobile fuel/ chemical sources away from flood risk, if appropriate and safe to do so.	Unlikely	Mild	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Fire	Nearby human receptors Local air quality and global climate impacts Ground / groundwater / surface waters	Air Overland runoff / infiltration / drainage systems	**Preventative controls** • Regular maintenance of equipment; LDAR programme in place. • Fire alarms are fitted in CHP cabinets and boiler house • DSEAR assessment has been completed for site and only appropriate ATEX rated equipment may be used in high-risk areas. • Access controls in place for digester compound and portable gas monitor use required when inside compound. • Site does not treat combustible wastes. Sludge is wet. • Gas slam shut valves on biogas feeds to the CHP / boiler • Gas and fire detection in the boiler house and CHP enclosure, and other key AD plant areas • Lightning protection provided for biogas storage. **In the event of an incident/accident** • Follow site emergency procedure. • Hydrants connected to a final effluent supply can be used by the fire service. • Excess biogas created by the site will be burnt through the flare.	Highly unlikely	Severe	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Failure to contain firewater following fire / explosion event leading to localised on site surface water flooding leading to damage to site processes and/or mobilisation of polluting materials	Ground / groundwater / surface waters	Floodwaters / Infiltration	**Preventative controls** • Site drainage collects and returns surface/yard water to WwTW for treatment. Small areas of surface water runoff within the installation are currently drained to the WwTW FSTs. These drains will be redirected to the WwTW inlet (see Improvement Programme). • Site drainage systems, hardstanding, sumps, storm tanks etc will minimise flow of firewater to receptors. **In the event of an incident/accident** • Initiate site emergency procedure.	Highly unlikely	Medium	Low risk
Excessively low temperatures leading to blockages or damage to pipework, valves or equipment and unplanned release of gas with fire / explosions risks and/or release of potentially polluting liquids	Nearby human receptors Local air quality and global climate impacts Ground / groundwater / surface waters	Air Overland runoff / infiltration / drainage systems	**Preventative controls** • 'Winterisation' procedures. • Bunding provided to environmentally critical plant and equipment. • Current YW technical standards include trace heating for vulnerable pipework. **In the event of an incident/accident** • Isolate systems as appropriate and initiate fire, spill and emergency response procedures, cleaning up spill and disposal of wastes appropriately. • Carry out repairs (as required).	Unlikely	Mild	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Generalised or localised power failure leading to failure of pumps / control systems and escape of sludge and/or biogas	Nearby human receptors Local air quality and global climate impacts Ground / groundwater / surface waters	Air Overland runoff / infiltration / drainage systems	**Preventative controls** • Process for recovering from power failure has been planned and recorded. • In the event of power failure, sludge transfers will stop but this will not affect security of containment e.g., tanks will not overflow. **In the event of an incident/accident** • Halt sludge imports to site. • Confirm backup power supply is online. • Confirm that all systems are operating normally.	Unlikely	Mild	Low risk
Vandalism / site security failure leading to unplanned release of gas with fire / explosions risks and/or release of potentially polluting liquids (chemicals, oils, sludges)	Nearby human receptors Local air quality and global climate impacts Ground / groundwater / surface waters	Air Overland runoff / infiltration / drainage systems	**Preventative controls** • High level of security on site with 24 hr security monitoring, secure entry gate systems and locked cabs and control units. • In addition to perimeter fencing around site, key digestion equipment sits within a separate fenced area. • Storage containers bunded. **In the event of an incident/accident** • Isolate systems as appropriate and initiate fire, spill and emergency response procedures, cleaning up spill and disposal of wastes appropriately. • Carry out repairs (as required). • Review security measures on site.	Highly unlikely	Mild	Negligible risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Failure of chemical or oil containment due to deterioration of storage containers, pipework or valves leading to spillage	Ground / groundwater / surface waters	Overland runoff / infiltration / drainage systems	**Preventative controls** • All oil storage and waste oil storage tanks are fully bunded (using either fixed or mobile bunds). • Joints external to containment minimised where possible. • Tank and pipework inspections undertaken as part of routine maintenance. • Operational procedures for refilling oil and chemical storage tanks. Spill kit to be available at tanks. • Any oil spilt around engines during maintenance will be cleaned up and disposed of appropriately. **In the event of an incident/accident** • Isolate systems as appropriate and initiate spill response procedure, cleaning up spill and disposal of wastes appropriately. • Carry out repairs (as required). • Review systems to prevent recurrence.	Unlikely	Mild	Low risk
Failure of chemical or oil containment during delivery	Ground / groundwater / surface waters	Overland runoff / infiltration / drainage systems	**Preventative controls** • Delivery procedures inc. supervision by site staff, check on space available in receiving tank. • Storage containers bunded. • Chemical/oil storage only in area surrounded by hardstanding with all drainage directed to WwTW. **In the event of an incident/accident** • Follow incident plan.	Unlikely	Mild	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Vehicle impact leading to loss of pressurised gas and explosion / fire risk or loss of liquid containment (chemicals, oils, sludges)	Nearby human receptors Contribution to local air pollution and global warming Ground / groundwater / surface waters	Air	**Preventative controls** • Site speed limits in place to reduce chance and consequence of collision. • Tanker discharge point and access to this area are controlled by manned security point at main site entrance. • Key areas including have barriers to prevent collision with equipment. • Key digestion assets including digestion tanks are set back from road and surrounded by a fence. • Site drainage will capture spills related to pipe failure. **In the event of an incident/accident** • Isolate systems as appropriate and initiate fire, spill and emergency response procedures, cleaning up spill and disposal of wastes appropriately. • Carry out repairs (as required)	Highly unlikely	Medium	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Excessive noise from plant or equipment e.g., due to equipment deterioration or failure	Nearby human receptors	Air	**Preventative controls** • Procurement controls mean plant are selected to comply with relevant noise limits. • Regular maintenance completed to ensure equipment operates within normal noise parameters. • Acoustic enclosures / controls on some noise generating plan (e.g. compressors) • Sensitive receptors not located within close proximity to the site. Refer to Table C2:6-2 for summary of sensitive receptors. **In the event of an incident/accident** • Investigate cause and implement preventive measures, which may include system maintenance interventions.	Unlikely	Mild	Low risk
Site wide - sludge pipework, tanks, valves						
Spillage of sludge during transfer / handling activities	Ground / groundwater / surface waters	Overland runoff / infiltration / drainage systems	**Preventative controls** • Staff training on system operation. • Hardstanding in key/high risk areas. • Site drainage returns surface runoff to WwTW. Small areas of surface water runoff within the installation are currently drained to the WwTW FSTs. These drains will be redirected to the WwTW inlet (see Improvement Programme). **In the event of an incident/accident** • Isolate systems as appropriate and initiate spill response procedure, cleaning up spill and disposal of wastes appropriately.	Likely	Minor / negligible	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Failure (cracks, splitting) of underground pipework (e.g. fuel, chemicals, sludge, site drains)	Ground / groundwater / surface waters	Infiltration	**Preventative controls** • Existing underground pipework will be periodically surveyed using in-pipe crack detection technology. • Where new pipework at the site has to be underground, the containment provision will be risk assessed and appropriate design specification implemented, which may include secondary containment and leak detection. **In the event of an incident/accident** • Damaged pipe will be isolated. • Spill management procedure will be followed. • Repairs to damaged pipework will be arranged.	Unlikely	Medium	Moderate/Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Minor failure of sludge storage tanks / digester tanks e.g., tank overtopping, pipework leaks	Ground / groundwater / surface waters	Overland runoff / infiltration / drainage systems	**Preventative controls** • High level probes to prevent overfilling of tanks, overflow pipework is in place as a failsafe. • Trace heating is provided to tank level gauges to prevent freezing and reduce the risk of false readings. • Site is monitored on a daily basis. • Infrastructure maintenance and inspections. • Protective measures as for sludge spillage. • Site drainage returns to WwTW. Small areas of surface water runoff within the installation are currently drained to the WwTW FSTs. These drains will be redirected to the WwTW inlet (see Improvement Programme). • Refer to Appendix 11 for details of secondary containment risk assessment. **In the event of an incident/accident** • Isolate systems as appropriate and initiate spill response procedure, cleaning up spill and disposal of wastes appropriately. • Arrange repairs.	Likely	Minor / negligible	Minor risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Major failure of digester or other sludge storage tank or associated pipework leading to large scale sludge loss/spillage	Ground / groundwater / surface waters	Overland runoff / infiltration / drainage systems	**Preventative controls** • Design and construction of assets is governed by relevant YW technical standards to ensure it is fit for purpose. • Infrastructure maintenance and inspections. • Existing and planned bunding/secondary containment (Refer to Appendix 11 secondary containment risk assessment). • Site drainage returns to WwTW. Small areas of surface water runoff within the installation are currently drained to the WwTW FSTs. These drains will be redirected to the WwTW inlet (see Improvement Programme). **In the event of an incident/accident** • Cancel all sludge deliveries to site. • Isolate systems as appropriate and initiate spill response procedure, cleaning up spill and disposal of wastes appropriately.	Highly unlikely	Severe	Moderate/Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Biogas pipework, valves, vents						
Failure of biogas pipework, valves and biogas holder (corrosion, cracks, material defects etc) leading to **minor** release of biogas and slight fire / explosion risk	Nearby human receptors Local air quality and global climate impacts	Air	**Preventative controls** • Design and construction of pipework is governed by relevant YW technical standards to ensure it is fit for purpose. • Most biogas pipework operates at low pressures. • Pipework/gas holders protected from excessive pressure by pressure relief valves. • Pipework is above ground where possible to facilitate inspection and maintenance. • Maintenance schedule defined as part of LDAR strategy at site. • Requirements around use of ATEX rated equipment control risk of leak leading to fire/explosion. **In the event of an incident/accident** • Consider need to isolate pipework. • Consider need to initiate emergency response procedures. • Arrange repair to affected asset.	Unlikely	Minor / negligible	Negligible risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Failure of biogas pipework, valves and biogas holder (corrosion, cracks, material defects etc) leading to major release of biogas and fire/ explosion risk	Nearby human receptors Local air quality and global climate impacts	Air	**Preventative controls** • Design and construction of pipework is governed by relevant YW technical standards to ensure it is fit for purpose. • Most biogas pipework operates at low pressures. Pipework/gas holders protected from excessive pressure by pressure relief valves. • Pipework is above ground where possible to facilitate inspection and maintenance. • Maintenance schedule defined as part of LDAR strategy at site. • Requirements around use of ATEX rated equipment control risk of leak leading to fire/explosion. • Standard operational H&S requires staff to wear personal gas monitors at all times, these will detect large scale leakage from pipes. (PPE and personal gas detectors represent the final layer of protection from a safety perspective and are not relied upon for detection). **In the event of an incident/accident** • Immediately follow safety control mechanisms in place to isolate pipework / equipment. • Consider need to initiate emergency response procedures.	Highly Unlikely	Medium	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Breakdown or other damage to on site gas consumers e.g. CHP/boiler leading to disposal of biogas without energy recovery	Nearby human receptors Local air quality and global climate impacts	Air	**Preventative controls** • Site is designed to minimise risk of uncontrolled release to air. • Operational and maintenance controls in place to ensure reliability of equipment and minimise requirement to send biogas to flare. • There are two CHP engines and one boiler with biogas firing capability, therefore flaring rarely occurs. **In the event of an incident/accident** • Any remaining capacity on on-site gas storage will fill. • Once gas storage is full flare will operate, ensuring proper combustion of biogas. • If flare fails, gas will vent through PRVs to prevent damage to site gas system.	Unlikely	Mild	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Failure of flare leading to release of unburnt biogas to atmosphere	Nearby human receptors Local air quality and global climate impacts	Air	**Preventative controls** • Flare only used as backup in event of problems elsewhere on site. • Operational and maintenance controls in place to minimise requirement to send biogas to flare. • Flare has control system that ensures ignition e.g., flame detection. • Maintenance programme in place to ensure that flare is always in good operational condition. **In the event of an incident/accident** • Raise urgent maintenance request for repairs to flare. • If flare fails, valve will automatically shut down flow of gas to flare. • Once all site gas containment is full, pressure will release through PRVs to prevent damage to equipment and uncontrolled release of biogas.	Unlikely	Mild	Low risk
Incorrect setting or damage to emergency pressure relief valves leads to premature release of gas or valve fails to reseat after release leading to uncontrolled release of biogas to atmosphere	Local air quality and global climate impacts	Air	**Preventative controls** • Inspection and maintenance of PRVs carried out on a routine basis to ensure they are set and operate correctly. • Checks on PRVs part of normal operational routine. • Over-pressure alarms in control system will alert site staff to incidents that could trigger PRV release. **In the event of an incident/accident** • Follow management procedures to ensure that the valves are re-seated/pressure setting adjusted rapidly and without putting staff at risk.	Unlikely	Minor / negligible	Negligible risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Digester foaming blocks gas lines, leading to release of biogas and/or foam through PRVs	Local air quality and global climate impacts	Air	**Preventative controls** • Feed rate to digesters is controlled to prevent organic overloading. • Digester mixing is regularly assessed as part of operational checks to ensure that it is functioning effectively. • Feedstock assessment ensures that nature and quality of feedstock is understood. • Final effluent spray / Anti-foam system is fitted to digesters to control foaming. **In the event of an incident/accident** • Follow site procedures for dealing with foaming. • Investigate cause and implement preventive measures. • Ensure that PRVs are not blocked with foam and operating correctly to protect tanks. • Ensure PRVs reseat once pressure in headspace returns to normal levels.	Unlikely	Mild	Low risk
Spillage / loss of containment of liquids	Ground / groundwater / surface waters	Overland runoff / infiltration / drainage systems	**Preventative controls** • Checks on condensate traps and valves are part of regular operational routine. • Condensate runs to site drainage for treatment. • Digester operation is controlled to minimise risk of foaming, which could lead to blockages on condensate system. **In the event of an incident/accident** • Clear up any spills. • Ensure all valves are operating correctly.	Unlikely	Minor / negligible	Negligible risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Sludge treatment processes						
Import of sludge which does not meet waste acceptance criteria leading to disruption to sludge treatment processes	Ground	Spread to land as part of disposal	**Preventative controls** • YW control all sites supplying sludge. Only sewage sludge is imported to Woodhouse Mill STF (either at the head of the works outside of the permitted installation, or occasionally directly into the STF), this has a consistent composition and comes from carefully controlled treatment processes. • Prior to initial acceptance of sludge from a new YW site, a screening assessment will be completed to confirm it is safe and stable. • JRP-WaSP system records the dry solids, volume and origin of every import brought to site. • Site operators and tanker drivers are trained to identify problem sludges and divert them to alternative sites for treatment. **In the event of an incident/accident** • Digester health will be investigated to understand cause of problem and best route to resolution. • Digestate being removed from digesters will be subject to enhanced monitoring to ensure that there is no environmental risk. Note this is also a HACCP requirement. • Where relevant the Environment Agency will be alerted that a problem has occurred. • The root cause of the problem will be investigated and procedures updated so that the incident cannot recur.	Unlikely	Minor / negligible	Negligible risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Sludge contamination leading to inhibition of microbial activity / process disruption and insufficient digestion	Ground	Spread to land as part of disposal	**Preventative controls** • Management controls to identify potentially problematic sludges at source. • All sludge imports are from YW sites where sludge characteristics are very stable. • Contamination levels would need to be very severe to significantly impact digestion processes due to the very large digester volume. **In the event of an incident/accident** • Assess digester content to decide best route to normal digester health. • Sample cake prior to export from site to confirm it is safe to spread to land. • Review acceptance procedures.	Highly Unlikely	Medium	Low risk
Excessive feeding of digester leads to reduced retention time and failure to meet pathogen kill requirements	Ground / groundwater / surface waters	Spread to land as part of disposal	**Preventative controls** • Staff training • Digesters have a maximum feed interlock ensuring that a set daily feed volume cannot be exceeded. This limit has been calculated to ensure digester stability and environmental safety. • HACCP monitoring. **In the event of an incident/accident** • Turn off digester feed. • Stop additional sludge imports until normal operational situation returns.	Highly Unlikely	Medium	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Failure of dewatering process leading to discharge to cake pad of cake with high water content	Ground / groundwater / surface waters	Overland runoff / infiltration / drainage systems	**Preventative controls** • Liquid runoff from sludge cake pad collected and directed to WwTW for treatment. System has large storage and handling capacity. **In the event of an incident/accident** • Switch off centrifuge and identify cause of problem.	Unlikely	Minor/negligible	Negligible risk
Temporary cessation of land spreading e.g. due to extreme weather conditions, leading to build up of digested sludge cake	Local air quality and global climate impacts	Air	**Preventative controls** • Cake storage is on a pad, which under normal circumstances, has spare capacity. • Additional storage is available at nearby YW sites. **In the event of an incident/accident** • Monitor available storage on cake pad and reduce/stop sludge imports as required. • Divert sludge imports to alternative YW sites for storage.	Likely	Minor/negligible	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Very warm weather leading to increase in odour generation from sludge cake	Local air quality	Air	**Preventative controls** • Only digested sludge is stored on cake pad. This has less odour potential than untreated sludge. • Only likely to happen during a prolonged of extreme weather event. • Sensitive receptors not located within close proximity to the cake pad. Refer to Table C2:6-2 for summary of sensitive receptors. **In the event of an incident/accident** • Initial response would be to review operating times and avoid cake generation during problematic weather events, considering both temperature and wind. • If this was not sufficient, YW would look to remove cake from site and store elsewhere.	Likely	Minor/negligible	Low risk
Odour control unit						
Failure of components within odour extraction and treatment systems leading to reduced dispersion of odorous emissions to air	Nearby human receptors Local air quality and global climate impacts	Air	**Preventative controls** • Regular operational checks on systems (e.g. fan operation). • Inspection and maintenance schedule to ensure reliability of extraction system. • Sensitive receptors not located within close proximity to the OCU. Refer to Table C2:6-2 for summary of sensitive receptors. **In the event of an incident/accident** • Follow operational procedures to minimise generation of emissions until system is repaired.	Unlikely	Mild	Low risk

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Failure of media within odour treatment system leading to release of partially treated or untreated, odorous emissions to air	Nearby human receptors Local air quality and global climate impacts	Air	**Preventative controls** • Regular operational checks and process monitoring at OCU. • Inspection and maintenance schedule to ensure reliability of extraction and treatment system. **In the event of an incident/accident** • Follow operational procedures to minimise generation of emissions until system is repaired.	Unlikely	Mild	Low risk
Contamination of ground/groundwater following accidental spillage of exhausted odour control media	Ground / groundwater / surface waters	Overland runoff / infiltration / drainage systems	**Preventative controls** • Operational controls in place for removal and disposal of exhausted media. • Area surrounding odour control unit, including areas where maintenance activities are undertaken are covered by hardstanding and surface water drainage is connected to the head of the works. • Only appropriately licenced operators used to remove waste from site. **In the event of an incident/accident** • Contain media to prevent pollution. • Arrange clean up and safe disposal of media as soon as is practicable.	Unlikely	Minor/negligible	Negligible risk
CHPs, Boiler and other gas consumers						

What harm can be caused and who can be harmed			Managing the risk	Assessing the risk (after preventative controls)		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Environmental Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains?**
Excessive emissions to air from boilers and CHP e.g., due to equipment failure, poor performance or malfunction leading to incomplete or inefficient combustion	Nearby human receptors Local air quality and global climate impacts	Air	**Preventative controls** • Planned preventative maintenance in place for equipment to ensure assets continue to meet original specification on emissions. • Site operational knowledge supported through contracts with specialist providers. • Regular emissions monitoring timetable in operation to confirm required performance level is maintained **In the event of an incident/accident** • Investigate cause and implement preventive measures, which may include system maintenance interventions.	Unlikely	Mild	Low risk

Q 6-9 Assessment of point source emissions to sewer

All liquor from raw and digested sludge thickening and dewatering processes, condensate (e.g. from biogas handling), cleaning / washdown effluent and all surface water runoff (with the exception of a small areas of surface water runoff that will be redirected to the WwTW inlet – refer to proposed improvement programme) is collected and discharged via underground drainage systems to Woodhouse Mill WwTW for full treatment prior to discharge to the River Rother. This position has been managed for a long period within YW without a requirement for a formal discharge consent between YW STF and YW WwTW. The WwTW treats effluent from off site and from the STF, and has consent limits in place covering all outputs. Therefore, there has been no requirement to separately characterise or assess the outputs from the STF, or any effects of these on receiving waters, separately from the wider WwTW. As such there is no such information available at this time.

YW is committed to undertaking a period of monitoring in order to characterise the liquors returned to the WwTW. The programme of monitoring is identified in Table C2: 6-9 below. In addition to those listed in the table, other parameters may be identified in discussion with the EA and in line with EA guidance 'Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk)'. Samples will be taken from suitable location(s) upstream of the liquor return point to the WwTW inlet. Sampling and chemical analysis will be undertaken in line with EA guidance. Analysis will be carried out at a UKAS (17025) accredited laboratory.

It is proposed this sampling will be carried out monthly for a period of 12 months. The data will be used to undertake an H1 risk assessment in accordance with Environment Agency guidance. The findings of the monitoring, analysis and impact assessment will be provided to the Environment Agency within 18 months of permit issue. Any requirements for ongoing monitoring will be established after this has been completed.

Table C2: 6-9 – Proposed analytical suite: Woodhouse Mill return liquors characterisation programme - BAT 3 and BAT 7 requirements

Substance / Parameter	Waste Treatment Process to which the BAT-AEL applies	Monitoring Frequency
Flow (m^3/day)	N/A	To be confirmed
Chemical oxygen demand (COD)	Treatment of water-based liquid waste	Monthly for 12 months
Biological oxygen demand (BOD)	N/A	Monthly for 12 months
pH	N/A	Monthly for 12 months
Conductivity	N/A	Monthly for 12 months
Temperature	N/A	Monthly for 12 months
Total nitrogen	Treatment of water-based liquid waste	Monthly for 12 months
Total phosphorus		Monthly for 12 months

Substance / Parameter	Waste Treatment Process to which the BAT-AEL applies	Monitoring Frequency
Adsorbable organically bound halogens (AOX)		Monthly for 12 months
Benzene, toluene, ethylbenzene, xylene (BTEX)		Monthly for 12 months
Free cyanide (CN-)		Monthly for 12 months
Hydrocarbon oil index (HOI)		Monthly for 12 months
PFOA	All waste treatments	Monthly for 12 months
PFOS		Monthly for 12 months
Phenol index	Treatment of water-based liquid waste	Monthly for 12 months
Arsenic (expressed as As)		Monthly for 12 months
Cadmium (expressed as Cd)		Monthly for 12 months
Chromium (expressed as Cr)		Monthly for 12 months
Copper (expressed as Cu)		Monthly for 12 months
Lead (expressed as Pb)		Monthly for 12 months
Nickel (expressed as Ni)		Monthly for 12 months
Zinc (expressed as Zn)		Monthly for 12 months
Manganese (Mn)		Monthly for 12 months
Hexavalent chromium (Cr(VI))		Monthly for 12 months
Mercury (expressed as Hg)		Monthly for 12 months

Q 6-10 Risk assessment methodology

The risk assessment methodology employed for the noise impact assessment (Q 6-5) and accident management plan (Q 6-8) is summarised in Tables C2 6-11 to 6-14 below.

The overall risk rating for each of the identified risk scenarios is determined on the basis of the probability of the scenario occurring (the probability/likelihood score) and the environmental consequence(s) if the scenario were to occur (the consequence score). The probability and consequence categories used in this methodology are provided in Tables C2: 6-10 and 6-11 below.

Table C2: 6-10: Classification of Consequences

Classification	Definition
Severe	• Acute risks to human health • Short-term risk of pollution of sensitive water resource (e.g. major spillage into controlled waters) • Impact on controlled waters e.g. large-scale pollution or very high levels of contamination • Catastrophic damage to buildings or property (e.g. explosion causing building collapse) • Ecological system effects – irreversible adverse changes to a protected location. Immediate risks
Medium	• Chronic risks to human health • Pollution of sensitive water resources (e.g. leaching of contaminants into controlled waters) • Ecological system effects – substantial adverse changes to a protected location • Significant damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such as foundation damage)
Mild	• Non-permanent health effects to human health • Pollution of non-sensitive water resources (e.g. pollution of non-classified groundwater) • Damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such as foundation damage) • Substantial damage to non-sensitive environments (unprotected ecosystems e.g. crops)
Minor/Negligible	• Non-permanent health effects to human health (easily prevented by appropriate use of PPE) • Minor pollution to non-sensitive water resources • Minor damage to non-sensitive environments (unprotected ecosystems e.g. crops) • Easily repairable effects of damage to buildings, structures, services or the environment (e.g. discoloration of concrete, loss of plants in a landscaping scene)

Table C2: 6-11: Classification of probability / Likelihood

Classification	Definition
High Likelihood	An event is very likely to occur in the short term, and is almost inevitable over the long term OR there is evidence at the receptor of harm or pollution
Likely	It is probable that an event will occur. It is not inevitable, but possible in the short term and likely over the long term
Unlikely	Circumstances are possible under which an event could occur. It is by no means certain that even over a longer period such an event would take place, and less likely in the short term
Highly Unlikely	Probability is so low that it is close to zero; It is improbable that an event would occur even in the very long term

Table C2: 6-12 below provides the matrix used to identify the overall risk category using these consequence and probability categories.

Table C2: 6-12: Risk Matrix and Terminology Used for Risk Assessments

		Consequence			
		Severe	**Medium**	**Mild**	**Minor/Negligible**
Probability (Likelihood)	**High Likelihood**	Very high risk	High risk	Moderate risk	Moderate/Low risk
	Likely	High risk	Moderate risk	Moderate/Low risk	Low risk
	Unlikely	Moderate risk	Moderate/Low risk	Low risk	Negligible risk
	Highly Unlikely	Moderate/Low risk	Low risk	Negligible risk	Negligible risk

The overall risk categories are described in Table C2: 6-13 below.

Table C2: 6-13: Description of Risk Categories

Term	Description
Very high risk	Severe harm to a receptor may already be occurring OR a high likelihood that severe harm will arise to a receptor, unless immediate remedial action works / mitigation measures are undertaken.
High risk	Harm is likely to arise to a receptor, and is likely to be severe, unless appropriate remedial actions / mitigation measures are undertaken. Remedial works may be required in the short term, but likely to be required over the long term.
Moderate risk	Possible that harm could arise to a receptor but low likelihood that such harm would be severe. Harm is likely to be medium. Some remedial works may be required in the long term.
Moderate / low risk	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low, but is not of sufficient concern to be classified as medium. It can be driven by cases where there is an acute risk which carries a severe consequence, but where the exposure is unlikely.
Low risk	Possible that harm could arise to a receptor. Such harm would at worse normally be mild.
Negligible risk	Low likelihood that harm could arise to a receptor. Such harm unlikely to be any worse than mild.

Form C3 Supporting Information

1 What activities are you applying to vary?

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

Table C3: 1a-1 – 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
Woodhouse Mill STF	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	R3: recycling/ reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)	N/A	Total digester treatment capacity combined 270 tonnes per day[7] (at 6% dry solids), 16.2 tonnes dry solids (TDS) per day. Refer to Appendix 14 for supporting calculations spreadsheet.
Directly Associated Activities (including description)						
Import and treatment of sludges prior to digestion, including screening, mixing and thickening			R3: Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)			
Secondary treatment of digestate (including physical handling and dewatering) before being recycled to agriculture, including digestate produced on site.			R3: Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)			
As a contingency measure, the **interim storage** of digested and undigested sludge produced at Woodhouse Mill or other YW sites, before AD treatment at Woodhouse Mill STF.			R13: Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced) D15: Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where the waste is produced)			

7 Digester treatment capacity has been calculated based on the known digester volume in m^3 and 12 days hydraulic retention time and then presented as tonnes per year based on an assumed 1:1 volume to weight ratio. Refer to Appendix 14 for supporting calculations spreadsheet.

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
Storage and treatment of biogas			R13: Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced) D15 Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where it is produced)			
Use of biogas as a fuel			R1: Use principally as a fuel to generate energy			
Incineration of biogas			D10: Incineration on land			
Raw material (non-waste) **storage**			No applicable waste codes			
Surface water collection, including **temporary storage**			No applicable waste codes			
Collection and treatment of odorous gases			No applicable waste codes			
Total storage capacity (tonnes)			Sludge storage capacity within STF vessels provided in Table 1a-2 overleaf.			
Annual throughput (tonnes each year)[8]			**Liquid sludge (indigenous primary):** 127,273 tonnes (maximum) **Liquid sludge (indigenous SAS):** 511,111 tonnes (maximum) **Liquid sludge (import)**: 40,650 tonnes/year (maximum) Refer to Appendix 14 for supporting calculations spreadsheet.			

[8] All figures have been calculated on the basis of maximum tonnes of dry solids per year, converted to m^3/year on the basis of the minimum % dry solids (which varies according to sludge source) and then presented as tonnes per year based on an assumed 1:1 volume to weight ratio. The calculation uses minimum % dry solids in order to present the maximum throughput figure. Refer to Appendix 14 for supporting calculations spreadsheet.

Table 1a-2 – Storage capacities

Vessel	Nominal capacity (m^3)
Thickener feed tanks (2)	1,427 each
Digester feed tanks (2)	250 and 554
Dewatering feed tanks (3)	1 x 500 and 2 x 606
Cake pad	
A maximum storage capacity is 25,000 tonnes. Under normal circumstances the amount of cake stored will be significantly below this quantity.	

Table C3: 1b-1 – Types of waste accepted - Imported and Indigenous wastes to the sludge AD process (digesters)

Waste Code	Description of the waste
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use
19 02	Wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 02 06	Sludges from physico/chemical treatment other than those mentioned in 19 02 05, specifically sewage sludge
19 06	Wastes from anaerobic treatment of waste
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste
19 08	Wastes from waste water treatment plants not otherwise specified
19 08 05	Sludges from treatment of urban waste water

Table C3: 1b-2 – Types of waste accepted - Imported wastes for dewatering/storage only (prior to recovery)

Waste Code	Description of the waste
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use
19 02	Wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 02 06	Sludges from physico/chemical treatment other than those mentioned in 19 02 05, specifically sewage sludge.
19 02 06	Sludges from physico/chemical treatment other than those mentioned in 19 02 05, specifically sewage sludge conditioned with sanitised green waste.

Waste Code	Description of the waste
19 02 06	Sludges from physico/chemical treatment other than those mentioned in 19 02 05, specifically sewage sludge conditioned with wood waste.
19 02 06	Sludges from physico/chemical treatment other than those mentioned in 19 02 05, specifically sludge phyto conditioned.
19 06	Wastes from anaerobic treatment of waste
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste
19 08	Wastes from waste water treatment plants not otherwise specified
19 08 05	Sludges from treatment of urban waste water

2 Point source emissions to air, water and land

A full inventory of emission points is provided in Table C3: 2-1 below and illustrated in Section IV, Figure 3. Proposals for monitoring emissions to air are provided in Table C3: 4a-1.

Table C3:2-1: Emissions Inventory to air

Emission Point Ref	Source	Grid reference	Emissions parameter	Quantity / unit		Techniques to minimise emissions
A1	CHP 1 engine exhaust	443462, 385890	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	180[9]	mgNm	Low NOx combustion controls
			Sulphur dioxide (SO_2)	5[9]	mgNm	Sludge management techniques
			Carbon monoxide (CO)	453[9]	mgNm	Engine servicing and maintenance
			Total VOCs (as carbon)	312[9]	mgNm	Engine servicing and maintenance
A2	CHP 2 engine exhaust	443465, 385885	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	172[9]	mgNm	Low NOx combustion controls
			Sulphur dioxide (SO_2)	5[9]	mgNm	Sludge management techniques
			Carbon monoxide (CO)	464[9]	mgNm	Engine servicing and maintenance
			Total VOCs (as carbon)	290[9]	mgNm	Engine servicing and maintenance
A3	Boiler exhaust (natural gas)	443425, 385905	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	Not quantified[10]		Servicing and maintenance
			Sulphur dioxide (SO_2)	Not quantified[10]		No significant sulphur present in natural gas fuel
			Carbon monoxide (CO)	Not quantified[10]		Boiler servicing and maintenance
			Total VOCs (as carbon)	Not quantified[10]		Boiler servicing and maintenance
	Boiler 2 exhaust (biogas)		Oxides of nitrogen (NO and NO_2 expressed as NO_2)	Not quantified[10]		Servicing and maintenance
			Sulphur dioxide (SO_2)	Not quantified[10]		Sludge management techniques
			Carbon monoxide (CO)	Not quantified[10]		Boiler servicing and maintenance
			Total VOCs (as carbon)	Not quantified[10]		Boiler servicing and maintenance
A4	Waste gas burner	443442, 385934	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	Not quantified[10]		None - abnormal use only
			Carbon monoxide (CO)	Not quantified[10]		None - abnormal use only
			Sulphur dioxide (SO_2)	Not quantified[10]		None - abnormal use only. Sludge management techniques
			Total VOCs (as carbon)	Not quantified[10]		Flame temperature and residence

[9] Emissions data taken from a single round of stack emissions monitoring undertaken on 28/1/2021 with allowance for measurement uncertainty, using reference conditions: 273 degrees Kelvin, 101.3kPa, dry gas, 15% O_2. No ELV for these determinands proposed in permit. No appropriate reference limit value identified.
[10] No emissions data available. No ELV for these determinands proposed in permit. No appropriate reference limit value identified.

Emission Point Ref	Source	Grid reference	Emissions parameter	Quantity / unit		Techniques to minimise emissions
A5	Odour control unit	443384, 385955	Calculated odour emission rate	66.8 [11]	$ou_E/m^2/s$	Biofilter and carbon scrubber, sludge management techniques
			Hydrogen Sulphide H_2S	0 [11]	ppm	Biofilter and carbon scrubber, sludge management techniques
			Ammonia NH_3	<0.1 [11]	ppm	Biofilter and carbon scrubber, sludge management techniques
			Total VOCs	<0.1 [11]	ppm	Biofilter and carbon scrubber, sludge management techniques
			Mercaptans	<0.1 [11]	ppm	Biofilter and carbon scrubber, sludge management techniques
			Dimethyl sulphide	<0.1 [11]	ppm	Biofilter and carbon scrubber, sludge management techniques
N/A	PRVs - other	Various	Biogas	Not quantified – emergency use only[10]		None - emergency use only

[11] Emissions data provided is the mean of 4 stack emission samples collected on 4 and 5/8/2021. No appropriate reference limit value identified.

Emissions to sewer and water

All liquor from raw and digested sludge thickening and dewatering processes, and condensate (e.g. from biogas handling) is collected and discharged via underground drainage systems to the Woodhouse Mill WwTW inlet for full treatment prior to discharge to the River Rother. The majority of surface water runoff, including all run off from the cake storage pads, is also discharged via the WwTW. Small areas of surface water runoff from some roadways within the installation area is currently being discharged directly to the Final Settlement Tanks (FSTs) and then to the River Rother. These drains will be redirected to the WwTW inlet (refer to Improvement Programme).

Discharge points are shown on Figure 3. Key sources are as follows:

- Discharge point S1 comprises liquor from the drum thickeners and dewatering centrifuges. This is returned to Woodhouse Mill WwTW for full treatment prior to discharge to the River Rother.
- Discharge point S2 comprises surface water runoff and cleaning wash water from local site areas including the northerly cake pad and areas around the drum thickeners and feed tanks. This is returned to Woodhouse Mill WwTW for full treatment prior to discharge to the River Rother.
- Discharge point S3 comprises surface water runoff and cleaning wash water from local site areas including the southerly cake pad, centrifuges, digesters and associated tanks as well as boiler blowdown and biogas condensate. This is returned to Woodhouse Mill WwTW for full treatment prior to discharge to the River Rother.

A copy of the site drainage plan is provided as Figure 4.

Woodhouse Mill WwTW treats effluent from off site and from the STF, and has consent limits in place covering all outputs. There has been no requirement to separately characterise or assess the outputs from the STF, or any effects of these on receiving waters, separately from the wider WwTW. As such no monitoring data is available at this time.

YW is committed to undertake a 12-month programme of monitoring of process liquors returned to the WwTW to characterise the emissions – refer to Form C2 Q6-9 for details of the proposed monitoring programme.

Table C3: 2-2 – Emissions to sewer

Emission Point Ref.	Grid reference	Source	Parameter	Expected Emissions
S1	443339, 386038	Thickener liquors Centrifuge liquors	Suspended solids	Not yet quantified. Characterisation of emissions will be undertaken in line with BAT – refer to information provided in response to Form C2 Q6-9 for more details.
			Biological Oxygen Demand (BOD)	
			Ammonia	
			Volume	
S2	443355, 385958	Surface water runoff Cleaning effluent / washwaters	Suspended solids	Not yet quantified. Characterisation of emissions will be undertaken in line with BAT – refer to information provided in response to Form C2 Q6-9 for more details.
			BOD	
			Ammonia	
			Volume	
S3	443389, 385887	Surface water runoff Boiler blowdown Condensate Cleaning effluent / washwaters	Suspended solids	Not yet quantified. Characterisation of emissions will be undertaken in line with BAT – refer to information provided in response to Form C2 Q6-9 for more details.
			BOD	
			Ammonia	
			Volume	

3 Operating techniques

3b General requirements

Fugitive emissions management plan – Leak Detection and Repair (LDAR) programme

YW has a defined maintenance plan for biogas pipework at Woodhouse Mill STF – this is included as Appendix 13. This includes regular visual inspections, as well as more detailed investigations such as use of a methane detecting camera to identify leaks. Any leaks identified are assigned a priority for repair, the priority recognises potential as both an environmental and safety hazard. Key section headings in the LDAR management procedure (which forms part of the EMS) include:

- Introduction, scope, responsibilities, assurance.
- LDAR considerations including summary of equipment, techniques and approaches.
- Site specific LDAR plan:
  - STF Tanks (All STF tanks including sludge storage, Anaerobic Digesters);

- Pressure Relief Valves;
- Biogas pipework from AD to biogas treatment and storage;
- Biogas storage;
- Pipework from biogas treatment to flare stack and engine;
- Biogas Engines;
- Boilers (including boiler house)
- Flare Stack;
- Natural gas pipework from mains network to gas consumers.

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.

Best Available Techniques: Reducing diffuse (fugitive) emissions to air (*BAT 14*)

The design and operation of Woodhouse Mill STF ensures diffuse (fugitive) emissions to air are minimised. This includes the following measures:

- Raw sludge is contained with displaced air from tanks piped to an OCU for treatment prior to release to atmosphere.
- H_2S levels are monitored in the biogas and are recorded.
- Emissions of odour and organic compounds from digested material (post AD) is very low. Refer to the odour impact assessment and odour management plan (Appendices 8 and 10, respectively) 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 is 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, Section 6).
- Traffic speed limits of 10mph are enforced on site.

3c Types and amounts of raw materials

Table C3: 3c-1 – Types and amounts of raw materials

Description of raw material	Use	Maximum storage capacity	Annual throughput[12]	Main hazards	Alternative
Polymer (liquid)	Coagulant used for raw sludge thickening	1 x 10m^3 tank and occasional 1 m^3 IBC storage	65 tonnes	Polluting to watercourses in the event of a spillage/loss	No viable alternative
Polymer (powder)	Coagulant used for digested sludge thickening	Storage in 750kg bags (~5 no.)	67 tonnes	Polluting to watercourses in the event of a spillage/loss	No viable alternative
Antifoam	Digester antifoaming agent	IBC storage (~5 m^3)	<5 m^3	Polluting to watercourses in the event of a spillage/loss	No viable alternative
Boiler treatment chemicals	Boiler treatment	Not normally stored on site	<250 litres	Polluting to watercourses in the event of a spillage/loss	No viable alternative
Glycol	Antifreeze	Not normally stored on site	<1 m^3	Polluting to watercourses in the event of a spillage/loss	No viable alternative
Lubrication oil	Equipment lubricant	20 litre containers (~5 no.)	1,480 litres	Polluting to watercourses in the event of a spillage/loss	No viable alternative
Diesel	Fuel for mechanical loaders	1,000 litres	2,456 litres[13]	Polluting to watercourses in the event of a spillage/loss	No viable alternative

[12] Raw materials use data is estimated on the basis of typical storage volumes and data available for usage at this and at other YW STF sites.
[13] Annual throughput data includes some use outside of the installation boundary (within the wider Woodhouse Mill WwTW)

4 Monitoring

4a Describe the measures you use for monitoring emissions

Proposals for monitoring point source emissions to air and sewer are shown in Table C3: 4a-1.

Table C3: 4a-1 Proposed emissions monitoring requirements

Emission point	Parameter	Monitoring technique	Monitoring frequency
Emissions to air			
A1 CHP 1	NOx (NO and NO_2 expressed as NO_2)	None due to small size of plant (below MCP threshold).	
	CO		
	Sulphur dioxide (SO_2)		
	Total VOCs		
A2 CHP 2	NOx (NO and NO_2 expressed as NO_2)	None due to small size of plant (below MCP threshold).	
	CO		
	Sulphur dioxide (SO_2)		
	Total VOCs		
A3 Boiler	NOx (NO and NO_2 expressed as NO_2)	None due to small size of plant (below MCP threshold).	
	CO		
	Sulphur dioxide (SO_2)		
	Total VOCs		
A4 Waste gas burner	NOx (NO and NO_2 expressed as NO_2)	None; emergency function only. Low historic usage.	
	CO		
	Total VOCs		
A5 Odour control unit	Odour concentration	None – H_2S and NH_3 proposed to be used as an alternative.	
	H_2S	CEN TS 13649 for sampling NIOSH 6013 for analysis. Refer to odour management plan (Appendix 10) for more detail.	
	NH_3	EN ISO 21877. Refer to odour management plan (Appendix 10) for more detail.	
PRVs - other	No emissions monitoring proposed due to nature of release point as an essential safety mechanism with very occasional and short duration use.		
Emissions to sewer			

Emission point	Parameter	Monitoring technique	Monitoring frequency
S1-S3 Return liquors to WwTW	A 12-month programme of monitoring of return liquors is proposed in order to characterise emissions – refer to Q 6-9 Assessment of point source emissions to sewer and proposed improvement programme for more details. Any ongoing monitoring requirements will be established after this initial monitoring, and subsequent analysis and assessment, has been completed.		

Selected process monitoring parameters are illustrated in Table C3: 4a-2. The site is operated under full PLC SCADA control with data logging and interrogation of key parameters to maintain safe, efficient and low emissions operation.

Table C3: 4a-2 Key process monitoring provisions

Emission point / description	Parameter	Monitoring approach	Monitoring frequency
Occasional sludge intake direct to STF (not currently in normal use)	Intake volume	SCADA	Continuous during unloading operations
	% dry solids	SCADA	Continuous during unloading operations
CHP (A1, A2)	Operating hours	SCADA	Continuous data logging
	Electricity generated	SCADA	Continuous data logging
	Load required / actual (%)	SCADA	Continuous data logging
	Biogas flow / pressure to CHP	SCADA	Continuous data logging
	Heat circuit temperatures (deg. C)	SCADA	Continuous data logging
Boilers (A3)	Load required / actual (%)	SCADA	Continuous data logging
	Biogas / natural gas flow / pressure to boiler	SCADA	Continuous data logging
	Heat circuit temperatures (deg. C)	SCADA	Continuous data logging
	Heat circuit flow	SCADA	Continuous data logging
Flare compound (A4)	Biogas to flare (m^3)	SCADA	Continuous data logging
	Run hours	SCADA	Continuous data logging
Odour control unit stack (A5)	Operational status	SCADA	Indication
	Refer to odour management plan (Appendix 10) for more detail.		
Biogas storage	Gas level (%)	SCADA	Continuous data logging
	Gas pressure (mb)	SCADA	Continuous data logging
	Methane %	SCADA	Continuous data logging
Digesters	Volume	SCADA	Continuous data logging
	Volatile Fatty Acids (VFAs)	Manual	Periodic
	Alkalinity	Manual	Periodic
	Process temperature	SCADA	Continuous data logging
	% solids (intake)	SCADA	Continuous data logging
	Retention (hours)	SCADA	Continuous data logging
	Temperature	SCADA	Continuous data logging

Emission point / description	Parameter	Monitoring approach	Monitoring frequency
	H_2S (ppm)	SCADA	Continuous data logging
	Foam level	SCADA	Continuous data logging
Centrifuges	Dry solids (%)	Manual	Periodic
	Flow	SCADA	Continuous data logging

4b Point source emissions to air only – M1 Assessment

The proposed sampling locations and facilities are assessed in Table C3: 4b-1, based on the requirements and recommendations provided in Environment Agency M1[14]. Although no ongoing monitoring is proposed, a recent one-off characterisation MCERTS accredited stack emission test[15] carried out at the site on the CHPs reported:

"The [CHP] sampling location meets all the requirements specified in EA Guidance Note M1 and EN 15259, and therefore there are no improvement recommendations."

Table 4b-1: M1 Assessment - Sampling Requirements (CHP stacks only)

Characteristic	Requirement	Commentary
Sample plane location	As far downstream or upstream from any disturbance, which could produce a change in direction of flow (e.g. bends, fans).	Sampling ports are installed on a straight section of stack, substantially downstream of the termination point of the stack. A constant cross-sectional area is present within the flues, which are narrow in design.
	In a section of duct with constant shape and cross-sectional area.	
	Recommend five hydraulic diameters* upstream and two hydraulic diameters downstream (or five hydraulic diameters from the top of the stack)	
Sample plane orientation	Installation of sample plane in vertical stacks is preferred to horizontal ducts	The sampling plane is vertical.
Exploratory survey	It is advised that an exploratory velocity traverse is carried out before committing to installation	The ports are installed and reported as compliant. Due to the narrow diameter, homogeneity testing in line with the requirements set out in BS EN 15259 is not required, as per guidance[16].

[14] Environment Agency Technical Guidance Note (Monitoring) M1 (2010)
[15] Element Materials Technology (2021), Job Reference Number EMT00062
[16] Method Implementation Document for EN 15259:2007, Environment Agency, v3, May 2019

Characteristic	Requirement	Commentary
Flow criteria	Angle of gas flow less than 15° to duct axis.	No particulate sampling is undertaken or proposed in line with the requirements of the current permit .
	No local negative flow.	
	Minimum velocity (a differential pressure of 5Pa, which equates to 3 ms-1).	
	Ratio of the highest to lowest gas velocity less than 3:1.	
Measurement ports	Planned at detailed design stage because retrofitting can be expensive (for example ducts may have protective linings).	The number, location and type of measurement ports were designed having regard to TGN M1. A temporary sampling platform is installed which allows compliant sampling from all ports. Sample ports are sized appropriately to the equipment to be used for monitoring. The ports are accessible via the platform for maintenance. No CEMS is installed or proposed – not applicable.
	Allows access to sample points.	
	It is recommended that for small stacks (less than 0.7m diameter) a socket of 75mm is acceptable.	
	The port socket must not project into the gas stream.	
	Additional ports may be required to allow access for measurement of other quantities (for example velocity and water vapour)	
	Additional ports for CEMS (if applicable)	
	The operator must maintain the ports in good condition and free them up prior to work being undertaken	
Identification	Clearly identified and labelled measurement section	The ports are clearly identifiable.
Load bearing capacity	Permanent and temporary working platforms must have a load bearing capacity sufficient to fulfil the measurement objective	A temporary working platform is provided when required; the structure is designed for appropriate loading for all sampling and maintenance activities.
Position and working space	Sufficient working area to manipulate probe and operate the measuring instruments, without equipment overhanging guardrails	A suitable temporary working platform is provided, which facilitates manipulation of probes and operation of measuring instruments. Safe access is provided, including fall protection.
	A sufficient depth of the working area is given by the internal diameter or depth of the duct and the wall thickness plus 1.5 m	

Characteristic	Requirement	Commentary
	If two opposite measurement ports are installed for one measurement line, a correspondingly smaller working area is required	
	Its recommended that vertical ducts have a working height from the platform to the ports of 1.2 to 1.5m	
	Removable chains or self-closing gates at the platform to prevent workers falling through access hatches or ladders.	
Fall prevention	Upper handrails at a minimum of 950mm (910mm allowed for old handrails). Gaps in rail no bigger than 470mm. Toe boards required	Fixed guard rails are reported to be provided on the temporary platform (at 0.5m and 1m); vertical base boards are also provided (Elements, 2021)
	Consider installing personal protection systems on vertical ladders	
Access	Easy and safe access available	Temporary access provisions are reported by the MCERTS contractors as 'safe' and 'easy'
	Consider installing work restraint systems on vertical ladders	
Power supply	Single phase 110V electrical power of a suitable current provided by a suitable number of sockets at the platform	Adequate and safe electrical supply provisions are made.
Lifting equipment	Lifting systems for raising and lowering of equipment, where access to the sampling platform is by vertical, or steeply inclined, ladders or stairs	Not applicable
	Lifting systems (for example, hoists) and attachments (for example, eyes) must be inspected and maintained by a competent person	
	Installation of a support structure for securing portable lifting systems (handrails are not usually suitable for supporting lifting systems)	
Monorails	Consider sampling monorails above the sampling ports to enable certain designs of sampling train to be suspended.	Not applicable
Exposure to gas	Avoid areas of sources which emit unexpectedly, for example rupture discs, overpressure valves and steam discharges.	Compliant

Characteristic	Requirement	Commentary
Exposure to stack gas	Avoid areas of significant positive pressure.	Monitoring takes place externally; natural ventilation reduces risk of exposure to stack gases.
Awareness	Consider how stack emission monitoring personnel are informed of operating faults that may endanger them?	All monitoring works would be under a permit to work scheme, which includes a detailed Risk Assessment and Method Statement (RAMS).
Ventilation	Well ventilated.	Monitoring takes place externally which provides natural (passive) ventilation.
Heat and dust	Protection of the working area from heat and dust.	No dust sources within working space (external). No specific personnel protection required for heat above normal safe site working conditions.
Weather protection	Protective measures (for example, weather protection and heating to ensure conditions are appropriate for personnel and equipment).	The suitability of weather conditions is assessed as part of the risk assessment and monitored during the course of the sampling exercise. If weather conditions were deemed unsafe by dynamic risk assessment following commencement, work would be halted and rescheduled.
Lighting	Artificial lighting or facilities for temporary lighting.	Need is assessed on a case by case basis, but preference is for monitoring to take place during daylight hours. Area and task lighting would be provided as required.

6 Resource efficiency and climate change

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

YW consumption and generation data is collated and stored within a web-based energy database. This enables the business to produce bespoke reports as required by internal stakeholders.

Monthly energy consumption hubs are held to review ongoing energy use and performance. These are supported with discussions regarding how asset operation can be modified, or capital intervention made, to reduce energy use. This is further supported by YW requirements under the Energy Saving Opportunity Scheme (ESOS) compliance programme. YW conducts energy surveys that are discussed with the site operational teams. The findings of the surveys are collated into a final report and presented to senior management.

YW have published performance commitments in relation to the amount of biogas that is derived from the sludge processed. The higher the efficiency of biogas production the greater the potential for electricity generation. There is a daily generation hub that seeks to identify any generation issues and rectify them promptly.

Overall annual energy and carbon performance is publicly shared via the company annual report as part of the Streamlined Energy and Carbon Reporting (SECR) requirements.

Energy is monitored and managed on a regular basis through the Energy and Recycling Team. Energy consumption and energy generation reports are run and reviewed regularly and are recorded on YW's Performance Zone. YW also participates in a number of mandatory and voluntary carbon reporting schemes. YW sets itself targets for energy consumption and energy generation at both a strategic and operational level. YW has dedicated teams which focus on:

- Maximising renewable energy generation; and
- Implementing strategic and site-specific energy efficiency projects.

Table C3: 6a-1 below describes the measures taken on site to minimise energy use.

Table C3: 6a-1 – Energy efficiency measures

Operating and maintenance	Documented measures in place	
Regular testing and maintenance of biogas systems for leaks, seals, and condensate traps	Yes	Maintenance/servicing undertaken by qualified technicians and registered organisations. Records are maintained on site.
Operation of motors and drives	Yes	Regular inspections/lubrication & maintenance undertaken by qualified technicians and specialist contractors. Records are retained.
Compressed air systems	Yes	On-going leak detection and repair programme undertaken by qualified technicians.
Hot water systems	Yes	Digester system monitored constantly and inspected and tested regularly by an operator and recorded.
Lubrication to avoid high friction losses	Yes	Technicians and specialist contractors carry out regular lubrication, including CHP engine oil change, and records are maintained.
Boiler maintenance e.g. optimising excess air	Yes	Carried out as per legislative requirements and YW procedures.
Physical measures	Documented measures in place	
Sufficient insulation of heated vessels and pipework	Yes	Inspection and housekeeping to check condition of insulation; repair or replacement carried out as necessary
Provision of sealing and containment methods to maintain temperature	Yes	Anaerobic digesters are enclosed.
Other appropriate measures	Yes	Daily operational inspections are conducted to check for aspects such as leaking tanks and pipework
Building services	Documented measures in place	
Energy efficient lighting is in place	Yes	There are limited building service requirements on site, energy efficient options are provided where readily available, and when equipment comes up for renewal
Space heating	Yes	
Hot water	Yes	
Temperature control	Yes	
Ventilation	Yes	
Draft proofing	Yes	
BAT conclusions for energy recovery	Documented measures in place	
Heat recovery (please specify where from and add more lines if appropriate)	Yes	Heat recovered from CHP engines used to maintain anaerobic digester temperature.
Heat exchangers (explain where fitted and add more lines if appropriate)	Yes	Heat exchangers are used in the CHP engines and in the anaerobic digesters.
Re-use of spent cooling water	N/A	
Minimisation of water use and re-circulating water systems for energy saving	Yes	Preference is given to the use of final treated effluent rather than mains water where water quality demand allows.
Good insulation	Yes	Boilers, anaerobic digesters and pipework are insulated
Plant layout to reduce pumping distances	Yes	Where existing layout allows

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

The main site energy sources are electricity from the public supply, natural gas (used as a back up fuel source for the boiler) and biogas generated by the anaerobic digesters which is combusted in the CHP engines to generate electricity.

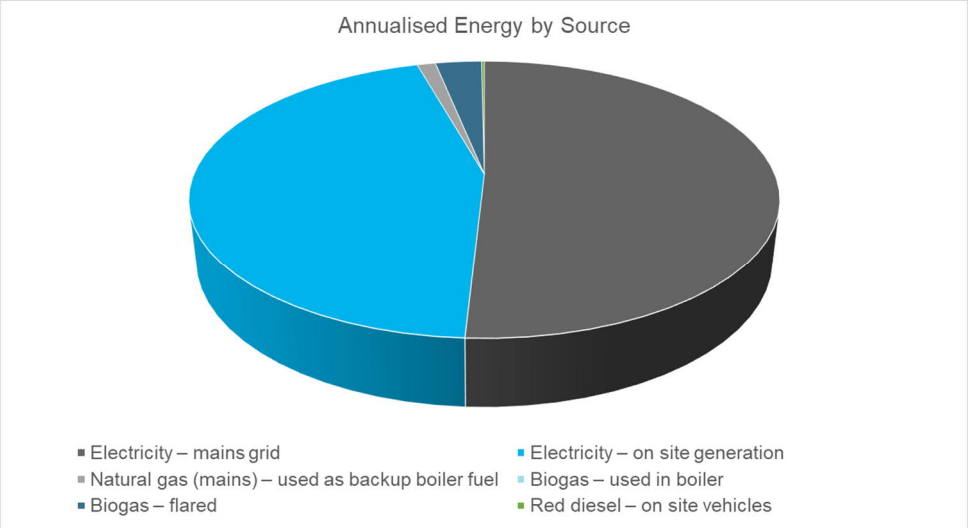
Table C3: 6b-1 shows the energy balance for the site. Electricity generated on site is used to power site equipment. There is currently no facility to export any excess to the national grid. To maintain control of energy consumption, and improve it where possible, electricity and fuel consumption is reported and reviewed on a regular basis.

Table C3: 6b-1 – Typical annual energy use

Energy Source	Energy Consumption MWh [17] [18]		
	Delivered	Primary	% of total (primary)
Electricity – mains grid [19]	3,095	7,429	50.9
Electricity – on site generation from biogas [20]	2,614	6,534	44.7
Natural gas used in boilers	174	174	1.2
Biogas used in boilers	1	1	<0.1
Biogas flared[21]	440	440	3.0
Diesel – on site vehicles	26	26	0.2
Totals	*6,350*	*14,604*	*100*

[17] Figures presented are an average of 2019 and 2020 data (or a representative sub-set of this data where metering or other data issues exist)
[18] Gross calorific value of biomethane used in calculations was 37.706 MJ per m^3 (OFGEM 2016 / ISO 6976:1995).
[19] Electricity imported includes the use for the whole site not just the permitted activities due to metering arrangements.
[20] Delivered value derived from measured biogas methane content of 64.2%, and recorded electricity generated (no export of electricity). Does not take account of heat generated.
[21] Total annualised biogas generation was 12,191.8 MWh, of which 6,533.9 MWh calculated usage in electricity generation and 1.0 MWh calculated usage in boiler. Biogas flared reported.

Figure C3: 6b-1 – 2020 energy by source



Global warming potential (GWP)

The CHPs are operated as renewable energy generation plant; therefore there are no direct emissions of carbon dioxide (a greenhouse gas) resulting from the combustion of biogas in the CHPs. However, there are direct CO_2 emissions as a result of combustion of natural gas in the boiler. It should be noted however that the boiler is rarely used; the CHPs normally generate sufficient heat for the digesters. When the use of the boiler is required, biogas is the first choice fuel source with natural gas only used when insufficient biogas is available.

There are also indirect emissions of CO_2 resulting from the use of imported electricity. At present, due to metering arrangements, it is not possible to apportion electricity usage to just the permitted activities within the installation, therefore site wide (Woodhouse Mill WwTW) usage is reported in this section. The CO_2 equivalent (CO_2e) emissions for the plant are set out in Table C3: 6b-2, together with overall GWP calculation.

There will be some losses of biogas (methane) from the plant (a substance with a high global warming potential, at least 21 times higher than CO_2), resulting from unquantified fugitive losses from the biogas system (see LDAR programme). These have not been included in the GWP calculation as no data is available.

Table C3:6b-2 – Global warming potential

Substance	Energy source	Energy Consumption in 2020– Primary (MWh)	CO_2 emission factor (T/MWh) [22]	Mass CO_2 released (tonnes/yr)	Global warming potential	Overall Global Warming Potential (TCO_2 / yr) [23] [24]
Carbon dioxide	Electricity (mains) imported	7,429	0.166	1,233	1	1,233
	Gas (mains)	174	0.19	33	1	11
	Biogas	6,975	0	0	0	0
	Diesel	26	0.25	7	1	7
Total GWP						1,273

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

No, the activities are not eligible to take part in the CCL Scheme.

The production and use of biogas to produce heat (which is used in the process) and electricity used on site, is the single greatest measure which allows the site to minimise its use of fossil fuels and maximise the use of energy, whilst recovering biological wastes. Biogas may be used in any of the two CHPs or the boiler on site and therefore biogas flaring is rarely required.

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

Information related to raw materials use and selection is provided above in response to Q3c.

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) for sludge thickening and dewatering processes, as boiler feed water and for some cleaning activities e.g. thickener drums / centrifuges, 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. The primary water users are listed below, along with the source of water.

[22] Factors from https://www.gov.uk/guidance/assess-the-impact-of-air-emissions-on-global-warming
[23] These calculations do not consider the CO_2 equivalent amount which is avoided through the avoidance of releasing methane which has a much higher GWP than CO_2
[24] Does not include fugitive losses of methane, which are considered low and are not quantified (see LDAR)

Table C3:6d-1 – Water use

Use	Source
Domestic use within control / welfare building	Mains potable water
General cleaning/hosing of external hardstanding surfaces	Final treated effluent and potable for internal cleaning activities
Mixing with liquid polymer for sludge thickening and dewatering processes	Mains potable water used for product make-up. Final effluent is used as the carrier water during dosing.
Digester anti-foam washwater spray	Final treated effluent
Boiler feed water	Mains potable water

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

Waste Minimisation

The site is designed and operated as a waste recovery plant and as such minimises waste generation from its own operations. 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 Woodhouse Mill STF is provided in Table C3 6e-1 below.

Table C3 6e-1 – Waste streams

Waste Type	Nature of material	Storage arrangements	Treatment / disposal method	Annual production (tonnes)[25]
Waste oil	Hazardous	Stored in IBCs on hardstanding within the digester compound prior to collection by approved waste contractor	Recycle	1
General waste	Non-hazardous	Stored within dedicated skips and smaller containers located on hardstanding prior to collection by approved waste contractor	Recycle or energy from waste	5
Wood	Non-hazardous	Stored within a skip prior to collection by approved waste contractor	Recycle (or if contaminated may be energy from waste)	2
Empty IBCs	Hazardous	Stored in a dedicated area prior to collection by approved waste contractor	Recycle	0.1
Oil contaminated absorbents	Hazardous	Stored in a dedicated container within the digester compound prior to collection by approved waste contractor	Recycle	0.1
Oil filters	Hazardous	Stored in a dedicated container within the digester compound prior to collection by approved waste contractor	Recycle	<0.1
Antifreeze	Hazardous	Removed from site when servicing requires a change over (in 20litre drums)	Recycle	0.1

[25] Waste data is estimated on the basis of waste arisings data for Woodhouse Mill WwTW as a whole and from waste data for comparable YW STF sites.

Best Available Techniques: Waste storage, handling and transfer (*BAT 4 and 5*)

IMS procedures specify appropriate measures to ensure compliance with applicable legislation and to control and minimise pollution risks. Controls to minimise environmental risks associated with waste storage, handling and transfer include:

- Waste materials are stored on site for the shortest practicable period of time, in suitable, fit for purpose containers located on areas of hardstanding and away from sensitive receptors such as watercourses. 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, away from sensitive receptors 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 YW 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 on the cake pad. Surface water runoff from the cake pad is fully contained and is discharged back to Woodhouse Mill WwTW for treatment. Sludge storage and handling areas are located away from sensitive receptors such as the River Rother.

Form C6 Supporting Information

3 How much do you want to discharge?

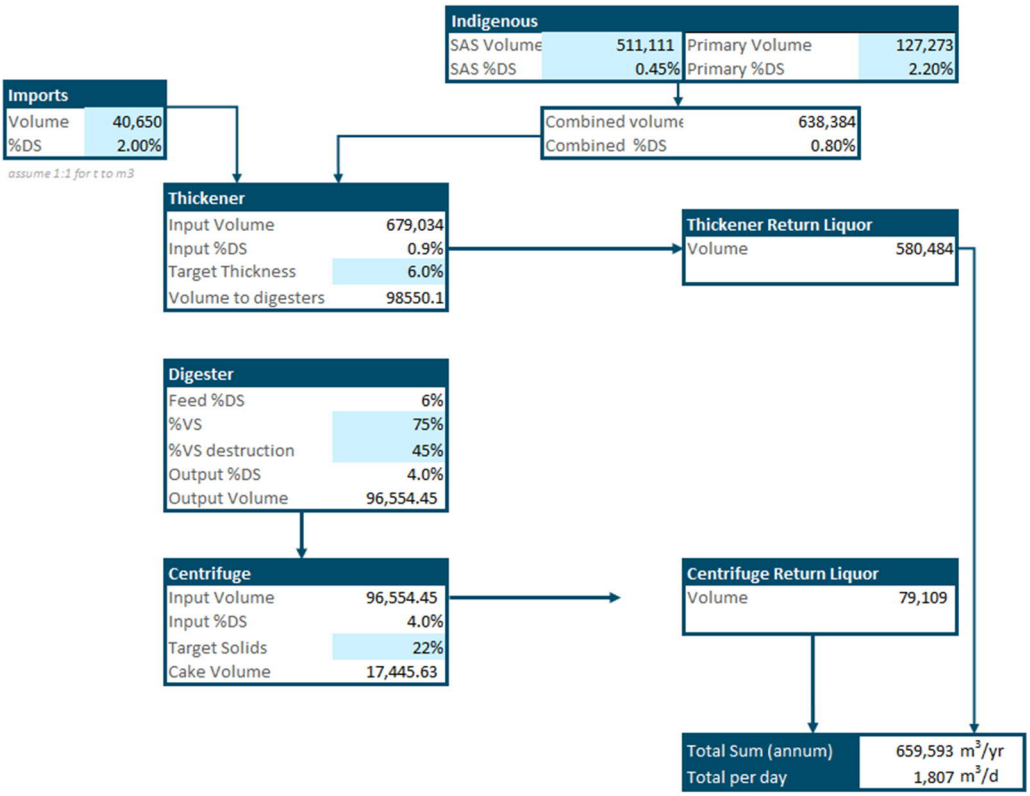
3b, c, d and f

All liquor from raw and digested sludge thickening and dewatering processes, condensate (e.g. from biogas handling), cleaning / washdown effluent and all surface water runoff is collected and discharged via underground drainage systems to Woodhouse Mill WwTW for full treatment prior to discharge to the River Rother. Small areas of surface water runoff from some roadways within the installation area is currently being discharged directly to the Final Settlement Tanks (FSTs) and then to the River Rother. These drains will be redirected to the WwTW inlet (refer to Improvement Programme).

YW do not currently undertake any routine monitoring of this discharge. It is noted that these discharges include surface water runoff from hardstanding areas within the installation, including the large cake pad and therefore discharges will vary according to rainfall.

Calculations have been used to estimate the volume of effluent returned to Woodhouse Mill WwTW. These values have been provided for indicative purposes and not for the purpose of deriving any permit conditions at this time. The estimated figures presented have been calculated as follows:

Process return calculation



Rainfall plus process return calculation

Cake pad surface area	5,237	m^2	→ Expected cake pad runoff (annum)	5,237,000	Litres	≈	14.35 M^3/d
Average Rainfall (annum)	1000	mm					

Source: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/regional-climates/north-east-england_-climate---met-office.pdf

Source: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/regional-climates/north-east-england_-climate---met-office.pdf

Highest monthly rainfall (mm)	92	mm			
↓					
Daily rainfall (mm) (averaged)	3.07	mm	→ Estimated cake pad runoff per day (based on highest monthly rainfall data)	16,060.13	l/d
Cake pad surface area	5,237.00	m^2		↓	
			Highest run off (cubic metres per day)	16.06	m^3/d
			+		
			Process returns	1807	m^3/d
			=		
			Sum worst case cake pad run off and process returns	**1823.16**	**m^3/d**

5a, b2 Should your discharge be made to the foul sewer?

Form C6 directs YW to answer questions 5a and 5b2. These questions cannot be answered by YW as the STF is co-located on site with the WwTW. These questions appear to be directed at applicants who wish to discharge to surface water or groundwater, which does not apply to YW (all effluent/contaminated water is returned to the WwTW).

No further information is therefore provided in relation to these specific questions.

6a, b, c How will the effluent be treated?

All liquor from raw and digested sludge thickening and dewatering processes, condensate (e.g. from biogas handling), cleaning / washdown effluent and surface water runoff is collected and discharged via underground drainage systems to the co-located Woodhouse Mill WwTW for full treatment prior to discharge to the River Rother. Small areas of surface water runoff from some roadways within the installation area is currently being discharged directly to the Final Settlement Tanks (FSTs) and then to the River Rother. These drains will be redirected to the WwTW inlet (refer to Improvement Programme).

7b, c, d, e, f, g What will be in the effluent?

There will be no discharges directly to surface water or groundwater from this installation. All liquor from raw and digested sludge thickening and dewatering processes, condensate (e.g. from biogas handling), cleaning / washdown effluent and surface water runoff is collected and discharged via underground drainage systems to the Woodhouse Mill WwTW for full treatment prior to discharge to the River Rother. This position has been managed for a long period within YW without a requirement for a formal discharge consent between the YW STF and the YW WwTW. The WwTW treats effluent from off site and from the STF, and has consent limits in place covering all outputs. Therefore, there has been no requirement to separately characterise or assess the outputs from the STF, or any effects of these on receiving waters, separately from the wider WwTW. As such there is no information to undertake this at this time. Due to the variability of the influent, a data set covering an extended period of time would be needed in order to accurately undertake an assessment.

8d, e, f Environmental risk assessments and modelling

Refer to information provided above in response to question 7.

9a, b, d, e, f, h, i Monitoring arrangements

YW do not currently undertake any routine monitoring of effluent discharged to the co-located Woodhouse Mill WwTW. There is no flow monitoring and sampling equipment currently in place or proposed at this time. The grid reference of emission points S1, S2 and S3 (refer to Figure 3) is as follows:

Emission point	Emission point	Proposed sampling point
S1	443339, 386038	443339, 386038
S2	443355, 385958	443355, 385958
S3	443389, 385887	443389, 385887

10a, b, c Where will the effluent discharge to

Form C6 directs YW to answer questions 10a, b and c. These questions cannot be answered by YW as there is no option that applies to discharges from the installation. These questions appear to be directed at applicants who wish to discharge treated effluent to the receiving environment, which does not apply to YW (all effluent/contaminated water is returned to the WwTW).

No further information is therefore provided in relation to these specific questions.

Proposed Improvement Programme

IP Ref.	Related Section	Requirement	Time from receiving permit
1	C3: 2	Small areas of surface water runoff within the installation are drained to the WwTW FSTs. These drains will be redirected to the WwTW inlet.	End of 2024
2	C2: Q6-5	Dewatering feed tanks and screening skips will be covered. It is noted that digested sludge sources are inherently lower emissions generation potential and therefore residual biogas potential and emissions testing will be undertaken to determine the most appropriate type of cover, including emissions capture or abatement if required.	End of 2024
3	C2: Q6-9	Complete return liquors monitoring programme followed by data analysis and assessment.	18 months
4	Appendix 11 (Containment Risk Assessment)	Engineering feasibility assessments and detailed design and construction in respect of identified containment enhancements.	End of 2024

Section IV: Figures

Figure 1 Site Location Plan

Figure 2 Site Layout Plan

Figure 3 Principal emission points

Figure 4 Drainage Plan

Section V: Appendices

Appendix 1 Relevant Offences

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

Yorkshire Water Services Ltd Relevant Prosecutions Record

Huddersfield Magistrates' Court 9 February 2011

On the above date YW pleaded guilty to breach of Section 85 (1) and (3) of the Water Resources Act 1991.

This incident relates to the Heaton Lodge site which partially treats sewage and then transports this treated sewage to the Cooper Bridge site.

On 9 August 2009 at approximately 4.10pm, an Environment Agency officer found a discharge to the River Calder from the Heaton Lodge site. This was reported to YWS at 4.47pm but an off-duty YW colleague had already noted the discharge and reported it proactively 30 minutes earlier. An operator attended site at 4.30pm and identified the cause of the discharge to be a burst from a cracked rising main on the Heaton Lodge site.

The sludge pumps were immediately isolated, stopping the discharge some 30 – 40 minutes after it had first been noted by the off duty YW operator and the matter was escalated to senior management to inform them of the incident in line with the usual process.

YW offered to clean up the affected area but were informed by the EA officer that no clean-up was necessary. Service partners for YW attended on 10 August to locate the exact position of the main burst which was caused by excessive pressure thought to have been due to a blockage. The discharge from the main occurred in the area where it goes under the river. The area around the main was also bunded to contain any future spillages pending confirmation of the structural condition of the main. Visual inspections of the pipe work were maintained for a number of weeks following this incident as part of the site visits that are routinely undertaken.

Repairs were completed by 12 August when sludge transfer and full operations returned. The length of damaged pipe, 20m, was replaced and 75 metres of the main were jetted and CCTV was also carried out to ensure there were no other defects in the main. The total cost of the works was £16,800.

Since the incident, the main had been pressure tested to ensure the integrity of the main – no further incidents have occurred since August 2009 and the further testing did not establish any need for further repair works. The volumes and pressures pumped in this main were reduced following the incident due to a change in the process of transporting the sludge.

The evidence from the EA covered the potential effect, and the actual chemistry/biology however there's no indication that this incident affected the watercourse in terms of its flora and fauna. There was no fish kill. In fact, YWS offered to clean up the watercourse on the day of the incident and were informed that this was not necessary.

The watercourse recovered rapidly. There was no evidence put forward by the EA to suggest that the effect was medium or long term, supported by the EA's contention that a clean-up was not required.

There was no evidence that the recreational use around the discharge point had been adversely affected. The Magistrates accepted that there had been no "flaunting of the law" by the Company. They noted that there was no significant damage to flora or fauna and that the watercourse recovered rapidly. On the issue of culpability, they accepted that the Company did not deliberately break the law and they further noted that the Company did not achieve any economic gain through the commission of this offence.

YWS was fined £10,000 and ordered to pay the EA's costs of £1,164.34.

Huddersfield Magistrates' Court 9 February 2011

On the above date YW pleaded guilty to breach of Section 85 (1) and (3) of the Water Resources Act 1991. This incident occurred on what is known as the Deighton site. This site receives crude sewage and undertakes preliminary treatment in the form of screening of any debris. The main in question transports this treated sludge to the Calder Valley incinerator, at the time of this incident.

At 7.45pm on 9 September 2009, a call was received from the EA that there had been a report of sewage from a local resident and it is noted what the EA state this resident said when reporting this issue. I would ask the Court to be mindful of the terminology used and place the appropriate reliance on this when considering what the customer may or may not have meant by this comment as there is no further evidence with regard to this statement and it clearly could not relate to actual measured flow. RTS which is the alarm system used by Yorkshire Water on its assets was checked immediately for any alarms but none were found.

An operator attended site at 8.30pm and was unable to safely locate the discharge as daylight was fading and for health and safety reasons, the operator ceased his investigation. Service partners for YW had previously been isolating the pumps on a daily basis as the pumps were being commissioned and therefore these pumps were only running between the hours of 7.30am – 6.00pm at the time of this incident. On 9 September, the pumps had been turned off when the operator attended so there was not a discharge left to continue by the operator leaving site.

On the morning of 10 September, the pumps were set running again at 9.05am. The exact point of the discharge which had proved difficult to find due to the excess of overgrowth on the wall was then located. An EA officer was on site and aware that the pumps had been set to run again and at 10.15am witnessed the discharge point. The pumps were immediately stopped.

On 10 September at 11.30am, service partners for YW began the repairs to the main which resulted in a 4m length being replaced. The repairs were made difficult by the presence of a large tree adjacent to the burst. This is believed to have been a contributing factor to the cause of the burst as the tree had displaced the main. CCTV operations were also undertaken on the main, 100m to establish its overall condition with no defects found.

All sludge was tankered from site and any debris observed in the river was completely removed by YW operations. The main was subsequently flushed with final effluent and a full CCTV survey was undertaken with no defects identified, the main was found to be in good condition and was brought back into service on 12 September.

Following this incident, the tree and its roots were completely removed to avoid any repeat incident once YW were aware of the contribution of this tree to this incident. The entire length of the main has been cleaned out and a pressure monitor has been placed on the main so that in future, if the pressure rises due to a blockage or any problem, the pumps will cease pumping to avoid a burst. The monitor is alarmed to notify YW of a problem. Together with the cost of the repair works immediately after the incident and the further cleaning works, a total of approximately £375k has been spent on this main.

The evidence from the EA covers the potential effect, and the actual chemistry/biology however there's no indication that this incident affected the watercourse in terms of its flora and fauna.

There was no fish kill. YWS offered to clean up the watercourse and carried out these operations immediately with the agreement of the EA. No further actions were requested by the EA following their further investigations.

There was no evidence put forward by the EA to suggest that the effect was medium or long term. There was no evidence that the recreational use around the discharge point has been adversely affected. They noted that this was a Category 1 offence. It was however noted that there was no significant permanent damage to the flora or fauna. In respect of culpability, there was no deliberate pollution to the watercourse and no economic gain. They had considered all the environmental credentials and investment for the company and they also noted the significant investment in this main since the incident had occurred.

YWS was fined £12,000 and ordered to pay the EA's costs of £1,897.93.

Scarborough Magistrates' Court 6 May 2011

YWS was prosecuted for an offence that on or before 26 April 2010 it did cause a water discharge, namely the entry of waste into the Runswick Beck, Runswick Bay other than in accordance with an environmental permit contrary to Regulations 12 (1) (b) and 38 1 (a) of the Environmental Permitting (England and Wales) Regulations. This was the first offence to be prosecuted under the new regulations.

At 4:26pm on 26 April, YWS was contacted by the EA via Loop informing it of potential pollution incident at Runswick Beck. YWS was directly informed by Loop at 4.40pm and a job was raised for the standby operator who was on site for 5:05pm (some 40 minutes after the first contact).

The operator confirmed that the detention tank on site was full and the overflow was active. The pumps appeared to be running but they were failing to keep on top of the flow. No alarms had been received from the site as it was established that the ultrasonic head that records levels in the tank was inoperable as it had been removed from the tank and placed on top of the tank. The reasons for this were unknown as was both the identity of the person who removed the ultrasonic head and when this was done.

The tank was pumped down by the operator by putting both pumps on hand. The site was not designed to operate using both pumps and was on a duty standby arrangement, however, to try to solve the problem both pumps were in use. At 6:45pm, approximately two hours from the report of the incident by the EA, the discharge was stopped. The operator later noted a discharge from the rising main at Hinderwell and believed the rising main to be blocked which would have had the effect of reducing the SPS's capacity to pump in any event. As the operator had stopped the discharge, before he left site, he checked the watercourse and beach for any signs of debris. He found no such debris as the detention tank has a screened overflow.

A high-level flow was placed in the tank as a temporary indicator for any future high levels. The operator confirmed to the EA that he had stopped the discharge. The EA informed YWS that it would be attending the following day to take samples and requested a clean-up of the beck.

A job was raised for Lumsden and Carroll to clean up Runswick Beck but it did seem that the vegetation in the Beck had contained the majority of the flow. No debris was found. In agreement with the EA, only the top 20 metres of the Beck were cleaned for health and safety reasons. Investigations into YWS's own assets on 27 April established that the detention tank was full of sewage debris. The STRATE pump unit was also cleaned out.

On 28 April, the STRATE tank was cleaned out and its controls were also checked by an electrician. A large quantity of silt was found in the unit and the pumping propellers were also found to be worn. The detention tank had been cleaned out two years prior to this in accordance with our accepted process. It was cleaned out on 29 April and impellors were ordered which had to be delivered from Germany.

The rising main was found to have two of the three air valves clogged with fat and the third valve was found to be damaged – all of which were cleaned and replaced. Approximately £6k in costs was incurred in both the clean-up operation and repair and replacement of the relevant assets. Following the incident, the site was visited every other day, with daily monitoring of RTS.

Sample results taken by the EA showed a significant impact at the point of discharge. Sample results 300 metres downstream of the discharge point on 26 April, showed a lesser impact. Samples taken from the same place 300 metres downstream on 27 April showed a greatly reduced impact suggesting that the watercourse had improved significantly within 24 hours of the incident. The site now has an updated maintenance plan and the telemetry has been fully tested.

The Magistrates made the following comments: "We have listened very carefully to all that has been said today regarding this unfortunate incident at Runswick Bay. We have acknowledged that Yorkshire Water did respond exceedingly quickly. In our view, a response time of 25 minutes is exceptional. We have also noted the early guilty plea and given maximum credit for this."

YWS was fined £7,500 fine and ordered to pay the EA's costs of £1,581.67.

Rotherham Magistrates' Court 10 June 2011

YWS was prosecuted for an offence that on or before 24 April 2010 it did cause a water discharge, namely the entry of waste into the Blackwater Dyke, Aldwarke Lane, Rotherham other than in accordance with an environmental permit contrary to Regulations 12 (1) (b) and 38 1 (a) of the Environmental Permitting (England and Wales) Regulations.

At 11:05am on 26 April, YWS was informed via the EA of a discharge to Blackwater Dyke. YWS operatives were on site at Aldwarke Lane SPS at 12:30pm and found that both pumps at the site were inoperative. Pump no 1 was found to be blocked and the fuses had blown at pump no 2.

A job was immediately raised for an electrician and fitter to attend site. In the interim, straw bales were delivered to site and placed at the confluence of the Dyke and River Don to prevent solids moving into the River Don. Pump No 1 was lifted, unblocked and restored to normal operation on the same afternoon but pump no 2 was found to be burnt out so was removed from the wet well. The pumping station operated on a duty/standby basis and therefore one pump was capable of dealing with the flows.

The site was monitored overnight by standby operatives to ensure the pumping station continued to operate satisfactorily using one pump. No further issues were noted. On 27 April, a replacement pump no 2 was delivered but was not immediately fitted due to wet well restrictions. The site was monitored again overnight. Pump No 2 was installed on 28 April. On 30 April, the EA requested a clean-up of the Dyke and a recycler/vactor unit was requested which removed the surface liquids from the Dyke. No further works were required by the EA.

Aldwarke Lane SPS was monitored by telemetry, however, a telemetry failure was identified on 9 December 2009 which was not rectified until 28 April 2010. The pumping station was visited on a monthly basis prior to the incident and the last visit prior to the incident being on 1 April. The EA did not take any samples of the Dyke nor did it produce any photographs. There was therefore no evidence of the impact on the Dyke.

An employee of the EA witnessed this incident on Saturday 24 April whilst in the area socially. For reasons which had not been explained in his statement or elsewhere, he did not report this incident to any party until two days later on 26 April.

The Magistrates made the following comments: "We have been hearing a case prosecuted by the Environment Agency against Yorkshire Water. We have taken into account the statement from the Environment Agency that the breakdown of the telemetry had no bearing on the subsequent breakdown of the pumps. However, telemetry would have given an early indication of the problem and should not have taken 5 months to repair. We do however appreciate that Yorkshire Water took early action on being informed by the Environment Agency. We would have fined the company £5,000 but give maximum credit for the early guilty plea".

YWS was fined £3,750 fine and ordered to pay the EA's costs of £835.38.

Wakefield Magistrates' Court 18 July 2011

YW was prosecuted for an offence that on or before 7 April 2010 it did cause the entry of polluting matter, namely sewage waste, into the un-named tributary of the River Calder to the North of Pugneys Country Park in the district of Wakefield, a controlled water, other than in accordance with a discharge consent contrary to section 85 (1) and 85 (6) of the Water Resources Act 1991.

On 7 April at 11.38am, YWS were informed of a discharge to the tributary by the EA. An operator was sent to site and noted a problem with the Denby Dale Road CSO. Around 1.5 tonnes of fat, rags, silt and grit were removed from the CSO chamber. At the time of the incident, the CSO telemetry data was not visible due to a fault with the alarm points. Data recovered since the incident indicates that the CSO began to discharge to the site detention tank on 11 February 2010 and ceased on 7 April 2010. The flow was being returned to sewer and there is no recorded data to indicate when the discharge to the watercourse may have commenced.

On the day of the incident, a bund was created using straw bales to prevent solid material reaching the River Calder. A litter pick around the CSO outfall was also carried out. On 9 April, fat was again found to be accumulating in the CSO chamber which became partially blocked again. This blockage was cleared on the same day and the asset was proactively checked over the weekend and the watercourse also monitored.

On 12 April, the CSO and continuation sewer were completely cleansed by high pressure jetting. One storm pump was also found to be blocked, this blockage was also cleared that day. During that week, the CSO telemetry was also repaired and modified to make graphical data visible and a supplementary “pollution incident” alarm was created. On 13 April, YWS met with the EA and agreed to bund off the dyke upstream of the overflow and that the site would be monitored daily.

Since this incident, potential sources of the fact have been investigated but have not identified a source. All of these businesses who could be the potential source of the fat have been contacted to inform them of the problem and provide guidance on the correct disposal method. A cyclical monthly inspection of the asset has been raised to help identify any future accumulations of fat. This involves checking the CSO itself and a visual check of the outfall.

Prior to the incident, the Detention Tank was inspected on a routine visit on 2 March with no faults found. The pumping station was visited on 11 March which found a partial blockage in the CSO caused by fats which was removed during the same visit. The CSO itself receives a 3-monthly inspection – YWS guidance is that it should be every 6 months so the asset was already being visited more frequently.

The EA took two sets of samples on 8 April and 16 April. The former sample was taken from the point where the drain emerges from culvert into an open ditch. This sample does demonstrate an impact on the watercourse. The second sample taken by the outfall itself some 9 days after the incident was reported, show significantly lower levels for all of the components tested on 8 April. A number of photographs have also been provided.

YWS was fined £10,500 and ordered to pay the EA's costs of £2,324.67.

Calderdale Magistrates’ Court 4 January 2012

On 4 January 2012 YWS pleaded guilty to an offence that on or before 1 April 2011 it failed to comply with Schedule 1, Conditions 11 (a) and 9 (a) (iii) of an environmental permit for waste water treatment and discharge, number WRA7510 in that the levels of biochemical oxygen demand and suspended solids discharged from the works were in excess of the permitted maximum amounts allowed under the said permit and caused pollution of the River Calder contrary to Regulations 12 (1) (a) and 38 (2) of the Environmental Permitting (England and Wales) Regulations 2010 and Section 2 of the Pollution Prevention and Control Act 1999. The levels of BOD were 3.6mg/l over the levels normally permitted to be discharged to the watercourse being 73.6 mg/l rather than 70 mg/l or under.

The works in question suffered greatly as a result of the intense winter of 2010/11. The weather had affected a great deal of authorities and the public alike. By way of background, during this period maintenance work in the area, including this sewage treatment works, increased by 374% in January and 240% in February. The impact on the Copley works was severe. A number of assets were affected at the works which resulted in the increase in the levels of sludge being held back for treatment which resulted in the breach of the permit. It can be described almost as a domino effect on preceding treatment assets caused by the winter which then impacted the operation of the centrifuges which were required to operate consistently in a manner for which they are not designed.

A centrifuge is a large drum which is motorised and spins very fast like a washing machine. Wet sludge enters the drum and is spun such that the water is removed and the thickened sludge is passed forward as a cake. It is one part of the overall treatment process at the works.

At the works, there are two centrifuges and the design is for them to operate on what is known as a duty/standby basis. The importance of that is that only one centrifuge is ever required to operate. The standby is there to be called into operation should a problem arise with the duty asset.

The centrifuges are maintained on a 6-monthly basis by a specialist contractor and were last inspected on 3 February 2011 and in July 2010 prior to that. An issue was identified with one of the centrifuges which in turn led to its removal for repair on 10 February leaving one still in situ which is still within the design capacity.

The remaining centrifuge continued to operate at a lower continuous level of operation. It is important to note that this asset did not fail. However, as it was struggling to maintain required levels, a decision was made to bring in a further centrifuge unit which eventually ran on a 24-hour basis, 7 days a week. This arrived on site on 2 April. The levels of BOD on 10 March were 136mg/l. By 1 April 2011, YW had reduced the level of BOD by 50% to 73.6mg/l, 3.6mg/l over the permitted levels of discharge i.e. the levels which are set by the EA that can be safely discharged without any impact. Therefore, clearly the activity by YW had made a significant impact to the BOD levels.

This incident came to the prosecution's attention as a result of self-reporting by YW, there was no attempt to conceal the events on site nor any potential impact on the watercourse. YW were proactive in their communication to the EA to ensure there was full visibility of what was occurring on site. The EA attendance on site was solely in response to the YW contact.

There was no evidence from the EA of any impact on the watercourse other than the sample results provided and some photographic evidence. The sample results show that the levels of BOD were 3.6mg/l over the levels normally permitted to be discharged to the watercourse. It was submitted therefore that taking this into account, the impact on the watercourse was minimal given the close proximity of the final sample result to what is allowed to be safely discharged in all normal circumstances. Any impact in any event was short term if at all.

There was no fish kill nor is there any evidence submitted by the EA of any damage to flora/fauna or impact on recreational or amenity value.

The Yorkshire Water response was timely and effective with costs of approximately £60k being incurred as an immediate and subsequent consequence of the incident. Since the incident occurred, a full root cause analysis was undertaken resulting in a full review of the maintenance procedures to equipment upstream as it were of the centrifuge assets. Those assets were already on an appropriate system of inspection and maintenance which was adhered to prior to this incident. A further new action is a robust two-phase escalation process to reinforce monitoring levels on site in terms of sludge levels which now instigate new actions within the company. A new team leader has also been brought to the site to give more focus to these sorts of issues.

Yorkshire Water self-reported this incident to the EA and fully cooperated with them under interview. Yorkshire Water now has an understanding as to the impact of such a severe winter event which had not previously been seen for in excess of 30 years.

A fine of £5,000 was imposed against a maximum of £50,000. Costs were also awarded to the EA in the sum of £1,593.98.

Bradford Magistrates' Court 20 March 2012

On 20 March 2012 YWS pleaded guilty to 3 offences all contrary to Regulation 38(2) of the Environmental Permitting (England and Wales) Regulations 2010 as follows:

1. Between 17 April and 3 June 2011 at Copley Sewage Treatment Works there was a failure to comply with the permit in that the works were not operated in accordance with that permit through the storage of sludge in external areas.
2. Between 1 April and 24 June 2011 at South Elmsall Sewage Treatment Works there was a failure to comply with the permit in that sludge originating from Copley works and Wheldale works was stored and treated at the site.
3. Between 1 April and 24 June 2011 at South Elmsall Works there was a failure to comply with the permit through the storage of sludge in external areas for more than 2 days and was not stored in sludge skips.

The works at Copley suffered greatly as a result of the intense winter of 2010/11 which affected a great deal of authorities and the public alike.

By way of background, during this period maintenance work in the area, including this sewage treatment works, increased by 374% in January and 240% in February of 2011. The impact on the Copley works was severe. A number of assets were affected at the works which resulted in the increase in the levels of sludge being held back for treatment which resulted in a discharge outside of the permit for Copley. The Company having seen this discharge occur wished to take all measures to repeat a discharge to the watercourse outside of permitted levels.

There were 3 offences before the court relating to permits at 2 sites Copley and South Elmsall sewage treatment works (STW). The background to all 3 offences is as described above. As a result of the issues being seen on site against the backdrop of the situation referred to, a Company Response Management Team (CRMT) was set up on 5 April to make risk based assessments and decisions on the process to be undertaken to deal with the sludge storage. Both sites have permits to regulate the storage of sludge, at Copley, there is an internal storage area and at South Elmsall, the sludge is permitted to be stored externally in skips for no more than 2 days. The offences were not financially motivated. The Company having set up a CRMT which consists of senior management and operators alike, considered all options for the storage of this sludge. The usual process would have been to send the sludge to the Calder Valley incinerator. This incinerator was undergoing its annual programme of planned maintenance between 1-18 April. This is done on an annual basis with no previous impact on operations.

The other appropriate option was another site which due to potential employee risk, had been temporarily closed down pending works to remove that risk.

The final potential option, other than that taken, was to take this matter to landfill. As an environmental option, due to this not being a particularly environmentally friendly option against all others, the decision was taken not to do so. Therefore, the option to store this substance elsewhere or indeed to use alternative containers was not appropriate or indeed a viable option. In all the circumstances, considering availability and indeed environmental impact, the decision taken was the only decision available so it certainly was not a decision taken without full consideration and assessment of the company's responsibilities both with regards to its regulatory duties but also its duties to the environment.

Offence 1:

The internal storage area was full to capacity by 14 April. The decision was made to store the overflow externally which could be safely stored on areas which were considered appropriate to avoid any external impact via drainage or ground impact. Bales of hay were also placed around the stored substance to protect against any issues in the event of rainfall and to protect against seepage outside of these areas. As soon as the incinerator was available, the sludge was removed from site starting from 23 April and completely removed by 3 June with the vast majority having been removed by 27 May.

Offence 2:

This relates to the transporting of sludge from Copley and Wheldale STW to South Elmsall STW. The sludge was only stored on site but no treatment actually took place. In respect of this offence, during the Environment Agency's (EA) own visit report of 11 May 2011, it was deemed that this was "a non-compliance which has no potential environmental impact". The sludge was transported from Wheldale to South Elmsall from 1 April to ensure as much storage was available at Copley as possible.

Offence 3:

It is permitted to store sludge externally at South Elmsall although it is accepted that this should be carried out by virtue of the use of skips and for no more than 2 days. The background explained above explains the duration and it is estimated that approximately 38 skips would have been required for this storage. As the company was continually making arrangements for transporting of this sludge appropriately and it was not known where 38 skips could have been obtained from, the option was taken to store the substance on the ground which was protected from any escape from the site whether by virtue of drains or ground contamination.

The removal of sludge from Copley was prioritised but as soon as possible with complete removal in accordance with the date on the summons.

The context of these incidents was to be considered amongst Yorkshire Water's regional operations. The issues explained on these sites due to the winter and its longstanding impact were felt regionally. Had the Company been in a position to consider any other options, it would have done so but was heavily constricted by events occurring which were caused by issues outside its control.

Effect on environment

There is no evidence from the EA of any impact on the environment save for reference to complaints of odour which the company does not seek to disregard or indeed argue against the impact. The EA's own guidance on incident classification for odour for significant effects is in summary, odour offensive and persistent enough to cause significant effect on human senses… which lead to some disturbance and significantly more intrusive than normal background and potentially with a significant effect on amenity value. There were two odour complaints on 3 May for South Elmsall over the period of external storage for the duration between 1 April to 24 June. There were 6 complaints from the same two customers over the period of external storage for Copley between 17 April and 3 June.

It was submitted that the odour complaints did not fall within this classification and therefore the incidents should be considered against the EA's own guidance of what constitutes a significant impact.

Further the considered actions taken by Yorkshire Water with regard to actual storage areas were to avoid an impact to the environment via a discharge to a watercourse or otherwise as previously seen.

The response by Yorkshire Water

It was submitted that the Yorkshire Water response was as timely and effective as possible in all the circumstances considering the options available in respect of the shut down for planned and unplanned reasons, of the usual process sites. Costs of approximately £55k were incurred as an immediate and subsequent consequence of the incident. Since these incidents occurred, the level of resource focused on audits and compliance has been increased with further training to be provided for responsible managers and teams.

Yorkshire Water now has an understanding as to the impact of such a severe winter event and the impact this had on assets and resulting operations such as the storage of sludge.

Following the EA's visit on 5 May, an action plan was agreed with them for South Elmsall in which Yorkshire Water confirmed that no additional material would be added to that already in placer and it was fully communicated that all of the cake would be removed by 4 July. There was no requirement by the EA at that stage to remove this material any quicker.

For the Copley site, from 10 May, the Company was in contact with the EA regarding its plans for removal of the sludge from the site. To this extent, in respect of both sites, from 5 May onwards, Yorkshire Water was in regular communication informing them of their plans and next steps.

A fine of £17,000 was imposed per offence against a maximum of £50,000. Costs were also awarded to the EA in the sum of £3,935.70.

Huddersfield Magistrates' Court 25 September 2012

On 25 September 2012 YWS pleaded guilty to one offence contrary to Regulations 12 and 38 (2) of the Environment Permitting (England and Wales) Regulations 2010 as follows:

That on or before 14th June 2011 at Huddersfield (Upper Brighouse) Sewage Treatment Works, Yorkshire Water Services Limited did fail to comply with an Environmental Permit, namely conditions 9 and 10 of Schedule 7 of the conditions of consent to discharge number WRA7409 in that a standby pump was not present.

Upper Brighouse is part of a complex of waste water treatment works which treats effluent from Huddersfield town and the surrounding area. Upper Brighouse is subject to conditions contained within permit number WRA7409. In particular, the discharge of settled sewage in an emergency is subject to conditions set out in Schedule 7 to permit WRA7409. Conditions 9 and 10 provide:-

> "9. The duty pump(s) shall be maintained in good working order, and at least one standby pump shall be provided and maintained.
>
> 10. Standby pump(s) shall automatically activate should the duty pump(s) become inoperative for reasons other than power failure. The pumping station shall be maintained so that the pump shall automatically reactivate as soon as is practical after the power is restored after interruption to the supply".

Conditions 9 and 10 relate to an interstage pumping station at Upper Brighouse. There are three pumps available within the pumping station. Pump A acts as a duty pump which pumps flows forward to treatment, pump B is used intermittently to assist the duty pump at times of high flow following heavy rainfall and pump C acts as the standby pump.

At the end of October 2010 pump A failed and could not be repaired in situ. The pump was removed and sent to the manufacturer for assessment. A decision was taken at that time, based on an assessment of operational risk not to source an alternative pump as pump B was capable of pumping flows to treatment and that pump C (formerly the standby pump) could be used as the assist pump. The permit does not, in any event, specify that an assist pump has to be provided. At the end of January 2011 the manufacturer (Hydrosteel) confirmed that the pump was capable of being repaired and gave a lead time for the work of approximately 3 weeks. As there had been no operational difficulties with the pumping arrangements at Upper Brighouse, the decision not to source a temporary third pump was not reviewed.

As with most large organisations, YWS operates a dedicated work and job scheduling system (SAP). The system has been in place for approximately 10 years and is used to schedule and allocate individual jobs. Each job is given its own individual SAP number but there is no overall unique number given to the whole life of a problem or a piece of work, so that a job such as the removal, repair and reinstatement of a pump is not given a single unique SAP reference number which allows it to be traced and remain "visible" until completed in its entirety. Instead, the current operation of the SAP system breaks jobs down into individual stages with each stage having to be separately scheduled and being capable of being completed without there being visibility for the whole job.

The repaired pump was returned to site at the beginning of March and a job raised for its installation. Throughout this period, there were no operational difficulties with the pumping arrangements and again, the decision to use two pumps was not reviewed. A pump was installed at the interstage pumping station in early May however, that pump that was not correctly rated and had to be removed. On 14th June prior to the correct pump (the repaired pump A) being installed, pump B developed an electrical fault which meant that although it was running and showing on the monitoring system as running, it was not actually pumping. At the same time, pump C which was acting as the assist pump, developed a mechanical failure. The failure of pumps B and C resulted in a discharge of settled storm sewage into the River Calder. That discharge was permitted under the terms of condition 3 of Schedule 7 to consent number WRA7409.

Effect on the Environment

There was no impact on the environment as a result of this offence.

Response by Yorkshire Water

YWS had, prior to the instigation of the prosecution, identified limitations within its current organisational working practices and structures and the current use of the SAP system for allocating and assigning jobs. A review and a programme for change (Operating for Excellence) commenced in 2011 and aims to ensure across all of YWS's business and operational functions that there are effective systems and processes in place, so that there is greater clarity and visibility as to how, when and why decisions are taken and work programmed. One of the issues to be taken into account in considering the criticality of a particular asset will be ensuring full permit compliance can be achieved and maintained. The Operating for Excellence project, which commenced in September 2011, is now in its pilot phase. In relation to Engineering & Reliability, one of the outcomes identified to date, is the need for there to be a central engineering reliability hub to allow improvements in the way that workflows are managed within operational teams including scheduling, planning and procurement.

The Magistrates made no comment when imposing the fine and costs award, save for confirming that the company had been given credit for an early guilty plea. A fine of £1,200.00 was imposed against a maximum of £50,000.00. Costs were also awarded to the Environment Agency in the sum of £913.42.

01 October 2013

Beverley magistrates' court in connection with an offence contrary to Regulation 12 and 38 of the EPR 2010 on 12 October 2011 at Beverley Waste Water Treatment Works, Beverley.

Fine - £4,000.
Costs - £1,248.70.

01 October 2013

Beverley magistrates' court in connection with an offence contrary to Regulation 12 and 38 of the EPR 2010 on 18 April 2012 at Beverley Waste Water Treatment Works.

20 February 2014

Wakefield magistrates' court in connection with an offence contrary to Regulation 12 and 38 of the EPR on 06 March 2013 at Wash Dyke, Pontefract (Sowgate Lane SPS).

19 January 2016 – Shay Lane Pumping Station

Shay Lane pumping station Single offence of causing a water discharge activity contrary to Regulation 12 and 38 of the EPR 2010 05 October 2013.

Negligent Harm 2 £600,000 £24,000.

28 April 2016 – Naburn WWTW

3 charges of contravening Regulations 12 and 38 EPR 2010:

1. Discharge of polluted water from Naburn WwTW into the River Ouse on 23 August 2013.

2. Failure to provide and maintain at least one standby pump at Naburn WwTW between March and October 2013.

3. Failure to provide and maintain at least one standby pump at Naburn WwTW between 17 August and 29 September 2014 See under "Offence(s).

Charges 1 and 2 - high degree of negligence.

Charge 3 – Reckless.

Charges 1 and 2 – Harm 3.

Charge 3 – Harm 4 Charges 1 and 2 - £500,000.

Charge 3 - £600,000.

17 August 2016 – Sherwood CSO

Single offence of causing a water discharge activity contrary to Regulation 12 and 38 of the EPR 2010 12 April 2013.

Negligent Harm 2 £350,000 £30,000.

13 July 2017 – Hinderwell WWTW

Single offence of causing a water discharge activity contrary to Regulation 12 and 38 of the EPR in July 2015.

Culpability – Reckless.
Harm – 2.
Fine - £600,000.

27 November 2017 – Sandy Lane (aka Belle Vue) Pumping Station, Doncaster

Single offence of causing a water discharge activity contrary to Regulation 12 and 38 of the EPR in 24 / 25 April 2014.

Culpability – Negligent.
Harm – 3.
Fine - £45,000.

8 September 2021 – Potteric Carr Nature Reserve (Balby STW)

Sheffield magistrates' court in connection with two offences on 28 March 2017 at Mother Drain at Potteric Carr Nature Reserve (Balby STW). Yorkshire Water pleaded guilty to a water discharge activity contrary to Reg 12 and 38 of the EPR and a breach of condition of the environmental permit. A fine of £150,000 was imposed against offence 1.

November 2017 – Sandy Lane (AKA Belle Vue) Pumping Station, Doncaster

Single offence of causing a water discharge activity contrary to Regulation 12 and 38 of the EPR in 24 / 25 April 2014.

Culpability – Negligent

Harm – 3

Fine - £45,000

Costs - £24,762.56

08 September 2021 – Balby Wastewater Treatment Works (Sheffield Magistrates' Court)

Two offences:

(1) causing a water discharge activity contrary to Regulation 12 and 38 of the EPR on 27 March 2017

(2) breaching condition 11 of EPR on 29 March 2017.

Culpability:	Negligent
Harm:	3
Fine:	£150,000 (starting point £225,000 – 1/3 credit given for guilty plea at earliest opportunity)
Costs:	£36,506.35
	(NB – fine made for breach of reg.12 and 38 of EPR. No separate penalty was made for the breach of condition).

Dale Road Sewage Pumping Station (Leeds Crown Court)

One offence of causing a water discharge activity contrary to Regulation 12 and 38 of the EPR on 28 January 2022.

Culpability:	Negligent
Harm:	2 (agreed)
Fine:	£233,000 (full credit given for guilty plea at earliest opportunity)
Costs:	£18,766.06 (plus victim surcharge of £170)

Leeds Magistrates' Court – 18 July 2022 at 10.00am – (DJ Kitson)
George Street Detention Tank, Bradford, West Yorkshire Discharging into Bradford Beck

SUMMARY**:**
Three offences:

Charge 1 – Causing a water discharge activity between 20-25 August 2018 contrary to reg 38 of EPR 2016.

Charge 2 – Causing a water discharge activity between 01 September 2017 and 31 August 2018 contrary to above.

Charge 3 – Between 1st September 2017 and 7th June 2019, at George Street, Bradford…failed to comply with the following conditions of Schedule No1 of environmental permit WRA8215:

- Condition 8(b) by failing to return the sewage return pumping station to normal operation as soon as reasonably practicable.
- Condition 9, by failing to provide at least one stand-by pump;
- Condition 12, by failing to maintain all pumps and associated controls in good working order; and
- Condition 14, by failing to maintain the overflow in an efficient operational condition,

Penalty: £1,623,032.79 as follows:

Charge	Culpability	Harm	Fine (£)
1	Reckless	Category 3	750,375
2	Reckless	Category 3	750,375
3	Reckless	Category 3	100,000

EA costs - £22,112.79

Victim surcharge - £170

Appendix 2 Technical Competence

WAMITAB

WASTE MANAGEMENT INDUSTRY TRAINING AND ADVISORY BOARD

CERTIFICATE No: 05247

CERTIFICATE OF TECHNICAL COMPETENCE

This Certificate confirms that

Matthew Ashford

has demonstrated the standard of technical competence required for the management of a facility of the type set out below

Facility Type:

Level 4 in Waste Management Operations -

Managing Treatment Hazardous Waste (4TMH)

WAMITAB INCORPORATED 1989

Authorising Signatures:

Director General

Director

Date of issue: 04 June 2003

CIWM

Continuing Competence Certificate

This certificate confirms that

David Shaw

Has met the relevant requirements of the Continuing Competence scheme for the following award(s) which will remain current for two years from 17/10/2023

TMNH	Treatment - Non Hazardous Waste
AD	Anaerobic Digestion

Expiry Date: 17/10/2025

Verification date: 04/10/2023

Authorised:

Professional Services Director

Learner ID: 27521

Certificate No.: 5236690

Date of Issue: 17/10/2023

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

Certificate No. OCC67229

Operator Competence Certificate

Title:

Non Hazardous transfer/with or without treatment (not otherwise specified) (4MPTNH6)

This Certificate is awarded to

David Shaw

Awarded: 30/09/2016

Authorised

WAMITAB Chief Executive Officer

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.

00084437

Credit certificate

This certificate determines credit awarded to:

David Shaw

Units gained:

		Credit Value	Credit Level
Y6015875	Monitor procedures to safely control work operations	4	3
M6009712	Manage the environmental impact of work activities	5	4
R6021609	Manage the reception of non hazardous waste	7	4
A6021670	Manage the movement, sorting and storage of waste	7	3
F6021671	Manage site operations for the treatment of non hazardous waste	14	4
L6021429	Manage the transfer of outputs and disposal of residues from non hazardous waste treatment and recovery operations	13	4

Awarded: 30/09/2016

Serial No.: 27521/HSS3/1

Authorised

Chris James
Chief Executive Officer, WAMITAB

Regulated by Ofqual

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

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.

00084441

wamitab

Qualification Title:

WAMITAB Level 4 Medium Risk Operator Competence for Anaerobic Digestion

Qualification Accreditation Number:

601/8515/6

This Certificate is awarded to

David Shaw

Awarded: 19/07/2017

Serial No:27521/MROC5/1

Authorised

Chris James
Chief Executive Officer, WAMITAB

Regulated by Ofqual

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

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.

00123938

Credit certificate
This certificate determines credit awarded to:
David Shaw

Units gained:

		Credit Value	Credit Level
A/508/1003	Manage site operations for the anaerobic digestion of non-hazardous waste	6	4
T/508/0979	Manage transfer and disposal from anaerobic digestion operations	5	4
Y6015875	Monitor procedures to safely control work operations		
M6009712	Manage the environmental impact of work activities		
R6021609	Manage the reception of non hazardous waste		
A6021670	Manage the movement, sorting and storage of waste		

Awarded: 19/07/2017

Serial No.: 27521/OCS32/1

Authorised

Chris James
Chief Executive Officer, WAMITAB

Regulated by Ofqual

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

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.

00123944

Certificate No. OCC7968

Operator Competence Certificate

Title:

Anaerobic Digestion

This Certificate is awarded to

David Shaw

Awarded: 19/07/2017

Authorised

WAMITAB Chief Executive Officer

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.

00123951

Appendix 3 ISO 14001 Certificate

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

Yorkshire Water Services Ltd
Western House
Western Way
Halifax Road
Bradford
BD6 2SZ
United Kingdom

Holds Certificate Number: EMS 685749

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The management and operation of clean and waste water assets and associated services.

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2015-04-01
Latest Revision Date: 2021-03-24

Effective Date: 2021-04-02
Expiry Date: 2024-04-01

...making excellence a habit.™

Appendix 4 Quality and Environmental Policy

Environmental Policy

Yorkshire Water's vision is 'A thriving Yorkshire. Right for our customers, right for the environment'. Our plan to deliver this vision is set out in our 10 year strategy and our Integrated Management System (IMS).

Every day, it's our job to make sure that everyone in Yorkshire has the water they need for their busy lives. And, when they've used it, it's our job to take it away, treat It and return it safely back to Yorkshire's environment.

We drive for continual improvement by managing change effectively and learning lessons from significant events, in accordance with our IMS - which is externally certified to ISO14001. This helps us to perform better and keep a clear focus on delivering the right results for our customers and the environment. It also helps us to work effectively in partnership with our key stakeholders to achieve the commitments outlined below - this is at the heart of our approach.

To achieve our company vision, we will:

- Identify, quantify and manage our adverse environmental impacts to eliminate or reduce them using Best Available Technology.
- Comply with our statutory and regulatory requirements and company commitments.
- Seek to understand the needs and expectations of our customers and stakeholders.
- Have the right capabilities and resources to deliver our services and protect the environment - both now and in the future.
- Use the Six Capitals framework to shape our sustainable business strategy and monitor and report on the impacts of our work.
- Work in partnership with stakeholders to manage land using nature based solutions, which will improve water quality, capture carbon, reduce flood risk and improve biodiversity.
- Aim to deliver a net gain to biodiversity across our assets and improve the ecological resilience of Yorkshire's rivers, coastal waters and catchments.
- Prevent the spread of invasive non-native species and pathogens to safeguard our water network and the wider environment.
- Reduce leakage on our network and maintain a safe and reliable water supply to customers in line with our Water Resources Management Plan.
- Reduce sewer flooding and protect the environment by managing the impact of our wastewater network and treatment works and seek to reduce the number of times our most active overflows operate.
- Champion both water efficiency and the responsible use of sewers with stakeholders.
- Work to neutralise our Scope 1 and 2 emissions and ultimately achieve Net Zero across all emissions.
- Use energy efficiently and generate renewable energy to improve resilience.
- Provide data to facilitate a transparent view of company performance.

Yorkshire Water will incorporate the above commitments into our objectives, goals, processes and behaviours to achieve our vision and enhance our performance. We'll continually work on embedding this policy and how well it's understood by our colleagues, stakeholders, contractors and suppliers, and it will be made available to our customers. We'll seek out and listen to comments and suggestions for improvements and will review this policy periodically in light of new knowledge, changing legislation and the views of our customers and our advisory panels.

Nicola Shaw - Chief Executive
Yorkshire Water Services Ltd
Date: November 2023
Issue: 1

YorkshireWater

Appendix 5 Site Condition Report

Woodhouse Mill Sludge Treatment Facility Environmental Permit Site Condition Report

Application for Environmental Permit Variation

Permit Reference: EPR/DP3092ZJ/V003

December 2023

YorkshireWater

Stantec

Sign-off sheet

Project details

Project number	331001762 100.2301-2
Project name	Environmental Permitting IED sites
Date	December 2023

Client details

Client name	Yorkshire Water Services Limited
Client address	Western House Halifax Road Bradford West Yorkshire BD6 2SZ

Document details

Document title	Woodhouse Mill Sludge Treatment Facility Environmental Permit Site Condition Report
Document version	FINAL
Report author	Jemma Prydderch
Report reviewed by	Emma Stewart
Report approved by	Philip Smith / Peter Duncan
Report by	Stantec

Contents

Executive summary

This document presents the Site Condition Report (SCR) for the Woodhouse Mill Sludge Treatment Facility (STF) operated by Yorkshire Water (YW) and forms part of an application to the Environment Agency (EA) for a permit variation to operate the anaerobic digestion facility and related activities under the Environmental Permitting (England and Wales) Regulations 2016 (EPR).

The role of the SCR is to document the baseline conditions present at the start of the permit, assess the likelihood of ground contamination occurring during the life of the permit, and to prevent and control contamination of the ground during operation of the permit.

This assessment has involved a desk study review and site reconnaissance and has been produced in accordance with the EA's Technical Guidance Note, H5 (2013). Records of the site and surrounding area have been reviewed in order to describe the condition of the site and, in particular, to identify any substance in, on or under the land that may constitute a pollution risk to land or groundwater. Pollution prevention measures have been identified and an assessment of pollution potential to land has been undertaken. This information has been used to produce a conceptual model for the site.

The main findings of the SCR are as follows:

- Activities under the varied permit will involve the operation of an anaerobic digestion (AD) plant to treat indigenous sludges prior to off site use for agricultural purposes. Sludge from other YW sites is currently imported to the head of the WwTW (and is therefore outside of the scope of this permit). A facility to import sludge directly to the STF does exist but is used only as an exception; a new import facility may be added in future. It is proposed that a liquor treatment plant will also be added as part of a planned future capital project. This would be located wholly within the installation boundary.
- The River Rother flows to the west and north in close proximity to the installation boundary. It therefore represents a sensitive receptor and potential risk of pollution. The Water Framework Directive assessment for the catchment area indicates an overall moderate quality for the 2019 assessment (Environment Agency, 2021).
- The underlying geology comprises of superficial alluvium over Pennine Middle Coal Measures Formation; both classified as Secondary A Aquifers. These are defined as formations with 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 also classified as aquifers of high and moderate-high vulnerability respectively.
- The site is not within a Drinking Water Safeguard Zone nor a Source Protection Zone (Environment Agency, 2021).
- The site has been subject to long-term industrial use as a wastewater treatment works (WwTW) and waste management facility; activity is documented on site from 1935 to the present day. The conceptual site model has identified a number of potential pollutant linkages which pre-date the current environmental permit (Reference 1).

A moderate - low risk[1] of future pollution occurring has been assessed from the bulk storage of raw materials, sludge and the drainage of liquors at the site. However, given the continuing management practices and mitigation measures in place, the risks are considered to be effectively managed. A comprehensive site history and conceptual site model have been produced which demonstrate the long-term industrial history of the site and the potential for legacy contamination to exist. Where available, data from previous ground investigation is provided to indicate conditions prior to regulation of this installation under the environmental permitting regime. Further collection of baseline data is proposed in due course, in preparation for planned capital works, and YW would seek to provide additional characterisation information to the EA relating to ground and groundwater quality within the installation area, at this time.

[1] CIRIA C552 Contaminated Land Risk Assessment: A guide to good practice

1 Introduction

This document supports the permit variation application for authorisation under the Environmental Permitting Regulations 2016 (England & Wales) (EPR) to vary the permit to operate the Woodhouse Mill sludge treatment facility (STF) which is operated by Yorkshire Water (YW).

1.1 EP Regime

This permit 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 with a treatment capacity of over 100 tonnes/day (t/d) are classified as installations for the purposes of EPR. Therefore, given the combined volumes of indigenous and imported material processed, a variation to an existing permit is required to add Schedule 5.4 Part A(1)(b)(i) for anaerobic digestion (AD) treatment activities.

YW holds an existing permit for sludge conditioning and phyto conditioning activities at Woodhouse Mill. The permit (reference number EPR/ DP3092ZJ/V002) was originally issued as a waste operation permit on 21st October 2013. Sludge conditioning / phyto conditioning is no longer carried out on site and therefore this application will vary the permit to remove these activities and add anaerobic digestion, liquor treatment and directly associated activities. A limited quantity of legacy waste material remains on site (stored on the concrete slab to the south of the dewatering centrifuges). This is awaiting removal from site for appropriate recycling/disposal. There is no technical connection between this material and the sludge digestion activities which are the subject of this permit variation application.

The terms “site” when used in this report relate to the area of operation as defined in the technical description of the main variation application. The current permit boundary is shown on Figure A1 of this SCR.

1.2 Site Condition Report (SCR)

The purpose of this SCR is to describe and record the condition of the land and groundwater on site and to demonstrate that land and groundwater are protected during the lifetime of the permit, ultimately so that the site is in a ‘satisfactory state’ when the permit is surrendered.

As detailed in the EA’s Technical Guidance Note, H5 (2013) the intention is that this is demonstrated by the following sequence of events:

- Producing the application part of the SCR when applying for an environmental permit (or permit variation);
- Updating the SCR during the lifetime of the permit; and
- Completing the surrender SCR and submitting the full completed SCR when applying to surrender the permit.

In the case of Woodhouse Mill, due to the transition of the site from the Waste Management Licensing regime into Environmental Permitting, an SCR does not exist for the current permit boundary. Recognising this inherent limitation, this report will gather information from available sources to provide supporting information against which any future surrender can be assessed. The collection of soil and groundwater data is proposed and the SCR will be updated to include this new information, setting an effective baseline.

The boundary of the original waste management licence and subsequent conditioning permit enclosed the wider YW ownership boundary, but excluded the area occupied by WwTW activities at the time of application. As the site developed over subsequent years, parts of the permitted land which had been initially allocated for future sludge conditioning activities were not used for this purpose as anticipated. Therefore YW will be submitting an application for a partial surrender of this land, as a 'low risk' surrender, given that waste management activities did not take place in these areas. In some cases, these areas were incorporated into the WwTW (undertaking urban wastewater treatment activities), with the addition of activated sludge tanks, final settlement tanks and screening equipment. In other parts of the site the areas have remained inactive and unoccupied. This intention was communicated to the Environment Agency's permitting team who requested that a separate surrender application be submitted to be determined concurrently. The area in question is illustrated on Figure A1.

The scope and content of this SCR will therefore focus on STF operational areas (i.e. AD, liquor treatment and directly associated activities) and will aim to set a baseline for these areas. It will discuss land use history, activities undertaken by YW during their long-term ownership, present existing site investigation information, and discuss the potential for the proposed permitted activities to impact on land quality given the containment, mitigation and management systems in place. This will provide a robust SCR, aligning documentation in the longer term with the STF and the issued permit.

2 Site Details

2.1 Site Location

Table 1 Site Details

Aspect	Details
Address	Woodhouse Mill Sludge Treatment Facility, Retford Rd, Sheffield S13 9WG
NGR	443453, 385945 [2]
Details of facility	Woodhouse Mill STF treats predominantly indigenous sewage sludges arising from the Woodhouse Mill WwTW. The proposed installation boundary comprises c.5.25 hectares, is broadly rectangular in shape, and is located directly adjacent to the Woodhouse Mill WwTW. The site is accessed from the south via Retford Road.
Main Facility Components	The principal activities currently undertaken within the STF installation as described in the permit variation include: • Raw sludge thickening; • Anaerobic digestion; • Biogas collection and storage (including flaring if operationally necessary); • Use of biogas (a renewable energy source) to fuel combined heat and power (CHP) and/or boilers, generating electricity and / or heat to support the AD process; • Digested sludge dewatering; • Liquor treatment and ferric dosing (proposed additions); • Storage and maturation of digested sludge on a cake pad, prior to transfer off site for landspreading as an agricultural soil conditioning agent; • Collection and treatment of potentially odorous process gases; • Raw material storage and use; and • Surface water and process liquor collection and return back to the WwTW for treatment. • Waste collection, storage and transfer off site. The location and layout of these activities is illustrated in Figure A1.
Surrounding land uses	The site is located to the east of the Woodhouse Mill WwTW. Land use directly to the north comprises of undeveloped land, with the River Rother beyond. To the east is a single-track railway with allotment gardens and public open space beyond. To the south is Retford Road, with commercial and industrial land beyond. The nearest residential properties are: • 175m to the east of the cake maturation area; • 200m southeast and 215m southwest of the site entrance; • 385m west of the sludge thickening plant; and • Over 1km to the north.

[2] Based on an approximate mid-point of the proposed permit area.

2.2 Identification of Potentially Polluting Substances

An assessment of the pollution potential of substances associated with the activities has been made based upon their properties, toxicity and the volume stored.

Materials have been screened according to their potential to cause concern in respect of future soil and / or groundwater contamination. The potential to pollute, and for any contaminant linkage pathway to be realised, is influenced by the physicochemical nature of the substance; materials of low mobility are less likely to be transmitted through soil or groundwater if released, and materials of low persistence in soil and groundwater may be of lower impact with regards identified receptors. This approach has been used in Table 2 (Raw Materials), Table 3 (Process Materials) and Table 4 (Waste Materials) to screen substances of potential concern in relation to their toxicity, mobility or persistence in the soil or groundwater environment. The location of material storage, bulk process storage tanks and waste storage is illustrated in Figure A2.

Table 2 Raw Materials Associated with the Facility and their Potential to Pollute

Substance (Contaminants)	Use	State	Storage Arrangements	Toxicity/ Fate/ Mobility	Potential Pollutant?
Polymer (liquid)	Coagulant used to aid for raw sludge thickening	Liquid	10m^3 bunded fibreglass tank (internal). Located on hardstanding surrounded by grill with a sump below. Occasional 1m^3 ICB storage.	Polluting to soil and watercourses in the event of a spillage/loss	✓
Polymer (liquid)	Diluted coagulant used to aid for raw sludge thickening	Liquid	2m^3 bunded plastic tank (internal) Located on hardstanding surrounded by a blind sump with grill.	Polluting to soil and watercourses in the event of a spillage/loss	✓
Ferric Chloride	1.5m^3 tank – not used at present				×
Polymer (powder)	Coagulant used for digested sludge dewatering	Solid	750kg bags in dedicated hopper room. Mixing tank and associated pipework located within centrifuge building.	Polluting if mobilised to watercourses in the event of a spillage/loss	✓
					✓
Antifoam	Digester antifoaming agent	Liquid	IBCs (1 m^3), dosing storage (stock tank- 0.128m^3) and associated dosing pump and pipework stored on hardstanding within digester compound.	Polluting to soil and watercourses in the event of a spillage/loss	✓
Water treatment chemicals	Boiler treatment	Liquid and solid	Brought to site by contractors for periodic maintenance only. No storage on site.	Polluting to soil and watercourses in the event of a spillage/loss	✓
Glycol	Antifreeze for use in CHP equipment	Liquid			✓
Biogas	Generated within the AD	Gas	Transferred from AD to gas holder (300m^3) for use in the CHP	Volatile and unlikely to pollute watercourses or land in the event of escape	×
Lubricating oil	For use in CHP equipment	Liquid	Small intermediary containers (20litre) stored within a bunded cabinet located on hardstanding (cake pad)	Polluting to soil and watercourses in the event of a spillage/loss	✓
Diesel	Refuelling of off road vehicles	Liquid	Integrally bunded storage tank on hardstanding		✓
Transformer oil	Transformer only	Liquid	No storage other than volume in use		✓

Table 3 Bulk Storage of Sludge, Sludge Cake and Process Liquors and their Potential to Pollute

Material	Nature of material	Storage Arrangements	Nominal capacity (m^3)	Potential Pollutant?
Raw sludge (un-thickened)	Liquid	Incoming underground pipes from WwTW	-	✓
		Thickener feed tanks, steel construction, covered, constructed c. 2013	2 x 1,427	✓
		Sludge feed to thickener building (above ground)	-	✓
Thickened sludge	Liquid	Sludge feed to digester feed tanks (above and below ground)	-	✓
		Digester feed tank no.1, steel, covered, constructed 1990	250	✓
		Digester feed tank no.2, steel, covered, constructed 2000	554	✓
Sludge within digesters	Liquid	Sludge feed to digesters (below ground)	-	✓
		Digesters, concrete, covered, constructed 2013	2 x 1,733	✓
Digested sludge	Liquid	Underground pipes running from digesters to dewatering tanks (below ground)	-	✓
		Dewatering feed tank No.1, steel, uncovered, constructed 1996	500	✓
		Dewatering feed tank No.2, steel, uncovered, constructed 2013	606	✓
		Dewatering feed tank No.3, steel, uncovered, constructed 2013	606	✓
Dewatering liquor	Liquid	Return liquor sump and associated pipework (underground, running from centrifuge building to Effluent Building on the northern boundary)	-	✓
Run-off from concrete pad	Liquid	Run-off collection drainage (to Effluent Building)	-	✓
		Return pipework (underground, running from Effluent Building to primary distribution chamber at WwTW)	-	✓
Cake	Solid	Concrete pad	25,000 tonnes (maximum permitted)	✓

Table 4 Process Wastes and Potential to Pollute

Waste Type	Nature of material	Storage Arrangements	Storage and Disposal Method	Potential Pollutant?
Waste oil	Hazardous	Stored in IBCs on hardstanding within the digester compound	Collected by approved waste contractor for off-site disposal	✓
General waste	Non-hazardous	Dedicated skips and smaller containers, located on hardstanding at designated points within the installation	Collected by approved waste contractor for off-site disposal	✓
Wood	Non-hazardous	Skip within designated area	Collected by approved waste contractor for off-site disposal (recycled or treated via EfW)	✗
Empty IBCs	Hazardous	Stored in designated within the installation prior to removal	Collected by approved waste contractor for off-site disposal	✗
Oil contaminated absorbents	Hazardous	Dedicated containers (20 litre drum) within digester compound	Collected by approved waste contractor for off-site disposal	✓
Oil filters	Hazardous	Dedicated container (20 litre drum) within digester compound	Collected by approved waste contractor for off-site disposal	✓
Antifreeze	Hazardous	Removed from site when servicing requires a change over (in 20 litre drums)	Collected by approved waste contractor for off-site disposal	✓

All waste materials are stored on areas of hardstanding in accordance with YW Environmental Management System (Reference 4).

2.3 Site Drainage

All liquor from raw and digested sludge thickening and dewatering processes, and condensate (e.g. from biogas handling) is collected and discharged via underground drainage systems to the WwTW for full treatment prior to discharge to the River Rother. The majority of surface water runoff, including all run off from the cake storage pads, is also discharged via the WwTW. A very small section of surface water drainage is discharged directly to the Final Settlement Tanks (FSTs) and then to the River Rother, as shown on drainage plans provided in Appendix 1. This has been identified as a potential containment risk (Reference 5) and improvements are proposed, as detailed within the Secondary Containment Report and main application document (Improvement Condition 1).

2.4 Surfacing

The majority of active process areas within the installation are covered by buildings and hardstanding, with some peripheral areas of soft landscaping (grass cover) and impermeable cover (gravel). Site surfacing is illustrated on Figure A3. Concrete hardstanding (including the cake pads) was generally observed to be in good condition across the site with no significant evidence of cracks or erosion.

2.5 Electrical Transformers and Sub-stations

There are two transformers located on site; one adjacent the thickener building, and the other adjacent to the CHP. These are managed by YW and maintained and serviced regularly by appointed contractors.

3 Site History

Ordnance Survey (OS) historical maps were obtained as part of an Envirocheck Report (Landmark Information Group, 2020). These maps have been reviewed to provide information relating to the historical development of the site and surrounding area. The Envirocheck report is provided in Appendix 2. In addition, other sources of information have been used including aerial photography (Google, 2021).

The summary of land condition within this report places emphasis on the proposed permit installation boundary, outlining potentially contaminative historical land uses or sensitive land uses within the surrounding area. The current installation boundary covers a larger area, a legacy of the current permit for sludge conditioning (permit reference EPR/DP3092ZJ/V003) (Reference 1) which in turn relates to a legacy Waste Management License (EAWML65465) (Reference 2).

The scope and content of this SCR will focus on STF operational areas and will aim to set an initial baseline for the areas within which permitted activities will take place, to be supported in due course by further ground investigation data (main application document, Improvement Condition 7). It will discuss land use history, activities undertaken by YW during their long-term ownership, present existing site investigation information, and discuss the potential for the proposed STF activities to impact on land quality given the containment, mitigation and management systems in place. This will provide a robust SCR, aligning documentation in the longer term with STF activities and the issued permit.

It is proposed that the additional areas, not subject to STF activities, are dealt with via a low risk surrender application. A review of history in Section 3.1 and in the separate surrender documentation will consider whether these areas have ever been subject to sludge treatment activities and whether there is any risk of detriment to the land quality or of any contamination occurring as a result of STF activities.

3.1 Historical Land Use

Historical maps for the site are available between 1855 and 2020; these have been reviewed and the findings are presented in Table 5. Descriptions of ‘on-site’ refer to areas situated within the proposed STF permit installation boundary[3]. All other areas of YW landholding are ‘off-site’.

[3] The Envirocheck Landmark report covers the wider YW landholding, including parts of the WwTW. The descriptions provided in Section 3 relate to the proposed installation boundary and distances have been adjusted accordingly.

Table 5 Historical map review

Historical Map	On Site	Off Site
1855 (1:10,560)	The site is largely undeveloped land. Part of the River Rother passes through the southwest corner. Retford Road is shown in its present-day orientation. Woodhouse Mills, located on the River Rother to the south of Retford Road, encroaches on the southwestern boundary. A railway on an embankment bounds the site to the east, in its approximate present-day orientation.	The River Rother is shown to the north and west of the site, flowing to the north. Woodhouse Mill is located to the south of the site. Woodhouse Mill Colliery is located c.250 m so the southwest, and several coal pits are marked further to the west. Fence Colliery is located 250 m to the east with associated shafts surrounding.
1892 (1:2,500) / 1893-1894, 1898 (1:2,500)	Buildings are located in the southwestern corner of the site (use unclear). Railway sidings are shown in the south eastern corner, associated with Woodhouse Mill Station.	Terraced residential housing is shown to the southwest of the site. Woodhouse Forge is located c.90 m to the south. Rotherwood Iron and Steel Works is shown c.85 m to the south of the site, with clay pits and kilns marked. Fence Colliery has expanded and related air shafts and excavations / spoil are now c.60 m to the southeast. An associated rail spur runs off the mainline, trending around the northern extent of the colliery. Woodhouse Mill Colliery and the associated coal pit to the west (>250 m) are no longer shown.
1903 (1:2,500), 1904-1906 (1:10,560)	No change	The rail line along the eastern site boundary has expanded, with the addition of new lines and a widening of the embankment. A pond is shown approximately 140 m to the south of the site. A sewage works is shown approximately 200 m south of the site and includes filter beds and tanks. Approximately 200 m to the north, the River Rother has been diverted; the historical meanders are indicated on the eastern side of the rail line as ‘River Rother (Old Course)’.

Historical Map	On Site	Off Site
1923 (1:2,500), 1924(1:10,000)	No change	Rotherwood Iron and Steel Works is no longer shown to the southeast; a refuse heap is marked c.100 m to the south of the site; and the remainder of the former works site is shaded as a pit. A golf course is labelled on the northern boundary of the River Rother, approximately 50 m northwest of the site. The pond noted c.140 m to the south of the site is no longer present and is potentially infilled. A sewage works is shown, approximately 160 m to the northeast of the site; this feature is shown to have tanks, sludge pits, and filter beds (shown on the mapping as marsh land).
1935 (1:2,500)	A Sewage Works (Sheffield Corporation) is shown on site for the first time. A tramway track enters the sewage works, from Woodhouse Mill Station in the southeast, running to the north of the site, and onto land to the west. Filter beds are located within the northern part of the site. A sludge bed, consistent with a present-day asset, is shown in the centre of the site. A single dwelling is shown on the southern boundary.	The sewage works extends onto land to the west. A tramway servicing this part of the works crosses the site. Tanks, a bio aeration unit, a small circular filter bed, a travelling crane and other associated infrastructure are shown. Rothervale Works (joinery) is shown c. 50m south, and includes a rail spur, tanks and infrastructure. The sewage works to the south is no longer shown.
1938, 1948 (1:10,560)	No change	No significant change
1956 (1:2,500), 1956 and 1967 (1:10,000)	No change	Fence Colliery to the east is labelled as disused. A spoil heap is noted c.100 m to the south of the site at Woodhouse Mill Forge. Opencast workings are marked on land to the northeast of the railway line, c. 200 m from the site. An area of marshland is shown approximately 200 m to the south of the site. A large reservoir is now shown to the northeast, 300m from site.

Historical Map	On Site	Off Site
1969 (1:2,500), 1971-1976 (1:2,500).	The River Rother no longer runs through the southwestern corner of the site and has been diverted to follow its approximate present-day orientation, to the west of the site. A drainage ditch is shown in the southwest of the site, in the approximate position of the River Rother's previous location. The tramway is no longer shown.	The dwellings to the southwest are no longer shown. Sludge beds are shown in the north / northeast corner of the site from 1975, with two extending off-site to the north. Woodhouse Mill Station is labelled as disused. Orgreave Colliery, to the northwest, has extended in the direction of the site and now bounds the northern banks of the River Rother, c.175 m from the site. Features include slurry ponds and slag heaps. A new rail spur runs off the mainline c. 50 m to the north of the site into an area named as Slag Reduction Works, situated approximately 400 m to the north/northeast of the site. The area to the southeast of the site, previously identified as the Fence Colliery has been redeveloped, and is now named as NCB Workshops and Stores, situated c.100 m to the southeast of the site.
1982, 1983, 1987 (1:2,500/1:1,250) and 1981-1984 (1:10,000)	Sludge beds are marked in the northeast of the site, adjacent to the previously developed filter beds.	The expansion of the sewage work on land adjacent to the west is evident from 1983. The drain that was present on site, after the realignment of the River Rother, is no longer shown; an outfall is present on the site's western boundary which suggests this drain has now been culverted. A fuel filling station is located c. 100m west of the site entrance (this feature is not labelled but information from the Envirocheck Report confirms the use of the land). A pumping station is now shown located approximately 100 m to the east of the site, on the opposite side of the rail line. The forge approximately 45 m to the south of the site is now labelled as works.

Historical Map	On Site	Off Site
1990-1991 (1:10,000) and 1993 (1:1,250)	Only one of the three sludge beds as still present, which extends off site to the north. Circular tanks are shown within the installation boundary for the first time in 1993 (including Digester Feed Tank 1, and two digester tanks to the south of the boiler house (not present 2021), as is the boiler house building. Four large rectangular consolidation tanks are shown in the central southern part of the site. A flare stack is marked to the north of both features.	Two of three slurry ponds at Orgreave Colliery to the north (c. 200m from the site boundary) have been infilled. Spoil heaps remain. The small sewage works noted in 1923, situated c. 160 m northeast of the site is no longer marked.
1996 (1:10,000)	No change	Additional tanks and other infrastructure are evident on the adjacent WwTW. The bio aeration unit in the northwest is no longer shown. Sludge beds area shown on land
1999 (aerial photography) and 2000, 2002, and 2006 (1:10,000)	Rectangular sludge beds / tanks in the northern part of the site are no longer shown and by 2000 a large open area, consistent with the present-day maturation slab is evident. A rectangular structure, consistent with the centrifuge bay is evident with a circular tank adjacent.	These sludge beds to the north appear partially vegetated.
2019 (Google Street View) and 2020 (1:10,000)	Two digesters are now shown in the place of the northern most consolidation tanks (consistent with the current layout). The former digesters, located to the south of the boiler house building, are no longer shown. An electricity sub-station is now shown in the north, and a second one in the central southern area.	The five sludge beds on land adjacent to the north of the site are no longer shown. A tank (unknown content) is shown approximately 90 m north of the site just south of the River Rother. A car wash is shown at the location of the former fuel filling station adjacent to the southwest of the site (Google Street View 2019). Landscaping works have been undertaken in the former Orgreave Colliery works, and two lakes excavated c. 500 m to the north of the site. The slag heap north/northeast of the site (beyond the rail line) is no longer shown and appears to be landscaped.

4 Environmental Setting

The following information was derived from information contained within the Landmark Envirocheck report (2020) (Appendix 2), other published sources (referenced within) and previous site investigations and assessments (Section 4.6).

4.1 Geology and Hydrogeology

Geological map extracts taken from the British Geological Survey (BGS) digital geological map of Great Britain (BGS, 2021) and the Envirocheck (Landmark Information Group, 2020) BGS geology report have been reviewed. A summary of the geological maps is discussed below.

4.1.1 Artificial Ground

The BGS 1:50,000 scale geological mapping provided in the Envirocheck report and on the BGS Geoindex (BGS, 2020) does not show artificial deposits on site. However, within 250 m of the site, extensive areas of Made Ground and infilled ground are shown, as follows:

- Infilled Ground from approximately 150 m to the north and northwest;
- Infilled ground approximately 100 m to the east; and
- Made Ground approximately 85 m to the northeast of the site.

The artificial/mapped Made/Infilled Ground shown by the BGS generally appears to correspond with the location of former open-cast workings and spoil heaps. The historical mapping indicates that variable and potentially significant thicknesses of Made Ground are anticipated across the site, and immediately surrounding area, associated with historical site development. In particular, the presence of former infilled sludge beds to the north and northeast of the site and an infilled watercourse in the southwest of the site represents a potential source of contamination pre-dating permitted activities. Previous ground investigations also encountered Made Ground (see Section 4.6) associated with localised development activities (construction and demolition of tanks, buildings and historical tramway).

4.1.2 Superficial Deposits

Superficial Deposits of Alluvium are shown covering the whole of the site, following along the eastern banks of the River Rother. The BGS Lexicon (BGS, 2020) described Alluvium as typically comprising normally consolidated soft to firm, compressible silty clay containing layers of silt, sand, peat and basal gravels possibly with a stronger, desiccated surface.

4.1.3 Solid Geology

The site is shown to be underlain by the Pennine Middle Coal Measures Formation, which is described by the BGS (BGS, 2020) as typically comprising a sequence of interbedded mudstones, siltstones and sandstones with common coal seams. Several generally northwest to southeast striking coal seams are shown to out-crop (beneath the Alluvium) across the site. A southeast to northwest striking fault is shown cutting through the site. It enters the site in the northwesternmost corner, before terminating in the approximate centre of the site. The BGS 1:50,000 mapping (BGS, 2011) shows the following coal seams outcrop beneath the site, outcropping in order from southwest to northeast:

- High Hazel (0 to 1.9 m thick);
- Top Hard Barnsley (0.3 to 1.4 m thick);
- Abdy (Furnace) (0.3 to 1.0 m thick);
- Two-Foot (0.6 to 1.0 m thick), and;
- Meltonfield (0.1 to 2.1 m thick) coal seams.

4.2 Coal Mining

The Coal Authority Interactive Map Viewer (Coal Authority, 2021) indicates the site is located in a Coal Mining Reporting Area. A Coal Authority Coal Mining report was purchased for the site and is provided in Appendix 3. The information is summarised below:

4.2.1 Mining Activity

The Coal Authority (CA) Coal Mining Report (Coal Authority, 2020) indicates the site is within an area which could be impacted by past underground mining in six seams locally:

- High Hazel – 45 m depth, last worked in 1857. Working located to the southeast of the site. Extraction thickness reported to be 112 cm.
- Top Hard Barnsley – five recorded workings at depths of between 63 m and 97 m, last worked in 1881. Workings are generally located beneath the site, though a single working is indicated to the southwest. Extraction thicknesses reported to range between 122 cm and 150 cm.
- Swallow Wood – 199 m depth, last worked in 1972. Working located beneath the STW site. Extraction thickness reported to be 175 cm.
- Flockton – three recorded workings at depths of between 240 m and 301 m, last worked in 1964. Two workings are located beneath the site and one working is indicated to the southeast of the site. Extraction thicknesses are reported range between 120 cm and 135 cm.
- Parkgate – three recorded workings at depths of between 301 m and 331 m, last worked in 1936. Workings located beneath the site. Extraction thicknesses are reported to be 138 cm and 164 cm.
- Silkstone – five recorded workings at depths of between 377 m and 462 m, last worked in 1929. Workings located beneath the site and to the south and northwest of the site. Extraction thicknesses are reported to be 160 cm and 183 cm.

The report identifies that there are probably other unrecorded shallow workings at depths of less than 30 m. The report provides details of nine abandoned mine plan catalogue numbers which intersect with some, or all, of the site boundary. The report indicates the Coal Authority may have more plans than are referenced in the report which may affect the site boundary.

There are no recorded mine entries (shafts, adits) within 100 m of the site boundary.

A map of opencast coal mining sites provided as part of the Coal Authority report shows there are several former opencast mines in the general vicinity of the site, including to the north, west, east and southeast. The report indicates that the following workable coal seams outcrop at the site:

- Furnace;
- High Hazel, and;
- Two Foot.

4.2.2 Other information

There is no current Stop Notice delaying the start of remedial works or repairs to the site.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. Regarding coal mining subsidence, the Coal Authority has not received a damage notice or claim for any locality within 50 m of the site, since 31 October 1994. No notices have been given under section 46 of the Coal Mining Subsidence Act (1991) stating that the land is at risk of subsidence.

There are no recorded incidences of mine gas or mine water treatment schemes within 500 m of the site.

There are no records of licences for future underground mining affecting the site area. An historical licence, for a location 100 m to the east of the site, is on record. The site is close to a Coal Authority license area for coal mining operations (location not specified).

4.3 BGS Records

A single BGS record (referenced SK48NW254 - Pigeon Brook Sewer BH27) is located in the southeastern corner of the site, located approximately on the southern edge of the cake pad. The record is for a percussive borehole drilled by Norwest Holst Soil Engineering Ltd on behalf of Rotherham Metropolitan Borough Council in 1988 and recorded the following ground and groundwater conditions:

- Made Ground - comprising ash, clay, and brick rubble to a depth of 3.8 m bgl;
- Weathered Pennine Middle Coal Measures - highly weathered mudstone with coal partings to a final depth of 5.15 m bgl.
- A groundwater strike was recorded at 4.40 m bgl, with no rise recorded over 20 minutes.
- A monitoring standpipe was installed into the borehole.

Several confidential records (referenced SK/48/NW/419 to SK/48/NW/431) are located to the west of the site, on the WwTW, but it has not been possible to obtain these details. These records date back to 1988.

4.4 Hydrogeology

4.4.1 Aquifer Classification

The superficial deposits of Alluvium and bedrock of Pennine Middle Coal Measures Formation are classified by the EA as Secondary A Aquifers. These are defined as formations with 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 also classified as aquifers of high vulnerability and medium-high vulnerability respectively.

4.4.2 Groundwater Quality

The site is not located within a groundwater Source Protection Zone (SPZ).

4.4.3 Groundwater Abstraction

The site is not located within a groundwater drinking water safeguard zone (EA, 2021). There are no reported active groundwater abstractions with 250 m of the site.

4.4.4 Groundwater Flooding

The site is potentially susceptible to groundwater flooding at surface according to the BGS susceptibility map (Envirocheck, 2020).

4.5 Hydrology

4.5.1 Surface Water Features

The site is located within close proximity to the River Rother which flows in a northerly direction to the north and west of the site, between 90 and 160m from the site boundary.

Historical maps show a former tributary of the River Rother crossing the southwestern corner of the site to confluence with the River Rother to the west of the WwTW. It is believed that this watercourse has been culverted and OS Water Network data supplied in the Envirocheck report (Appendix 2) confirms that this continues to drains land to the west of the site through culverted and open sections.

Shirtcliff Brook confluences with the River Rother to the west of the site. Contemporary mapping suggests this watercourse is also culverted.

4.5.2 Flooding

The Envirocheck Report shows that approximately 50% of the site is situated within a Flood Risk Zone 3 (land assessed as having a 1 in 100 (>1%) or greater annual probability of flooding from rivers). The majority of the remaining 50% is situated within a Flood Risk Zone 2 (land assessed as having between a 1 in 100 and 1 in 1,000 (1% - 0.1%) of flooding from rivers). A small area to the southeast is within Flood Zone 1, indicating a less than 1 in 1,000 (<0.1%) annual probability of flooding from rivers and the sea.

The site is situated within an area identified as being at risk of flooding from reservoirs. The flood map is indicative of the maximum extent of flooding should a reservoir be breached.

4.5.3 Surface Water Quality

The Water Framework Directive assessment for the catchment area indicates an overall moderate quality for the 2019 assessment (Environment Agency, 2021). The River Rother was assigned a General Quality Assessment (GQA) grade E, indicating poor quality based on an assessment in 2000.

The site is located in a surface water Nitrate Vulnerable Zone (NVZ) from source to the River Don.

4.5.4 Surface Water Abstractions

There are no active surface water abstraction licences within 250 m of the site.

4.6 Previous Site Investigations

Previous geotechnical and geo-environmental reports were provided by YW for the site:

- Woodhouse Mill Reconstruction. Boreholes & Test Pile Records. (1970).
- Woodhouse Mill WwTW. Factual Report on Ground Investigation. Report No A3111 Soil Mechanics (October 2003).
- Woodhouse Mill Sludge Thickening. Woodhouse Mill WwTW. Doc reference 4/M0400/X0011/A1. Earth Tech Morrison (ETM). (September 2003).

- Woodhouse Mill WwTW Digester Refurbishment. Factual Report on Ground Investigation. Report No A2015-12. Soil Mechanics (May 2012).

A summary of the relevant information has been provided in Section 4.6.1 onwards, with references to the report where relevant.

4.6.1 Woodhouse Mill Reconstruction. Boreholes & Test Pile Records. (1970).

A series of boreholes and test piles were excavated across the site in a grid pattern. Hand drawn borehole logs were available which did not provide detailed information on depth or classification of the stratum encountered. A summary is provided in Table 6, and some of the depths are inferred based on the information available. Borehole locations are shown in Appendix 4 and copies of the logs are provided in Appendix 5.

Table 6 Summary of ground conditions (1970)

Material and Description	Depth to Top of Stratum (m BGL) (approx.)	Range of Thickness (m) (approx.)
Topsoil	0	0.2-0.8
Superficial deposits (alluvium including clay, sand and gravel)	0.2-0.8	2.2-6.9
Pennine Middle Coal Measures (bands of mudstone, coal, sandstone and ironstone)	2.7-7.4	Max 6.6

4.6.2 Woodhouse Mill WwTW. Factual Report on Ground Investigation. Report No A3111 Soil Mechanics (October 2003).

A ground investigation was undertaken by Soil Mechanics Ltd in June 2003 at Woodhouse Mill STW (Soil Mechanics, 2003). The investigation was carried out on the instruction of Earth Tech Morrison (ETM) on behalf of Yorkshire Water Services Ltd. The fieldwork was undertaken between 3rd and 17th July 2003, comprising one inspection pit to 0.90 m bgl and two cable percussive boreholes with rotary follow on, to a maximum depth of 20.10 m bgl.

BH1 and BH1A was situated to the east of the Primary Settlement Tanks (PSTs), in the location of the existing gas holder. An inspection pit was undertaken in advance of progressing BH1, which had to be terminated due to encountering a plastic pipe. The second location was progressed in close proximity (BH1A). BH2 was situated to the south of the centrifuge building. Borehole locations are shown in Appendix 4 and borehole logs is provided in Appendix 5. Geotechnical testing was completed as part of the investigation but testing for contamination was not.

Encountered ground conditions are described below and summarised further in 0.

Made Ground

- Topsoil: From ground level to 0.10 m at all locations. The topsoil was not described in any of the borehole logs.
- Made Ground: Encountered at both localities underlying the topsoil. The Made Ground was encountered to depths of between 0.90 m (however this depth is related to termination of the hand dug pit due to buried services) and 1.60 m bgl. The Made Ground encountered at BH1 and BH1A was identified as a grey and brown sandy gravelly clay, with constituents including mudstone, brick, concrete, tile and ceramic pipe. Made Ground encountered at BH2 was described as an orange-brown slightly clayey gravelly sand, with frequent ash pockets, with constituents including concrete, mudstone, and brick.
- Frequent pockets of ash were described as being present within the Made Ground in BH2. No significant further visual or olfactory evidence of contamination was noted in the logs.

Alluvium

- Alluvium was encountered in localities BH1A and BH2 only, due to shallow termination of BH1. Deposits were encountered underlying the Made Ground, from a depth of 1.45 m bgl to depths of 6.10 m and 6.30 m bgl.
- The Alluvium was identified as being very soft and firm sandy clay, ranging in colour from orange-brown to blue grey.
- At the base of the Alluvium, in BH1A the Alluvium is described as being a very clayey gravelly sand (between 6.0 m and 6.1 m bgl), and as a clayey gravelly sand in BH2 (between 4.7 m and 6.3 m bgl).

Weathered Pennine Middle Coal Measures Formation

- A weathered horizon of the Pennine Middle Coal Measures was encountered underlying the Alluvium, from depths of 6.10 m and 6.30 m bgl. The weathered horizon was described as either a very stiff blue grey clay with lithorelicts of mudstone, or as a thinly laminated grey clay.

Intact Pennine Middle Coal Measures Formation

- Underlying the weathered horizon, the intact Middle Coal Measures was encountered.
- This intact Middle Coal Measures was encountered from depths of 7.00 m bgl (BH2) and 7.8 m bgl (BH1A). The stratum was typically described as being a blue grey or black coloured weak mudstone with coal or carbonaceous materials encountered throughout.
- Interbedded sandstone horizons were encountered in both boreholes, from 10.28 m to 14.30 m, and 14.40 to 16.00 m (end of hole) in BH2, and from 12.60 m to 14.95 m, from 16.06 m to 17.50 m, and from 18.53 m to 20.10 m bgl (end of borehole) in BH1A. The sandstone horizons were described as being laminated, with mudstone cross laminations present, and carbonaceous material throughout.

Groundwater

- Groundwater was encountered within BH1A only, struck at 7.20 m, rising to 4.70 m bgl after 20 minutes. The groundwater was struck within the weathered horizon of the Middle Coal Measures in this exploratory location.

Table 7 Summary of ground conditions (SM, 2003)

BH	Depth	Material and Description (depth m bgl)					Depth to Groundwater Strikes (m BGL)
		Made ground	Alluvium (sandy clay)	Weathered Middle Coal Measures	Intact Pennine Middle Coal Measures		
					Mudstone	Sandstone	
BH1	0.9	0.1 – 0.9	NE	NE	NE	NE	NE
BH1A	20.1	0.1 – 1.6	1.6 – 6.1	6.1 – 7.8	7.8-12.6 15.0-16.1 17.5-18.5	12.6-15.0 16.1-17.5 18.5-20.1	7.20 (rising to 4.70)
BH2	16.0	0.1 – 3.5	3.5 – 6.3	6.3 – 6.5	6.5-10.5 14.3-14.4	10.5-14.3 14.4-16.0	NE

NE – Not encountered

4.6.3 Woodhouse Mill Sludge Thickening. Woodhouse Mill WwTW. ETM (September 2003).

A Geotechnical Assessment Report was completed by ETM in September 2003, (ETM, 2003) interpreting the results of the Soil Mechanics (Soil Mechanics, 2003) GIR, and includes the findings of four trial pits undertaken by ETM, excavated on 18th June 2003. The trial pits were excavated adjacent to the boreholes which were advanced by Soil Mechanics in July 2003.

The works are listed as being undertaken for the purposes of construction of Dewatering Building and a Gas Holder Tank. A copy of the exploratory hole location plan and the trial pit logs is included as Appendix D. Geotechnical testing was completed as part of the investigation but testing for contamination was not.

The ground and groundwater conditions encountered in the trial pits are presented below.

Made Ground

- Made Ground was encountered in all four trial pits to depths of between 0.45 m (TP2) and 1.40 m (TP3). The Made Ground was recorded as being predominately clayey sand and gravel, with anthropogenic inclusions including slag, brick, rubble, and pottery.

Alluvium

- Alluvium was encountered in all trial pits, to the base of the excavations at depths of between 4.30 m and 4.65 m bgl. The Alluvium was typically described as a soft and soft/firm sandy CLAY with organic material and localized peaty inclusions/patches recorded. The strength of the Alluvium generally decreased with depth. In TP1 and TP4 the Alluvium directly underlying the Made Ground (0.10 m and 0.30 m thick horizon) was recorded as stiff and likely indicates the Alluvium has a localised upper desiccated surface.

Groundwater

- Groundwater was not encountered in any of the trial pits.

4.6.4 Woodhouse Mill WwTW Digester Refurbishment. Factual Report on Ground Investigation. Report No A2015-12. Soil Mechanics (May 2012).

A ground investigation was undertaken by Soil Mechanics Ltd (part of ESG) in March 2012 at Woodhouse Mill STW (Soil Mechanics, 2012). The investigation was carried out on the instruction of ETM on behalf of Yorkshire Water Services Ltd. The fieldwork was undertaken between 9th and 21st March 2012, comprising two cable percussive boreholes with rotary follow on, to a maximum depth of 15.90 m bgl. The exploratory locations were set out by ETM and were situated in the southeastern corner of the site, in the current location of the digester tanks. The overall scope of the investigation is not specified in the report. It is understood that the report relates to the construction of the digester tanks currently situated above the exploratory hole locations. A copy of the borehole location plan and borehole logs is included as Appendix D. Geotechnical testing was completed as part of the investigation but testing for contamination was not.

The ground and groundwater conditions encountered in BHD1 and BHD2 are described below and summarised in Table 8 below.

Made Ground

- Reinforced concrete was encountered in both exploratory locations, to depths of between 0.40 m (BHD2) and 0.45 m bgl (BHD1).

Alluvium

- Material inferred as Alluvium was encountered in BHD1 and BHD2 directly underlying the reinforced concrete slab to depths of 5.10 m and 5.60 m bgl
- The upper horizon of Alluvium to a depth of 3.30 m and 3.50 m bgl was described as soft to firm CLAY with occasional organic matter.
- The lower horizon of Alluvium to the base of the stratum was described as a medium dense to dense slightly sandy GRAVEL of subangular to subrounded sandstone, mudstone and siltstone. A 0.3 m thick band of firm sandy clay was encountered at the base in BHD2.

Weathered Pennine Middle Coal Measures

- Weathered Pennine Middle Coal Measures were not encountered in BHD1 and BHD2.

Intact Pennine Middle Coal Measures

- Intact Pennine Middle Coal Measures were encountered from 5.60 m bgl in both BHD1 and BHD2 and comprised extremely weak to medium strong SANDSTONE to depths of 7.65 m and 10.80 m bgl. The underlying strata comprised a sequence of interbedded very weak mudstone, weak to medium strong siltstone and medium strong to very weak sandstone. A 0.20 m and 0.40 m thick coal was encountered at 9.10 m and 10.80 m bgl and was described as extremely weak.
- No visual or olfactory evidence of contamination was noted on the logs in either of the boreholes completed.

Groundwater

- A groundwater strike was recorded in the shallow cohesive Alluvium at a depth of 0.70 m bgl. No rise was recorded. This strike was sealed at 1.0 m bgl. Groundwater strikes were also recorded upon encountering the granular Alluvium at depths of 3.30 m bgl (BHD2) and 4.00 m bgl (BHD1), with water level recorded to rise by 0.40 m and 0.60 m respectively after 20 minutes. No notation was recorded on the logs regarding whether this strike was sealed off.

Table 8 Summary of ground conditions (SM, 2012)

BH	Material and Description						Depth to Groundwater Strikes (m BGL)
	Made ground (concrete)	Alluvium		Pennine Middle Coal Measures			
		Cohesive	Granular	Sandstone	Mudstone	Siltstone	
BHD1	0-0.45	0.45-3.5	3.5-5.6	5.6-9.1 11.7-12.8	9.1-11.7 13.2-15.9	12.8-13.2	0.7 4.0 (rising to 3.4)
BHD2	0-0.4	0.4-3.3	3.3-5.1	5.1-7.7 9.8-11.1 14.9-15.8	7.7-8.7 9.3-9.8 11.1-14.9	8.7-9.3	3.3 (rising to 2.9)

NE – Not encountered

5 Environmental Data and Regulatory Information

A summary of the various regulatory and other environmental data is presented below, based on the data obtained in the Envirocheck Report (Appendix 2).

5.1 Discharge Consents

There are nine recorded discharge consents attributed to Yorkshire Water Services Ltd in the area surrounding the site (using a buffer of 200m). All relate to sewage type discharges from WwTW or storm overflows to the River Rother. Revocation dates are not supplied for all the licences and so it is not clear which entries relate to historical or active discharges.

5.2 Pollution Prevention and Control

A revoked Local Authority Pollution Prevention and Control (LAPPC) permit is listed related to air pollution for a former petrol filling station adjacent to the southwest of the site, identified a Tate Fuel Oils Ltd, 613 Rotherford Road (although the Envirocheck Report lists this as being on site). A second revoked LAPPC is listed at approximately 25 m to the southeast of the site, relating to air pollution control at Rugby Joinery Ltd.

There are no Local Authority Integrated Pollution Prevention and Control notices within 50 m of the site.

5.3 Pollution Incidents

There is a historic record of pollution incidents to controlled waters relating to the wider YW site (including WwTW) recorded by the Envirocheck report. All predate the issue of the current permit, and previous Waste Management License. A summary is listed in Table 9. One of these incidents related to the release of sewage sludge specifically and was categorised as a significant incident in 1995.

Table 9 Pollution Incident Summary

Date	Incident Ref.	Approx. Distance from Site	Pollutant	Incident severity
14/5/91	122319	220m west	Unknown sewage	Category 2 – significant incident
8/7/91	SH960300	220m west	Crude sewage	Category 3 – minor incident
23/8/91	125482	220m west	Unknown sewage	Category 3 – minor incident
12/7/94	152690	0m	Sewage – treated effluent	Category 2 – significant incident
20/6/95	**SH950084**	**0m**	**Sewage sludge**	**Category 2 – significant incident**
NS	SH960088	0m	Sewage – treated effluent	Category 3 – minor incident
23/7/96	SH960330	100m north west	Sewage – septic tank effluent	Category 3 – minor incident
19/9/96	SH960443	0m	Sewage – storm overflow	Category 3 – minor incident
10/5/97	SH970248	0m	Sewage – storm overflow	Category 3 – minor incident
18/9/97	SH970503	0m	Surcharge sewage	Category 3 – minor incident
4/4/98	SH980145	220m west	Sewage – storm overflow	Category 3 – minor incident

NS- Not supplied

5.4 Landfills and Waste Sites (landfill)

There are no BGS recorded landfill sites within 250 m of the site.

There is a historical landfill site and Local authority recorded landfill site, Woodhouse Mill, located approximately 75 m northeast of the site, coinciding with a former spoil heap on historical mapping and BGS mapped Made Ground. The records indicate that the site accepted was over a 10 year period (1982 – 1992) including waste and liquid sludge from inert, industrial, commercial, and household sources. This site now is now vegetated and identified as Forgemasters Tip Park and Garden.

In addition, several areas of infilled ground are located in close proximity to the site:

- Sludge beds (infilled adjacent to the north)
- Former Fence Colliery (infilled excavations c. 15m southeast)
- Opencast workings (infilled excavations c. 50m east)
- Former Orgreave slurry ponds and spoil heap (made ground c. 140m north)

A registered waste disposal site, listed as a scrap yard and transfer station, is listed as being approximately 50 m to the south of the site. The site has been operational since 1993.

5.5 Contemporary Trade Directory Entries

There are no active or inactive Contemporary Trade Directory Entries within 50 m of the site.

5.6 COMAH Sites

There are no Control of Major Accident Hazards sites (COMAH) recorded within 50 m of the site.

5.7 Contaminated Land Register Entries and Notices

There are no sites on the Contaminated Land register entries or notices within 250 m of the site.

5.8 Fuel Station Entries

The Rothervale Service Station (now a hand car wash only) was located approximately 100m to the southwest of the site entrance. Google mapping would suggest this has not been a petrol filling station since at least 2008. There are no other fuel station entries within 250 m of the site.

5.9 Sensitive Land Use

The following sensitive land uses have been identified within 2km of the site:

- Woodhouse Washlands Local Nature Reserve (LNR) located c. 190 m from southern site boundary.
- Shire Brook LNR located c. 965m south of the site.

There are no National Nature Reserves, RAMSAR sites, Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) within 2km of the site and no internationally designated sites within 10km.

6 Conceptual Site Model

The guiding principle of EPR is to accept no further deterioration of land during the lifetime of the permit. The aim of the SCR is therefore to develop a conceptual site model (CSM) which identifies past and future potential sources of contamination and assesses the vulnerability of the site and sets a baseline against which any potential future deterioration of site condition can be judged at the point of surrender.

The information presented above and in previous sections of this report have been collated and evaluated to develop the CSM for the site. This has been undertaken following procedures outlined in 'Land Contamination: Risk Management (LCRM) published by the Environment Agency (Environment Agency, 2020) and EA's Technical Guidance Note H5 (2013). The CSM outlines:

- Sources: substances that are capable of causing pollution or harm;
- Pathways: routes by which the contaminant can reach a receptor;
- Receptors: something which could be adversely affected by the contaminant including human health, properties and controlled waters.

The establishment of pollutant linkages and assessment of pollution potential enables pollution prevention measures to be identified which will mitigate any potential environment impacts of the permitted activities.

6.1 Sources

A number of potential sources of contamination (PSCs) have been identified on site and in the surrounding area which may have impacted soil and groundwater quality in the areas where the permitted activities will take place, and which could potentially impact land quality in the future. The following PSCs have been identified within 100 m of the site (250 m for areas of infilling / made ground which could potentially result in the generation of ground gas):

6.1.1 Historical

On-Site:

- Long-term sewage and sludge treatment activities including buildings and former structures (filters, settlement tanks, sludge beds), and an associated tramway, including the demolition and potential infilling of some structures (consolidation tanks, sludge beds) with materials which may have included spent filter media, sludge, cake, grit, and screened arisings.
- Construction of former digesters, and subsequent demolition, (prior to the existence of the Environmental Permit).
- Electrical sub-stations.
- Infilled former channel of the River Rother (southwest).
- Pollution incidents to controlled waters (as detailed in Section 5.3).

Off-site:

- Long-term sewage and sludge treatment activities including further tramways, construction and operation of bioaeration unit, filter beds, tanks, pumps and associated infrastructure.
- Subsequent demolition and potential infilling of some of these features.
- Railway land and sidings (adjacent to the east);
- Petrol filling station (100 m to the southwest)

- Coal mining and associated areas potentially infilled with spoil within 100 m to the east, north and south.
- Refuse tip within 100 m south and northeast).
- Long-term industrial development including works to the south and southwest (including a scrap yard).

Potential contaminants that may impact soils and groundwater beneath the site derived from these historical land uses include metals, petroleum hydrocarbons, benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), Volatile Organic Compounds (VOCs), ammonia, dioxins, pathogens and asbestos. In addition, there is potential for ground gas (e.g. methane, carbon dioxide, hydrogen sulphide, and carbon monoxide) to be present.

6.1.2 Potential Contaminant Sources Associated with Permitted Activities

Potential sources of pollution which are present as a result of activities covered by the scope of this permit variation application have been outlined in Section 2. These include raw materials (Table 2), process liquors (Table 3) and waste materials (Table 4).

There are no direct discharges from the process to land or water. All liquor from raw and digested sludge thickening and dewatering processes, and condensate (e.g. from biogas handling) is collected and discharged via underground drainage systems to the WwTW for full treatment prior to discharge to the River Rother. The majority of surface water runoff, including all run off from the cake storage pads, is also discharged via the WwTW. A small section of drainage, limited to an area of roadway in the northwest of the site, is discharged directly to the Final Settlement Tanks (FSTs) and then to the River Rother. Further assessment and optioning of drainage improvements are proposed within the Secondary Containment Report and main application document (Improvement Condition 1).

The Woodhouse Mill WwTW treats sewerage discharges from Sheffield and the surrounding area. Woodhouse Mill WwTW is permitted to discharge flows related to the treatment of sewerage to the River Rother which is wholly separate to this permit application and discharges are monitored accordingly. Effluent generated at Woodhouse Mill STF contributes a proportion of overall loading to the treatment works (both in terms of hydraulic and organic/chemical loading). Processes and controls in place in respect of process liquor to prevent significant negative impacts on the receiving environment as a result of site activities. With regard surface water handling there is a commitment to re-route those drains which currently discharge to the FST as a means of further mitigating against the potential for the release of any contaminated runoff. In addition, proposals are being developed to install a liquor treatment plant and ferric dosing plant to reduce phosphate loading to the WwTW. This project remains in development and further information will be provided in due course.

A secondary containment risk assessment (Reference 5) is provided in support of the current permit application which considers whether measures to protect the environment in the event of a failure of containment of primary storage tanks are adequate. Whilst the overall risk assessment indicates that the installation presents an acceptable risk, a series of control enhancements are identified and evaluated against a range of criteria including BAT compliance, carbon footprint, safety and operational risk and cost. This resulted in the identification of potential improvements (for which detailed technical and engineering review is now proposed), designed to reduce the risks associated with potential containment failure and identified receptor impact in discrete areas.

6.2 Pathways and Receptors

- Human health exposure via direct contact with contamination, ingestion of contamination and inhalation of contaminated dust, vapours or asbestos. For site users and operational staff proposed building cover, hardstanding ground cover or clean topsoil are expected to break any potential pathway in respect of this risk. Human health is not a focus of the H5 methodology.
- Human health exposure of potential ground gases and volatile contaminants beneath the site (if present) to impact site users and operational staff via the inhalation pathway. Human health is not a focus of the H5 methodology.
- Leaching and migration of contaminants within shallow soils beneath the site (if present) to the underlying Secondary A aquifers and River Rother. Contaminants may also migrate off-site within groundwater in shallow permeable soils and impact off-site human health receptors via the direct contact, ingestion and vapour inhalation pathways, although the primary pathway is likely to be towards the River Rother. Contaminants, ground gas, and vapours may also migrate onto site from potential off-site sources.
- Infrastructure, including pipelines, are considered to be a potential pathway to receptors.

6.3 Vulnerability of the Site to Contamination

Sensitive aspects of the site setting are identified in Table 10.

Table 10 Sensitivity of Environmental Receptors in the Vicinity of the Site

Receptor Type	Receptor(s)	Sensitivity	Reasoning
Groundwater	Secondary A Aquifers (Superficial alluvium, Middle Coal measures)	Moderate	Site underlain by Secondary A Aquifers. No groundwater abstractions within 1km and site not located within SPZ.
Surface water	River Rother	High	Located in close proximity to the site. No active surface water abstractions within 1km of the site.
Ecological	Local Nature Reserves	Moderate	No statutory ecological designations within 1km. Woodhouse Washlands LNR located c. 75 m from southern site boundary. Treeton Dyke local wildlife site located 75m to the northeast. Shire Brook located c. 965m south.

6.4 Assessment of Pollution Potential from Facility Activities

An environmental risk assessment in line with H1 guidance[4] has been completed to identify the possibility of land or groundwater pollution from facility activities to impact the sensitive environmental receptors identified in Table 10. This is presented in Table 11.

[4] Horizontal Guidance Note H1. V2.1. Environment Agency Dec 2011 (Withdrawn 1/2/2016)

Table 11 H1 Risk Assessment of Pollution Potential from Activities within the Facility

Potentially Polluting Substance Relevant System / Activity			Managing the risk	Assessment of Risk		
Hazard	Pathway	Receptor	Pollution prevention measures	Probability	Consequence	Overall Risk
Failure of process tank / containment measure: digester tanks, feed tanks, dewatering feed tanks	Direct site drainage / infiltration / runoff	Land, surface water groundwater	Bulk tanks of sludge: All process tanks are located on hardstanding, although surrounded by areas of grass. All tanks and pipework are subject to periodic inspections and maintenance. Potential for run off to areas of soft ground/gravelled areas. A secondary containment risk assessment has been undertaken (Reference 5) and improvements to further enhance pollution prevention measures in the event of failure of the primary tank have been proposed.	Low likelihood	Impact on soil and/or groundwater quality [Medium]	Moderate / low risk
Pipe blockage requiring line entry	Direct site drainage / infiltration / runoff	Land, surface water groundwater	Sludge and liquor transfer pipework: manual intervention, carried out by trained operatives with the intention of minimising the loss of material. Appropriate and timely clean-up of any losses.	Low likelihood	Impact on soil and/or groundwater quality [Medium]	Moderate / low risk
Failure of pumps and valves transferring process liquors	Direct site drainage / infiltration / runoff	Land, surface water groundwater	Sludge and liquor: Valve and pump operation indicated on the SCADA. Planned maintenance programme to ensure line integrity is maintained.	Low likelihood	Impact on soil and/or groundwater quality [Medium]	Moderate / low risk
Failure of raw materials storage tank: liquid polymer, powder polymer, antifoam, glycol, boiler treatment chemicals, diesel	Direct site drainage / infiltration / runoff	Land, surface water groundwater	Antifoam, glycol and boiler treatment chemicals stored in relatively small quantities in intermediary containers. Bulk tanks of polymer (liquid and powder, mixed polymer): All potentially polluting materials are located on concrete hardstanding and secondary containment for the primary tank and fill points are provided. Potential for run off to areas of soft ground/gravelled areas. Tank and pipework subject to periodic inspections and maintenance.	Low likelihood	Impact on soil and/or groundwater quality [Medium]	Moderate / low risk

Potentially Polluting Substance Relevant System / Activity			Managing the risk	Assessment of Risk		
Hazard	Pathway	Receptor	Pollution prevention measures	Probability	Consequence	Overall Risk
Failure of subsurface pipes and/or sumps transporting liquor and raw sludge	Direct site drainage / infiltration / runoff	Land, surface water groundwater	Liquor transported in below ground pipes between vessels. Existing underground pipework will be surveyed using in-pipe crack detection technology every 5 years where there are mechanical joints, and a minimum of every 10 years elsewhere.	Low likelihood	Impact on soil and/or groundwater quality [Medium]	Moderate / low risk
Failure of containment / management practices at sludge unloading facility (occasional practice currently)	Direct site drainage / infiltration / runoff	Land, surface water groundwater	Raw sludge: Activity carried out on hardstanding by approved contractors and supervised by YW staff. Management procedures in place. Rapid manual intervention in the event of a failed connection or hose.	Low likelihood	Impact on soil and/or groundwater quality [Medium]	Moderate / low risk
Failure of engine: Engine oil	Direct site drainage / infiltration / runoff	Land, surface water groundwater	Engine enclosed and located on concrete hardstanding. All associated pipework is above ground. Engine subject to periodic inspections and maintenance.	Unlikely	Impact on soil and/or groundwater quality [Medium]	Low risk
Failure of transformer: Transformer oil	Direct site drainage / infiltration / runoff	Land, surface water groundwater	Transformer subject to periodic inspections and maintenance by appointed contractor.	Unlikely	Impact on soil and/or groundwater quality [Medium]	Low risk

Table 12 Risk Assessment methodology

Consequence	Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined in the Environmental Protection Act, Part IIA. Short-term risk of pollution of sensitive water resource (note: Water Resources Act contains no scope for considering significance of pollution). Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000)
	Medium	Chronic damage to Human Health ("significant harm" as defined in DETR, 2000). Pollution of sensitive water resources (note: Water Resources Act 1991 contains no scope for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem. (note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000)
	Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the Draft Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/services or the environment
	Minor	Harm, although not necessarily significant, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.). Easily repairable effects of damage to buildings, structures and services.
Probability	High likelihood	There is a contaminant linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution
	Likely	There is a contaminant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
	Low Likelihood	There is a contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such an event would take place, and is less likely in the shorter term.
	Unlikely	There is a contaminant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Risk level

	Probability			
Consequence	Severe	Medium	Mild	Minor
High Likelihood	Very high risk	High risk	Moderate risk	Moderate low risk
Likely	High risk	Moderate risk	Moderate low risk	Low risk
Low Likelihood	Moderate risk	Moderate low risk	Low risk	Very low risk
Unlikely	Moderate low risk	Low risk	Very low risk	Very low risk

Risk description	Very high	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to the designated receptor is currently happening. Urgent investigation (if not undertaken already) and remediation are likely to be required
	High	Harm is likely to arise to a designated receptor from an identified hazard. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely in the long term.
	Moderate	It is possible that harm could arise to a designated receptor for an identified hazard. However, if it is either unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk, and to determine the potential liability. Some remedial works may be required in the long term.
	Moderate low	It is possible that harm could arise to a designated receptor for an identified hazard, but it is likely that this harm, if realised, would at worst be mild
	Low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Source: CIRIA document 552: 'Contaminated Land Risk Assessment; A Guide to good practice'.

The risk assessment indicates that the risk of pollution potential from activities to be operated within the facility is moderate low to low. A separate Accident Management Plan has been prepared which assesses other accidental / unexpected events which could increase the risk of release of a potential polluting substance (Reference 6).

7 Protection of Land and Groundwater During Operation

7.1 Site Operational Controls

The Woodhouse Mill STF installation is operated in accordance with an Environmental Management System (EMS) and controls to minimise point source and fugitive emissions to air, water and land. The YW EMS is certified to ISO14001 and a planned maintenance and inspection programme is in place to optimise the operation of plant. Control measures specific to the containment of raw materials and process liquors include:

- High level alarms on bulk process tanks, linked to site SCADA, which cease pumping if the set point level is reached;
- Certain tanks also include emergency overspill arrangements, which would direct sludge to liquor return if overfilled;
- Hardstanding in key process areas and immediate surrounds of key vessels and tanks;
- Drainage of process areas and associated hardstanding to liquor sumps and return to head of works for treatment;
- Secondary or tertiary containment and level detection on key tanks and certain vessels; and
- Planned infrastructure inspection programme.

An Accident Management Plan (Reference 6) is also in place to assess risks and identify controls associated with accidents and other unplanned events.

7.2 Waste Handling

EMS procedures specify appropriate measures to ensure compliance with applicable legislation and to control and minimise pollution risks in relation to the generation, storage and disposal of wastes. Controls to minimise environmental risks associated with waste storage, handling and transfer include:

- Waste materials arising from the process 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 and potential pathways. 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, away from sensitive receptors 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 YW personnel as appropriate.

7.3 Environmental Monitoring Programme

The objectives of the monitoring programme are:

- To demonstrate that the pollution prevention measures will be inspected, tested and maintained over the lifetime of the permit; and
- To ensure that future pollution to land is not caused by installation activities.

Environmental monitoring of groundwater, surface water, soil and soil vapour is not considered to be required over the lifetime of the permit. It is considered that formalised inspection and testing procedures of the pollution prevention infrastructure will be sufficient to control the risk of future pollution from activities with the potential for releases to ground.

7.3.1 Infrastructure

A Secondary Containment Risk Assessment has been undertaken (Reference 5).

The site will maintain an inventory of tanks. The tanks will be:

- Impermeable and resistant to the stored materials; and
- Subject to visual inspection for rusting, leakage or other damage.
- Subject to programmed inspection incorporating visual examinations and non-destructive testing (e.g. ultrasonic thickness measurements).

Bunded areas will:

- Be impermeable and resistant to the stored materials;
- Be designed to catch leaks from the tanks or fittings;
- Be subject to regular visual inspection and any contents pumped out or otherwise removed under manual control after checking for contamination;
- Have fill points within the bund where possible or otherwise provide adequate additional containment; and
- Have a routine programmed inspection of bunds (normally visual but extending to water testing where structural integrity is in doubt).

7.4 Infrastructure Monitoring Programme

YW will continue to formally inspect and maintain site infrastructure in line with the requirements of the site's EMS and Inspection Procedures. This includes a programme of visual inspections by site staff of all tanks and bunds, pipework, drainage and hardstanding. The Technically Competent Manager also undertakes regular inspections on site to identify any potential issues and arrange resolution as necessary. All inspections are recorded in a site log and action taken as required. The log also records the work that has been carried out and any other issues noted within the operating period. Table 13 details the infrastructure inspection and testing programme which will continue to be utilised on site. The inspections will be carried out on a frequency defined in maintenance and management procedures and will primarily be visual to identify any signs of corrosion, cracks or other damage.

Table 13 Details of infrastructure inspection and testing

Activity	Specific Activities	Inspection & Testing Details	Frequency
Process tanks, bunds and associated pipework and valves	Sludge processing	In accordance with YW Inspection Procedures include periodic visual inspection of shell, concrete collars, valves and above ground pipework. Regular check on condition and functioning of gauges, level floats and alarms. Tanks subject to periodic drain down for condition inspections, and NDT to check shell thickness.	In accordance with Inspection Procedures (IP), visual checks as set out in daily, weekly and monthly tasks, frequency of NDT to be determined by asset age and condition.
Underground pipework	Sludge processing	Underground pipework surveyed using in-pipe crack detection technology.	Every 5 years where there are mechanical joints, and a minimum of every 10 years elsewhere else.
Raw materials tanks and bunds	Sludge treatment, biogas combustion	In accordance with YW Inspection Procedures to include periodic visual inspection of shell, concrete collar, valves and pipework. Regular check on condition and functioning of gauges, level floats and alarms. Tanks subject to periodic drain down for condition inspections, and NDT to check shell thickness.	In accordance with IP, visual checks as set out in daily, weekly and monthly tasks, frequency of NDT to be determined by asset age and condition.
Boilers, biogas bulk storage and associated pipelines	Combustion of biogas	Visual checks of the pipe work and connections. Visual checks of plant for signs of leaks, corrosion or damage.	Subject to daily walk around. Weekly inspections of gas holder membrane, blowers, burners.
Oil / fuel storage and pipework	Storage and use of light fuel oil, lubricating oil and waste oil	Tank bunds will be visually checked for accumulated rainwater. Visual checks of the pipe work and connections, and any leaks, corrosion or damage rectified as appropriate.	Monthly (more frequently in periods of high rainfall).

Activity	Specific Activities	Inspection & Testing Details	Frequency
		Visual checks of the tank/ bund to check integrity, if the integrity of the bund is suspect then water testing of the bund will be undertaken.	Monthly
		Associated underground pipework will be surveyed using in-pipe crack detection technology.	Every 5 years where there are mechanical joints, and a minimum of every 10 years elsewhere else.
Surface water and process area drains	Transport of rainwater and liquors.	Site drainage plans will be maintained with any changes made incorporated. Any suspected leaks will be inspected promptly and the necessary remedial action taken.	Every 5 years where there are mechanical joints, and a minimum of every 10 years elsewhere else.
Surfacing	All areas within the facility including around bulk storage tanks, fill points, and waste storage areas.	Areas of hardstanding inspected by detailed visual inspection to assess condition, wear, cracks and surface break up.	Periodic checks carried out under daily, weekly and monthly IP.
Site Maintenance	Routine maintenance to process equipment	Maintenance to all pumps, electrical activated valves (EAVs), isolating / non-return valves and associated infrastructure.	As per manufacturer requirements and more often when necessary due to identified defects.

7.5 Personnel Issues

Personnel responsible for the inspection, testing and maintenance of pollution prevention infrastructure will be trained to an appropriate level to ensure compliance with the infrastructure monitoring programme.

Staff will be trained in the use of spill kits and spillage response procedures as part of the site's Environmental Management System.

7.5.1 Reporting Procedure

A log of site inspections will be maintained for the life of the permit. Any maintenance or actions identified during inspections will be recorded using the current procedures for environmental incident reporting. Subsequent actions taken (such as repair of damaged structures and leaking containers) will be recorded in the site log.

At time of surrender, the site's inspection and maintenance records are to be made available for inspection by the EA to demonstrate that the containment and risk control mitigation measures have been maintained for the duration of the permit, such that no deterioration of land or water quality has occurred as a result of the site's activities. The evidence will need to show that:

- Measures to protect land and groundwater have worked;
- Pollution incidents that may have affected the land were investigated and remediated; and
- Any risk of pollution by decommissioning has been investigated and remediated.

8 Statement of Site Condition

The SCR is based on a desk study review of the historical land use, a series of previous ground investigations and reviews, and observations made during a site reconnaissance visit. This application SCR therefore provides an initial statement of site condition; this will to be supported in due course by further ground investigation data. So far, the following ground conditions have been confirmed:

- Made ground is present across the site, to a maximum thickness of 3.8m as recorded in the southeast corner of the site but more generally at thickness of less than 1 m.
- Made ground and topsoil overlies superficial deposits of Alluvium which vary in thickness between 2.2 m and 6.9 m.
- Solid geology of the Pennine Middle Coal Measures Formation comprising interbedded grey mudstone, siltstone, pale grey sandstone with coal seams was also encountered at depths of up to 18.5m bgl.
- Groundwater was encountered within superficial deposits at depths of between 0.7 m and 4.0 m bgl and the underlying Pennine Middle Coal Measures at depths of between 4.4 m and 7.2 m bgl. Resting groundwater levels are likely to be influenced by the River Rother and the presence of underground structures.
- There is a history of coal mining in the wider area, with several coal seams on and around the site. The Coal Authority do not hold any records of past mining on the site, but it is probable that unrecorded shallow workings are present.
- Given the long-term historical use of the site and its surroundings, legacy contamination including metals, ammoniacal nitrogen, organic compounds including petroleum hydrocarbons and poly-aromatic hydrocarbons and asbestos is likely to be present and plausible pathways to potential receptors have been identified. These legacy sources of contamination predate STF activities on site.
- YW have not recorded any pollution incidents related to the operation of the sludge treatment facilities on site since the commencement of these operations.
- The proposed installation will result in the storage, use, and processing of number of potentially contaminative materials, including sewage sludge, cake, liquor, liquid and powder raw materials associated with their treatment, and oils and lubricants associated with the operation of the CHP plant.
- The principal potential receptors for existing and future contamination are considered to comprise site operational staff and visitors, soil, groundwater and the River Rother.
- The permitted activities include a range of containment and management measures for the process areas which will limit the potential for spills or leaching of pollutants from the site directly to the underlying soils and adjacent River Rother.
- All liquor from raw and digested sludge thickening and dewatering processes, and condensate (e.g. from biogas handling) is collected and discharged via underground drainage systems to the WwTW for full treatment prior to discharge to the River Rother. The majority of surface water runoff, including all run off from the cake storage pads, is also discharged via the WwTW. A small section of drainage, limited to an area of roadway in the northwest of the site, is discharged directly to the Final Settlement Tanks (FSTs) and then to the River Rother. It is proposed that these drains are redirected to improve containment in the event of spillage or release.
- It is considered that the permitted activities to be undertaken at the site will not present a significant risk of pollution or harm due to the various containment measures provided by site infrastructure and the implementation of a planned preventative maintenance programme.

9 References

1. Woodhouse Mill Waste Water Treatment Works Environmental Permit EPR/DP3092ZJ/V002. Issued 21/10/2013

2. Woodhouse Mill WwTW Waste Management Licence. EAWML65465. Issued to Yorkshire Water Services Limited. Effective date 17 May 2006

3. Yorkshire Water Services, Woodhouse Mill Sludge Conditioning Plant. Working Plan. (Atkins) September 2005

4. Yorkshire Water Environmental Management System

5. Yorkshire Water: Woodhouse Mill Sludge Conditioning Site. Supporting Technical Assessment: Secondary Containment Risk Assessment. September 2021

6. Yorkshire Water: Woodhouse Mill Sludge Conditioning Site Accident Management Plan. September 2021

Other studies cited:

A. Woodhouse Mill Reconstruction. Boreholes & Test Pile Records. (1970).

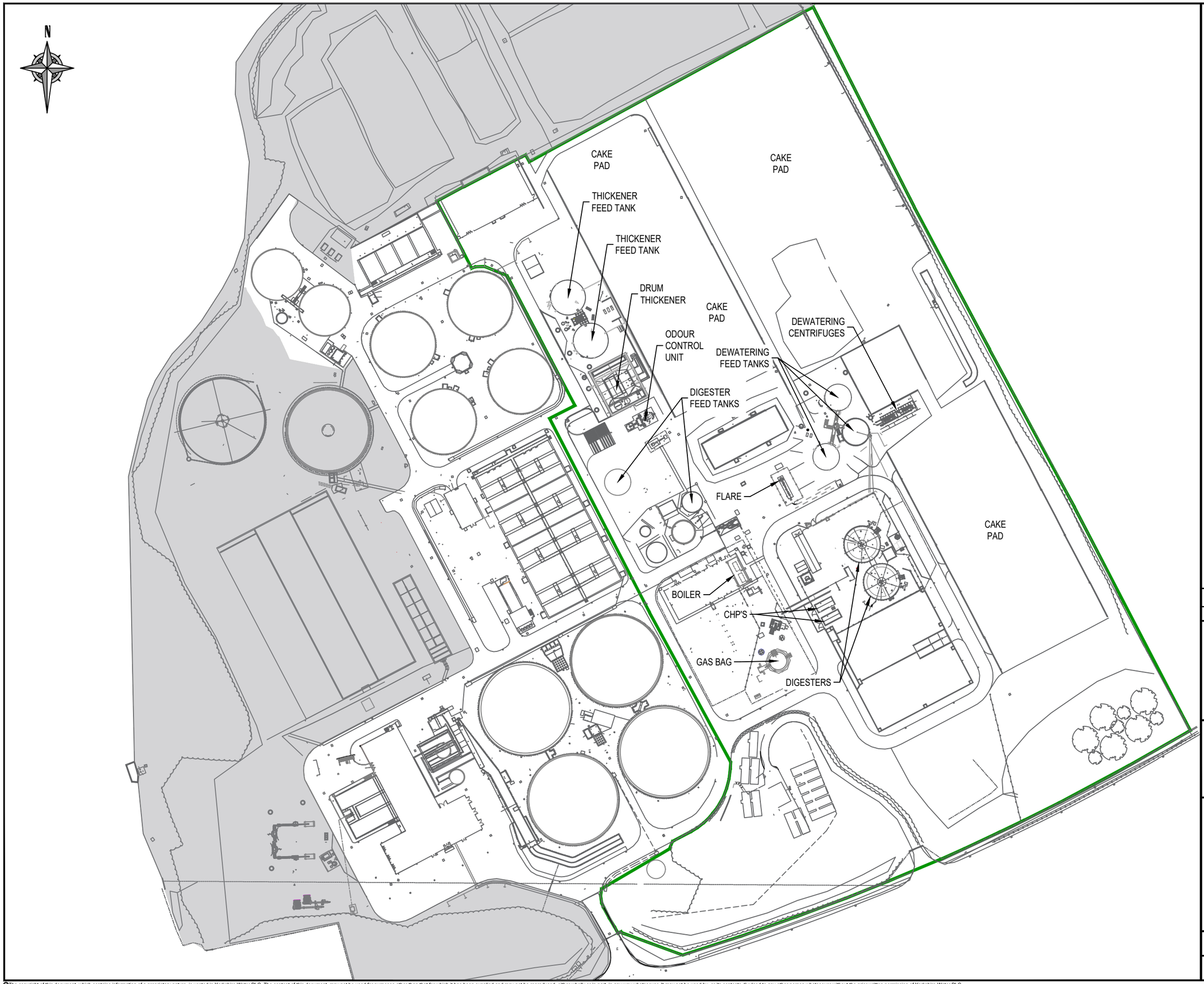
B. Woodhouse Mill WwTW. Factual Report on Ground Investigation. Report No A3111 Soil Mechanics (October 2003).

C. Woodhouse Mill Sludge Thickening. Woodhouse Mill WwTW. Doc reference 4/M0400/X0011/A1. Earth Tech Morrison (ETM). (September 2003).

D. Woodhouse Mill WwTW Digester Refurbishment. Factual Report on Ground Investigation. Report No A2015-12. Soil Mechanics (May 2012).

Figures

Figure A1 Site Layout



KEY.

INSTALLATION BOUNDARY

AREA SUBJECT TO SEPARATE SURRENDER APPLICATION

VERSION	DRWN	CHKD	REVD		DATE
A	MD	SW	JP	FOR PERMITTING	09.21

YorkshireWater

Stantec

YORKSHIRE WATER SERVICES LTD
ENVIRONMENTAL PERMITTING

WOODHOUSE MILL SLUDGE TREATMENT FACILTY
SITE CONDITION REPORT
SHEET 1 of 1

SCALE	SHEET SIZE
1:1,500	A3
DRAWING NUMBER	REVISION
FIGURE A1 - SITE LAYOUT	A

Figure A2 Potential Sources of Pollution

KEY.

- INSTALLATION BOUNDARY
- STORAGE OF RAW MATERIALS
- STORAGE OF SLUDGE, PROCESS & LIQUORS
- ROUTE OF UNDERGROUND PROCESS LIQUOR TRANSFER PIPEWORK
- WASTE STORAGE

VERSION	DRWN	CHKD	REVD		DATE
A	MD	SW	JP	FOR PERMITTING	09.21

YorkshireWater

Stantec

YORKSHIRE WATER SERVICES LTD
ENVIRONMENTAL PERMITTING

WOODHOUSE MILL SLUDGE TREATMENT FACILTY
SITE CONDITION REPORT
SHEET 1 of 1

SCALE	SHEET SIZE
1:1,500	A3
DRAWING NUMBER	REVISION
FIGURE A2 - SOURCES OF POLLUTION	A

Figure A3 Site surfacing

KEY.

- INSTALLATION BOUNDARY
- ROADWAYS & AREAS OF HARDSTANDING
- GRAVEL AREAS
- SOFTSTANDING

VERSION	DRWN	CHKD	REVD		DATE
A	MD	SW	JP	FOR PERMITTING	09.21

YorkshireWater

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YORKSHIRE WATER SERVICES LTD
ENVIRONMENTAL PERMITTING

WOODHOUSE MILL SLUDGE TREATMENT FACILTY

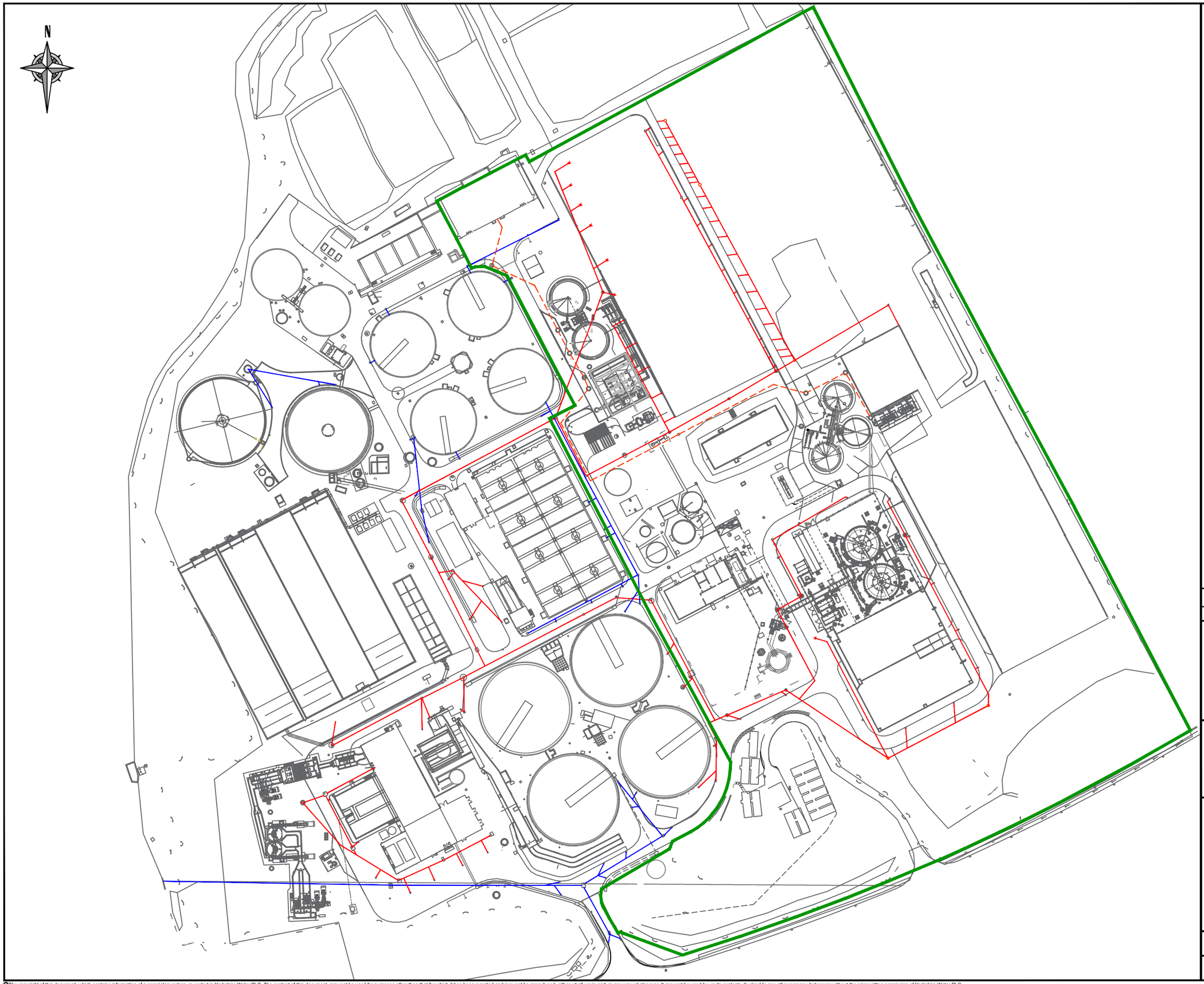
SITE CONDITION REPORT

SHEET 1 of 1

SCALE	SHEET SIZE
1:1,500	A3
DRAWING NUMBER	REVISION
FIGURE A3 - SITE SURFACING	A

Appendices

Appendix 1 Drainage Drawing



KEY.

- INSTALLATION BOUNDARY
- PROCESS LIQUOR / DRAINAGE TO WwTW INLET
- CENTRATE & THICKENING LIQUORS
- SURFACE WATER DRAINAGE

VERSION	DRWN	CHKD	REVD		DATE
A	MD	SW	JP	FOR PERMITTING	09.21

YorkshireWater

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YORKSHIRE WATER SERVICES LTD
ENVIRONMENTAL PERMITTING

WOODHOUSE MILL SLUDGE TREATMENT FACILTY

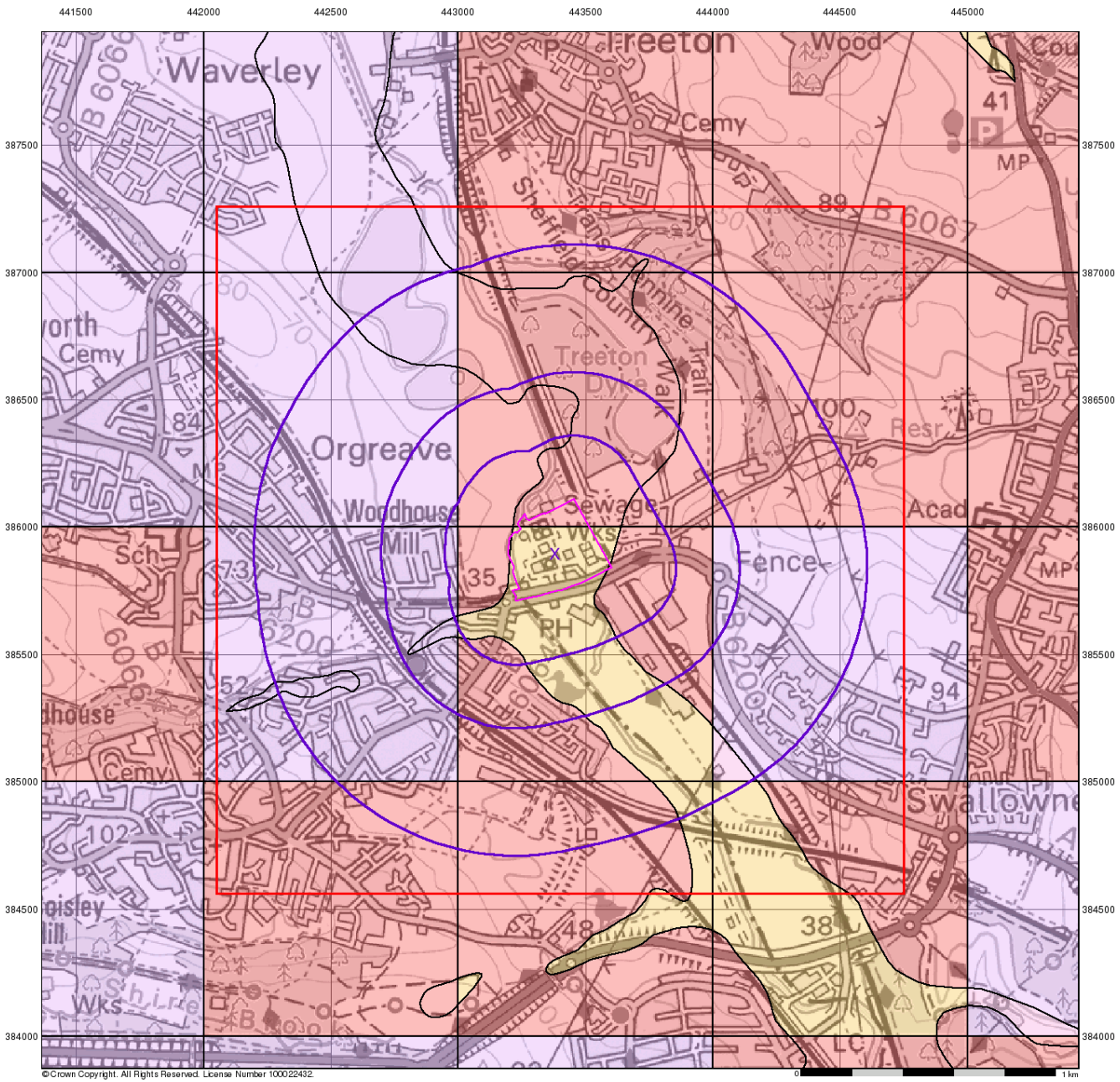
DRAINAGE LAYOUT

SHEET 1 of 1

SITE CONDITION REPORT

SCALE	SHEET SIZE
1:1,500	A3
DRAWING NUMBER	REVISION
Appendix 1- Drainage Layout	A

Appendix 2 Envirocheck Report (Landmark, 2020)



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Groundwater Vulnerability

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

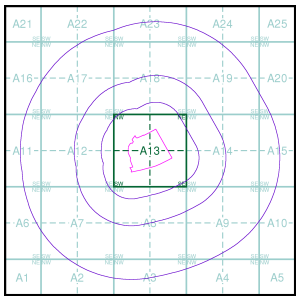
Agency and Hydrological

Bedrock Aquifers	Superficial Aquifers
High Vulnerability, Principal Aquifer	High Vulnerability, Principal Aquifer
High Vulnerability, Secondary Aquifer	High Vulnerability, Secondary Aquifer
Medium Vulnerability, Principal Aquifer	Medium Vulnerability, Principal Aquifer
Medium Vulnerability, Secondary Aquifer	Medium Vulnerability, Secondary Aquifer
Low Vulnerability, Principal Aquifer	Low Vulnerability, Principal Aquifer
Low Vulnerability, Secondary Aquifer	Low Vulnerability, Secondary Aquifer

Unproductive Aquifer

Soluble Rock

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Landmark® INFORMATION GROUP

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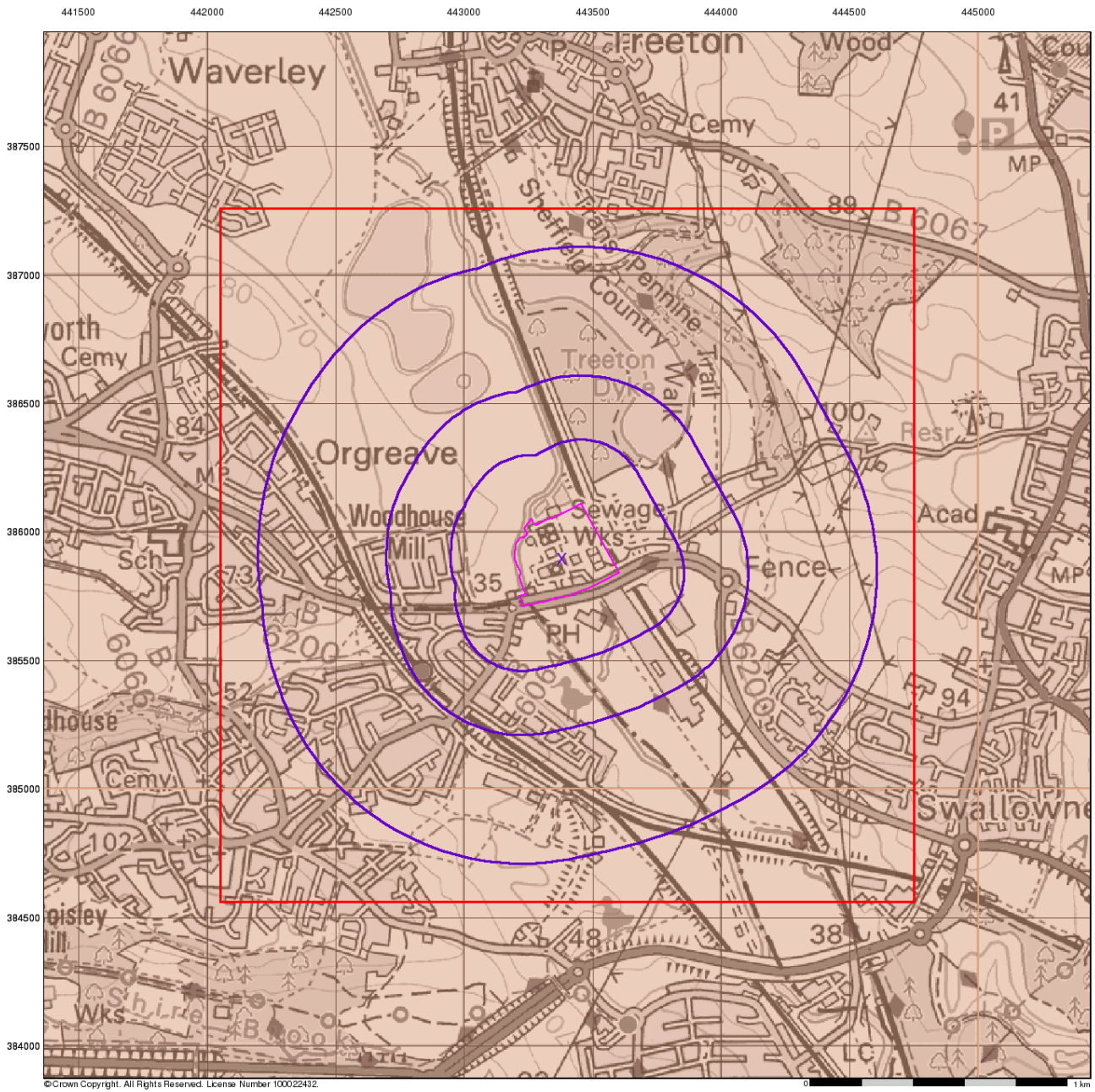
Web: www.envirocheck.co.uk



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Bedrock Aquifer Designation

General

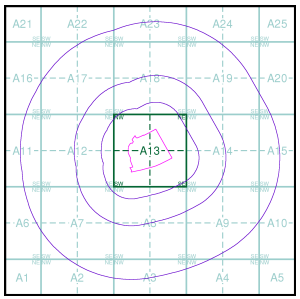
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



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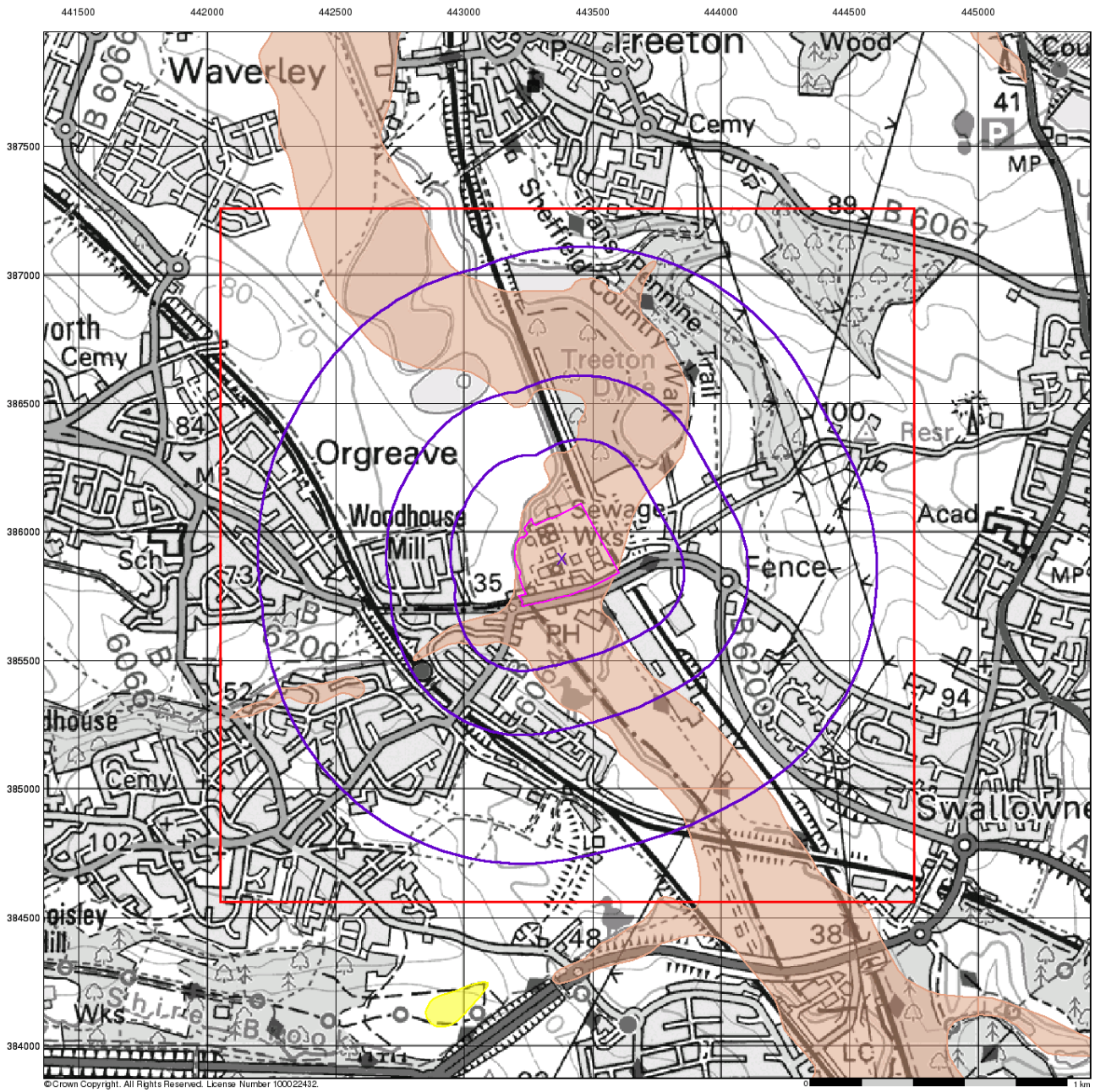

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Superficial Aquifer Designation

General

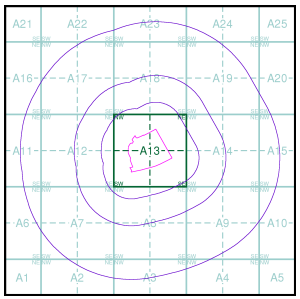
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



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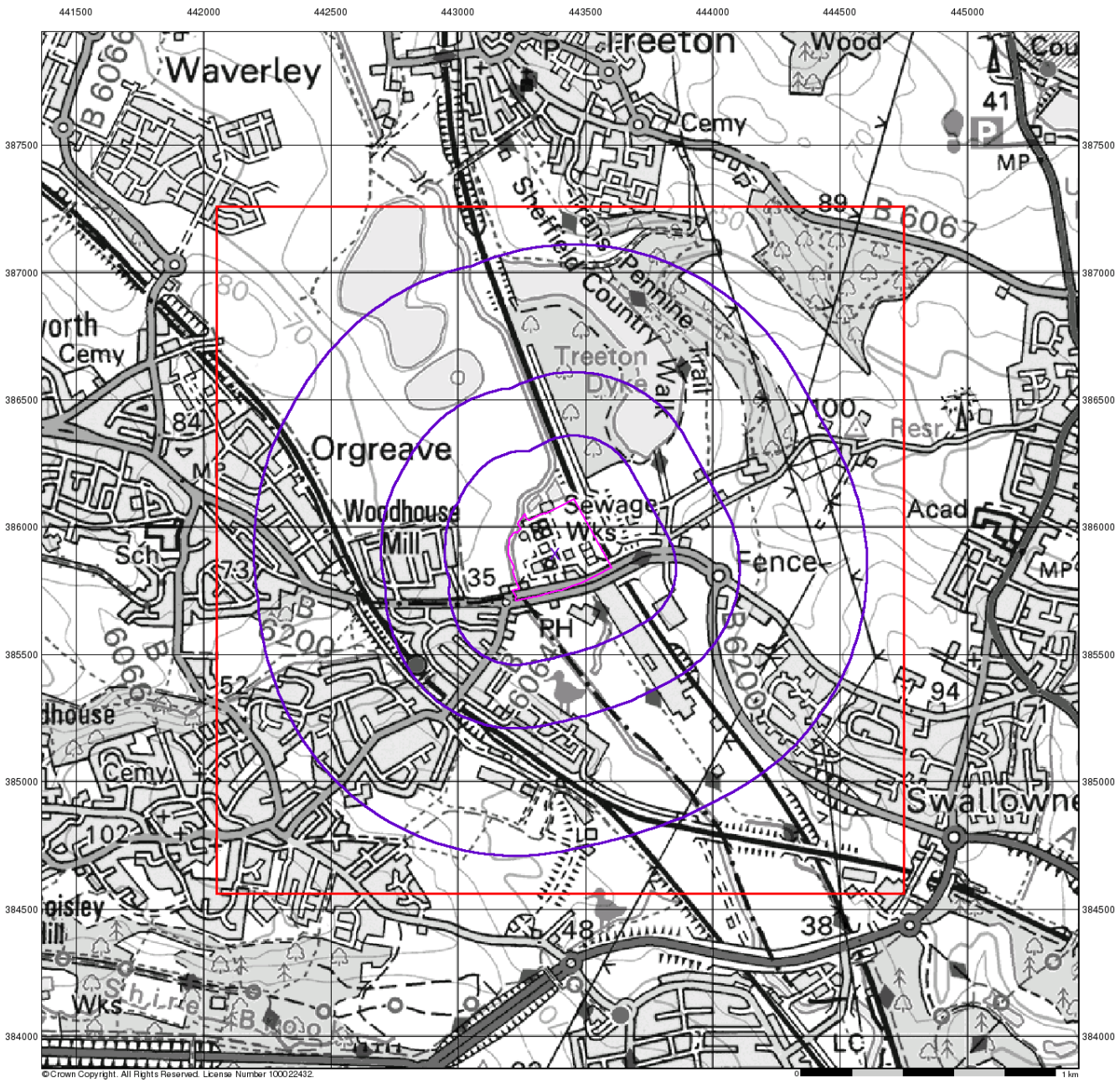

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Source Protection Zones

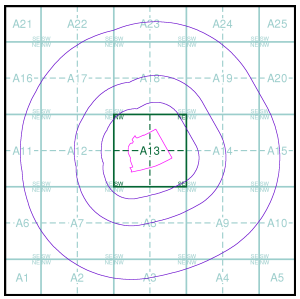
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Site Sensitivity Context Map - Slice A



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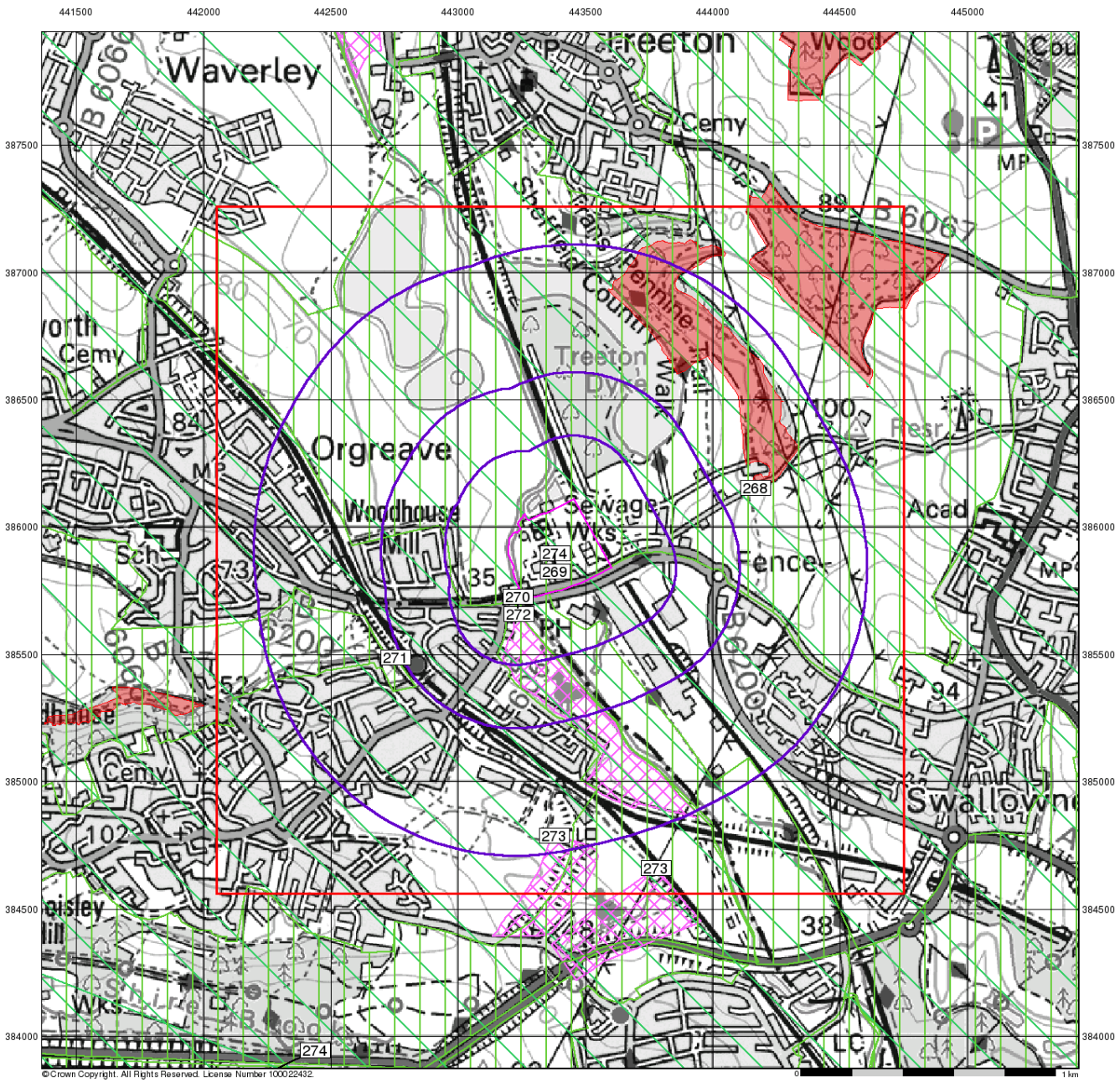

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Sensitive Land Uses

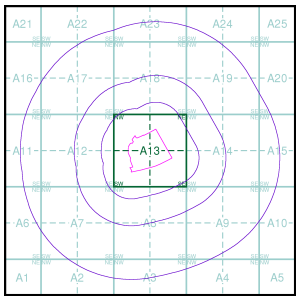
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice A



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Order Number:	261993045_1_1
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Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

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Tel: 0844 844 9952
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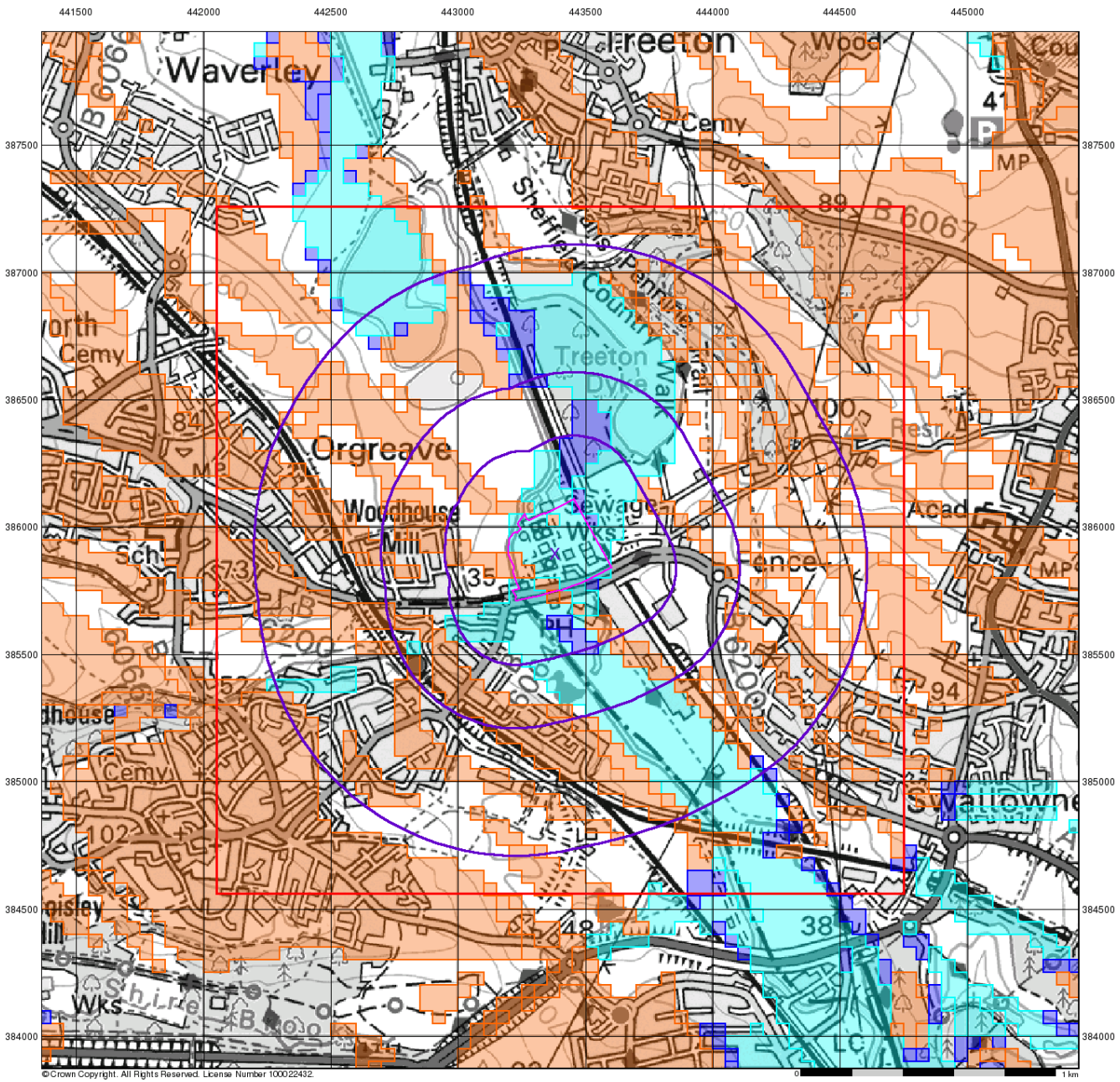

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BGS Flood GFS Data

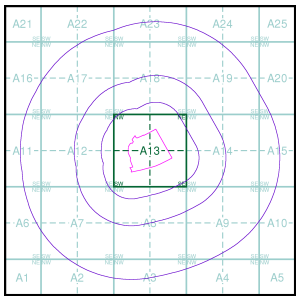
General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice

Agency and Hydrological (Flood)

Limited Potential for Groundwater Flooding to Occur
Potential for Groundwater Flooding of Property Situated Below Ground Level
Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice A



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Site Area (Ha):	10.21
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Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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Envirocheck® Report:

Datasheet

Order Details:

Order Number:
261993045_1_1

Customer Reference:
41527254

National Grid Reference:
443380, 385900

Slice:
A

Site Area (Ha):
10.21

Search Buffer (m):
1000

Site Details:

Woodhouse Mill STW
Retford Road
SHEFFIELD
S13 9WG

Client Details:

Mr E Parsons
Stantec UK Ltd
1 Papermill Drive
Kesley House
Redditch
B98 8QJ

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Contents

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.
In this datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Radon Potential dataset Copyright Notice

Natural Resources Wales Copyright Notice

Report Version v53.0

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 3	2	58	2	10
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls	pg 21		4		
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control	pg 21		1		
Local Authority Pollution Prevention and Controls	pg 22	1	4	3	3
Local Authority Pollution Prevention and Control Enforcements	pg 23		1		
Nearest Surface Water Feature	pg 23	Yes			
Pollution Incidents to Controlled Waters	pg 23	6	13	7	8
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality	pg 29	1	2		
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 29				(*4)
Water Industry Act Referrals					
Groundwater Vulnerability Map	pg 30	Yes	n/a	n/a	n/a
Groundwater Vulnerability - Soluble Rock Risk			n/a	n/a	n/a
Groundwater Vulnerability - Local Information			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 31	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 31	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences	pg 31	Yes	Yes	n/a	n/a
Flooding from Rivers or Sea without Defences	pg 34	Yes		n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas	pg 34		Yes	n/a	n/a
Flood Defences	pg 34		Yes	n/a	n/a
OS Water Network Lines	pg 34	1	29	23	36

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 45		1		
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)	pg 45				1
Licensed Waste Management Facilities (Locations)	pg 45	1	1		2
Local Authority Landfill Coverage	pg 46	1	n/a	n/a	n/a
Local Authority Recorded Landfill Sites	pg 46		1		
Potentially Infilled Land (Non-Water)	pg 46		4	3	5
Potentially Infilled Land (Water)	pg 47	3	1	3	11
Registered Landfill Sites	pg 48			1	1
Registered Waste Transfer Sites	pg 49				1
Registered Waste Treatment or Disposal Sites	pg 49		1		4
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 51	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 51	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 58		2	5	7
BGS Urban Soil Chemistry	pg 60			Yes	Yes
BGS Urban Soil Chemistry Averages	pg 61	Yes			
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas	pg 62	Yes	n/a	n/a	n/a
Mining Instability	pg 62	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 62	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 62	Yes	Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 62	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 62	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 63	Yes		n/a	n/a
Radon Potential - Radon Affected Areas	pg 63	Yes	n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 64		6	15	35
Fuel Station Entries	pg 68	1	1		
Points of Interest - Commercial Services	pg 69		2	3	5
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 69	2	2	6	15
Points of Interest - Public Infrastructure	pg 71	6	14	4	2
Points of Interest - Recreational and Environmental	pg 74		1	1	
Gas Pipelines					
Underground Electrical Cables					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland	pg 75				1
Areas of Adopted Green Belt	pg 75	1	1		1
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves	pg 75		1		1
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 75	1			
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13SW (SW)	0	1	443300 385800
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (S)	0	1	443381 385750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (NE)	0	1	443450 386050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (N)	0	1	443381 386000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (NE)	0	1	443500 386000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (S)	0	1	443381 385800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (SE)	0	1	443500 385800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13SW (NW)	0	1	443381 385898
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (SW)	0	1	443300 385850
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (S)	1	1	443400 385750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (NW)	1	1	443300 386050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (N)	41	1	443400 386150
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (W)	47	1	443150 385898
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SE (S)	64	1	443450 385700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (S)	86	1	443381 385650
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (NW)	93	1	443150 386050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13SE (S)	112	1	443450 385650
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SE (SE)	128	1	443500 385650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13SE (S)	175	1	443500 385600
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SE (SE)	192	1	443550 385600
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (NE)	210	1	443700 386100
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7NE (SW)	278	1	443000 385550

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (SE)	279	1	443650 385550
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (E)	292	1	443850 386000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12NE (W)	305	1	442900 386000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (E)	315	1	443900 385950
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SE (SW)	330	1	442900 385650
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SE (W)	350	1	442850 385850
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (E)	351	1	443950 385900
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12NE (W)	365	1	442850 386050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (E)	396	1	444000 385898
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (E)	404	1	443950 386050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12NE (NW)	404	1	442850 386150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A7NE (SW)	410	1	442850 385550
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (E)	426	1	444000 386000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NW (S)	427	1	443381 385300
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7NE (SW)	432	1	442850 385500
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SW (N)	440	1	443250 386500
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (E)	446	1	444050 385850
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SE (W)	447	1	442750 385898
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SW (N)	453	1	443350 386550
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SW (N)	455	1	443200 386500
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A7NE (SW)	456	1	442800 385550
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SE (W)	467	1	442750 385700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SW (E)	468	1	444050 385700
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (S)	498	1	443450 385250
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14SE (E)	499	1	444100 385900
1	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: Sewage Disposal Works - Water Company Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 6 Effective Date: 31st March 2010 Issued Date: 21st March 2005 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (NW)	0	2	443280 386000
2	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: Sewage Disposal Works - Water Company Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 6 Effective Date: 31st March 2010 Issued Date: 21st March 2005 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (S)	0	2	443380 385850
3	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: GROUNDWATER REMEDIATION SITES/CIVIL ENGINEERING Location: Woodhouse Mill Stw Dewatering Retford Road, Woodhouse, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: WRA7504 Permit Version: 1 Effective Date: 12th May 1999 Issued Date: 12th May 1999 Revocation Date: 30th December 1999 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Consent expired** Positional Accuracy: Located by supplier to within 100m	A13SW (W)	19	2	443190 385860

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 1 Effective Date: 29th January 1979 Issued Date: 29th January 1979 Revocation Date: 9th October 1985 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Transferred from 1975 Regulations** Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	23	2	443200 385800
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 10 Effective Date: 29th March 2010 Issued Date: 29th March 2010 Revocation Date: 30th March 2014 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 10 Effective Date: 29th March 2010 Issued Date: 29th March 2010 Revocation Date: 30th March 2014 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 11 Effective Date: 31st March 2014 Issued Date: 29th March 2010 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 11 Effective Date: 31st March 2014 Issued Date: 29th March 2010 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 9 Effective Date: 24th March 2010 Issued Date: 24th March 2010 Revocation Date: 28th March 2010 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 9 Effective Date: 24th March 2010 Issued Date: 24th March 2010 Revocation Date: 28th March 2010 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 8 Effective Date: 1st April 2009 Issued Date: 14th October 2008 Revocation Date: 23rd March 2010 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 8 Effective Date: 1st April 2009 Issued Date: 14th October 2008 Revocation Date: 23rd March 2010 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: Sewage Disposal Works - Water Company Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 6 Effective Date: 31st March 2010 Issued Date: 21st March 2005 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: Sewage Disposal Works - Water Company Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 6 Effective Date: 31st March 2010 Issued Date: 21st March 2005 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 5 Effective Date: 6th October 2004 Issued Date: 6th October 2004 Revocation Date: 31st March 2009 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 5 Effective Date: 6th October 2004 Issued Date: 6th October 2004 Revocation Date: 31st March 2009 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 4 Effective Date: 5th September 2000 Issued Date: 5th September 2000 Revocation Date: 31st December 2000 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 4 Effective Date: 5th September 2000 Issued Date: 5th September 2000 Revocation Date: 31st December 2000 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 7 Effective Date: 1st January 2001 Issued Date: 5th September 2000 Revocation Date: 5th October 2004 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 7 Effective Date: 1st January 2001 Issued Date: 5th September 2000 Revocation Date: 5th October 2004 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	27	2	443190 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Retford Rd Recreation Ground 3 Cso Off Retford Road, Woodhouse Mill, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7979 Permit Version: 3 Effective Date: 31st March 2018 Issued Date: 19th March 2018 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A13SW (SW)	44	2	443175 385810
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Retford Road Cso, Woodhouse Mill, Sheffield, South Yorkshire, Nk Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 2805 Permit Version: 1 Effective Date: 11th February 1972 Issued Date: 11th February 1972 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Transferred from Rivers (Prevention of Pollution) Act 1951-1961** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	47	2	443170 385820
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Retford Rd Recreation Ground 3 Cso Off Retford Road, Woodhouse Mill, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7979 Permit Version: 2 Effective Date: 17th August 2004 Issued Date: 17th August 2004 Revocation Date: 30th March 2018 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (SW)	48	2	443170 385810

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Retford Rd Recreation Ground 3 Cso Off Retford Road, Woodhouse Mill, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7979 Permit Version: 1 Effective Date: 31st March 2004 Issued Date: 4th February 2004 Revocation Date: 16th August 2004 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (SW)	48	2	443170 385810
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Retford Road No 2 Cso Opp 580 Retford Road, Junc St James Walk And Retford R, Sheffield, South Yorkshire, S13 9wf Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7952 Permit Version: 2 Effective Date: 17th August 2004 Issued Date: 17th August 2004 Revocation Date: 30th March 2018 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	57	2	443160 385830
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Retford Road No 2 Cso Opp 580 Retford Road, Junc St James Walk And Retford R, Sheffield, South Yorkshire, S13 9wf Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7952 Permit Version: 1 Effective Date: 31st March 2004 Issued Date: 4th February 2004 Revocation Date: 16th August 2004 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (W)	57	2	443160 385830
4	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: Not Given Location: Retford Road, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Rother (Yorkshire) Reference: WADC1276 Permit Version: Not Supplied Effective Date: Not Supplied Issued Date: Not Supplied Revocation Date: Not Supplied Discharge Type: Storm sewage overflow discharge Discharge Environment: Freshwater Stream/River Receiving Water: Rother **Status: Not Supplied** Positional Accuracy: Located by supplier to within 100m	A13SW (W)	58	2	443160 385810

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 3 Effective Date: 10th March 2000 Issued Date: 10th March 2000 Revocation Date: 4th September 2000 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 100m	A13NW (N)	58	2	443300 386100
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 2 Effective Date: 10th October 1985 Issued Date: 10th October 1985 Revocation Date: 9th March 2000 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Transferred from COPA 1974** Positional Accuracy: Located by supplier to within 100m	A13NW (N)	58	2	443300 386100
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 1 Effective Date: 29th January 1979 Issued Date: 29th January 1979 Revocation Date: 9th October 1985 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Transferred from 1975 Regulations** Positional Accuracy: Located by supplier to within 100m	A13NW (N)	58	2	443300 386100
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 10 Effective Date: 29th March 2010 Issued Date: 29th March 2010 Revocation Date: 30th March 2014 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 10 Effective Date: 29th March 2010 Issued Date: 29th March 2010 Revocation Date: 30th March 2014 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 11 Effective Date: 31st March 2014 Issued Date: 29th March 2010 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 11 Effective Date: 31st March 2014 Issued Date: 29th March 2010 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 9 Effective Date: 24th March 2010 Issued Date: 24th March 2010 Revocation Date: 28th March 2010 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 9 Effective Date: 24th March 2010 Issued Date: 24th March 2010 Revocation Date: 28th March 2010 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 8 Effective Date: 1st April 2009 Issued Date: 14th October 2008 Revocation Date: 23rd March 2010 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: Sewage Disposal Works - Water Company Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 6 Effective Date: 31st March 2010 Issued Date: 21st March 2005 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 5 Effective Date: 6th October 2004 Issued Date: 6th October 2004 Revocation Date: 31st March 2009 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status:** **Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 4 Effective Date: 5th September 2000 Issued Date: 5th September 2000 Revocation Date: 31st December 2000 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140
5	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 7 Effective Date: 1st January 2001 Issued Date: 5th September 2000 Revocation Date: 5th October 2004 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	95	2	443290 386140
6	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 3 Effective Date: 10th March 2000 Issued Date: 10th March 2000 Revocation Date: 4th September 2000 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 100m	A13NW (N)	105	2	443400 386200
6	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 2 Effective Date: 10th October 1985 Issued Date: 10th October 1985 Revocation Date: 9th March 2000 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Transferred from COPA 1974** Positional Accuracy: Located by supplier to within 100m	A13NW (N)	105	2	443400 386200

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
6	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 1 Effective Date: 29th January 1979 Issued Date: 29th January 1979 Revocation Date: 9th October 1985 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Transferred from 1975 Regulations** Positional Accuracy: Located by supplier to within 100m	A13NW (N)	105	2	443400 386200
7	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: EXTRACTION OF CRUDE PETROLEUM + NATURAL GAS Location: Copley Village Sps Copley Lane, Halifax, Wakefield, West Yorkshire, Hx3 0uq Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 655 Permit Version: 1 Effective Date: 27th February 1957 Issued Date: 27th February 1957 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Rother **Status: Transferred from Rivers (Prevention of Pollution) Act 1951-1961** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	112	2	443330 386170
8	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 10 Effective Date: 29th March 2010 Issued Date: 29th March 2010 Revocation Date: 30th March 2014 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	159	2	443360 386240
8	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 11 Effective Date: 31st March 2014 Issued Date: 29th March 2010 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	159	2	443360 386240

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 9 Effective Date: 24th March 2010 Issued Date: 24th March 2010 Revocation Date: 28th March 2010 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	159	2	443360 386240
8	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 8 Effective Date: 1st April 2009 Issued Date: 14th October 2008 Revocation Date: 23rd March 2010 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	159	2	443360 386240
8	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 5 Effective Date: 6th October 2004 Issued Date: 6th October 2004 Revocation Date: 31st March 2009 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	159	2	443360 386240
8	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 4 Effective Date: 5th September 2000 Issued Date: 5th September 2000 Revocation Date: 31st December 2000 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	159	2	443360 386240

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Woodhouse Mill Wwtw, Retford Road, Sheffield, South Yorkshire, S13 9wd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3334(Ss) Permit Version: 7 Effective Date: 1st January 2001 Issued Date: 5th September 2000 Revocation Date: 5th October 2004 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13NW (N)	159	2	443360 386240
9	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: Not Given Location: Retford Road/St James Road, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Rother (Yorkshire) Reference: WADC1278 Permit Version: Not Supplied Effective Date: Not Supplied Issued Date: Not Supplied Revocation Date: Not Supplied Discharge Type: Storm sewage overflow discharge Discharge Environment: Freshwater Stream/River Receiving Water: Rother **Status: Not Supplied** Positional Accuracy: Located by supplier to within 100m	A12SE (SW)	175	2	443050 385690
10	**Discharge Consents** Operator: Hrm Resources Limited Property Type: MINING OF COAL + LIGNITE Location: Former Laycast Foundry, Sheffield Road, Rotherham, South Yorkshire, S13 9zd Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Eprbp3828xe Permit Version: 1 Effective Date: 25th June 2010 Issued Date: 25th June 2010 Revocation Date: 14th June 2012 Discharge Type: Trade Discharges - Site Drainage Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Surrendered under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A14SW (E)	215	2	443818 385868
11	**Discharge Consents** Operator: Uk Coal Mining Limited Property Type: MINING OF COAL + LIGNITE Location: Orgreave Reclamation Site, Orgreave, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7163 Permit Version: 3 Effective Date: 21st June 2005 Issued Date: 21st June 2005 Revocation Date: 12th April 2007 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Revoked (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 100m	A18SW (N)	241	2	443300 386300

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
11	**Discharge Consents** Operator: Rjb Mining (Uk) Ltd Property Type: MINING OF COAL + LIGNITE Location: Orgreave Reclamation Site, Orgreave, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7163 Permit Version: 2 Effective Date: 17th January 1996 Issued Date: 17th January 1996 Revocation Date: 20th June 2005 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Revised Consent, by Notice (Section 37(1))** Positional Accuracy: Located by supplier to within 100m	A18SW (N)	241	2	443300 386300
11	**Discharge Consents** Operator: Uk Coal Mining Limited Property Type: Iron & Steel Industries Location: Orgreave Coking Plant-General Wks D, Rainage 1- Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra6173 Permit Version: 1 Effective Date: 5th September 1995 Issued Date: 5th September 1995 Revocation Date: 30th September 1995 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Pre National Rivers Authority Legislation where issue date < 01/09/1989** Positional Accuracy: Located by supplier to within 100m	A18SW (N)	241	2	443300 386300
11	**Discharge Consents** Operator: Rjb Mining (Uk) Ltd Property Type: MINING OF COAL + LIGNITE Location: Orgreave Reclamation Site, Orgreave, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7163 Permit Version: 1 Effective Date: 5th September 1995 Issued Date: 5th September 1995 Revocation Date: 16th January 1996 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: New Consent, by Application (Water Resources Act 1991, Section 88)** Positional Accuracy: Located by supplier to within 100m	A18SW (N)	241	2	443300 386300
11	**Discharge Consents** Operator: Uk Coal Mining Limited Property Type: MINING OF COAL + LIGNITE Location: Orgreave Colliery-No.2 Settling Pon, Ds- Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 2091 Permit Version: 2 Effective Date: 15th March 1984 Issued Date: 15th March 1984 Revocation Date: 24th February 1997 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Authorisation revoked** Positional Accuracy: Located by supplier to within 100m	A18SW (N)	241	2	443300 386300

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
11	**Discharge Consents** Operator: Uk Coal Mining Limited Property Type: MINING OF COAL + LIGNITE Location: Orgreave Colliery-No.2 Settling Pon, Ds- Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 2091 Permit Version: 1 Effective Date: 18th May 1966 Issued Date: 18th May 1966 Revocation Date: 14th March 1984 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: River Rother **Status: Transferred from Rivers (Prevention of Pollution) Act 1951-1961** Positional Accuracy: Located by supplier to within 100m	A18SW (N)	241	2	443300 386300
12	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Woodhouse Sewer Network - 3 Csos, Woodhouse, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: S/Cb/132 Permit Version: 1 Effective Date: 21st May 1964 Issued Date: 21st May 1964 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Shirtcliff Brook **Status: Transferred from Rivers (Prevention of Pollution) Act 1951-1961** Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	464	2	442799 385532
12	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Horsewood Road Cso R/O 36 Horsewood Road, Woodhouse, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra9138 Permit Version: 1 Effective Date: 7th August 2007 Issued Date: 7th August 2007 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Shirtcliff Brook **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	473	2	442790 385530
13	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Woodhouse Sewer Network - 3 Csos, Woodhouse, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: S/Cb/132 Permit Version: 1 Effective Date: 21st May 1964 Issued Date: 21st May 1964 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Shirtcliff Brook **Status: Transferred from Rivers (Prevention of Pollution) Act 1951-1961** Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	829	2	442449 385424

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
13	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Brunswick Primary School Cso Off Station Road In School Field, Woodhouse, Sheffield, South Yorkshire, S13 7rb Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: 3655 Permit Version: 3 Effective Date: 20th November 2017 Issued Date: 20th November 2017 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Shirtcliff Brook **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	832	2	442448 385418
13	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: Not Given Location: Badger Drive, SHEFFIELD, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Reference: WADC692 Permit Version: Not Supplied Effective Date: Not Supplied Issued Date: Not Supplied Revocation Date: Not Supplied Discharge Type: Storm sewage overflow discharge Discharge Environment: Freshwater Stream/River Receiving Water: Shirecliffe Brook **Status: Not Supplied** Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	850	2	442440 385390
14	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Retford Road Orrgreave No 2 Cso Adj 4 Old Retford Crt Retford Rd, Orgreave, Sheffield, South Yorkshire, S13 9qg Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra8185 Permit Version: 3 Effective Date: 31st March 2018 Issued Date: 19th March 2018 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Orgreave Common Drain **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A17SW (NW)	847	2	442433 386307
14	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Retford Road Orrgreave No 2 Cso Adj 4 Old Retford Crt Retford Rd, Orgreave, Sheffield, South Yorkshire, S13 9qg Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra8185 Permit Version: 2 Effective Date: 17th August 2004 Issued Date: 17th August 2004 Revocation Date: 30th March 2018 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Orgeave Common Drain **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A17SW (NW)	847	2	442430 386300

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
14	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Retford Road Orrgreave No 2 Cso Adj 4 Old Retford Crt Retford Rd, Orgreave, Sheffield, South Yorkshire, S13 9qg Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra8185 Permit Version: 1 Effective Date: 31st March 2004 Issued Date: 4th February 2004 Revocation Date: 16th August 2004 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Orgeave Common Drain **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A17SW (NW)	847	2	442430 386300
15	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: John Calvert Lane Cso John Calvert Lane (Opp No 57), Woodhouse, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra8713 Permit Version: 2 Effective Date: 4th June 2007 Issued Date: 4th June 2007 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Tributary Of The River Rother **Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A2NE (S)	866	2	442980 384880
15	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: John Calvert Lane Cso John Calvert Lane (Opp No 57), Woodhouse, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra8713 Permit Version: 1 Effective Date: 31st March 2005 Issued Date: 11th March 2005 Revocation Date: 3rd June 2007 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Tributary Of The River Rother **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A2NE (S)	866	2	442980 384880
16	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Orgreave Drive Sewage Pumping Stn Dore House Farm Ind Estate, Orgreave, Handsworth, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wra7799 Permit Version: 1 Effective Date: 26th February 2002 Issued Date: 26th February 2002 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Orgreave Common Drain **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A11NE (W)	954	2	442270 386160

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
16	**Discharge Consents** Operator: Yorkshire Water Services Ltd Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Orgreave Drive Sps, Orgreave Drive, Sheffield, South Yorkshire Authority: Environment Agency, North East Region Catchment Area: Don Tributaries Reference: Wadc327 Permit Version: 1 Effective Date: 2nd November 1989 Issued Date: 2nd November 1989 Revocation Date: 8th June 2002 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Orgreave Common Drain **Status: Transferred from Water Act 1989** Positional Accuracy: Located by supplier to within 10m	A11NE (W)	957	2	442270 386170
17	**Prosecutions Relating to Controlled Waters** Location: River Rother, Long Lane, Treeton, Rotherham Prosecution Text: Breaching the permit to discharge BOD Prosecution Act: Wra91 S85(1) Hearing Date: 14th February 2007 Verdict: Guilty Fine: 3000 Cost: 1303 Positional Accuracy: Manually positioned within the geographical locality	A13NW (N)	46	2	443333 386099
18	**Integrated Pollution Controls** Name: Jeld-Wen Uk Ltd Location: Retford Road, Woodhouse Mill, Sheffield, S13 9WH Authority: Environment Agency, North East Region Permit Reference: Bj5392 Dated: 2nd November 2000 Process Type: IPC minor (non-substantial) variation to previous variation Description: 6.7 A (A) Timber processes within Miscellaneous Industries **Status: Authorisation revoked** Positional Accuracy: Manually positioned to the address or location	A13SE (SE)	109	2	443586 385708
18	**Integrated Pollution Controls** Name: Jeld-Wen Uk Ltd Location: Retford Road, Woodhouse Mill, Sheffield, S13 9WH Authority: Environment Agency, North East Region Permit Reference: BE4541 Dated: 24th November 1998 Process Type: IPC minor (non-substantial) variation to previous variation Description: 6.7 A (A) Timber processes within Miscellaneous Industries **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Manually positioned to the address or location	A13SE (SE)	109	2	443586 385708
18	**Integrated Pollution Controls** Name: Jeld-Wen Uk Ltd Location: Retford Road, Woodhouse Mill, Sheffield, S13 9WH Authority: Environment Agency, North East Region Permit Reference: BB1945 Dated: 24th June 1998 Process Type: IPC minor (non-substantial) variation to previous variation Description: 6.7 A (A) Timber processes within Miscellaneous Industries **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Manually positioned to the address or location	A13SE (SE)	109	2	443586 385708
18	**Integrated Pollution Controls** Name: Jeld-Wen Uk Ltd Location: Retford Road, Woodhouse Mill, Sheffield, S13 9WH Authority: Environment Agency, North East Region Permit Reference: AU8377 Dated: 7th June 1996 Process Type: IPC new application Description: 6.7 A (A) Timber processes within Miscellaneous Industries **Status: Authorisation superseded by a substantial or non substantial variation** Positional Accuracy: Manually positioned to the address or location	A13SE (SE)	109	2	443586 385708
19	**Local Authority Integrated Pollution Prevention And Control** Name: Laycast Ltd Location: Sheffield Road, Swallownest, Rotherham, South Yorkshire Authority: Rotherham Metropolitan Borough Council, Planning Department Permit Reference: E21/14 Dated: Not Supplied Process Type: Production and Processing of Metals Description: Iron and steel melting **Status: Permit Issued** Positional Accuracy: Located by supplier to within 10m	A14SW (E)	215	3	443804 385762

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
20	**Local Authority Pollution Prevention and Controls** Name: Tate Fuel Oils Ltd Location: 613 Retford Road, Woodhouse Mill, Sheffield, S13 9WD Authority: Rotherham Metropolitan Borough Council, Planning Department Permit Reference: Not Given Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG1/14 Petrol filling station **Status: Authorisation revoked** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	0	3	443270 385733
21	**Local Authority Pollution Prevention and Controls** Name: Rugby Joinery Ltd Location: Retford Road, Woodhouse Mill, SHEFFIELD, South Yorkshire, S13 9WH Authority: Rotherham Metropolitan Borough Council, Planning Department Permit Reference: Not Given Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG6/33 Wood coating **Status: Authorisation revoked** Positional Accuracy: Manually positioned to the road within the address or location	A13SE (SE)	24	3	443577 385799
22	**Local Authority Pollution Prevention and Controls** Name: Woodhouse Mill Service StationBrobot Petroleum Ltd Location: 590 Woodhouse Mill Petrol Station, Retford Road, Sheffield, South Yorkshire, S13 9WF Authority: Sheffield City Council, Environmental Protection Service Permit Reference: 1.2/049101/NP Dated: Not Supplied Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	161	4	443073 385664
23	**Local Authority Pollution Prevention and Controls** Name: Laycast Ltd Location: Sheffield Road, Fence, Woodhouse Mill, SHEFFIELD, South Yorkshire, S13 9ZD Authority: Rotherham Metropolitan Borough Council, Planning Department Permit Reference: EAFMSLSHEF/1 Dated: 31st March 1998 Process Type: Local Authority Pollution Prevention and Control Description: PG2/3 Electrical and rotary furnaces **Status: Site Closed** Positional Accuracy: Located by supplier to within 10m	A14SW (E)	215	3	443804 385762
24	**Local Authority Pollution Prevention and Controls** Name: Former Fence Colliery & Laycast Foundry Site Location: Sheffield Road, Fence, Rotherham, S13 9zd Authority: Rotherham Metropolitan Borough Council, Planning Department Permit Reference: EAJLFESHEF/1 Dated: 21st January 2010 Process Type: Local Authority Pollution Prevention and Control Description: PG3/5 Coal, coke and coal product processes **Status: Site Closed** Positional Accuracy: Manually positioned to the road within the address or location	A14SW (E)	223	3	443825 385876
25	**Local Authority Pollution Prevention and Controls** Name: Laycast Ltd Location: Sheffield Road, Swallownest, Rotherham, S13 9zd Authority: Rotherham Metropolitan Borough Council, Planning Department Permit Reference: EAFMSLSHEF/1 Dated: 31st March 1998 Process Type: Local Authority Pollution Prevention and Control Description: PG2/4 Iron, steel and non-ferrous metal foundry processes **Status: Site Closed** Positional Accuracy: Manually positioned to the road within the address or location	A14SW (E)	446	3	444046 385777
26	**Local Authority Pollution Prevention and Controls** Name: Jeld-Wen Uk Ltd Location: Retford Road, Woodhouse Mill, Sheffield, S13 9WH Authority: Rotherham Metropolitan Borough Council, Planning Department Permit Reference: E67/9 Dated: 1st March 2002 Process Type: Local Authority Air Pollution Control Description: PG6/2 Manufacture of timber and wood-based products **Status: Authorised** Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	469	3	443000 385300

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
26	**Local Authority Pollution Prevention and Controls** Name: Jeld Wen Uk Ltd Location: Retford Road, Woodhouse Mill, Sheffield, S13 9WH Authority: Rotherham Metropolitan Borough Council, Planning Department Permit Reference: E65/19 Dated: 30th September 1993 Process Type: Local Authority Air Pollution Control Description: PG6/33 Wood coating **Status:** **Authorised** Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	469	3	443000 385300
27	**Local Authority Pollution Prevention and Controls** Name: Clark And Partners Ltd Location: 1 Orgreave Way, Sheffield, S13 7ls Authority: Sheffield City Council, Environmental Protection Service Permit Reference: 6.4/045286/GJ Dated: Not Supplied Process Type: Local Authority Pollution Prevention and Control Description: PG6/34 Respraying of road vehicles **Status:** **Permitted** Positional Accuracy: Manually positioned to the address or location	A12SW (W)	766	4	442432 385848
28	**Local Authority Pollution Prevention and Controls** Name: Crosby Kitchens Ltd Location: 25 Orgreave Drive, Handsworth, SHEFFIELD, S13 9NS Authority: Sheffield City Council, Environmental Protection Service Permit Reference: Not Given Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG6/2 Manufacture of timber and wood-based products **Status:** **Authorisation revoked** Positional Accuracy: Manually positioned to the address or location	A12NW (W)	818	4	442388 386042
28	**Local Authority Pollution Prevention and Controls** Name: Crosby Kitchens Ltd Location: 25 Orgreave Drive, Handsworth, SHEFFIELD, S13 9NS Authority: Sheffield City Council, Environmental Protection Service Permit Reference: Not Given Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: Part B - General Coating Process (No Specific Reference) **Status:** **Authorisation revoked** Positional Accuracy: Manually positioned to the address or location	A11NE (W)	819	4	442386 386040
29	**Local Authority Pollution Prevention and Control Enforcements** Location: Sheffield Road, Swallownest, Rotherham, South Yorkshire, S13 9ZD Type: Air Pollution Control Enforcement Notice Reference: Not Supplied Date Issued: Not Supplied Enforcement Date: Not Supplied Details: Not Supplied Positional Accuracy: Manually positioned to the road within the address or location	A14SW (E)	213	3	443815 385874
	Nearest Surface Water Feature	A13SW (SW)	0	-	443222 385723
30	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Storm Overflow Location: River Rother At, Woodhouse Mill Authority: Environment Agency, North East Region Pollutant: Sewage - Storm Overflow Note: Pollution Found; No Fish Killed Incident Date: 19th September 1996 Incident Reference: SH960443 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NW (N)	0	2	443350 386000
30	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Sewage Treatment Works Location: Woodhouse Mill Stw, Woodhouse Mill, SHEFFIELD Authority: Environment Agency, North East Region Pollutant: Sewage Sludge Note: No Fish Killed Incident Date: 20th June 1995 Incident Reference: SH950084 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A13NW (N)	0	2	443400 386000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
30	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Sewage Treatment Works Location: Woodhouse Mill Stw Authority: Environment Agency, North East Region Pollutant: Sewage - Treated Effluent Note: No Fish Killed Incident Date: Not Supplied Incident Reference: SH960088 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NW (N)	0	2	443400 385995
30	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Sewage Treatment Works Location: Woodhouse Mill Stw Authority: Environment Agency, North East Region Pollutant: Sewage - Treated Effluent Note: Pollution Found; No Fish Killed Incident Date: Not Supplied Incident Reference: SH960088 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (N)	0	2	443405 385995
31	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Sewage Treatment Works Location: Woodhouse Mill Stw Authority: Environment Agency, North East Region Pollutant: Sewage - Septic Tank Effluent Note: Pollution Found; No Fish Killed Incident Date: 23rd July 1996 Incident Reference: SH960330 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	0	2	443300 385800
32	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Sewage Treatment Works Location: Rear Colliery/Woodhse Mill Rother 05 Authority: Environment Agency, North East Region Pollutant: Sewage - Treated Effluent Note: Not Supplied Incident Date: 12th July 1994 Incident Reference: 152690 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A13SW (W)	0	2	443300 385900
33	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Storm Overflow Location: Woodhouse Mill, SHEFFIELD Authority: Environment Agency, North East Region Pollutant: Sewage - Storm Overflow Note: No Fish Killed Incident Date: 10th May 1997 Incident Reference: SH970248 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	15	2	443250 385700
33	**Pollution Incidents to Controlled Waters** Property Type: Domestic/Residential Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Rubble/Litter Or Solids Note: Not Supplied Incident Date: 22nd January 1990 Incident Reference: 107380 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	29	2	443200 385700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
34	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Un-Named Tributary Of, The Rother Authority: Environment Agency, North East Region Pollutant: Surcharged Sewage Note: No Fish Killed Incident Date: 18th September 1997 Incident Reference: SH970503 Catchment Area: Rother Tributaries Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NW (N)	17	2	443400 386100
35	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Sewage Treatment Works Location: Rother At, Woodhouse Mill Authority: Environment Agency, North East Region Pollutant: Crude Sewage Note: Pollution Found; No Fish Killed Incident Date: 8th July 1996 Incident Reference: SH960300 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	17	2	443205 385805
35	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 23rd August 1991 Incident Reference: 125482 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	18	2	443205 385800
35	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 14th May 1991 Incident Reference: 122319 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	20	2	443205 385795
35	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Storm Overflow Location: Rother, WOODHOUSE Authority: Environment Agency, North East Region Pollutant: Sewage - Storm Overflow Note: Watercourse :Rother; From Shire Brook To Shirtcliff Brook Incident Date: 4th April 1998 Incident Reference: SH980145 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	21	2	443200 385805
35	**Pollution Incidents to Controlled Waters** Property Type: Industrial Premises Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Miscellaneous - No Visible Pollution/Nothing Found Note: Not Supplied Incident Date: 25th January 1991 Incident Reference: 120310 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	23	2	443200 385800

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
35	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 10th October 1990 Incident Reference: 115712 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (SW)	25	2	443200 385795
36	**Pollution Incidents to Controlled Waters** Property Type: Miscellaneous Premises: Unknown Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Unknown Note: Not Supplied Incident Date: 6th April 1989 Incident Reference: 101023 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A13SW (S)	26	2	443300 385700
37	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Storm Overflow Location: Dore House Industrial Estate, Handsworth/Woodhouse Mill Authority: Environment Agency, North East Region Pollutant: Surcharged Sewage Note: No Fish Killed Incident Date: 29th March 1995 Incident Reference: SH950070 Catchment Area: Rother Tributaries Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A13NW (NW)	80	2	443200 386100
38	**Pollution Incidents to Controlled Waters** Property Type: Fire Water Location: River Rother At, A57 Road, WOODHOUSE Authority: Environment Agency, North East Region Pollutant: Not Given Note: Less Than Ten Fish Killed Incident Date: 6th September 1997 Incident Reference: SH970477 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SW (S)	148	2	443400 385600
39	**Pollution Incidents to Controlled Waters** Property Type: Fire Water Location: Tributary Of Rother At, Orgreave Occs Authority: Environment Agency, North East Region Pollutant: Not Given Note: No Fish Killed Incident Date: 23rd May 1997 Incident Reference: SH970223 Catchment Area: Rother Tributaries Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NW (NW)	163	2	443200 386200
40	**Pollution Incidents to Controlled Waters** Property Type: Other General Premises Location: Rear Colliery/Woodhse Mill Rother 05 Authority: Environment Agency, North East Region Pollutant: Unknown Note: Not Supplied Incident Date: 23rd May 1989 Incident Reference: 6943 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A18SE (NE)	325	2	443600 386400

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
41	**Pollution Incidents to Controlled Waters** Property Type: Fire Water Location: River Rother Authority: Environment Agency, North East Region Pollutant: Chemicals - Solvents Note: River Rother; Fisheries Affected; No Fish Killed Incident Date: 10th December 1998 Incident Reference: SH980475 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NE (S)	365	2	443500 385400
42	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Sewage Treatment Works Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 8th May 1990 Incident Reference: 110261 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12SE (W)	417	2	442800 385700
43	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Animal Waste/Slurry Note: Not Supplied Incident Date: 19th December 1994 Incident Reference: 153736 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NW (S)	438	2	443400 385300
43	**Pollution Incidents to Controlled Waters** Property Type: Industrial Premises Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Blood And Offal Note: Not Supplied Incident Date: 16th May 1994 Incident Reference: 152039 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NW (S)	443	2	443400 385295
44	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Shirtcliff Brook Authority: Environment Agency, North East Region Pollutant: Surcharged Sewage Note: No Pollution Found; No Fish Killed Incident Date: 23rd December 1996 Incident Reference: SH960504 Catchment Area: Rother Tributaries Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	476	2	442800 385500
45	**Pollution Incidents to Controlled Waters** Property Type: Other General Premises Location: Rear Colliery/Woodhse Mill Rother 05 Authority: Environment Agency, North East Region Pollutant: Unknown Note: Not Supplied Incident Date: 26th May 1989 Incident Reference: 9504 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A18NW (N)	493	2	443400 386600

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
46	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Industrial Effluent Note: Not Supplied Incident Date: 26th March 1991 Incident Reference: 120921 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A8SW (S)	526	2	443100 385200
47	**Pollution Incidents to Controlled Waters** Property Type: Other General Premises Location: Treeton Dyke, Woodhouse Mill Authority: Environment Agency, North East Region Pollutant: Fish Disease Note: No Pollution Found; Fisheries Affected; 11-20 Fish Killed Incident Date: 28th June 1996 Incident Reference: SH960275 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18NW (N)	638	2	443200 386695
47	**Pollution Incidents to Controlled Waters** Property Type: Other General Premises Location: Treeton Dyke, Woodhouse Mill Authority: Environment Agency, North East Region Pollutant: Fish Disease Note: Fisheries Affected; 11-200 Fish Killed Incident Date: 28th June 1996 Incident Reference: SH960275 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18NW (N)	643	2	443200 386700
48	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Shirtcliffe Brook At, Goathland Drive Authority: Environment Agency, North East Region Pollutant: Surcharged Sewage Note: Pollution Found; No Fish Killed Incident Date: 22nd July 1996 Incident Reference: SH960328 Catchment Area: Rother Tributaries Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	791	2	442500 385400
49	**Pollution Incidents to Controlled Waters** Property Type: Water Company Sewage: Foul Sewer Location: Woodhse Mill A57 /, Road Bridge B6053 Rother 06 Authority: Environment Agency, North East Region Pollutant: Crude Sewage Note: Not Supplied Incident Date: 3rd May 1991 Incident Reference: 122098 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A7SE (SW)	874	2	442900 384900
50	**Pollution Incidents to Controlled Waters** Property Type: Other General Premises Location: Rear Colliery/Woodhse Mill Rother 05 Authority: Environment Agency, North East Region Pollutant: Unknown Note: Not Supplied Incident Date: 30th November 1992 Incident Reference: 139095 Catchment Area: Not Given Receiving Water: No Pollution Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NW (SW)	883	2	442400 385400

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
51	**Pollution Incidents to Controlled Waters** Property Type: Industrial: Other Location: Handsworth, SHEFFIELD Authority: Environment Agency, North East Region Pollutant: Not Given Note: No Fish Killed Incident Date: 4th February 1996 Incident Reference: SH960121 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A11NE (W)	901	2	442300 386000
51	**Pollution Incidents to Controlled Waters** Property Type: Industrial: Other Location: Handsworth, SHEFFIELD Authority: Environment Agency, North East Region Pollutant: Not Given Note: No Pollution Found; No Fish Killed Incident Date: 4th February 1996 Incident Reference: SH960121 Catchment Area: Rother Receiving Water: Freshwater Stream/River Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A11NE (W)	901	2	442300 385995
	River Quality Name: River_Rother GQA Grade: River Quality E Reach: Shirtcliff_Brook_Handsworth_Bec Estimated Distance (km): 1.3 Flow Rate: Flow less than 2.5 cumecs Flow Type: River Year: 2000	A13NW (NW)	0	2	443230 385973
	River Quality Name: River_Rother GQA Grade: River Quality C Reach: Shire_Brook_Shirtcliff_Broo Estimated Distance (km): 1.9 Flow Rate: Flow less than 2.5 cumecs Flow Type: River Year: 2000	A13SW (S)	112	2	443269 385599
	River Quality Name: Shirtcliff_Brook GQA Grade: River Quality A Reach: Handworth_River_Rothe Estimated Distance (km): 2.9 Flow Rate: Flow less than 0.31 cumecs Flow Type: River Year: 2000	A13SW (SW)	112	2	443235 385599
	Water Abstractions Operator: British Steel Plc Licence Number: 2/27/03/012 Permit Version: Not Supplied Location: Location Description Not Available Authority: Environment Agency, North East Region Abstraction: Cooling/Gen Ind. Abstraction Type: Not Supplied Source: Surface Daily Rate (m3): 8637 Yearly Rate (m3): 2363920 Details: Licence Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A22SW (NW)	1280	2	442700 387200

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Uk Coal Mining Ltd Licence Number: 2/27/03/033 Permit Version: 101 Location: River Rother - Treeton Rothermam Authority: Environment Agency, North East Region Abstraction: Mineral Products: Mineral Washing Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Orgreave Opencast Site, Treeton, Rotherham Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 25th May 2001 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A22SW (NW)	1321	2	442710 387250
	Water Abstractions Operator: Rjb Mining (Uk) Ltd Licence Number: 2/27/03/033 Permit Version: 100 Location: River Rother Authority: Environment Agency, North East Region Abstraction: Mineral Products: Mineral Washing Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 320 Yearly Rate (m3): 70000 Details: Orgreave Opencast Site, Treeton, Rotherham Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 20th June 1996 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A22SW (NW)	1321	2	442710 387250
	Water Abstractions Operator: British Coal Licence Number: 2/27/03/013 Permit Version: Not Supplied Location: Location Description Not Available Authority: Environment Agency, North East Region Abstraction: Cooling/Gen Ind. Abstraction Type: Not Supplied Source: Surface Daily Rate (m3): 27 Yearly Rate (m3): 600070 Details: Licence Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(SE)	1970	2	444580 384130
	Groundwater Vulnerability Map Combined Classification: Secondary Superficial Aquifer - High Vulnerability Combined Vulnerability: High Combined Aquifer: Productive Bedrock Aquifer, Productive Superficial Aquifer Pollutant Speed: High Bedrock Flow: Well Connected Fractures Dilution: 300-550 mm/year Baseflow Index: >70% Superficial Patchiness: <90% Superficial Thickness: <3m Superficial Recharge: High	A13SW (NW)	0	5	443381 385898

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Groundwater Vulnerability Map Combined Classification: Secondary Bedrock Aquifer - High Vulnerability Combined Vulnerability: High Combined Aquifer: Productive Bedrock Aquifer, Productive Superficial Aquifer Pollutant Speed: High Bedrock Flow: Well Connected Fractures Dilution: 300-550 mm/year Baseflow Index: <40% Superficial Patchiness: <90% Superficial Thickness: <3m Superficial Recharge: High	A13NW (N)	0	5	443381 386000
	Groundwater Vulnerability Map Combined Classification: Secondary Bedrock Aquifer - High Vulnerability Combined Vulnerability: High Combined Aquifer: Productive Bedrock Aquifer, No Superficial Aquifer Pollutant Speed: High Bedrock Flow: Well Connected Fractures Dilution: 300-550 mm/year Baseflow Index: >70% Superficial Patchiness: <90% Superficial Thickness: <3m Superficial Recharge: High	A13SE (SE)	0	5	443568 385793
	Groundwater Vulnerability Map Combined Classification: Secondary Bedrock Aquifer - High Vulnerability Combined Vulnerability: High Combined Aquifer: Productive Bedrock Aquifer, No Superficial Aquifer Pollutant Speed: High Bedrock Flow: Well Connected Fractures Dilution: 300-550 mm/year Baseflow Index: >70% Superficial Patchiness: <90% Superficial Thickness: <3m Superficial Recharge: High	A13SW (W)	0	5	443206 385908
	Groundwater Vulnerability - Soluble Rock Risk None				
	Bedrock Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A13SW (NW)	0	5	443381 385898
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A13SW (NW)	0	5	443381 385898
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13NE (NE)	0	2	443496 386020
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SE (E)	0	2	443525 385858
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SE (E)	0	2	443446 385877
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A13SW (NW)	0	2	443381 385898

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A13SW (SW)	0	2	443292 385767
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13NW (W)	7	2	443172 385946
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SE (S)	29	2	443428 385729
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial / Undefined Events Boundary Accuracy: As Supplied	A13SW (S)	39	2	443347 385695
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A13SW (SW)	76	2	443223 385635
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A13SW (SW)	86	2	443219 385625
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A13SW (SW)	95	2	443218 385616
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial / Undefined Events Boundary Accuracy: As Supplied	A13NW (N)	105	2	443298 386152
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A13NW (NW)	112	2	443264 386165
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Undefined Events Boundary Accuracy: As Supplied	A13NW (NW)	125	2	443210 386163
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A13NW (N)	135	2	443284 386183
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A13SW (SW)	136	2	443213 385575
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Undefined Events Boundary Accuracy: As Supplied	A13SW (SW)	136	2	443212 385575
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A13NW (NW)	144	2	443215 386185
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A13NW (NW)	151	2	443215 386193
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A8NW (SW)	153	2	443199 385560

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A8NW (SW)	153	2	443199 385560
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A8NW (SW)	153	2	443199 385560
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A8NW (SW)	153	2	443201 385560
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Undefined Events Boundary Accuracy: As Supplied	A8NW (SW)	153	2	443199 385560
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A8NW (SW)	154	2	443198 385558
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A8NW (SW)	155	2	443199 385558
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A8NW (SW)	156	2	443197 385557
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A13NW (NW)	160	2	443202 386198
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A13NW (N)	187	2	443255 386236
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A13NW (N)	187	2	443255 386236
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A13NW (NW)	191	2	443196 386229
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A8NW (SW)	193	2	443166 385527
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A13NW (N)	196	2	443263 386245
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A13NW (NW)	199	2	443206 386240
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A8NW (SW)	200	2	443184 385515
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A18SW (N)	203	2	443271 386253

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A18SW (N)	205	2	443269 386255
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A18SW (N)	206	2	443255 386256
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Undefined Events Boundary Accuracy: As Supplied	A18SW (N)	209	2	443304 386266
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A18SW (N)	210	2	443233 386258
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A18SW (N)	213	2	443295 386266
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A8NW (S)	219	2	443234 385489
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial / Undefined Events Boundary Accuracy: As Supplied	A18SW (N)	223	2	443293 386277
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A18SE (NE)	241	2	443636 386268
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (NW)	0	2	443381 385898
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas Type: Flood Water Storage Areas Reference: Not Supplied	A13SW (S)	35	2	443352 385702
	Flood Defences Type: Flood Defences Reference: Not Supplied	A13SW (SW)	1	2	443227 385710
	Flood Defences Type: Flood Defences Reference: Not Supplied	A13SW (SW)	16	2	443211 385708
	Flood Defences Type: Flood Defences Reference: Not Supplied	A13SW (S)	32	2	443351 385704
	Flood Defences Type: Flood Defences Reference: Not Supplied	A13SW (SW)	57	2	443233 385654
	Flood Defences Type: Flood Defences Reference: Not Supplied	A13SW (SW)	65	2	443225 385645
52	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 477.8 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13SW (S)	0	6	443349 385765

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
53	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 418.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Rother Catchment Name: Don and Rother Primacy: 1	A13SW (SW)	9	6	443194 385770
54	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 350.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Rother Catchment Name: Don and Rother Primacy: 1	A13NW (NW)	16	6	443215 386011
55	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 67.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Rother Catchment Name: Don and Rother Primacy: 1	A13SW (W)	27	6	443178 385836
56	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 492.4 Watercourse Level: Underground Permanent: True Watercourse Name: Shirtcliff Brook Catchment Name: Don and Rother Primacy: 1	A13SW (W)	40	6	443178 385836
57	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 8.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13SE (E)	75	6	443664 385797
58	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 383.4 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13SE (E)	79	6	443672 385801
59	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 36.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13SE (E)	79	6	443672 385801
60	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 730.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Rother Catchment Name: Don and Rother Primacy: 1	A13NW (N)	97	6	443297 386151
61	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 12.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13NW (N)	97	6	443278 386145

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
62	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 48.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13SE (E)	103	6	443705 385817
63	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 7.8 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13NW (NW)	105	6	443272 386154
64	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 124.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13NW (NW)	106	6	443264 386155
65	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 17.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13SE (E)	134	6	443738 385853
66	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 39.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13SW (S)	146	6	443281 385573
67	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 517.6 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14SW (E)	147	6	443749 385866
68	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 20.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	174	6	443273 385543
69	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 34.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	174	6	443305 385544
70	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 19.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (SW)	181	6	443224 385529

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
71	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 273.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	181	6	443307 385543
72	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 56.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A13SE (SE)	182	6	443578 385623
73	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 12.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	183	6	443257 385530
74	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 17.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	190	6	443248 385522
75	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 6.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	190	6	443248 385522
76	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.3 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	203	6	443238 385508
77	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 55.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	207	6	443235 385504
78	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 77.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (SE)	230	6	443571 385567
79	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 9.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (SE)	230	6	443571 385567

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
80	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 86.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (SE)	237	6	443579 385563
81	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 14.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	244	6	443314 385480
82	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 82.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	258	6	443317 385466
83	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 83.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (S)	272	6	443512 385502
84	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 13.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (S)	272	6	443512 385502
85	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 99.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (S)	274	6	443525 385504
86	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 6.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (S)	308	6	443450 385447
87	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 14.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (S)	311	6	443445 385442
88	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 841.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Rother Catchment Name: Don and Rother Primacy: 1	A8NE (S)	318	6	443434 385433

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
89	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 13.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NW (E)	349	6	443927 385975
90	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NW (E)	362	6	443939 385977
91	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 12.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NW (E)	365	6	443943 385978
92	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NW (E)	377	6	443955 385980
93	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 14.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NW (E)	381	6	443958 385981
94	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 6.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	382	6	443395 385356
95	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 60.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	387	6	443399 385352
96	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 44.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NW (S)	387	6	443399 385352
97	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 10.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NW (E)	395	6	443972 385987

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
98	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 34.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NW (E)	406	6	443982 385991
99	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 21.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (S)	409	6	443442 385341
100	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 41.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (S)	409	6	443442 385341
101	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 266.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8NE (S)	424	6	443484 385335
102	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 291.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14SW (E)	454	6	444055 385790
103	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 87.7 Watercourse Level: Underground Permanent: True Watercourse Name: Shirtcliff Brook Catchment Name: Don and Rother Primacy: 1	A7NE (SW)	465	6	442795 385538
104	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 452.7 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A7NE (SW)	465	6	442795 385538
105	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 304.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Shirtcliff Brook Catchment Name: Don and Rother Primacy: 1	A7NE (SW)	546	6	442735 385474
106	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 52.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A17SE (NW)	631	6	442915 386577

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
107	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 39.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NE (E)	651	6	444161 386179
108	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 28.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A17NE (NW)	684	6	442892 386624
109	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 31.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NE (E)	690	6	444196 386196
110	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 314.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A17NE (NW)	712	6	442876 386647
111	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 40.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14NE (E)	720	6	444227 386204
112	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 4.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14SE (E)	732	6	444336 385816
113	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 773.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A14SE (E)	736	6	444340 385813
114	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 32.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Rother Catchment Name: Don and Rother Primacy: 1	A18NW (N)	751	6	443133 386789
115	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 11.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A18NW (N)	751	6	443133 386789

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
116	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A18NW (N)	752	6	443143 386794
117	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 7.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A17SW (NW)	759	6	442605 386438
118	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 439.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A17SW (NW)	765	6	442604 386445
119	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 701.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Rother Catchment Name: Don and Rother Primacy: 1	A18NW (N)	774	6	443106 386808
120	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 61.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A18NW (N)	774	6	443106 386808
121	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 426.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Treeton Dyke Catchment Name: Don and Rother Primacy: 1	A18NE (N)	789	6	443527 386895
122	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 51.8 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A18NW (N)	792	6	443155 386842
123	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 42.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A18NW (N)	807	6	443196 386874
124	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 347.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A8SW (S)	812	6	443097 384909

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
125	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 10.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A18NW (N)	817	6	443221 386893
126	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 437.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Shirtcliff Brook Catchment Name: Don and Rother Primacy: 1	A7NW (SW)	828	6	442450 385423
127	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 6.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A7NW (SW)	828	6	442450 385423
128	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 75.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A23SE (N)	830	6	443587 386929
129	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 118.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A11SE (W)	881	6	442346 385598
130	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 273.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A23SE (N)	887	6	443629 386979
131	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 24.9 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A9SE (SE)	919	6	444164 385111
132	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A9SE (SE)	919	6	444182 385128
133	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 7.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A9SE (SE)	920	6	444159 385107

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
134	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 40.4 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A9SE (SE)	921	6	444133 385083
135	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 55.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A9SE (SE)	926	6	444129 385079
136	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.4 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A9SE (SE)	975	6	444146 385030
137	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 30.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A9SE (SE)	975	6	444146 385030
138	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 190.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A9SE (SE)	978	6	444143 385026
139	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 31.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A11SE (W)	991	6	442231 385618
140	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 22.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Don and Rother Primacy: 1	A11SE (W)	991	6	442231 385624

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
141	**Historical Landfill Sites** Licence Holder: BSC Forges Foundries and Engineering Location: Woodhouse Mill, Sheffield Name: Woodhouse Mill Tip Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD04745 First Input Date: 31st December 1982 Last Input Date: 31st December 1992 Specified Waste Type: Deposited Waste included Inert, Industrial, Commercial and Household Waste, and Liquid Sludge EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 4400/0171 BGS Ref: Not Supplied Other Ref: 4400/R156, WD20/R156(22)	A13NE (NE)	76	2	443508 386163
142	**Licensed Waste Management Facilities (Landfill Boundaries)** Name: P J Hall Licence Number: 61717 Location: Soaphouse Lane, Woodhouse, Sheffield, South Yorkshire, S13 7RT Licence Holder: Hall P J Authority: Environment Agency - North East Region, Yorkshire Area Site Category: Landfills Taking Non-biodegradeable Wastes (Not Construction) Max Input Rate: Not Supplied **Licence Status:** **Closure** Issued: 16th July 1993 Positional Accuracy: Positioned by the supplier Boundary Accuracy: As Supplied	A8SE (S)	889	2	443700 384914
143	**Licensed Waste Management Facilities (Locations)** Licence Number: 65465 Location: Woodhouse Mill W W T W, Retford Road, Sheffield, South Yorkshire, S13 9WD Operator Name: Yorkshire Water Services Ltd Operator Location: Not Supplied Authority: Environment Agency - North East Region, Yorkshire Area Site Category: Treatment - Biological **Licence Status:** **Modified** Issued: 17th May 2006 Last Modified: 21st October 2013 Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 100m	A13SW (E)	0	2	443400 385900
144	**Licensed Waste Management Facilities (Locations)** Licence Number: 61607 Location: 682 Retford Road, Woodhouse Mill, Sheffield, South Yorkshire, S13 9GW Operator Name: Barrett J P Operator Location: Not Supplied Authority: Environment Agency - North East Region, Yorkshire Area Site Category: Metal Recycling Sites (Mixed) **Licence Status:** **Surrendered** Issued: 26th October 1993 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: 22nd August 2005 IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 100m	A13SE (S)	175	2	443500 385600
145	**Licensed Waste Management Facilities (Locations)** Licence Number: 406567 Location: Waverley Soil Treatment Facility, Orgreave Road, Catcliffe, Rotherham, South Yorkshire, S13 9XQ Operator Name: Red Materials Limited Operator Location: Not Supplied Authority: Environment Agency - North East Region, Yorkshire Area Site Category: Treatment of waste to produce soil <75,000 tpy **Licence Status:** **Issued** Issued: 19th December 2019 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 10m	A17SE (NW)	601	2	442735 386348

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
146	**Licensed Waste Management Facilities (Locations)** Licence Number: 61640 Location: Railway Siddings, Junction Road, Woodhouse, Sheffield, South Yorkshire, S12 7NJ Operator Name: Dennis Hobson Jr Metals Operator Location: Not Supplied Authority: Environment Agency - North East Region, Yorkshire Area Site Category: Metal Recycling Sites (Mixed) **Licence Status: Expired** Issued: 11th September 1995 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 10m	A8SW (S)	717	2	443320 385000
	Local Authority Landfill Coverage Name: Rotherham Borough Council - Has supplied landfill data		0	7	443381 385898
	Local Authority Landfill Coverage Name: Sheffield Metropolitan District Council - Has not been able to supply Landfill data		8	4	443220 385708
147	**Local Authority Recorded Landfill Sites** Location: Woodhouse Mill, Rotherham Reference: 22 Authority: Rotherham Metropolitan Borough Council, Environmental Health Department **Last Reported Status: Open** Types of Waste: Inert, Non Hazardous, Industrial, Effluent Treatment Sludge, Etc Date of Closure: Not Supplied Positional Accuracy: Positioned by the supplier Boundary Quality: Moderate	A13NE (N)	78	7	443457 386187
148	**Potentially Infilled Land (Non-Water)** Bearing Ref: E Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A13SE (E)	18	-	443613 385867
149	**Potentially Infilled Land (Non-Water)** Bearing Ref: SW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A8NW (SW)	142	-	443195 385572
150	**Potentially Infilled Land (Non-Water)** Bearing Ref: SW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A8NW (SW)	158	-	443165 385566
151	**Potentially Infilled Land (Non-Water)** Bearing Ref: SW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A12SE (SW)	176	-	443054 385671
152	**Potentially Infilled Land (Non-Water)** Bearing Ref: W Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A12SE (W)	333	-	442881 385749
153	**Potentially Infilled Land (Non-Water)** Bearing Ref: W Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A12SE (W)	396	-	442819 385721
154	**Potentially Infilled Land (Non-Water)** Bearing Ref: S Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A8NE (S)	467	-	443429 385276
155	**Potentially Infilled Land (Non-Water)** Bearing Ref: NE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A19SE (NE)	679	-	444141 386272
156	**Potentially Infilled Land (Non-Water)** Bearing Ref: W Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A12NW (W)	693	-	442513 386040

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
157	**Potentially Infilled Land (Non-Water)** Bearing Ref: S Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A8SW (S)	732	-	443326 384985
158	**Potentially Infilled Land (Non-Water)** Bearing Ref: NE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A19SE (NE)	905	-	444349 386364
159	**Potentially Infilled Land (Non-Water)** Bearing Ref: S Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A3NE (S)	986	-	443612 384788
160	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13SW (S)	0	-	443384 385813
161	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13SW (W)	0	-	443213 385868
162	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13SW (S)	0	-	443358 385746
163	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13SE (S)	28	-	443420 385728
164	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1950	A12SE (W)	303	-	442912 385776
165	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8NE (S)	353	-	443517 385418
166	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8NE (SE)	396	-	443634 385413
167	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8NE (SE)	507	-	443661 385301
168	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8NE (SE)	540	-	443684 385279
169	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8SE (S)	556	-	443567 385220
170	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A9SW (SE)	612	-	443758 385232
171	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A12NW (W)	666	-	442534 385971
172	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1924	A9SW (SE)	677	-	443906 385234
173	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1924	A8SE (S)	679	-	443423 385059
174	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8SE (S)	697	-	443445 385044
175	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A7NW (SW)	855	-	442432 385394
176	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A9SW (SE)	901	-	443900 384980

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
177	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A11NE (W)	941	-	442294 386199
178	**Registered Landfill Sites** Licence Holder: Sheffield Forgemasters Licence Reference: WD20 R 156 MOD 2 Site Location: Woodhouse Mill Tip, Woodhouse Mill, Aston, Sheffield, South Yorkshire Licence Easting: 443500 Licence Northing: 386600 Operator Location: As Site Address Authority: Environment Agency - North East Region, Ridings Area Site Category: Landfill Max Input Rate: Large (Equal to or greater than 75,000 and less than 250,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st January 1979 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste: Ind. Non-Haz. Inert, Non-Flammable; Ind. Non-Haz. Potentially Combustible; Ind. Non-Haz. Waste; Industrial Effluent Treatment Sludge; Slag Prohibited Waste: Asbestos; Liquids In Containers Over 4l Cap.; Slurry In Containers Over 4l Cap. Environment Agency must give specific authorisation for this waste to be acceptedWaste requires prior approval: Waste N.O.S	A18NE (N)	493	2	443500 386600
179	**Registered Landfill Sites** Licence Holder: P J Hall Licence Reference: WD20 S 995 MOD 2 Site Location: Soaphouse Lane, Woodhouse, SHEFFIELD, South Yorkshire, S13 7RT Licence Easting: 443840 Licence Northing: 384850 Operator Location: As Site Address Authority: Environment Agency - North East Region, Ridings Area Site Category: Landfill Max Input Rate: Large (Equal to or greater than 75,000 and less than 250,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Status: Site Closed Dated: 16th July 1993 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste: Max.Storage In Licence; Max.Waste Permitted By Licence; Other Non-Haz.Inert Non-Flam. Waste; Rubble; Soil, Topsoil Prohibited Waste: Asbestos/Asbestos Containing Waste; Biodegradable Materials; Hazardous Wastes; Paper/Cardboard; Putrescible Waste; Waste N.O.S.; Wood	A4NW (SE)	996	2	443840 384850

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
180	**Registered Waste Transfer Sites** Licence Holder: C Keeton Licence Reference: WD20 S 475 Site Location: Victoria Works, Soaphouse Lane, Sheffield, South Yorkshire Operator Location: 97 Tilford Road, Woodhouse, Sheffield, South Yorkshire Authority: Environment Agency - North East Region, Ridings Area Site Category: Transfer Max Input Rate: Undefined Waste Source Restrictions: No known restriction on source of waste Licence Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st July 1985 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Quality: Not Supplied Authorised Waste: Construction And Demolition Wastes Household + Commercial Waste Prohibited Waste: Asbestos	A8SW (S)	633	2	443400 385100
181	**Registered Waste Treatment or Disposal Sites** Licence Holder: J P Barrett t/a G A Barrett & Son Licence Reference: WD20 R 884 MOD 2 Site Location: 682 Retford Road, Woodhouse Mill, Aston, SHEFFIELD, South Yorkshire, S13 9GW Operator Location: 57 Woodsetts Road, North Anston, ROTHERHAM, South Yorkshire, S31 7EQ Authority: Environment Agency - North East Region, Ridings Area Site Category: Scrapyard - with Transfer Station Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Operational as far as is knownOperational Dated: 1st October 1993 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the road within the address or location Boundary Quality: Not Supplied Authorised Waste: Max.Storage In Licence Max.Waste Permitted By Licence Railway Sleepers Scrap Metal Prohibited Waste: Asbestos Pcb'S And Analogues Spec.Waste (Epa'90:S62/1996 Regs) Waste N.O.S.	A13SE (SE)	49	2	443490 385730
182	**Registered Waste Treatment or Disposal Sites** Licence Holder: P E Hall Licence Reference: WD20 S 839 Site Location: P J Hall Metal Processors, Soaphouse Lane, Woodhouse, Sheffield, South Yorkshire Operator Location: 1 Wickfield Close, SHEFFIELD, South Yorkshire, S12 4TN Authority: Environment Agency - North East Region, Ridings Area Site Category: Scrapyard - with Transfer Station Max Input Rate: Medium (Equal to or greater than 25,000 and less than 75,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st March 1993 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the road within the address or location Boundary Quality: Not Supplied Authorised Waste: Excavation Waste, Soil, Subsoil Ferrous Metal Scrap Gen. Commercial Waste Gen. Construction/Demolition Wastes Ind. Non-Haz. Waste Max.Storage Of These Wastes Non-Ferrous Metal Scrap Prohibited Waste: Asbestos Liquid Waste N.O.S. Pcbs In Capacitors/Transformers Putrescible Waste Special Wastes	A8SW (S)	633	2	443400 385100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
183	**Registered Waste Treatment or Disposal Sites** Licence Holder: G K & I Wathen Licence Reference: WD20 S 838 Site Location: Soaphouse Lane, Woodhouse, SHEFFIELD, South Yorkshire, S13 7RT Operator Location: 9 Farmoor Gardens, Beighton, Sheffield, South Yorkshire Authority: Environment Agency - North East Region, Ridings Area Site Category: Scrapyard Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Licence not applicable (partially revoked)Partially Revoked Dated: 30th April 1993 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Approximate location provided by supplier Boundary Quality: Not Supplied Authorised Waste: Max.Storage In Licence Scrap Motor Vehicles Prohibited Waste: Asbestos Liquid Waste N.O.S. Pcbs Putrescible Waste Special Wastes Tyres If Not Part Of Vehicle Accepted	A8SE (S)	656	2	443500 385100
184	**Registered Waste Treatment or Disposal Sites** Licence Holder: K Ledger Licence Reference: WD20 S 594 Site Location: Woodhouse Goods Sidings, Junction Road, Woodhouse, Sheffield, South Yorkshire Operator Location: 35 Bents Lane, Dronfield, SHEFFIELD, South Yorkshire, S18 6EX Authority: Environment Agency - North East Region, Ridings Area Site Category: Scrapyard Max Input Rate: Small (Equal to or greater than 10,000 and less than 25,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 1st May 1990 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the road within the address or location Boundary Quality: Not Supplied Authorised Waste: Ferrous Metal Scrap Max.Storage Permitted By Licence Non-Ferrous Metal Scrap Prohibited Waste: All Forms Of Asbestos Liq./Slurry In Drum/Cont'Rs > 4 L Cap. Putrescible Waste	A8SW (S)	714	2	443300 385000
184	**Registered Waste Treatment or Disposal Sites** Licence Holder: D Hobson t/a Lodge Metals Licence Reference: WD20 S1101 MOD 2 Site Location: The Railway Sidings Junction Road, Woodhouse, SHEFFIELD, South Yorkshire, S13 7NJ Operator Location: The Lodge, Stone Lane, Woodhouse, SHEFFIELD, South Yorkshire, S13 7BR Authority: Environment Agency - North East Region, Ridings Area Site Category: Scrapyard Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Operational as far as is knownOperational Dated: 12th September 1995 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Located by supplier to within 100m Boundary Quality: Not Supplied Authorised Waste: Ferrous Metal Scrap Max.Storage In Licence Max.Waste Permitted By Licence Non-Ferrous Metal Scrap Prohibited Waste: Asbestos Pcbs In Cpacitors/Transformers Putrescible Waste Scrap Motor Vehicles Spec.Waste (Epa'90:S62/1996 Regs)	A8SW (S)	717	2	443320 385000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Pennine Middle Coal Measures Formation And South Wales Middle Coal Measures Formation (Undifferentiated)	A13SW (NW)	0	1	443381 385898
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13SW (W)	0	1	443206 385908
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13NW (N)	0	1	443391 386000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 25 - 35 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A13SW (SW)	0	1	443324 385825
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 25 - 35 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A13NE (NE)	0	1	443422 385986
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A13SW (NW)	0	1	443381 385898
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13NE (E)	110	1	443641 386000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13SE (SE)	197	1	443597 385616
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A12NE (W)	207	1	443000 386000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 30 - 45 mg/kg	A8NW (S)	211	1	443381 385500
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7NE (SW)	292	1	442970 385567
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A12SE (SW)	294	1	442963 385577
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7NE (SW)	304	1	443007 385500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A12SE (SW)	315	1	442927 385613
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A12SE (W)	324	1	442886 385803
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A17SE (NW)	342	1	443000 386269
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A7NE (SW)	381	1	442878 385557
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 30 - 45 mg/kg	A7NE (SW)	395	1	442893 385500
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14SW (E)	399	1	443985 385721

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NW (E)	434	1	444000 386020
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7NE (SW)	438	1	442837 385510
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7NE (SW)	438	1	442843 385500
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A7NE (SW)	439	1	442833 385516
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NW (E)	441	1	444016 386000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7NE (SW)	452	1	442815 385525

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A9NW (SE)	453	1	443908 385506
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8NE (S)	517	1	443500 385244
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NW (NE)	537	1	444000 386233
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NE (E)	547	1	444128 386000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 25 - 35 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A8SE (S)	564	1	443559 385210
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A7NW (SW)	565	1	442703 385500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NE (E)	639	1	444138 386196
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NE (E)	678	1	444264 386000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A19SE (NE)	765	1	444098 386542
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7SW (SW)	802	1	442598 385214
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A19NE (NE)	811	1	444117 386603
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A11NE (W)	830	1	442372 386000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 15 - 30 mg/kg	A2NE (S)	836	1	443052 384893
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A19SE (NE)	885	1	444334 386349
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A23SW (N)	890	1	443381 387000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7NW (SW)	913	1	442431 385263
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A6NE (SW)	947	1	442355 385340
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 15 - 30 mg/kg	A24SW (N)	953	1	443795 387000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: <100 mg/kg Nickel Concentration: 30 - 45 mg/kg	A22SE (N)	987	1	443000 387001
185	**BGS Recorded Mineral Sites** Site Name: Woodhouse Mill Colliery Location: Woodhouse Mill, Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109242 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A13SW (SW)	153	1	443139 385586
186	**BGS Recorded Mineral Sites** Site Name: Woodhouse Brick Yard Location: Woodhouse Mill, Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109249 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Quaternary Geology: Alluvium Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	224	1	443017 385632
187	**BGS Recorded Mineral Sites** Site Name: Former Fence Colliery & Laycast Foundry Surface Coal Mine Location: Fence, Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 131357 Type: Opencast **Status: Ceased** Operator: J. F. Finnegan Ltd. Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Coal - Opencast Positional Accuracy: Located by supplier to within 10m	A14SW (E)	266	1	443850 385740
187	**BGS Recorded Mineral Sites** Site Name: Fence Colliery Location: Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 32273 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A14SW (E)	273	1	443855 385733
188	**BGS Recorded Mineral Sites** Site Name: Fence Colliery Pits Location: Fence, Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109248 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A14SW (E)	335	1	443938 385818

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
189	**BGS Recorded Mineral Sites** Site Name: Coalbrook Lodge Coal Pit Location: Orgreave, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109243 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A12SE (W)	344	1	442870 385761
190	**BGS Recorded Mineral Sites** Site Name: Woodhouse Mill Colliery Location: Woodhouse Mill, Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109251 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A8NE (S)	449	1	443412 385291
191	**BGS Recorded Mineral Sites** Site Name: Woodhouse Mill Colliery Location: Woodhouse Mill, Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109252 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A8SE (S)	567	1	443498 385192
192	**BGS Recorded Mineral Sites** Site Name: Fence Colliery Pits Location: Fence, Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109247 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A14SE (SE)	593	1	444138 385584
193	**BGS Recorded Mineral Sites** Site Name: Fence Colliery Pits Location: Fence, Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109246 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A14SE (E)	678	1	444242 385611
194	**BGS Recorded Mineral Sites** Site Name: Faulkner House Sand Pit Location: Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109245 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A19SE (NE)	683	1	444143 386277

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
195	**BGS Recorded Mineral Sites** Site Name: Coalbrook Location: Orgreave, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109250 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A12NW (W)	712	1	442496 386053
196	**BGS Recorded Mineral Sites** Site Name: Woodhouse Junction Colliery Location: Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109253 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A8SW (S)	780	1	443288 384933
197	**BGS Recorded Mineral Sites** Site Name: Smallage Location: Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109244 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A19SE (NE)	901	1	444340 386372
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 442740, 385750 Soil Sample Type: Topsoil Sample Area: Sheffield Arsenic Measured Concentration: 14.60 mg/kg Cadmium Measured Concentration: 0.80 mg/kg Chromium Measured Concentration: 53.70 mg/kg Lead Measured Concentration: 74.20 mg/kg Nickel Measured Concentration: 20.00 mg/kg	A12SE (W)	474	1	442740 385750
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 442740, 386210 Soil Sample Type: Topsoil Sample Area: Sheffield Arsenic Measured Concentration: 16.40 mg/kg Cadmium Measured Concentration: 0.20 mg/kg Chromium Measured Concentration: 85.60 mg/kg Lead Measured Concentration: 44.10 mg/kg Nickel Measured Concentration: 38.60 mg/kg	A12NE (NW)	529	1	442740 386210

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 442760, 385270 Soil Sample Type: Topsoil Sample Area: Sheffield Arsenic Measured Concentration: 16.20 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 69.70 mg/kg Lead Measured Concentration: 87.50 mg/kg Nickel Measured Concentration: 30.10 mg/kg	A7NE (SW)	642	1	442760 385270
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 442710, 386690 Soil Sample Type: Topsoil Sample Area: Sheffield Arsenic Measured Concentration: 59.90 mg/kg Cadmium Measured Concentration: 0.10 mg/kg Chromium Measured Concentration: 97.50 mg/kg Lead Measured Concentration: 35.80 mg/kg Nickel Measured Concentration: 37.80 mg/kg	A17NW (NW)	846	1	442710 386690
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 442290, 385730 Soil Sample Type: Topsoil Sample Area: Sheffield Arsenic Measured Concentration: 31.70 mg/kg Cadmium Measured Concentration: 0.70 mg/kg Chromium Measured Concentration: 76.30 mg/kg Lead Measured Concentration: 141.70 mg/kg Nickel Measured Concentration: 32.50 mg/kg	A11SE (W)	921	1	442290 385730
	BGS Urban Soil Chemistry Averages Source: British Geological Survey, National Geoscience Information Service Sample Area: Sheffield Count Id: 575 Arsenic Minimum Concentration: 5.00 mg/kg Arsenic Average Concentration: 25.00 mg/kg Arsenic Maximum Concentration: 243.00 mg/kg Cadmium Minimum Concentration: 0.10 mg/kg Cadmium Average Concentration: 0.80 mg/kg Cadmium Maximum Concentration: 6.80 mg/kg Chromium Minimum Concentration: 32.00 mg/kg Chromium Average Concentration: 120.00 mg/kg Chromium Maximum Concentration: 1291.00 mg/kg Lead Minimum Concentration: 21.00 mg/kg Lead Average Concentration: 252.00 mg/kg Lead Maximum Concentration: 5277.00 mg/kg Nickel Minimum Concentration: 9.00 mg/kg Nickel Average Concentration: 45.00 mg/kg Nickel Maximum Concentration: 520.00 mg/kg	A13SW (W)	0	1	443300 385898

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A13SW (NW)	0	8	443381 385898
	Mining Instability Mining Evidence: Inconclusive Coal Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A13SW (NW)	0	-	443381 385898
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	443194 385880
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	0	1	443547 385797
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	443194 385880
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	0	1	443547 385797
	Potential for Compressible Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	72	1	443126 385881
	Potential for Compressible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	89	1	443442 386200
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	103	1	443599 386086
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
	Potential for Landslide Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	183	1	443276 386234
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	0	1	443547 385797
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	443194 385880
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	72	1	443126 385881
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	89	1	443442 386200

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	103	1	443599 386086
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	443336 385839
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	1	443399 386081
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	32	1	443287 386075
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	193	1	443629 386191
	Radon Potential - Radon Affected Areas Affected Area: The property is in an Intermediate probability radon area (1 to 3% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
198	**Contemporary Trade Directory Entries** Name: The Carpet Cleaning Professor Location: 605, Retford Road, Sheffield, S13 9WD Classification: Carpet, Curtain & Upholstery Cleaners **Status: Active** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	52	-	443174 385705
198	**Contemporary Trade Directory Entries** Name: Woodhouse Mill Car Sales Location: 590 Mission Hall,Retford Road, Sheffield, South Yorkshire, S13 9WF Classification: Car Dealers - Used **Status: Active** Positional Accuracy: Manually positioned to the address or location	A13SW (SW)	96	-	443141 385669
199	**Contemporary Trade Directory Entries** Name: Peak Fire Surrounds Ltd Location: Retford Road, Woodhouse Mill, Sheffield, S13 9WH Classification: Fireplaces & Mantelpieces **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (E)	100	-	443704 385839
200	**Contemporary Trade Directory Entries** Name: Jeld-Wen Location: Woodhouse Mill, Retford Road, Woodhouse Mill, Sheffield, S13 9WH Classification: Window Frame Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	110	-	443587 385708
200	**Contemporary Trade Directory Entries** Name: Jeldwen Location: Woodhouse Mill, Retford Road, Woodhouse Mill, Sheffield, S13 9WH Classification: Joinery Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	110	-	443587 385708
201	**Contemporary Trade Directory Entries** Name: Brobot Petroleum Ltd Location: Woodhouse Mill Petrol Station, 590, Retford Road, Sheffield, S13 9WF Classification: Petrol Filling Stations **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	161	-	443073 385664
202	**Contemporary Trade Directory Entries** Name: Laycast Ltd Location: 247, Sheffield Road, Woodhouse Mill, Sheffield, S13 9ZD Classification: Foundries **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14SW (E)	277	-	443879 385807
203	**Contemporary Trade Directory Entries** Name: Holmat Properties Ltd Location: 590, Retford Road, Sheffield, S13 9WF Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned in the proximity of the address	A12SE (SW)	279	-	442951 385660
204	**Contemporary Trade Directory Entries** Name: S21 Motors Location: 38, Watch Street, Sheffield, S13 9WX Classification: Commercial Vehicle Servicing, Repairs, Parts & Accessories **Status: Active** Positional Accuracy: Automatically positioned to the address	A7NE (SW)	282	-	442985 385566
205	**Contemporary Trade Directory Entries** Name: Home Decor Location: Innovation Way, Woodhouse Mill, Sheffield, S13 9AD Classification: Door Manufacturers - Domestic **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14SW (SE)	294	-	443836 385660
206	**Contemporary Trade Directory Entries** Name: Allisons Pest Control Location: 1, Watch Street, Sheffield, S13 9WX Classification: Pest & Vermin Control **Status: Active** Positional Accuracy: Automatically positioned to the address	A8NW (SW)	309	-	443073 385443
207	**Contemporary Trade Directory Entries** Name: Jeld Wen Uk Location: Woodhouse Mill, Retford Road, Woodhouse Mill, Sheffield, S13 9WH Classification: Door Manufacturers - Domestic **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NE (SE)	337	-	443734 385527

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
207	**Contemporary Trade Directory Entries** Name: Jeld Wen (Uk) Ltd Location: Woodhouse Mill, Retford Road, Woodhouse Mill, Sheffield, S13 9WH Classification: Joinery Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NE (SE)	337	-	443734 385527
207	**Contemporary Trade Directory Entries** Name: Rugby Joinery Uk Ltd Location: Woodhouse Mill, Retford Road, Woodhouse Mill, Sheffield, S13 9WH Classification: Joinery Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NE (SE)	337	-	443734 385527
207	**Contemporary Trade Directory Entries** Name: Peak Fire Surrounds Ltd Location: Woodhouse Mill, Retford Road, Woodhouse Mill, Sheffield, S13 9WH Classification: Fireplaces & Mantelpieces **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NE (SE)	337	-	443734 385527
207	**Contemporary Trade Directory Entries** Name: Jeld Wen Location: Woodhouse Mill, Retford Road, Woodhouse Mill, Sheffield, S13 9WH Classification: Joinery Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NE (SE)	337	-	443734 385527
208	**Contemporary Trade Directory Entries** Name: Envifilter Ltd Location: 39, Hail Mary Drive, SHEFFIELD, S13 9XW Classification: Filtration Systems & Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SE (W)	357	-	442841 385882
209	**Contemporary Trade Directory Entries** Name: Mediplan Ltd Location: 245, Sheffield Road, Woodhouse Mill, SHEFFIELD, S13 9ZD Classification: Medical Equipment Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14SW (E)	442	-	444031 385726
209	**Contemporary Trade Directory Entries** Name: Mediplan Ltd Location: 245, Sheffield Road, Woodhouse Mill, Sheffield, S13 9ZD Classification: Medical Equipment Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14SW (E)	444	-	444031 385718
210	**Contemporary Trade Directory Entries** Name: J A'S Group Location: 45, John Hibbard Avenue, Sheffield, S13 9UT Classification: Carpet, Curtain & Upholstery Cleaners **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NW (S)	448	-	443330 385274
211	**Contemporary Trade Directory Entries** Name: Contour Studio Location: 16, Coalbrook Avenue, Sheffield, South Yorkshire, S13 9XR Classification: Stained Glass Designers & Producers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12NE (W)	457	-	442740 385914
212	**Contemporary Trade Directory Entries** Name: Nationwide Transport (Leeds) Ltd Location: 1, Coalbrook Avenue, Sheffield, S13 9XQ Classification: Road Haulage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12NW (W)	564	-	442633 385926
213	**Contemporary Trade Directory Entries** Name: Mediplan Ltd Location: 245, Sheffield Road, Woodhouse Mill, Sheffield, S13 9ZD Classification: Medical Equipment Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned in the proximity of the address	A14SE (E)	586	-	444164 385668
213	**Contemporary Trade Directory Entries** Name: Mediplan Location: 245, Sheffield Road, Woodhouse Mill, Sheffield, S13 9ZD Classification: Medical Equipment Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned in the proximity of the address	A14SE (E)	586	-	444164 385668

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
213	**Contemporary Trade Directory Entries** Name: Peak Fire Surrounds Ltd Location: Sheffield Rd, Woodhouse Mill, Sheffield, South Yorkshire, S13 9ZB Classification: Fireplaces & Mantelpieces **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A14SE (E)	595	-	444179 385686
214	**Contemporary Trade Directory Entries** Name: Crest Cuisine Ltd Location: Unit 1, Ironbridge Industrial Estate, 389, Retford Road, Sheffield, S13 9WA Classification: Frozen Food Processors & Distributors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	620	-	442594 385729
214	**Contemporary Trade Directory Entries** Name: Forte Lubricants Ltd Location: Unit 5, Ironbridge Industrial Estate, 397, Retford Road, Sheffield, S13 9WA Classification: Oil Fuel Distributors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	629	-	442585 385735
214	**Contemporary Trade Directory Entries** Name: The Handmade Sandwich Co Location: Unit 3, Ironbridge Industrial Estate, 393, Retford Road, Sheffield, South Yorkshire, S13 9WA Classification: Food Products - Manufacturers **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A12SW (W)	637	-	442576 385742
215	**Contemporary Trade Directory Entries** Name: Lodge Metals Location: Junction Rd, Woodhouse, Sheffield, South Yorkshire, S13 7RP Classification: Scrap Metal Merchants **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A8SW (S)	634	-	443114 385087
216	**Contemporary Trade Directory Entries** Name: Sheffield Fascias Glazing & Doors Ltd Location: 62, Hannah Road, Sheffield, S13 7RU Classification: Fascias and Soffits **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A7SE (SW)	660	-	442903 385136
217	**Contemporary Trade Directory Entries** Name: Nickel Diamond Tools Ltd Location: Junction Rd, Woodhouse, Sheffield, South Yorkshire, S13 7RP Classification: Diamond Tool Manufacturers **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A8SW (S)	661	-	443215 385050
218	**Contemporary Trade Directory Entries** Name: Pilkington Ltd Location: 27, Orgreave Drive, SHEFFIELD, S13 9NR Classification: Glass Products - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12NW (W)	714	-	442483 385923
219	**Contemporary Trade Directory Entries** Name: Hulleys Frozen Location: 29, Orgreave Drive, Sheffield, S13 9NR Classification: Ice Cream Manufacturers & Suppliers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	719	-	442488 385775
219	**Contemporary Trade Directory Entries** Name: Unita Maintain Location: 29, Orgreave Drive, Sheffield, S13 9NR Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	732	-	442474 385779
220	**Contemporary Trade Directory Entries** Name: Clark & Partners Ltd Location: 1, Orgreave Way, SHEFFIELD, S13 9LS Classification: Disability Equipment - Manufacturers & Suppliers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	765	-	442434 385849

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
220	**Contemporary Trade Directory Entries** Name: Clark & Partners Ltd Location: 1, Orgreave Way, SHEFFIELD, S13 9LS Classification: Disability Equipment - Manufacturers & Suppliers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	765	-	442434 385849
220	**Contemporary Trade Directory Entries** Name: Clark & Partners Location: 1, Orgreave Way, Sheffield, S13 9LS Classification: Disability Equipment - Manufacturers & Suppliers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A12SW (W)	778	-	442419 385874
220	**Contemporary Trade Directory Entries** Name: Clark & Partners Ltd Location: 1, Orgreave Way, Sheffield, S13 9LS Classification: Disability Equipment - Manufacturers & Suppliers **Status: Active** Positional Accuracy: Automatically positioned to the address	A12SW (W)	778	-	442419 385874
221	**Contemporary Trade Directory Entries** Name: Crane Force Location: 67, Haigh Moor Way, Swallownest, Sheffield, S26 4SW Classification: Crane Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A9NE (SE)	811	-	444240 385338
222	**Contemporary Trade Directory Entries** Name: D G Roofline (Sheffield) Ltd Location: 16, Badger Drive, Sheffield, S13 7TJ Classification: Fascias and Soffits **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A7NW (SW)	876	-	442431 385345
223	**Contemporary Trade Directory Entries** Name: Amefa (Uk) Ltd Location: 15, Orgreave Drive, Sheffield, S13 9NR Classification: Catering Equipment **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A11NE (W)	890	-	442339 386171
223	**Contemporary Trade Directory Entries** Name: Amefa (Uk) Ltd Location: 15-19, Orgreave Drive, Sheffield, South Yorkshire, S13 9NR Classification: Catering Equipment **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A11NE (W)	890	-	442339 386171
224	**Contemporary Trade Directory Entries** Name: Hodge Clemco Location: 36, Orgreave Drive, Sheffield, S13 9NR Classification: Blast Cleaning Equipment Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A11NE (W)	907	-	442297 386035
224	**Contemporary Trade Directory Entries** Name: Samuel Hodge Group Location: 36 Orgreave Drive, Sheffield, South Yorkshire, S13 9NR Classification: Blast Cleaning Equipment Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A11NE (W)	907	-	442297 386035
224	**Contemporary Trade Directory Entries** Name: S Y Seals Ltd Location: 14, Orgreave Drive, Sheffield, S13 9NR Classification: Seal & Joint Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A11NE (W)	914	-	442295 386077
224	**Contemporary Trade Directory Entries** Name: S Y Pumps Ltd Location: 14, Orgreave Drive, Sheffield, S13 9NR Classification: Pumps - Sales, Servicing & Repairs **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A11NE (W)	914	-	442295 386077
224	**Contemporary Trade Directory Entries** Name: S Y Pumps Location: 14, Orgreave Drive, Sheffield, S13 9NR Classification: Pumps - Sales, Servicing & Repairs **Status: Active** Positional Accuracy: Automatically positioned to the address	A11NE (W)	914	-	442295 386077

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
225	**Contemporary Trade Directory Entries** Name: Wolverhampton Abrasives Location: Orgreave Dr, Sheffield, South Yorkshire, S13 9NR Classification: Abrasive Products - Manufacturers & Distributors **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A11NE (W)	927	-	442291 386128
225	**Contemporary Trade Directory Entries** Name: Wolverhampton Abrasives Location: Orgreave Dr, Sheffield, South Yorkshire, S13 9NR Classification: Abrasive Products - Manufacturers & Distributors **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A11NE (W)	927	-	442291 386128
225	**Contemporary Trade Directory Entries** Name: U S L Location: 32, Orgreave Close, Sheffield, S13 9NP Classification: Oil & Gas Exploration Supplies & Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A11NE (W)	944	-	442271 386113
225	**Contemporary Trade Directory Entries** Name: Associate Rubber Service (Uk) Ltd Location: 32, Orgreave Close, Sheffield, South Yorkshire, S13 9NP Classification: Hose, Tubing & Fittings **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A11NE (W)	944	-	442271 386113
226	**Contemporary Trade Directory Entries** Name: Evans Halshaw Location: 7, Orgreave Drive, Sheffield, S13 9NR Classification: Commercial Vehicle Dealers **Status: Active** Positional Accuracy: Automatically positioned to the address	A11NE (W)	960	-	442280 386220
227	**Contemporary Trade Directory Entries** Name: Universal Supplies Engineering Location: 30, Orgreave Close, Sheffield, S13 9NP Classification: Engineering Materials **Status: Active** Positional Accuracy: Automatically positioned to the address	A11NE (W)	963	-	442248 386092
227	**Contemporary Trade Directory Entries** Name: U S E L Location: Unit 30 Orgreave Close, Sheffield, South Yorkshire, S13 9NP Classification: Cutting Tools & Machinery **Status: Active** Positional Accuracy: Automatically positioned to the address	A11NE (W)	963	-	442248 386092
227	**Contemporary Trade Directory Entries** Name: Hopwells Ltd Location: 28, Orgreave Close, Sheffield, S13 9NP Classification: Frozen Food Processors & Distributors **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A11NE (W)	977	-	442229 386056
228	**Contemporary Trade Directory Entries** Name: York Transport Location: Meadow Bank House, 50, Junction Road, Woodhouse, Sheffield, S13 7RQ Classification: Road Haulage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A3NE (S)	983	-	443482 384760
229	**Fuel Station Entries** Name: Rothervale Service Station Location: 613, Retford Road , Woodhouse Mill , Sheffield, South Yorkshire, S13 9WD Brand: Obsolete Premises Type: Not Applicable **Status: Obsolete** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	0	-	443270 385733
230	**Fuel Station Entries** Name: Hks Woodhouse Mill Location: 590, Retford Road , Woodhouse Mill , Sheffield, South Yorkshire, S13 9WF Brand: Bp Premises Type: Petrol Station **Status: Open** Positional Accuracy: Automatically positioned to the address	A13SW (SW)	161	-	443073 385664

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
231	**Points of Interest - Commercial Services** Name: Hks Woodhouse Mill Location: Woodhouse Mill Petrol Station, 590, Retford Road, Sheffield, S13 9WF Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A13SW (SW)	161	9	443072 385664
231	**Points of Interest - Commercial Services** Name: Car Wash Location: Woodhouse Mill Petrol Station 590, Retford Road, Sheffield, S13 9WF Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A13SW (SW)	161	9	443073 385664
232	**Points of Interest - Commercial Services** Name: S21 Motors Location: 38 Watch Street, Sheffield, S13 9WX Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A7NE (SW)	282	9	442985 385566
233	**Points of Interest - Commercial Services** Name: Allisons Pest Control Location: 1 Watch Street, Sheffield, S13 9WX Category: Contract Services Class Code: Pest and Vermin Control Positional Accuracy: Positioned to address or location	A8NW (SW)	309	9	443073 385443
234	**Points of Interest - Commercial Services** Name: C & A Transport Ltd Location: 30 Coalbrook Avenue, Sheffield, S13 9XR Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A12NE (W)	358	9	442840 385932
235	**Points of Interest - Commercial Services** Name: Nationwide Transport (Leeds) Ltd Location: 1 Coalbrook Avenue, Sheffield, S13 9XQ Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A12NW (W)	564	9	442633 385926
236	**Points of Interest - Commercial Services** Name: Greener Future Group Location: Unit 27 Orgreave Drive, Sheffield, S13 9NR Category: Recycling Services Class Code: Recycling, Reclamation and Disposal Positional Accuracy: Positioned to address or location	A12NW (W)	715	9	442482 385923
237	**Points of Interest - Commercial Services** Name: Lodge Metals Location: 37 Junction Road, Woodhouse, Sheffield, S13 7RP Category: Recycling Services Class Code: Scrap Metal Merchants Positional Accuracy: Positioned to address or location	A8SW (S)	733	9	443398 384998
238	**Points of Interest - Commercial Services** Name: S Harris Trucking Services Location: 10 Sylvia Close, Sheffield, S13 7SB Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A7SE (SW)	795	9	442861 385005
239	**Points of Interest - Commercial Services** Name: Dentforce Ltd Location: 6 Kestrel Rise, Swallownest, Sheffield, S26 4SD Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9NE (SE)	860	9	444249 385273
240	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SW (SW)	0	9	443312 385864
240	**Points of Interest - Manufacturing and Production** Name: Works Location: S13 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SW (NW)	0	9	443358 385908

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
241	**Points of Interest - Manufacturing and Production** Name: Tank Location: S13 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A13SE (SE)	53	9	443521 385739
242	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A14SW (E)	197	9	443784 385762
243	**Points of Interest - Manufacturing and Production** Name: Works Location: S13 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SE (SE)	280	9	443712 385581
243	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A13SE (SE)	281	9	443712 385580
244	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A9NW (SE)	376	9	443738 385486
244	**Points of Interest - Manufacturing and Production** Name: Works Location: S13 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A8NE (SE)	382	9	443727 385474
245	**Points of Interest - Manufacturing and Production** Name: Shaft Location: S13 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to address or location	A7NE (SW)	476	9	443052 385268
245	**Points of Interest - Manufacturing and Production** Name: Shaft Location: S13 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to an adjacent address or location	A7NE (SW)	477	9	443055 385266
246	**Points of Interest - Manufacturing and Production** Name: Opencast Workings Location: S13 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to an adjacent address or location	A18SW (NW)	520	9	443101 386544
247	**Points of Interest - Manufacturing and Production** Name: Opencast Workings Location: S13 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to an adjacent address or location	A12NW (W)	528	9	442673 385984
248	**Points of Interest - Manufacturing and Production** Name: Opencast Workings Location: S13 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to an adjacent address or location	A17SE (NW)	545	9	442753 386268
249	**Points of Interest - Manufacturing and Production** Name: Shaft (Disused) Location: S13 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to an adjacent address or location	A8SE (S)	563	9	443495 385195

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
249	**Points of Interest - Manufacturing and Production** Name: Shaft (Disused) Location: S13 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to address or location	A8SE (S)	574	9	443500 385185
249	**Points of Interest - Manufacturing and Production** Name: Shaft (Disused) Location: S13 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to address or location	A8SE (S)	574	9	443500 385185
250	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12NW (W)	760	9	442440 385979
250	**Points of Interest - Manufacturing and Production** Name: Works Location: S13 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12NW (W)	760	9	442440 385979
250	**Points of Interest - Manufacturing and Production** Name: Works Location: S13 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A12NW (W)	802	9	442403 386039
251	**Points of Interest - Manufacturing and Production** Name: Tank Location: S13 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A12NW (W)	811	9	442403 386098
251	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	851	9	442358 386069
252	**Points of Interest - Manufacturing and Production** Name: Opencast Workings Location: S13 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to an adjacent address or location	A17NE (NW)	854	9	442774 386750
253	**Points of Interest - Manufacturing and Production** Name: Opencast Workings Location: S60 Category: Extractive Industries Class Code: Unspecified Quarries Or Mines Positional Accuracy: Positioned to an adjacent address or location	A17SW (NW)	869	9	442438 386367
254	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	935	9	442292 386168
255	**Points of Interest - Manufacturing and Production** Name: Industrial Estate Location: S13 Category: Industrial Features Class Code: Business Parks and Industrial Estates Positional Accuracy: Positioned to an adjacent address or location	A16SE (W)	958	9	442294 386256
256	**Points of Interest - Public Infrastructure** Name: Sludge Bed Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13NE (NE)	0	9	443428 385947

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
256	**Points of Interest - Public Infrastructure** Name: Works Sewage Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13SW (W)	0	9	443353 385908
256	**Points of Interest - Public Infrastructure** Name: Sludge Bed Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13NE (NE)	0	9	443428 385947
256	**Points of Interest - Public Infrastructure** Name: Sewage Works Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to address or location	A13NW (N)	0	9	443373 385957
257	**Points of Interest - Public Infrastructure** Name: Water Treatment Works Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13SW (SW)	0	9	443298 385790
257	**Points of Interest - Public Infrastructure** Name: Sewage Works Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to address or location	A13SW (SW)	0	9	443304 385811
257	**Points of Interest - Public Infrastructure** Name: Outfall Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13SW (SW)	12	9	443206 385817
257	**Points of Interest - Public Infrastructure** Name: Outfall Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13SW (SW)	18	9	443200 385816
257	**Points of Interest - Public Infrastructure** Name: Outfall Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13SW (SW)	18	9	443213 385780
258	**Points of Interest - Public Infrastructure** Name: Sludge Bed Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13NW (N)	26	9	443384 386102
258	**Points of Interest - Public Infrastructure** Name: Sludge Beds Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13NW (NW)	61	9	443281 386107
258	**Points of Interest - Public Infrastructure** Name: Sludge Bed Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13NW (N)	82	9	443368 386156
258	**Points of Interest - Public Infrastructure** Name: Outfall Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13NW (N)	120	9	443322 386175

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
258	**Points of Interest - Public Infrastructure** Name: Outfall Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A13NW (N)	125	9	443312 386176
259	**Points of Interest - Public Infrastructure** Name: Sluice Location: S13 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A13SW (SW)	39	9	443218 385673
259	**Points of Interest - Public Infrastructure** Name: Sluice Gate Location: S13 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A13SW (SW)	40	9	443226 385671
260	**Points of Interest - Public Infrastructure** Name: Brobot Petroleum Ltd Location: Woodhouse Mill Petrol Station 590, Retford Road, Sheffield, S13 9WF Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A13SW (SW)	161	9	443073 385664
260	**Points of Interest - Public Infrastructure** Name: Brobot Petroleum Ltd Location: Woodhouse Mill Petrol Station 590, Retford Road, Sheffield, S13 9WF Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A13SW (SW)	161	9	443073 385664
260	**Points of Interest - Public Infrastructure** Name: Brobot Petroleum Ltd Location: Woodhouse Mill Petrol Station 590, Retford Road, Sheffield, S13 9WF Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A13SW (SW)	161	9	443072 385664
260	**Points of Interest - Public Infrastructure** Name: HKS Woodhouse Mill Location: Woodhouse Mill Petrol Station 590, Retford Road, Sheffield, S13 9WF Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A13SW (SW)	161	9	443072 385664
261	**Points of Interest - Public Infrastructure** Name: Slurry Pond Location: S13 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A18SW (N)	277	9	443224 386324
262	**Points of Interest - Public Infrastructure** Name: Slag Heap Location: S13 Category: Infrastructure and Facilities Class Code: Refuse Disposal Facilities Positional Accuracy: Positioned to an adjacent address or location	A18SE (N)	475	9	443441 386584
263	**Points of Interest - Public Infrastructure** Name: Woodhouse Rail Station Location: S13 Category: Public Transport, Stations and Infrastructure Class Code: Railway Stations, Junctions and Halts Positional Accuracy: Positioned to address or location	A7NE (SW)	487	9	442853 385399
263	**Points of Interest - Public Infrastructure** Name: Woodhouse Station Location: Nr Driver Street, S13 Category: Public Transport, Stations and Infrastructure Class Code: Railway Stations, Junctions and Halts Positional Accuracy: Positioned to address or location	A7NE (SW)	487	9	442853 385399
264	**Points of Interest - Public Infrastructure** Name: Slag Heap Location: S60 Category: Infrastructure and Facilities Class Code: Refuse Disposal Facilities Positional Accuracy: Positioned to an adjacent address or location	A22SE (N)	975	9	442954 386974

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
265	**Points of Interest - Public Infrastructure** Name: Water Treatment Works Location: S60 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A16SE (NW)	996	9	442327 386428
266	**Points of Interest - Recreational and Environmental** Name: Play Area Location: S13 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A12SE (W)	214	9	443003 385789
267	**Points of Interest - Recreational and Environmental** Name: Play Area Location: S13 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A14NW (E)	285	9	443845 385994

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
268	**Ancient Woodland** Name: Hail Mary Hill Wood Reference: 1105144 Area(m²): 214394.28 Type: Ancient and Semi-Natural Woodland	A14NE (E)	638	10	444166 386152
269	**Areas of Adopted Green Belt** Authority: Rotherham Metropolitan Borough Council Plan Name: Proposal Map **Status: Adopted** Plan Date: 27th June 2018	A13SW (NW)	0	11	443381 385898
270	**Areas of Adopted Green Belt** Authority: Sheffield City Council Plan Name: Sheffield Unitary Development Plan **Status: Adopted** Plan Date: 31st March 1998	A13SW (SW)	29	12	443234 385682
271	**Areas of Adopted Green Belt** Authority: Sheffield City Council Plan Name: Sheffield Unitary Development Plan **Status: Adopted** Plan Date: 31st March 1998	A7NE (SW)	516	12	442755 385487
272	**Local Nature Reserves** Name: Woodhouse Washlands Multiple Area: N Area (m2): 138641.87 Source: Natural England Designation Date: 1st November 1999	A13SW (SW)	55	10	443236 385657
273	**Local Nature Reserves** Name: Shire Brook Multiple Area: Y Area (m2): 191548.15 Source: Natural England Designation Date: 1st November 1999	A3NW (S)	935	10	443376 384788
274	**Nitrate Vulnerable Zones** Name: River Rother (Source To Don) Nvz Description: Surface Water Source: Environment Agency, Head Office	A13SW (NW)	0	5	443381 385898

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Rotherham Metropolitan Borough Council - Environmental Health Department	April 2014	Annual Rolling Update
North East Derbyshire District Council - Environmental Health Department	January 2015	Annual Rolling Update
Environment Agency - Head Office	June 2020	Annually
Sheffield City Council - Environmental Protection Service	October 2017	Annual Rolling Update
Discharge Consents		
Environment Agency - Midlands Region	July 2020	Quarterly
Environment Agency - North East Region	July 2020	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - Midlands Region	March 2013	Annual Rolling Update
Environment Agency - North East Region	March 2013	Annual Rolling Update
Integrated Pollution Controls		
Environment Agency - Midlands Region	October 2008	Variable
Environment Agency - North East Region	October 2008	Variable
Integrated Pollution Prevention And Control		
Environment Agency - Midlands Region	July 2020	Quarterly
Environment Agency - North East Region	July 2020	Quarterly
Local Authority Integrated Pollution Prevention And Control		
North East Derbyshire District Council - Environmental Health Department	August 2014	Variable
Sheffield City Council - Environmental Protection Service	June 2014	Variable
Rotherham Metropolitan Borough Council - Planning Department	October 2014	Variable
Local Authority Pollution Prevention and Controls		
North East Derbyshire District Council - Environmental Health Department	August 2014	Annual Rolling Update
Sheffield City Council - Environmental Protection Service	June 2014	Annual Rolling Update
Rotherham Metropolitan Borough Council - Planning Department	October 2014	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements		
North East Derbyshire District Council - Environmental Health Department	August 2014	Variable
Sheffield City Council - Environmental Protection Service	June 2014	Variable
Rotherham Metropolitan Borough Council - Planning Department	October 2014	Variable
Nearest Surface Water Feature		
Ordnance Survey	August 2020	
Pollution Incidents to Controlled Waters		
Environment Agency - North East Region	December 1998	Not Applicable
Environment Agency - Midlands Region	December 1999	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - Midlands Region	July 2015	Annual Rolling Update
Environment Agency - North East Region	March 2013	Annual Rolling Update
Prosecutions Relating to Controlled Waters		
Environment Agency - Midlands Region	March 2013	Annual Rolling Update
Environment Agency - North East Region	March 2013	Annual Rolling Update
Registered Radioactive Substances		
Environment Agency - Midlands Region	June 2016	
Environment Agency - North East Region	June 2016	
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	July 2012	Annually

Agency & Hydrological	Version	Update Cycle
Substantiated Pollution Incident Register		
Environment Agency - Midlands Region - East Area	July 2020	Quarterly
Environment Agency - Midlands Region - Lower Trent Area	July 2020	Quarterly
Environment Agency - North East Region - Ridings Area	July 2020	Quarterly
Environment Agency - North East Region - Yorkshire Area	July 2020	Quarterly
Water Abstractions		
Environment Agency - Midlands Region	July 2020	Quarterly
Environment Agency - North East Region	July 2020	Quarterly
Water Industry Act Referrals		
Environment Agency - Midlands Region	October 2017	Quarterly
Environment Agency - North East Region	October 2017	Quarterly
Groundwater Vulnerability Map		
Environment Agency - Head Office	June 2018	As notified
Bedrock Aquifer Designations		
Environment Agency - Head Office	January 2018	Annually
Superficial Aquifer Designations		
Environment Agency - Head Office	January 2018	Annually
Source Protection Zones		
Environment Agency - Head Office	October 2019	Quarterly
Extreme Flooding from Rivers or Sea without Defences		
Environment Agency - Head Office	September 2020	Quarterly
Flooding from Rivers or Sea without Defences		
Environment Agency - Head Office	September 2020	Quarterly
Areas Benefiting from Flood Defences		
Environment Agency - Head Office	September 2020	Quarterly
Flood Water Storage Areas		
Environment Agency - Head Office	September 2020	Quarterly
Flood Defences		
Environment Agency - Head Office	September 2020	Quarterly
OS Water Network Lines		
Ordnance Survey	June 2020	Quarterly
Surface Water 1 in 30 year Flood Extent		
Environment Agency - Head Office	October 2013	Annually
Surface Water 1 in 100 year Flood Extent		
Environment Agency - Head Office	October 2013	Annually
Surface Water 1 in 1000 year Flood Extent		
Environment Agency - Head Office	October 2013	Annually
Surface Water Suitability		
Environment Agency - Head Office	October 2013	Annually
BGS Groundwater Flooding Susceptibility		
British Geological Survey - National Geoscience Information Service	May 2013	Annually

Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites		
Environment Agency - Head Office	October 2019	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - Midlands Region	October 2008	Not Applicable
Environment Agency - North East Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - Midlands Region - East Area	July 2020	Quarterly
Environment Agency - Midlands Region - Lower Trent Area	July 2020	Quarterly
Environment Agency - North East Region - Ridings Area	July 2020	Quarterly
Environment Agency - North East Region - Yorkshire Area	July 2020	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - Midlands Region - East Area	July 2020	Quarterly
Environment Agency - Midlands Region - Lower Trent Area	July 2020	Quarterly
Environment Agency - North East Region - Ridings Area	July 2020	Quarterly
Environment Agency - North East Region - Yorkshire Area	July 2020	Quarterly
Local Authority Landfill Coverage		
Derbyshire County Council	May 2000	Not Applicable
North East Derbyshire District Council - Environmental Health Department	May 2000	Not Applicable
Rotherham Metropolitan Borough Council - Environmental Health Department	May 2000	Not Applicable
Sheffield City Council - Environmental Protection Service	May 2000	Not Applicable
Local Authority Recorded Landfill Sites		
Derbyshire County Council	May 2000	Not Applicable
North East Derbyshire District Council - Environmental Health Department	May 2000	Not Applicable
Rotherham Metropolitan Borough Council - Environmental Health Department	May 2000	Not Applicable
Sheffield City Council - Environmental Protection Service	May 2000	Not Applicable
Potentially Infilled Land (Non-Water)		
Landmark Information Group Limited	December 1999	Not Applicable
Potentially Infilled Land (Water)		
Landmark Information Group Limited	December 1999	Not Applicable
Registered Landfill Sites		
Environment Agency - Midlands Region - East Area	March 2003	Not Applicable
Environment Agency - Midlands Region - Lower Trent Area	March 2003	Not Applicable
Environment Agency - North East Region - Ridings Area	March 2003	Not Applicable
Environment Agency - North East Region - Yorkshire Area	March 2003	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - Midlands Region - East Area	March 2003	Not Applicable
Environment Agency - Midlands Region - Lower Trent Area	March 2003	Not Applicable
Environment Agency - North East Region - Ridings Area	March 2003	Not Applicable
Environment Agency - North East Region - Yorkshire Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites		
Environment Agency - Midlands Region - East Area	March 2003	Not Applicable
Environment Agency - Midlands Region - Lower Trent Area	March 2003	Not Applicable
Environment Agency - North East Region - Ridings Area	March 2003	Not Applicable
Environment Agency - North East Region - Yorkshire Area	March 2003	Not Applicable

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	April 2018	Bi-Annually
Explosive Sites		
Health and Safety Executive	March 2017	Annually
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements		
Derbyshire County Council	February 2016	Variable
North East Derbyshire District Council - Planning Department	February 2016	Variable
Rotherham Metropolitan Borough Council	February 2016	Variable
Sheffield City Council	February 2016	Variable
Planning Hazardous Substance Consents		
Derbyshire County Council	February 2016	Variable
North East Derbyshire District Council - Planning Department	February 2016	Variable
Rotherham Metropolitan Borough Council	February 2016	Variable
Sheffield City Council	February 2016	Variable

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	October 2015	Annually
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	June 2020	Bi-Annually
BGS Urban Soil Chemistry British Geological Survey - National Geoscience Information Service	October 2015	Annually
BGS Urban Soil Chemistry Averages British Geological Survey - National Geoscience Information Service	October 2015	Annually
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	Annual Rolling Update
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	April 2020	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	Annually
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	Annually

Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	July 2020	Quarterly
Fuel Station Entries Catalist Ltd - Experian	September 2020	Quarterly
Gas Pipelines National Grid	September 2020	
Points of Interest - Commercial Services PointX	September 2020	Quarterly
Points of Interest - Education and Health PointX	September 2020	Quarterly
Points of Interest - Manufacturing and Production PointX	September 2020	Quarterly
Points of Interest - Public Infrastructure PointX	September 2020	Quarterly
Points of Interest - Recreational and Environmental PointX	September 2020	Quarterly
Underground Electrical Cables National Grid	August 2020	

Sensitive Land Use	Version	Update Cycle
Ancient Woodland		
Natural England	April 2020	Bi-Annually
Areas of Adopted Green Belt		
North East Derbyshire District Council	June 2020	As notified
Rotherham Metropolitan Borough Council	June 2020	As notified
Sheffield City Council	June 2020	As notified
Areas of Unadopted Green Belt		
North East Derbyshire District Council	June 2020	As notified
Rotherham Metropolitan Borough Council	June 2020	As notified
Sheffield City Council	June 2020	As notified
Areas of Outstanding Natural Beauty		
Natural England	June 2019	Bi-Annually
Environmentally Sensitive Areas		
Natural England	January 2017	
Forest Parks		
Forestry Commission	April 1997	Not Applicable
Local Nature Reserves		
Natural England	April 2020	Bi-Annually
Marine Nature Reserves		
Natural England	July 2019	Bi-Annually
National Nature Reserves		
Natural England	July 2019	Bi-Annually
National Parks		
Natural England	April 2017	Bi-Annually
Nitrate Sensitive Areas		
Natural England	April 2016	Not Applicable
Nitrate Vulnerable Zones		
Environment Agency - Head Office	December 2017	Bi-Annually
Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	October 2015	
Ramsar Sites		
Natural England	August 2020	Bi-Annually
Sites of Special Scientific Interest		
Natural England	May 2020	Bi-Annually
Special Areas of Conservation		
Natural England	July 2020	Bi-Annually
Special Protection Areas		
Natural England	September 2020	Bi-Annually

Data Suppliers

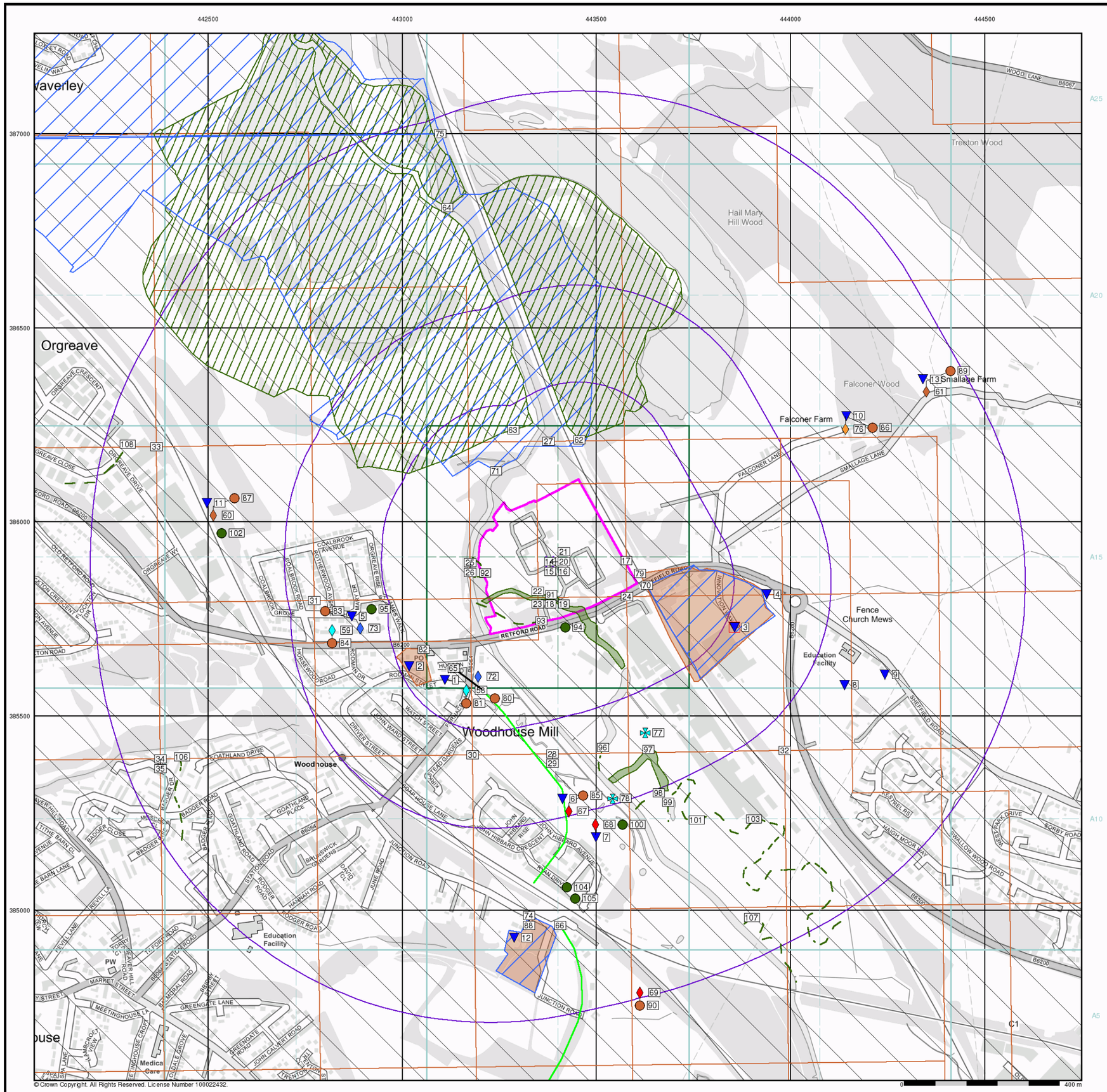
A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Stantec UK Ltd	

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	**Rotherham Metropolitan Borough Council - Planning Department** Bailey House, Rawmarsh Road, Rotherham, South Yorkshire, S60 1QT	Website: www.rotherham.gov.uk
4	**Sheffield City Council - Environmental Protection Service** 2-10 Carbrook Hall Road, Sheffield, S9 2DB	Telephone: 0114 272 6444 Website: www.sheffield.gov.uk
5	**Environment Agency - Head Office** Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409
6	**Ordnance Survey** Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 03456 05 05 05 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk
7	**Rotherham Metropolitan Borough Council - Environmental Health Department** Howard Building, College Lane, Rotherham, South Yorkshire, S65 1AX	Website: www.rotherham.gov.uk
8	**The Coal Authority - Property Searches** 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0345 762 6848 Fax: 01623 637 338 Email: groundstability@coal.gov.uk Website: www2.groundstability.com
9	**PointX** 7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY	Website: www.pointx.co.uk
10	**Natural England** County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
11	**Rotherham Metropolitan Borough Council** Bailey House, Rawmarsh Road, Rotherham, South Yorkshire, S60 1QT	Telephone: 01709 382121 Fax: 01709 823810 Website: www.rotherham.gov.uk
12	**Sheffield City Council** Howden House, 1 Union Street, Sheffield, South Yorkshire, S1 2SH	Telephone: 0114 273 4215 Fax: 0114 273 5002 Website: www.sheffield.gov.uk
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.



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Historical Land Use Information (1:10,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Potentially Contaminative Industrial Uses (Past Land Uses - Mining)

	Point	Line	Polygon
Air Shafts	◆		
Disturbed Ground	◆		
General Quarrying	◆		
Heap, unknown constituents	◆		
Mineral Railway	◆		
Mining and Quarrying General	◆		
Mining of Coal & Lignite	◆		
Quarrying of Sand and Clay, Operation of Sand and Gravel Pits	◆		

Historical Land Use

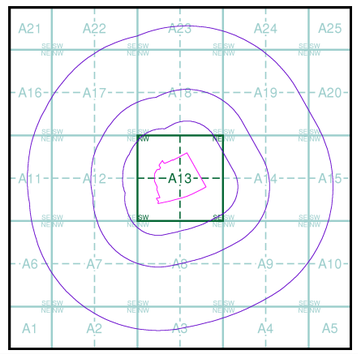
	Point	Line	Polygon
Potentially Infilled Land (Non-Water)	●		
Potentially Infilled Land (Water)	●		
Former Marsh	✠		

Mining Data

Potential Mining Area

BGS Recorded Mineral Site

Mining and Ground Stability - Slice A



Order Details

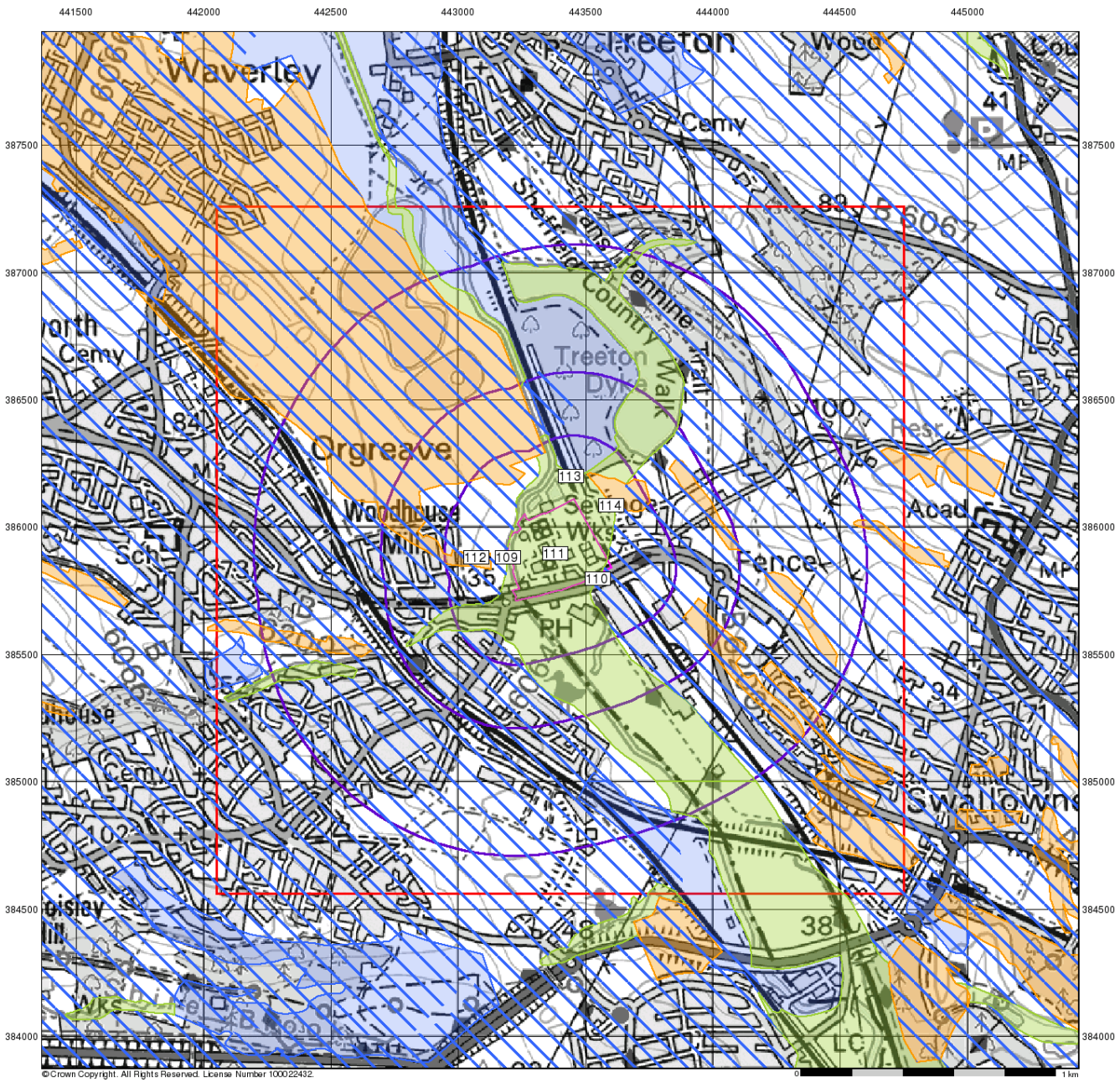
Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Landmark® INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Potential for Compressible Ground Stability Hazards

High | Low | Moderate | Very Low

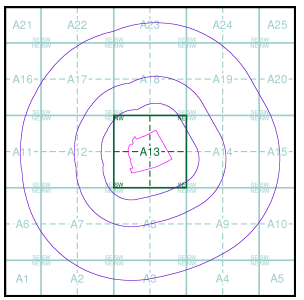
Potential for Collapsible Ground Stability Hazards

High | Low | Moderate | Very Low

Brine Pumping and Salt Mining

	Point	Polygon
Brine Pumping Related Feature	▲	▨
Salt Mining Related Feature	▲	▨

Mining and Ground Stability - Slice A



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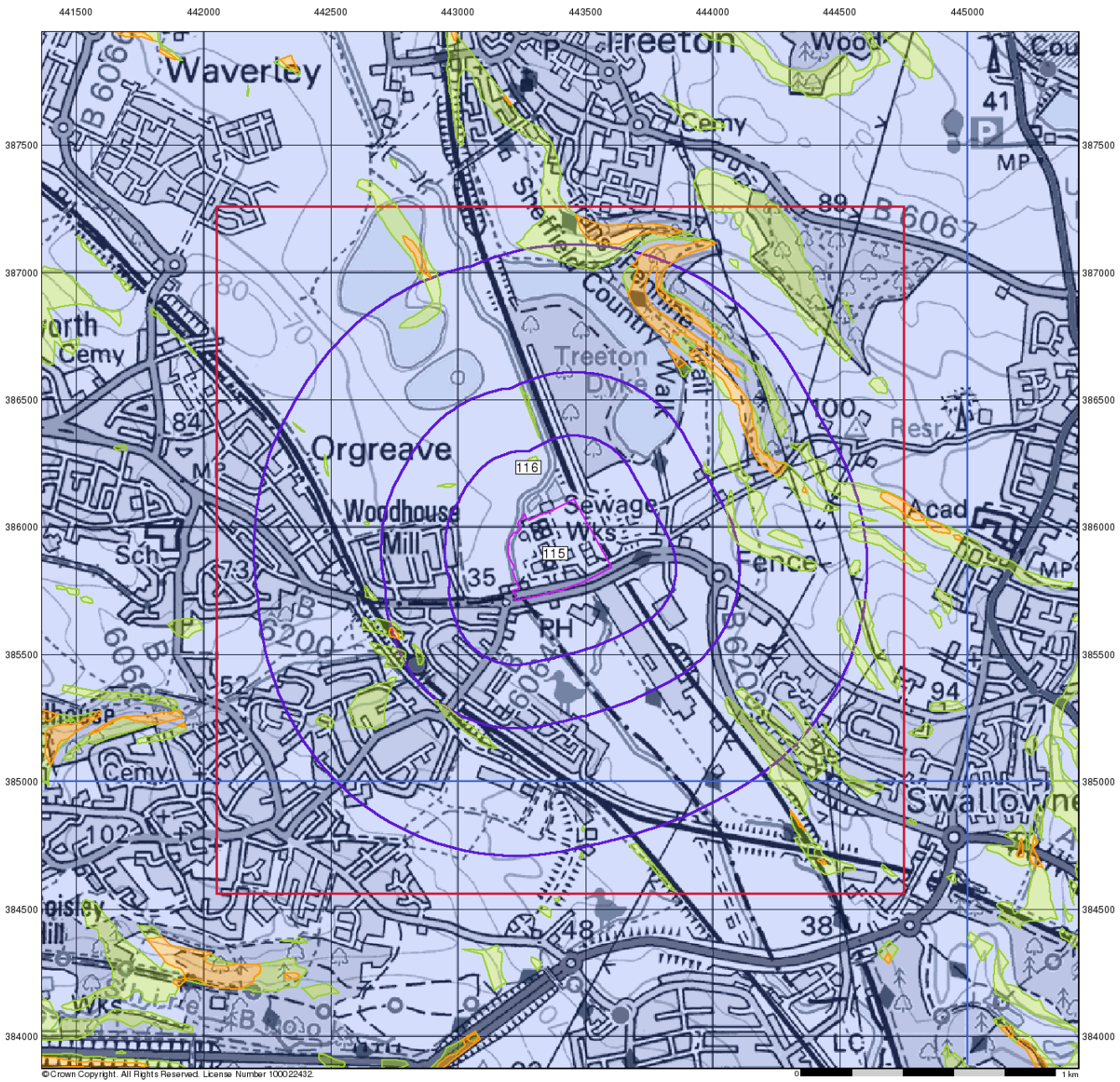

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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

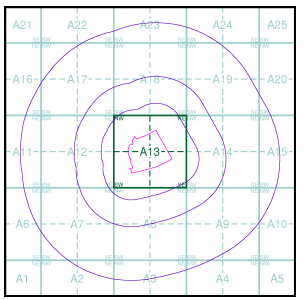
Potential for Landslide Ground Stability Hazards

High | Low | Moderate | Very Low

Potential for Ground Dissolution Stability Hazards

High | Low | Moderate | Very Low

Mining and Ground Stability - Slice A



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Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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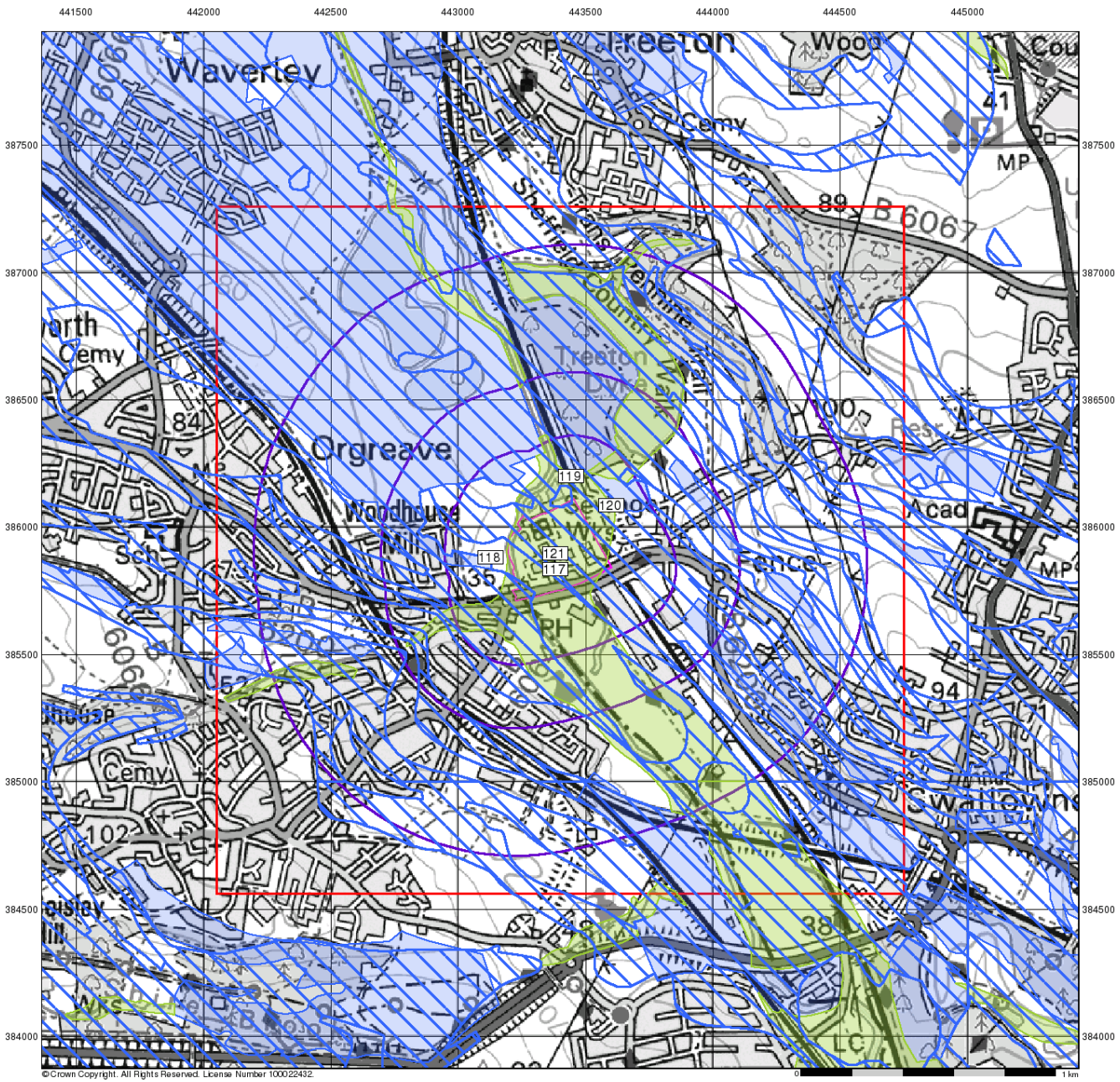
Web: www.envirocheck.co.uk



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Ground Stability Data (1:50,000)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

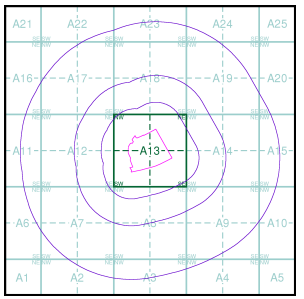
Potential for Running Sand Ground Stability Hazards

High | Low | Moderate | Very Low

Potential for Shrinking or Swelling Clay Ground Stability Hazards

High | Low | Moderate | Very Low

Mining and Ground Stability - Slice A



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Envirocheck® Report:

Mining and Ground Stability Datasheet

Order Details:

Order Number:
261993045_1_1

Customer Reference:
41527254

National Grid Reference:
443380, 385900

Slice:
A

Site Area (Ha):
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Search Buffer (m):
1000

Site Details:

Woodhouse Mill STW
Retford Road
SHEFFIELD
S13 9WG

Client Details:

Mr E Parsons
Stantec UK Ltd
1 Papermill Drive
Kesley House
Redditch
B98 8QJ

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Contents

Report Version v53.0

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Mining and Natural Cavities Data					
BGS Recorded Mineral Sites	pg 1		2	5	7
Coal Mining Affected Areas	pg 3	Yes	n/a	n/a	n/a
Man Made Mining Cavities					
Mining Instability	pg 3	Yes	n/a	n/a	n/a
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential Mining Areas	pg 3	10	4	4	4
Historical Land Use Information (1:2,500)					
Extractive Industries or Potential Excavations from 1855-1909 (100m)	pg 7	1	1	n/a	n/a
Extractive Industries or Potential Excavations from 1893-1915 (100m)	pg 7	1	2	n/a	n/a
Extractive Industries or Potential Excavations from 1906-1937 (100m)	pg 7	1	2	n/a	n/a
Extractive Industries or Potential Excavations from 1924-1949 (100m)	pg 7	3	2	n/a	n/a
Extractive Industries or Potential Excavations from 1950-1980 (100m)	pg 8	5	4	n/a	n/a
Subterranean Features (100m)				n/a	n/a
Historical Land Use Information (1:10,000)					
Air Shafts	pg 9		1	1	
Disturbed Ground					
General Quarrying	pg 9				2
Heap, unknown constituents	pg 9		2		1
Mineral Railway	pg 9		1		1
Mining & quarrying general	pg 9			1	2
Mining of coal & lignite	pg 9		3	1	2
Quarrying of sand & clay, operation of sand & gravel pits	pg 9				1
Former Marshes	pg 9			2	
Potentially Infilled Land (Non-Water)	pg 10		4	3	5
Potentially Infilled Land (Water)	pg 10	3	1	3	11
Ground Stability Data (1:50,000)					
CBSCB Compensation District			n/a	n/a	n/a
Brine Pumping Related Features					
Brine Subsidence Solution Area					
Potential for Collapsible Ground Stability Hazards	pg 12	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 12	Yes	Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 12	Yes		n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 12	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 12	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 12	Yes	Yes	n/a	n/a
Salt Mining Related Features					

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Summary

Report Version v53.0

Mining and Natural Cavities Data

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**BGS Recorded Mineral Sites** Site Name: Woodhouse Mill Colliery Location: Woodhouse Mill, Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109242 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A13SW (SW)	153	1	443139 385586
2	**BGS Recorded Mineral Sites** Site Name: Woodhouse Brick Yard Location: Woodhouse Mill, Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109249 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Quaternary Geology: Alluvium Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	224	1	443017 385632
3	**BGS Recorded Mineral Sites** Site Name: Former Fence Colliery & Laycast Foundry Surface Coal Mine Location: Fence, Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 131357 Type: Opencast **Status: Ceased** Operator: J. F. Finnegan Ltd. Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Coal - Opencast Positional Accuracy: Located by supplier to within 10m	A14SW (E)	266	1	443850 385740
3	**BGS Recorded Mineral Sites** Site Name: Fence Colliery Location: Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 32273 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A14SW (E)	273	1	443855 385733
4	**BGS Recorded Mineral Sites** Site Name: Fence Colliery Pits Location: Fence, Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109248 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A14SW (E)	335	1	443938 385818
5	**BGS Recorded Mineral Sites** Site Name: Coalbrook Lodge Coal Pit Location: Orgreave, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109243 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A12SE (W)	344	1	442870 385761

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
6	**BGS Recorded Mineral Sites** Site Name: Woodhouse Mill Colliery Location: Woodhouse Mill, Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109251 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A8NE (S)	449	1	443412 385291
7	**BGS Recorded Mineral Sites** Site Name: Woodhouse Mill Colliery Location: Woodhouse Mill, Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109252 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A8SE (S)	567	1	443498 385192
8	**BGS Recorded Mineral Sites** Site Name: Fence Colliery Pits Location: Fence, Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109247 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A14SE (SE)	593	1	444138 385584
9	**BGS Recorded Mineral Sites** Site Name: Fence Colliery Pits Location: Fence, Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109246 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A14SE (E)	678	1	444242 385611
10	**BGS Recorded Mineral Sites** Site Name: Faulkner House Sand Pit Location: Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109245 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A19SE (NE)	683	1	444143 386277
11	**BGS Recorded Mineral Sites** Site Name: Coalbrook Location: Orgreave, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109250 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A12NW (W)	712	1	442496 386053

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
12	**BGS Recorded Mineral Sites** Site Name: Woodhouse Junction Colliery Location: Woodhouse, Sheffield, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109253 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Coal Measures Group Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A8SW (S)	780	1	443288 384933
13	**BGS Recorded Mineral Sites** Site Name: Smallage Location: Aughton, Rotherham, South Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 109244 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A19SE (NE)	901	1	444340 386372
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A13SW (NW)	0	2	443381 385898
	Mining Instability Mining Evidence: Inconclusive Coal Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A13SW (NW)	0	3	443381 385898
	Non Coal Mining Areas of Great Britain No Hazard				
14	**Potential Mining Areas** Name: Birley East Ceased Operation: 1933 Commodity: Coal; Silkstone Reference: 11076 Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A13SW (NW)	0	4	443381 385898
15	**Potential Mining Areas** Name: Attercliffe Ceased Operation: Not Supplied Commodity: Coal; Barnsley Reference: Not Supplied Alternate Name/Mine: Darnall Alternate Name/Mine: Greenland Alternate Name/Mine: Handsworth Alternate Name/Mine: Orgreave Alternate Name/Mine: Peacock Alternate Name/Mine: Woodhouse Junction Alternate Name/Mine: Woodhouse Mill Custodian: O.J. Cotterell, 72 Queen Street, Sheffield.	A13SW (NW)	0	4	443381 385898
16	**Potential Mining Areas** Name: Ballifield Ceased Operation: 1854 Commodity: Coal; Top Hard Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: Coke, Turner and Co., 26 Low Pavement, Nottingham.	A13SW (NW)	0	4	443381 385898

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
17	**Potential Mining Areas** Name: Fence Ceased Operation: Not Supplied Commodity: Coal; Furnace; High Hazel Reference: R382A Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A13SE (E)	0	4	443577 385900
18	**Potential Mining Areas** Name: Fence Ceased Operation: 1903 Commodity: Coal; High Hazel; Flockton Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: United Steel Companies Ltd., Rother Vale Collieries Branch, Treeton, Rotherham.	A13SW (S)	0	4	443382 385805
19	**Potential Mining Areas** Name: Fence Ceased Operation: Not Supplied Commodity: Coal; High Hazel; Flockton Thick; Flockton Thin Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: J. Swift and Sons, Sim Hill, Thurgoland, Sheffield.	A13SW (S)	0	4	443382 385805
20	**Potential Mining Areas** Name: Fence; Orgreave and Treeton Ceased Operation: 1902 Commodity: Coal; Barnsley Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: United Steel Companies Ltd., Rother Vale Collieries Branch, Treeton, Rotherham.	A13SW (NW)	0	4	443381 385898
21	**Potential Mining Areas** Name: Sheffield (District) Ceased Operation: Not Supplied Commodity: Coal; Aston Common; Sough; Fox Earth; Furnace; Swallow Wood; Silkstone; Parkgate Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: C.E. Rhodes and Sons, Rotherham.	A13SW (NW)	0	4	443381 385898
22	**Potential Mining Areas** Name: Birley East Ceased Operation: 1933 Commodity: Coal; Silkstone Reference: 11076 Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A13SW (S)	0	4	443382 385805
23	**Potential Mining Areas** Name: Woodhouse Junction Ceased Operation: Not Supplied Commodity: Coal; Barnsley Reference: R356F Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A13SW (S)	0	4	443382 385805
24	**Potential Mining Areas** Name: Aston cum Aughton Ceased Operation: Not Supplied Commodity: Coal Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A13SE (SE)	17	4	443578 385807
25	**Potential Mining Areas** Name: Coalbrook Ceased Operation: Not Supplied Commodity: Coal; Barnsley Reference: R336A Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A13SW (W)	22	4	443174 385895

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
26	**Potential Mining Areas** Name: Dore House Ceased Operation: Not Supplied Commodity: Coal; Handsworth or Barnsley Reference: R143H Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A13SW (W)	22	4	443174 385895
27	**Potential Mining Areas** Name: Orgreave Ceased Operation: 1906 Commodity: Coal; Barnsley Reference: 8688 Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A13NW (N)	98	4	443377 386207
28	**Potential Mining Areas** Name: Junction Ceased Operation: Not Supplied Commodity: Coal; High Hazel Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: J. Swift and Sons, Sim Hill, Thurgoland, Sheffield.	A8NW (S)	310	4	443387 385403
29	**Potential Mining Areas** Name: Handsworth Woodhouse Ceased Operation: 1876 Commodity: Coal; Top Hard or Barnsley Reference: 533 Alternate Name/Mine: No. 3 Custodian: Not Supplied	A8NW (S)	310	4	443387 385403
30	**Potential Mining Areas** Name: Birley East Ceased Operation: 1904 Commodity: Coal; Silkstone Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: Coke, Turner and Co., 26 Low Pavement, Nottingham.	A8NW (S)	314	4	443181 385400
31	**Potential Mining Areas** Name: Woodthorpe Ceased Operation: 1928 Commodity: Coal; Silkstone Reference: 9624 Alternate Name/Mine: Handsworth Custodian: Not Supplied	A12SE (W)	434	4	442773 385797
32	**Potential Mining Areas** Name: Aston Main Ceased Operation: 1884 Commodity: Coal; Barnsley Reference: 1656 Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A9NW (SE)	575	4	443985 385410
33	**Potential Mining Areas** Name: Orgreave Ceased Operation: Not Supplied Commodity: Coal; High Hazel Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: O.J. Cotterell, 72 Queen Street, Sheffield.	A11NE (W)	870	4	442366 386194
34	**Potential Mining Areas** Name: Birley Ceased Operation: 1908 Commodity: Coal; Silkstone Reference: 5312 Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A6NE (SW)	909	4	442376 385390

Mining and Natural Cavities Data

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
35	**Potential Mining Areas** Name: Handsworth Ceased Operation: Not Supplied Commodity: Coal Reference: Not Supplied Alternate Name/Mine: Not Supplied Custodian: Not Supplied	A6NE (SW)	909	4	442376 385390

Historical Land Use Information (1:2,500)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
36	**Extractive Industries or Potential Excavations from 1855-1909** Use: Railway Embankment First Map Published Date: 1892 Last Map Published Date: 1892	A13NE (NE)	0	-	443521 385971
37	**Extractive Industries or Potential Excavations from 1855-1909** Use: Unspecified Deposited Material First Map Published Date: 1892 Last Map Published Date: Not Applicable	A13SE (SE)	92	-	443611 385740
38	**Extractive Industries or Potential Excavations from 1893-1915** Use: Railway Embankment First Map Published Date: 1898 Last Map Published Date: 1903	A13NE (NE)	0	-	443521 385970
39	**Extractive Industries or Potential Excavations from 1893-1915** Use: Unspecified Deposited Material First Map Published Date: 1903 Last Map Published Date: Not Applicable	A13SE (SE)	43	-	443531 385755
40	**Extractive Industries or Potential Excavations from 1893-1915** Use: Unspecified Deposited Material First Map Published Date: 1898 Last Map Published Date: 1903	A13SE (SE)	93	-	443581 385714
41	**Extractive Industries or Potential Excavations from 1906-1937** Use: Railway Embankment First Map Published Date: 1923 Last Map Published Date: 1923	A13NE (NE)	0	-	443522 385971
42	**Extractive Industries or Potential Excavations from 1906-1937** Use: Fence Colliery First Map Published Date: 1923 Last Map Published Date: Not Applicable	A13SE (SE)	21	-	443506 385767
43	**Extractive Industries or Potential Excavations from 1906-1937** Use: Unspecified Deposited Material First Map Published Date: 1923 Last Map Published Date: Not Applicable	A13SE (SE)	99	-	443584 385715
44	**Extractive Industries or Potential Excavations from 1924-1949** Use: Railway Embankment First Map Published Date: 1935 Last Map Published Date: Not Applicable	A13NE (NE)	0	-	443522 385972
45	**Extractive Industries or Potential Excavations from 1924-1949** Use: Sewage Works (Sheffield Corporation) First Map Published Date: 1935 Last Map Published Date: Not Applicable	A13SW (NW)	0	-	443381 385898
46	**Extractive Industries or Potential Excavations from 1924-1949** Use: Filter Beds First Map Published Date: 1935 Last Map Published Date: Not Applicable	A13NE (NE)	0	-	443409 385923

Historical Land Use Information (1:2,500)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
47	**Extractive Industries or Potential Excavations from 1924-1949** Use: Unspecified Deposited Material First Map Published Date: 1935 Last Map Published Date: Not Applicable	A13SW (W)	1	-	443210 385856
48	**Extractive Industries or Potential Excavations from 1924-1949** Use: Fence Colliery First Map Published Date: 1935 Last Map Published Date: Not Applicable	A13SE (E)	80	-	443672 385799
49	**Extractive Industries or Potential Excavations from 1950-1980** Use: Sludge Beds First Map Published Date: 1956 Last Map Published Date: Not Applicable	A13NW (N)	0	-	443378 385942
50	**Extractive Industries or Potential Excavations from 1950-1980** Use: Railway Embankment First Map Published Date: 1956 Last Map Published Date: Not Applicable	A13NE (NE)	0	-	443522 385974
51	**Extractive Industries or Potential Excavations from 1950-1980** Use: Sewage Works (Sheffield Corporation) First Map Published Date: 1956 Last Map Published Date: Not Applicable	A13SW (NW)	0	-	443381 385898
52	**Extractive Industries or Potential Excavations from 1950-1980** Use: Filter Bed First Map Published Date: 1956 Last Map Published Date: N/A	A13NE (NE)	0	-	443417 385934
53	**Extractive Industries or Potential Excavations from 1950-1980** Use: Filter Bed First Map Published Date: 1956 Last Map Published Date: N/A	A13NW (NW)	0	-	443230 385978
54	**Extractive Industries or Potential Excavations from 1950-1980** Use: Opencast Coal Workings First Map Published Date: 1956 Last Map Published Date: N/A	A13NE (NE)	72	-	443588 386017
55	**Extractive Industries or Potential Excavations from 1950-1980** Use: Unspecified Deposited Material First Map Published Date: 1956 Last Map Published Date: N/A	A13NE (N)	87	-	443469 386195
56	**Extractive Industries or Potential Excavations from 1950-1980** Use: Pond First Map Published Date: 1956 Last Map Published Date: N/A	A13NE (N)	98	-	443476 386205
57	**Extractive Industries or Potential Excavations from 1950-1980** Use: Unspecified Deposited Material First Map Published Date: 1956 Last Map Published Date: N/A	A13SE (SE)	99	-	443510 385684

Historical Land Use Information (1:10,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
58	**Air Shafts** Use: Not Supplied Date of Mapping: 1855	A8NW (SW)	158	-	443165 385566
59	**Air Shafts** Use: Not Supplied Date of Mapping: 1855	A12SE (W)	396	-	442819 385721
60	**General Quarrying** Use: Not Supplied Date of Mapping: 1855	A12NW (W)	693	-	442513 386040
61	**General Quarrying** Use: Not Supplied Date of Mapping: 1855	A19SE (NE)	905	-	444349 386364
62	**Heap, unknown constituents** Use: Not Supplied Date of Mapping: 1996	A13NE (N)	101	-	443457 386211
63	**Heap, unknown constituents** Use: Not Supplied Date of Mapping: 1996	A13NW (N)	164	-	443287 386237
64	**Heap, unknown constituents** Use: Not Supplied Date of Mapping: 1996	A18NW (N)	774	-	443116 386810
65	**Mineral Railway** Use: Not Supplied Date of Mapping: 1855	A8NW (SW)	143	-	443204 385569
66	**Mineral Railway** Use: Not Supplied Date of Mapping: 1894 - 1956	A8SE (S)	771	-	443407 384960
67	**Mining & quarrying general** Use: Not Supplied Date of Mapping: 1855	A8NE (S)	467	-	443429 385276
68	**Mining & quarrying general** Use: Not Supplied Date of Mapping: 1894	A8SE (S)	564	-	443497 385194
69	**Mining & quarrying general** Use: Not Supplied Date of Mapping: 1924	A3NE (S)	986	-	443612 384788
70	**Mining of coal & lignite** Use: Not Supplied Date of Mapping: 1894 - 1948	A13SE (E)	27	-	443631 385837
71	**Mining of coal & lignite** Use: Not Supplied Date of Mapping: 1938 - 1956	A13NW (NW)	85	-	443241 386132
72	**Mining of coal & lignite** Use: Not Supplied Date of Mapping: 1855	A8NW (SW)	142	-	443195 385572
73	**Mining of coal & lignite** Use: Not Supplied Date of Mapping: 1855	A12SE (W)	333	-	442881 385749
74	**Mining of coal & lignite** Use: Not Supplied Date of Mapping: 1894	A8SW (S)	732	-	443326 384985
75	**Mining of coal & lignite** Use: Not Supplied Date of Mapping: 1938 - 1956	A23SW (N)	959	-	443098 387000
76	**Quarrying of sand & clay, operation of sand & gravel pits** Use: Not Supplied Date of Mapping: 1855	A19SE (NE)	679	-	444141 386272
77	**Former Marshes** Use: Former Marsh Date of Mapping: 1956	A8NE (SE)	353	-	443625 385457
78	**Former Marshes** Use: Former Marsh Date of Mapping: 1956	A8NE (S)	485	-	443541 385287

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
79	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A13SE (E)	18	-	443613 385867
80	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A8NW (SW)	142	-	443195 385572
81	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A8NW (SW)	158	-	443165 385566
82	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A12SE (SW)	176	-	443054 385671
83	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A12SE (W)	333	-	442881 385749
84	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A12SE (W)	396	-	442819 385721
85	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A8NE (S)	467	-	443429 385276
86	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A19SE (NE)	679	-	444141 386272
87	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A12NW (W)	693	-	442513 386040
88	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A8SW (S)	732	-	443326 384985
89	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A19SE (NE)	905	-	444349 386364
90	**Potentially Infilled Land (Non-Water)** Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1996	A3NE (S)	986	-	443612 384788
91	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13SW (S)	0	-	443384 385813
92	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13SW (W)	0	-	443213 385868
93	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13SW (S)	0	-	443358 385746
94	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13SE (S)	28	-	443420 385728
95	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1950	A12SE (W)	303	-	442912 385776
96	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8NE (S)	353	-	443517 385418
97	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8NE (SE)	396	-	443634 385413
98	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8NE (SE)	507	-	443661 385301
99	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8NE (SE)	540	-	443684 385279

Historical Land Use Information (1:10,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
100	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8SE (S)	556	-	443567 385220
101	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A9SW (SE)	612	-	443758 385232
102	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A12NW (W)	666	-	442534 385971
103	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1924	A9SW (SE)	677	-	443906 385234
104	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1924	A8SE (S)	679	-	443423 385059
105	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8SE (S)	697	-	443445 385044
106	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A7NW (SW)	855	-	442432 385394
107	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A9SW (SE)	901	-	443900 384980
108	**Potentially Infilled Land (Water)** Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A11NE (W)	941	-	442294 386199

Ground Stability Data (1:50,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	CBSCB Compensation District The site does not fall within the brine compensation area.				
	Brine Subsidence Solution Area The site does not fall within the brine subsidence solution area.				
109	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	443194 385880
110	**Potential for Collapsible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	0	1	443547 385797
	Potential for Collapsible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
111	**Potential for Compressible Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
112	**Potential for Compressible Ground Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	72	1	443126 385881
113	**Potential for Compressible Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	89	1	443442 386200
114	**Potential for Compressible Ground Stability Hazards** Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	103	1	443599 386086
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	443194 385880
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	0	1	443547 385797
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
115	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
116	**Potential for Landslide Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	183	1	443276 386234
117	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898
118	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	72	1	443126 385881
119	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	89	1	443442 386200
120	**Potential for Running Sand Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	103	1	443599 386086
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	0	1	443547 385797
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	1	443194 385880
121	**Potential for Shrinking or Swelling Clay Ground Stability Hazards** Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	0	1	443381 385898

Ground Stability Data (1:50,000)

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	0	1	443336 385839
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (N)	0	1	443399 386081
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	32	1	443287 386075
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	193	1	443629 386191

The following mapping has been analysed for Historical Land Use Information (1:2,500):

1:2,500	Mapsheet	Published Date
Derbyshire	012_04	1877
Yorkshire	295_11	1892
Derbyshire	012_04	1898
Yorkshire	295_11	1903
Derbyshire	012_04	1923
Yorkshire	295_11	1923
Yorkshire	295_11	1935
Ordnance Survey Plan	SK4385	1956
Ordnance Survey Plan	SK4386	1956

The following mapping has been analysed for Historical Land Use Information (1:10,000):

1:10,560	Mapsheet	Published Date
Yorkshire	295_00	1855
Yorkshire	295_NE	1893
Derbyshire	012_NE	1894
Yorkshire	295_NW	1894
Yorkshire	295_SE	1894
Yorkshire	295_SW	1894
Derbyshire	013_NW	1895
Derbyshire	012_NE	1899
Derbyshire	013_NW	1900
Yorkshire	295_NE	1904
Yorkshire	295_NW	1906
Yorkshire	295_SW	1906
Derbyshire	012_NE	1924
Derbyshire	013_00	1924
Yorkshire	295_SE	1924
Yorkshire	295_NE	1938
Yorkshire	295_SE	1938
Yorkshire	295_SW	1938
Yorkshire	295_NW	1948
Derbyshire	012_NE	1950
Derbyshire	013_NW	1951
Ordnance Survey Plan	SK48NW	1956
Ordnance Survey Plan	SK48SW	1956
1:10,000	**Mapsheet**	**Published Date**
Ordnance Survey Plan	SK48NW	1996
Ordnance Survey Plan	SK48SW	1996

Data Currency

Mining and Cavities Data	Version	Update Cycle
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	June 2020	Bi-Annually
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	Annual Rolling Update
Man Made Mining Cavities Stantec UK Ltd	October 2020	Bi-Annually
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Natural Cavities Stantec UK Ltd	October 2020	Bi-Annually
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Historical Land Use Information (1:2,500)	**Version**	**Update Cycle**
Subterranean Features Landmark Information Group Limited	February 2020	Bi-Annually
Ground Stability Data (1:50,000)	**Version**	**Update Cycle**
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	April 2020	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	Annually
Brine Subsidence Solution Area Johnson Poole & Bloomer	January 2015	Annual Rolling Update

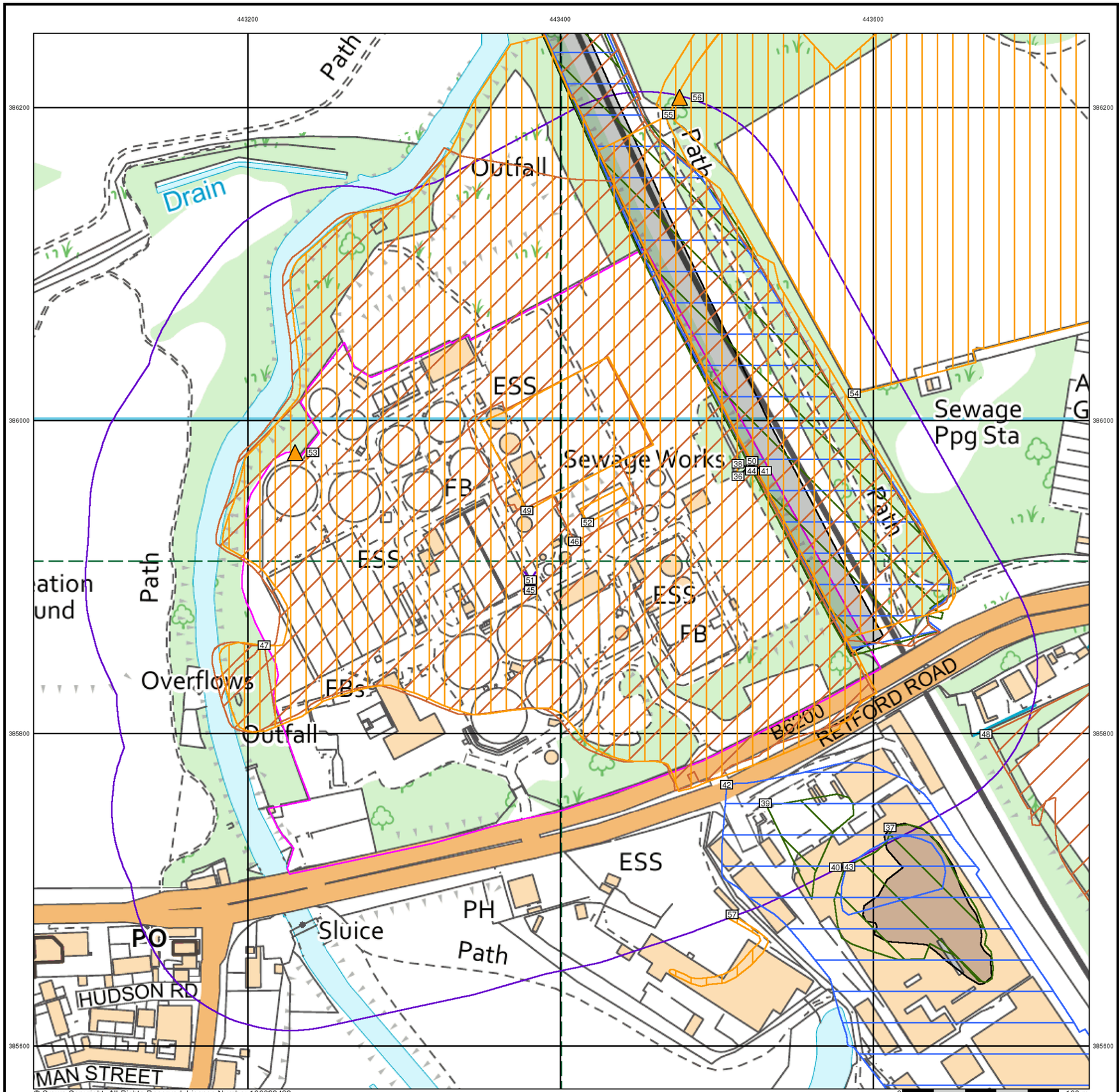
Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
British Geological Survey	
The Coal Authority	
Ove Arup	
Stantec UK Ltd	
Wardell Armstrong	
Johnson Poole & Bloomer	

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	**The Coal Authority - Property Searches** 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0345 762 6848 Fax: 01623 637 338 Email: groundstability@coal.gov.uk Website: www2.groundstability.com
3	**Ove Arup & Partners** Central Square, Forth Street, Newcastle upon Tyne, Tyne and Wear, NE1 3PL	Telephone: 0191 261 6080 Fax: 0191 261 7879
4	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9960 Fax: 0844 844 9951 Email: customerservice@promap.co.uk Website: www.landmarkinfo.co.uk
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk



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Historical Land Use Information (1:2,500)

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID | Several of Type at Location

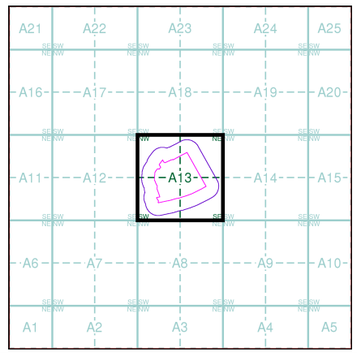
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	▭
Extractive Industries Activity from 1893 - 1915	▲	—	▨
Extractive Industries Activity from 1906 - 1937	▲	—	▦
Extractive Industries Activity from 1924 - 1949	▲	—	▨
Extractive Industries Activity from 1950 - 1980	▲	—	▥

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	- - -	▭

Mining and Ground Stability - Segment A13



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Plot Buffer (m):	100

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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Geology 1:50,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WMGR	Infilled Ground	Artificial Deposit	Not Supplied - Holocene
	MGR	Made Ground (Undivided)	Artificial Deposit	Not Supplied - Holocene
	WGR	Worked Ground (Undivided)	Void	Not Supplied - Holocene

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Gravel, Sand, Silt and Clay	Not Supplied - Holocene
	HEAD	Head	Clay, Silt, Sand and Gravel	Not Supplied - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MXR	Mexborough Rock	Sandstone	Not Supplied - Westphalian
	PMCM	Pennine Middle Coal Measures Formation	Mudstone, Siltstone and Sandstone	Not Supplied - Westphalian
	PMCM	Pennine Middle Coal Measures Formation	Sandstone	Not Supplied - Westphalian
	OR	Oaks Rock	Sandstone	Not Supplied - Westphalian
	PLCM	Pennine Lower Coal Measures Formation	Mudstone and Siltstone	Not Supplied - Westphalian
		Faults		
		Rock Segments		

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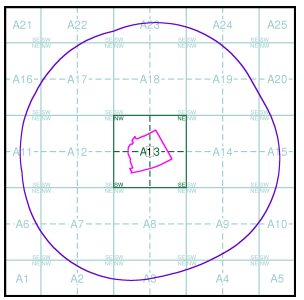
Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID: 1
Map Sheet No: 100
Map Name: Sheffield
Map Date: 2011
Bedrock Geology: Available
Superficial Geology: Available
Artificial Geology: Available
Faults: Not Supplied
Landslip: Available
Rock Segments: Not Supplied

Geology 1:50,000 Maps - Slice A

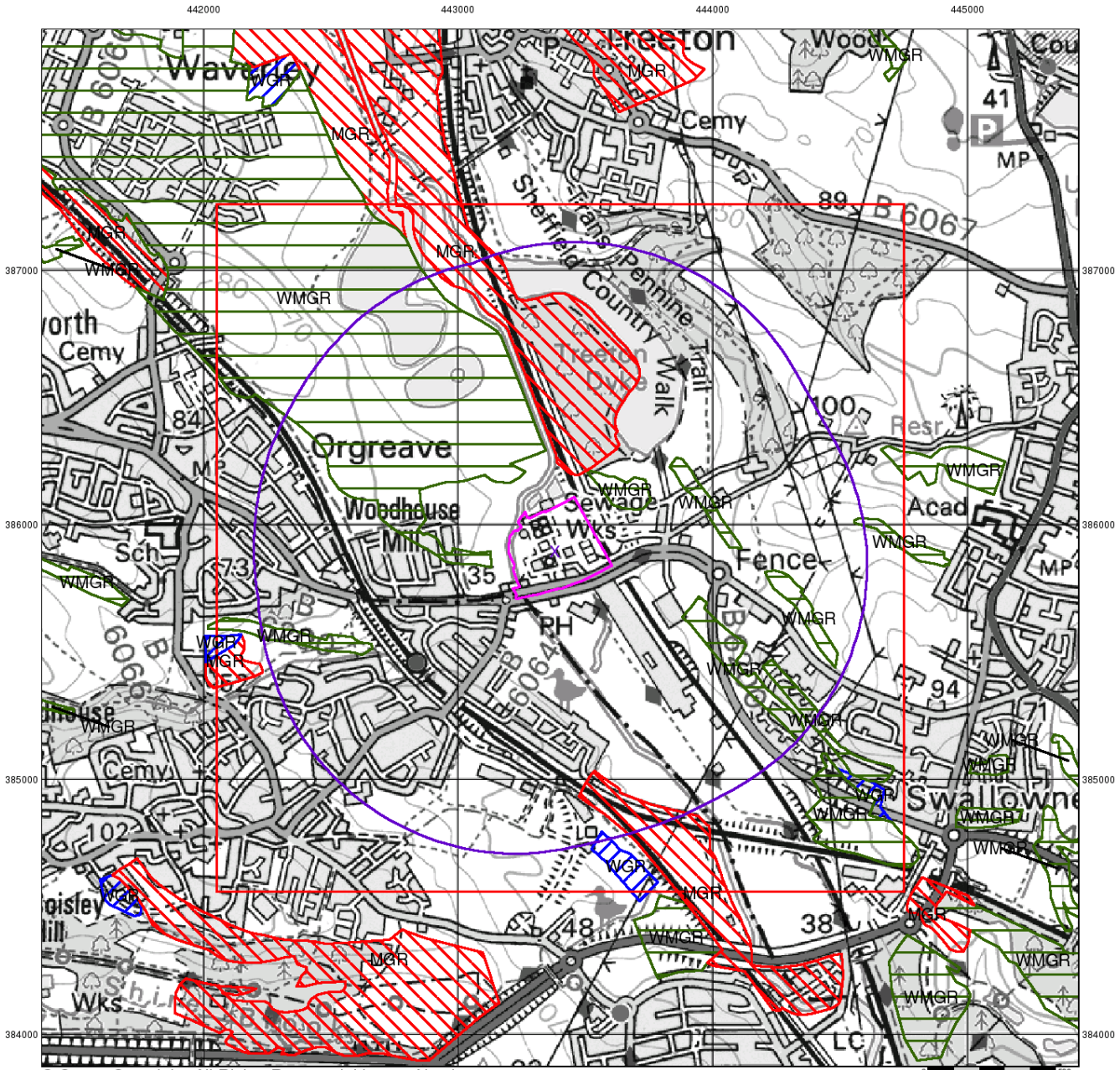


Order Details:

Order Number: 261993045_1_1
Customer Reference: 41527254
National Grid Reference: 443380, 385900
Slice: A
Site Area (Ha): 10.21
Search Buffer (m): 1000

Site Details:

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG



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Artificial Ground and Landslip

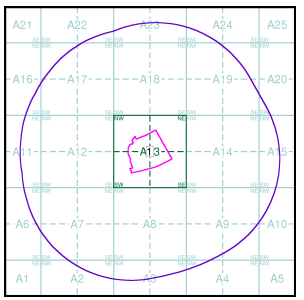
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



Order Details:

Order Number:	261993045_1_1
Customer Reference:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details:

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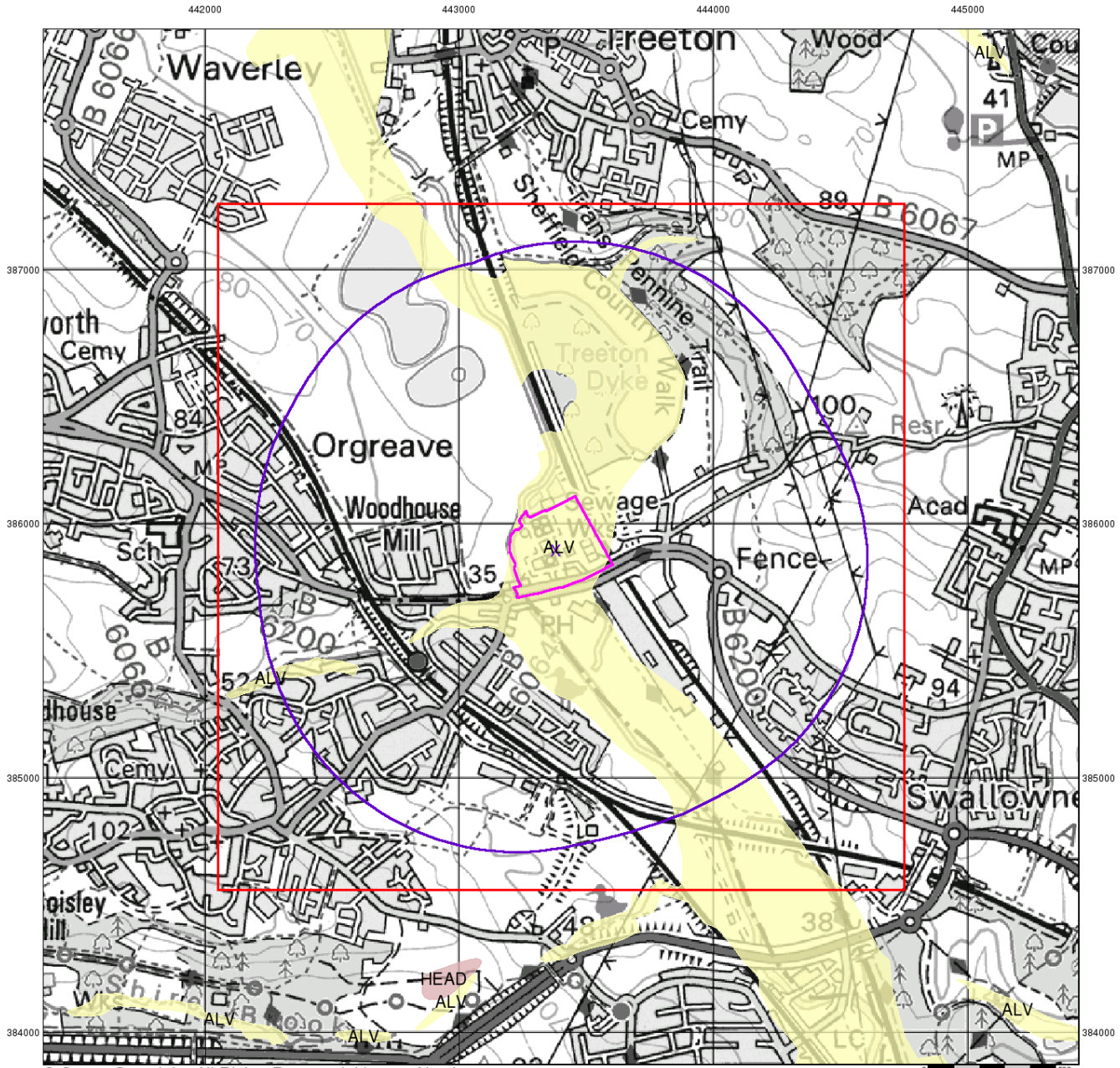

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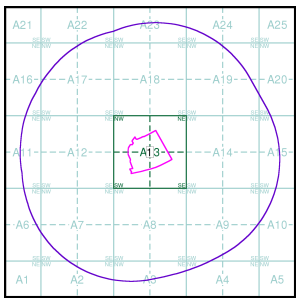
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



Order Details:

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National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
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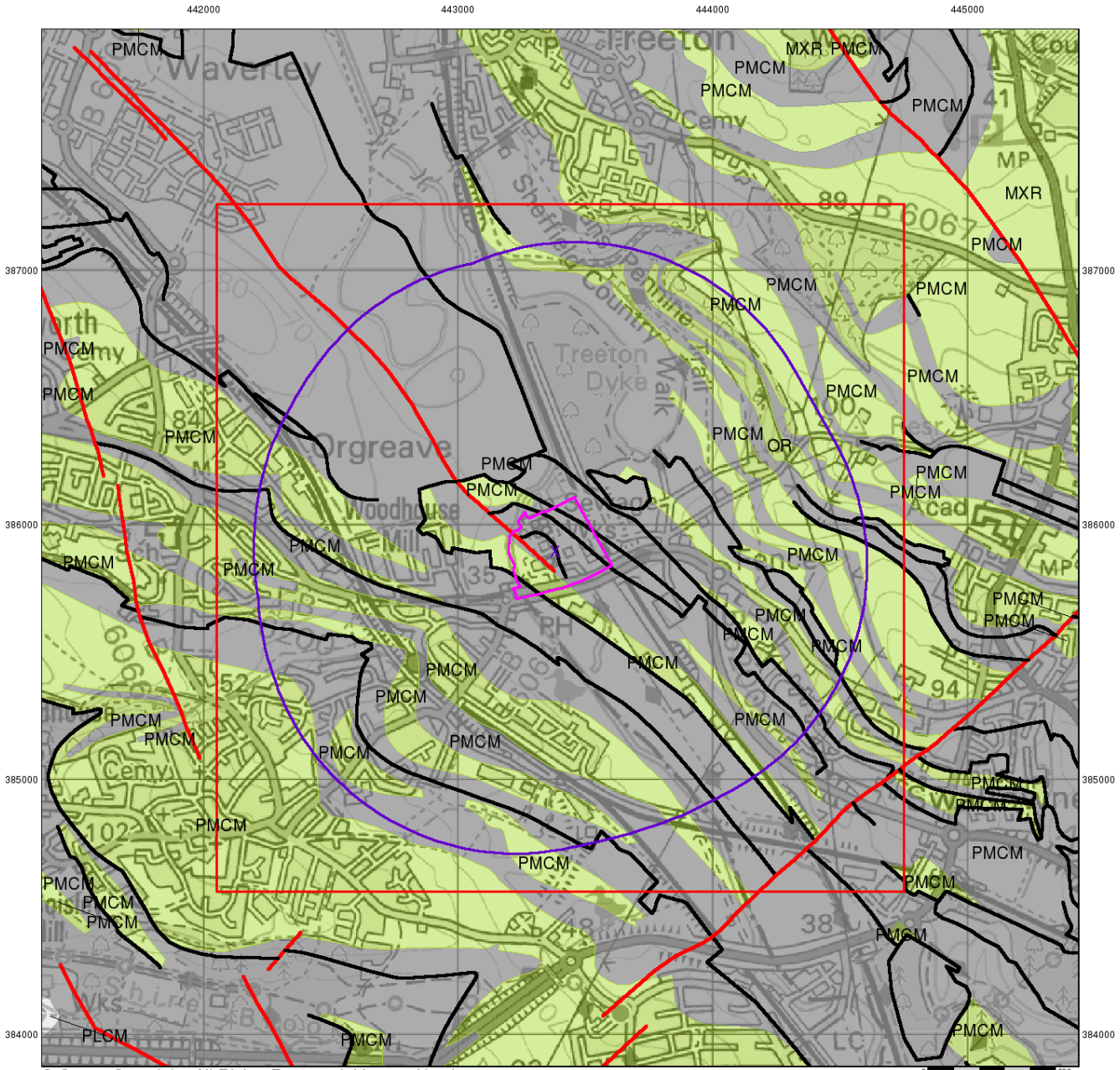

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Bedrock and Faults

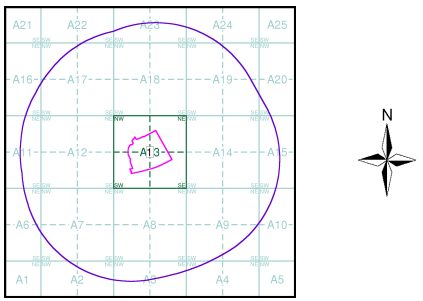
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



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Customer Reference:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
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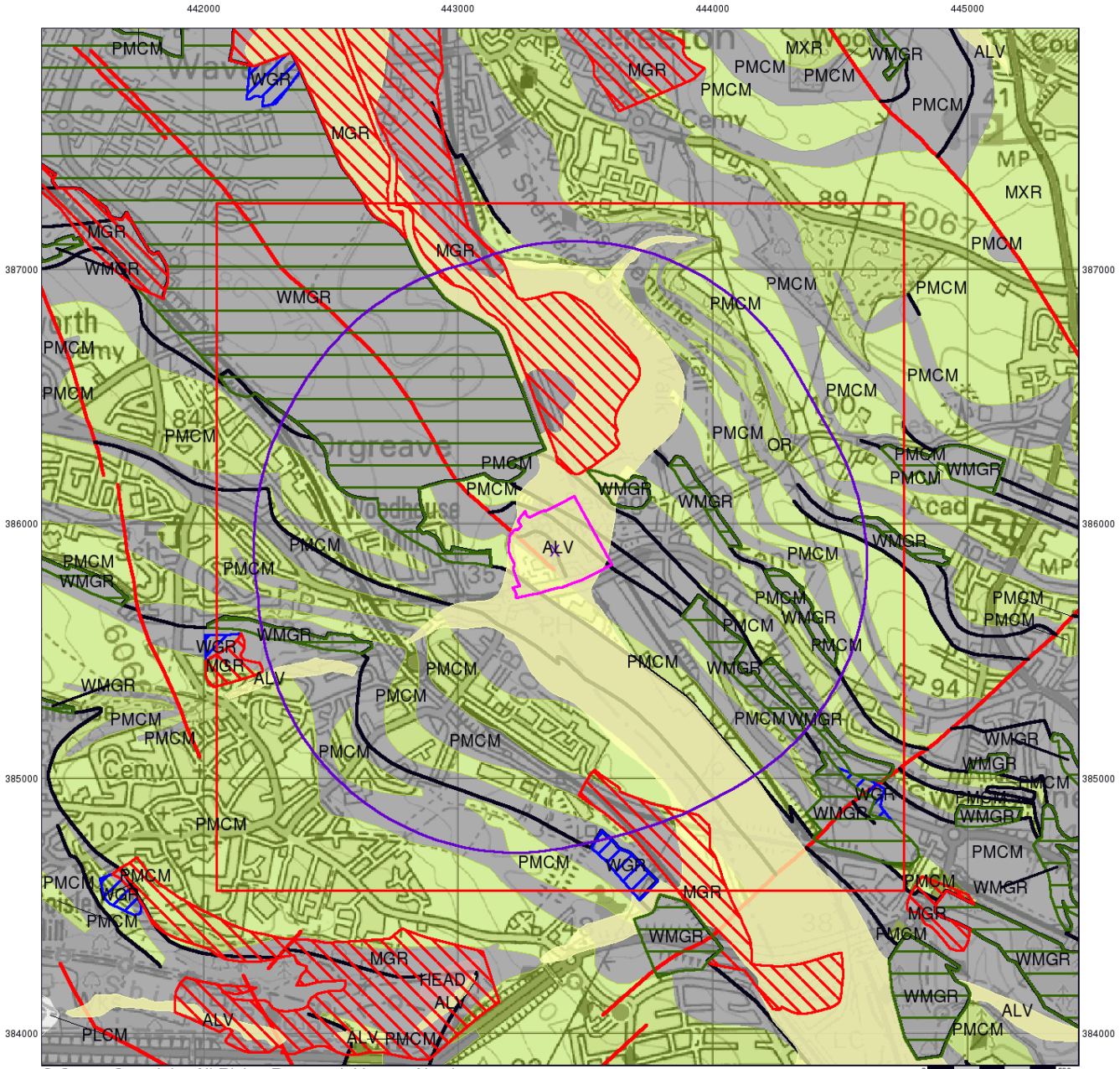

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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

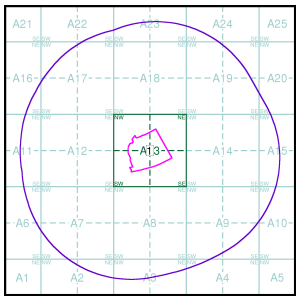
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number:	261993045_1_1
Customer Reference:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details:

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. Rural District Boundary
Civil Parish Boundary

Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Pylon
Electricity Transmission Line
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
Standard Gauge Single Track
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping

Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

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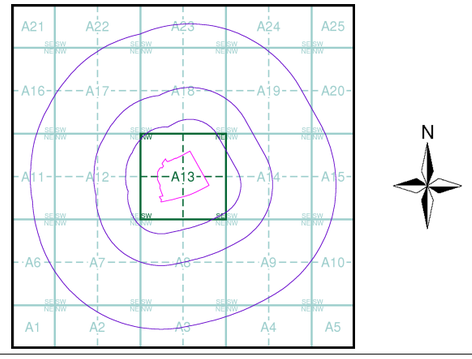
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:10,560	1855	3
Derbyshire	1:10,560	1875 - 1882	4
Yorkshire	1:10,560	1893 - 1894	5
Derbyshire	1:10,560	1899 - 1900	6
Yorkshire	1:10,560	1904 - 1906	7
Yorkshire	1:10,560	1924	8
Derbyshire	1:10,560	1924	9
Derbyshire	1:10,560	1924	10
Yorkshire	1:10,560	1935	11
Yorkshire	1:10,560	1938	12
Yorkshire	1:10,560	1938 - 1948	13
Yorkshire	1:10,560	1949	14
Derbyshire	1:10,560	1950 - 1951	15
Ordnance Survey Plan	1:10,000	1956	16
Ordnance Survey Plan	1:10,000	1967	17
Ordnance Survey Plan	1:10,000	1977	18
Sheffield	1:25,000	1977	19
Ordnance Survey Plan	1:10,000	1981 - 1984	20
Ordnance Survey Plan	1:10,000	1990 - 1991	21
Ordnance Survey Plan	1:10,000	1996	22
10K Raster Mapping	1:10,000	2000	23
10K Raster Mapping	1:10,000	2006	24
VectorMap Local	1:10,000	2020	25

Historical Map - Slice A



Order Details

Order Number: 261993045_1_1
Customer Ref: 41527254
National Grid Reference: 443380, 385900
Slice: A
Site Area (Ha): 10.21
Search Buffer (m): 1000

Site Details

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Web: www.envirocheck.co.uk

Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Fireproof Building
- Prominent Fireproof Building
- Non-fireproof Building
- Non-fireproof Building (non-dwelling)
- Factory, mill, and flour mill, with chimneys
- Factory, mill, and flour mill, without chimneys
- Power Station, drawn to scale
- Hydroelectric Power Station
- Radio Station, drawn to scale
- Telephone Station, drawn to scale
- Abandoned Open-pit Mine or Quarry
- Open-pit Salt Mine
- Pit
- Oil Deposit or Well
- Oil Seepage
- Tailings Pile
- Fuel Storage Tanks
- Natural Gas Tank
- Bench Mark
- Drill Hole
- Burial Mound
- Triangulation Point on Burial Mound
- Single-track Railroad
- Double-track Railroad and Station Building
- Coniferous Forest
- Deciduous Forest
- Mixed Forest
- Lawns
- Citrus Orchard
- Wet Ground
- Scattered Vegetation

243,8 Values for prominent elevations

186.0 Numbers for spot elevations, depth soundings, contour lines, etc.

0,2 Velocity of the current, width of river bed, depth of river

Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A)	З з (Z)	П п (P)	Ч ч (CH)
Б б (B)	И и (I)	Р р (R)	Ш ш (SH)
В в (V)	Й й (Y)	С с (S)	Щ щ (SHCH)
Г г (G)	К к (K)	Т т (T)	ъ (–)
Д д (D)	Л л (L)	У у (U)	ы (Y)
Е е (E)	М м (M)	Ф ф (F)	ь (')
Ё ё (YO)	Н н (N)	Х х (KH)	Э э (E)
Ж ж (ZH)	О о (O)	Ц ц (TS)	Ю ю (YU or IU)
			Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Partly Demolished Buildings
- Demolished Buildings
- Built-Up Area with Fireproof Buildings Predominant
- Built-Up Area with Non-Fireproof Buildings Predominant
- Individual Fireproof Building
- Prominent Industrial Building
- Individual Dwelling, Fireproof
- Ruins of an Individual Dwelling
- Factory or Mill Chimney
- Factory or Mill with Chimney
- Factory or Mill without Chimney
- Mine or Open Pit Mine
- Operating Shaft or Mine
- Non-Operating Shaft or Mine
- Salt Mine
- Tailings Pile
- Pit
- Stone Quarry
- Gas Pump or Service Station
- Fuel Storage or Natural Gas Tank
- Oil or Natural Gas Derrick
- Small Hydroelectric Power Station
- Power Station
- Transformer Station
- Cemetery
- Burial Mound (height in metres)
- Triangulation Point on Burial Mound
- Triangulation Point
- Bench Mark
- Bench Mark (monumented)
- Telegraph Office
- Telephone Station
- Radio Station
- Radio Tower
- Airfield or Seaplane Base
- Landing Strip
- Main Highway
- Highway under Construction
- Improved Dirt Road (former truck road)
- Double-track Railroad with First Class Station
- Dismantled Railroad
- Railroad Under Construction
- Shore Embankment
- River or Ditch with Embankment
- Well
- Water Reservoir or Rain Water Pit
- Spring
- Isobath with value
- Heavy (Index) Contour Line
- Contour Line and Value
- Half Contour Line
- Spot Elevation Value
- Coniferous
- Deciduous
- Mixed
- Scrub

Key to Numbers on Mapping

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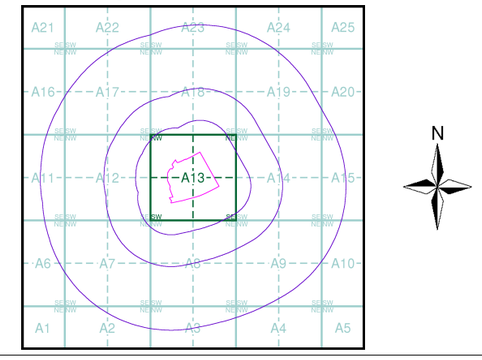
Historical Mapping & Photography included:

Russian Map - Slice A



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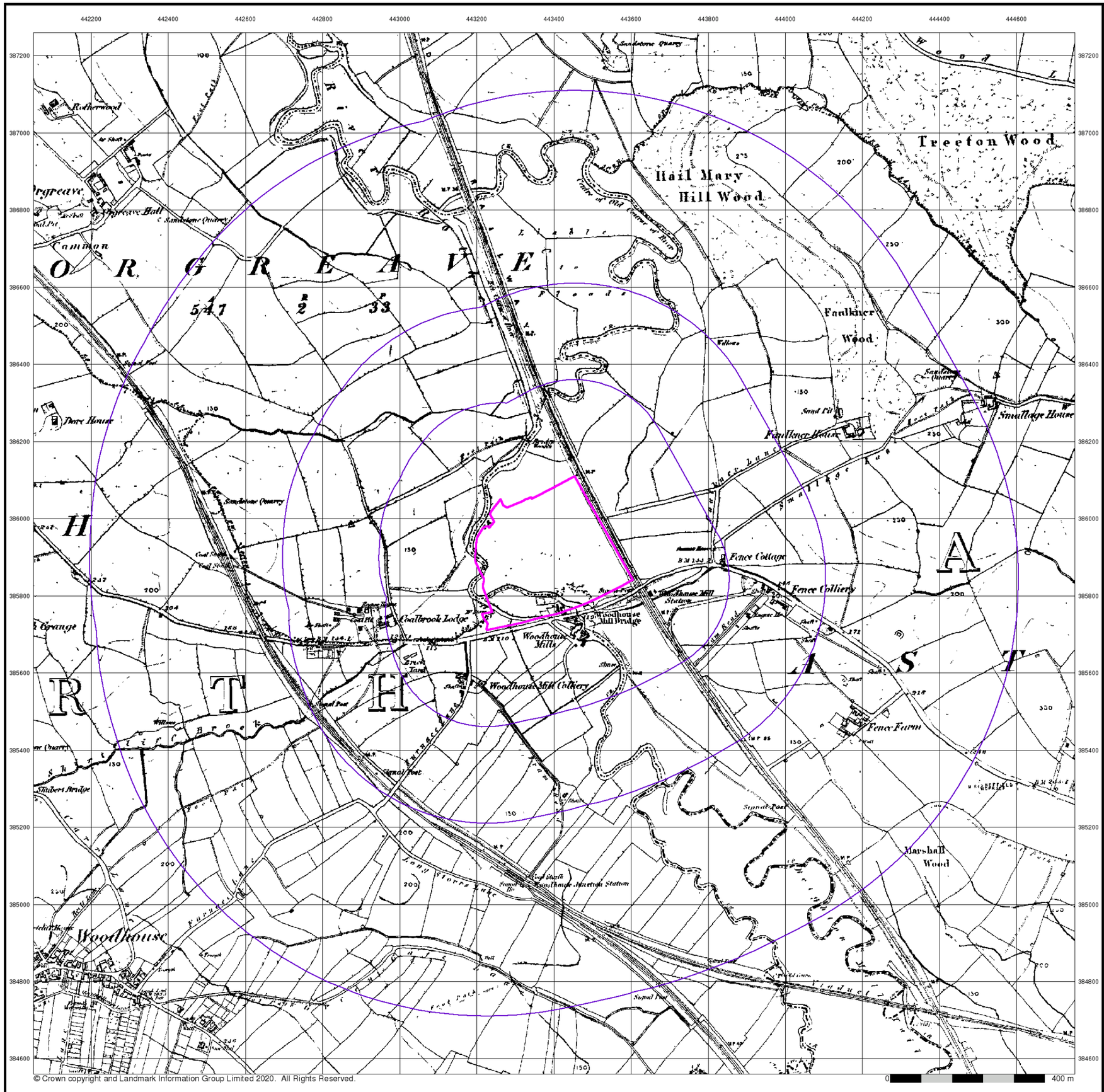

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LANDMARK INFORMATION GROUP®

Yorkshire

Published 1855

Source map scale - 1:10,560

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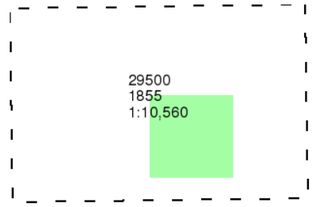
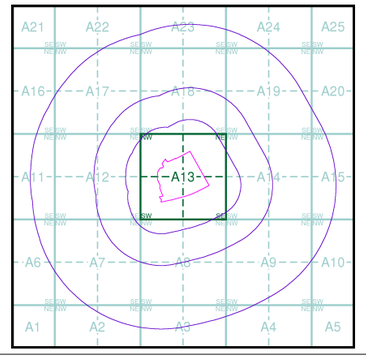
Map Name(s) and Date(s)



Historical Map - Slice A



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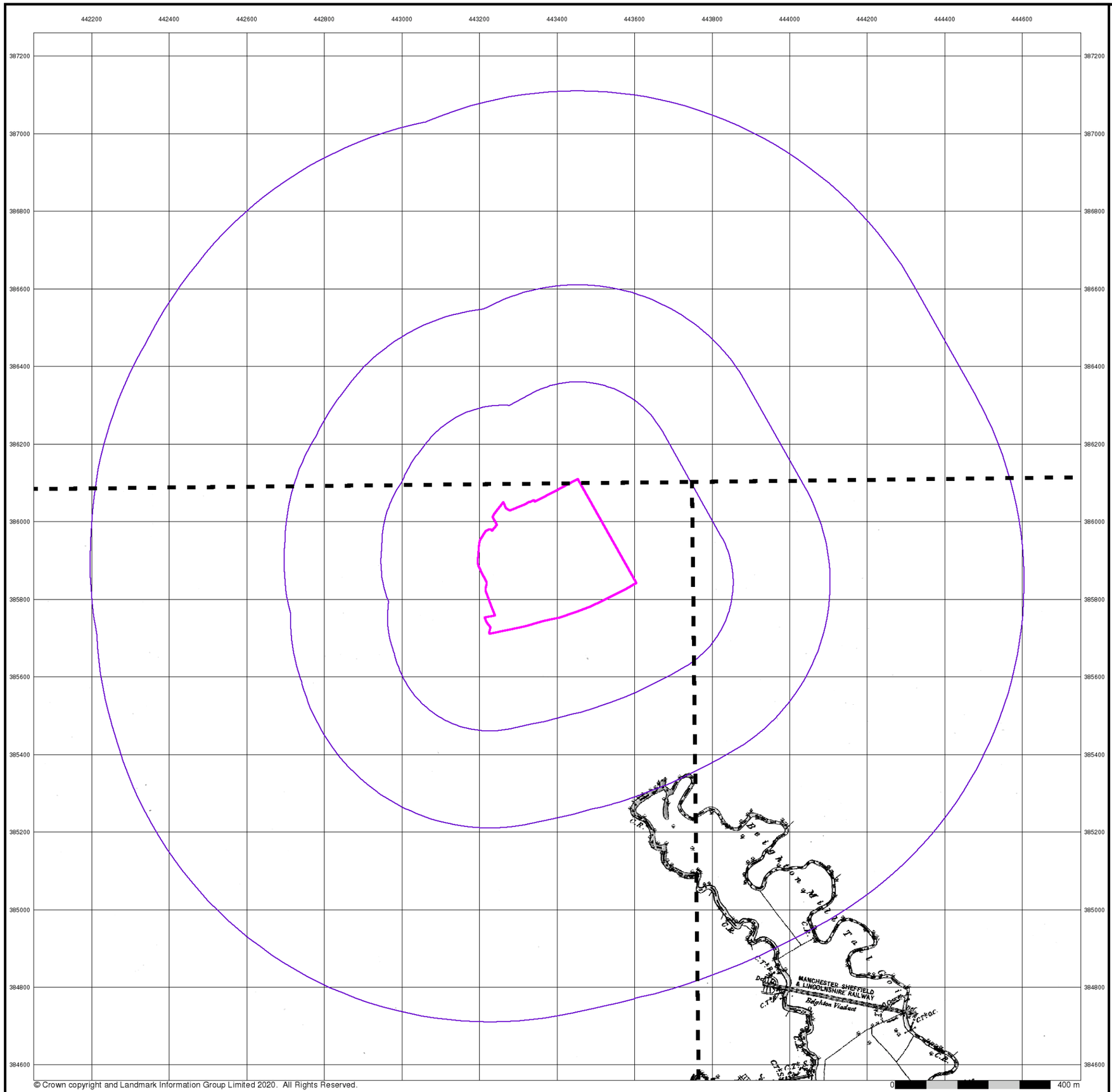

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LANDMARK INFORMATION GROUP®

Derbyshire

Published 1875 - 1882

Source map scale - 1:10,560

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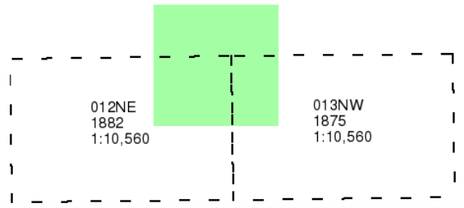
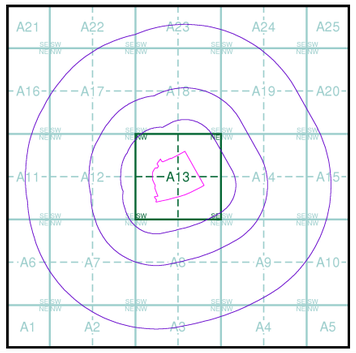


Historical Map - Slice A



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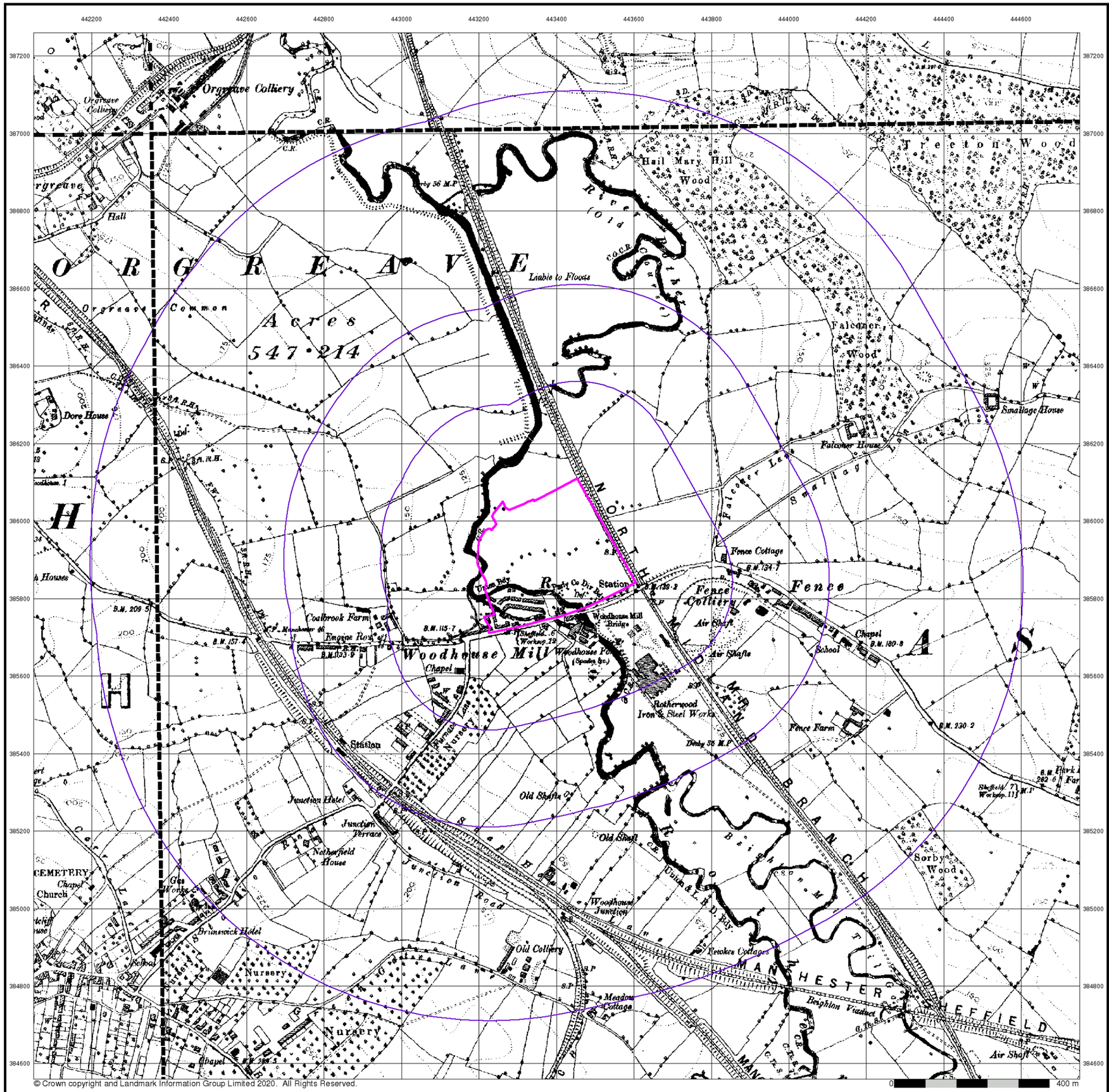

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LANDMARK INFORMATION GROUP®

Yorkshire

Published 1893 - 1894

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

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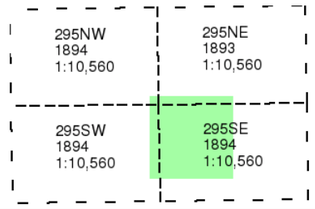
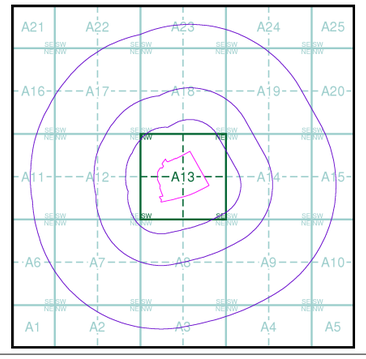


Historical Map - Slice A



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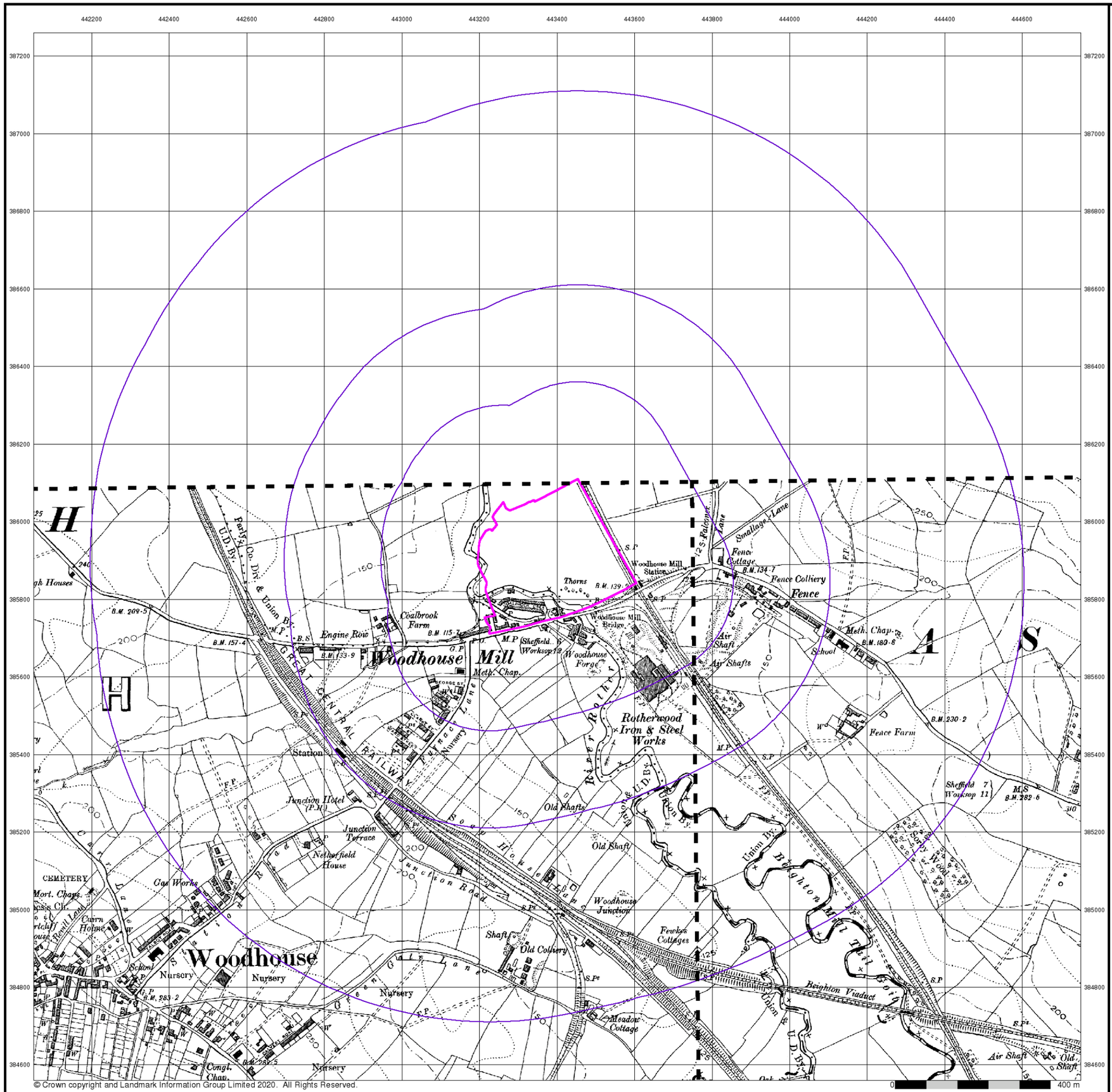

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LANDMARK INFORMATION GROUP®

Derbyshire

Published 1899 - 1900

Source map scale - 1:10,560

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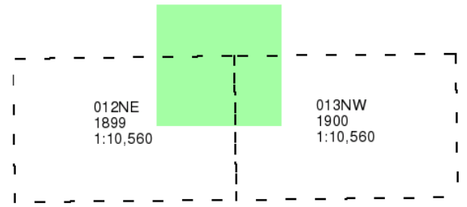
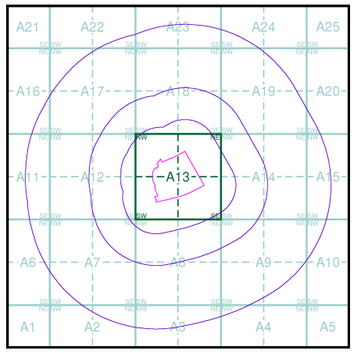


Historical Map - Slice A



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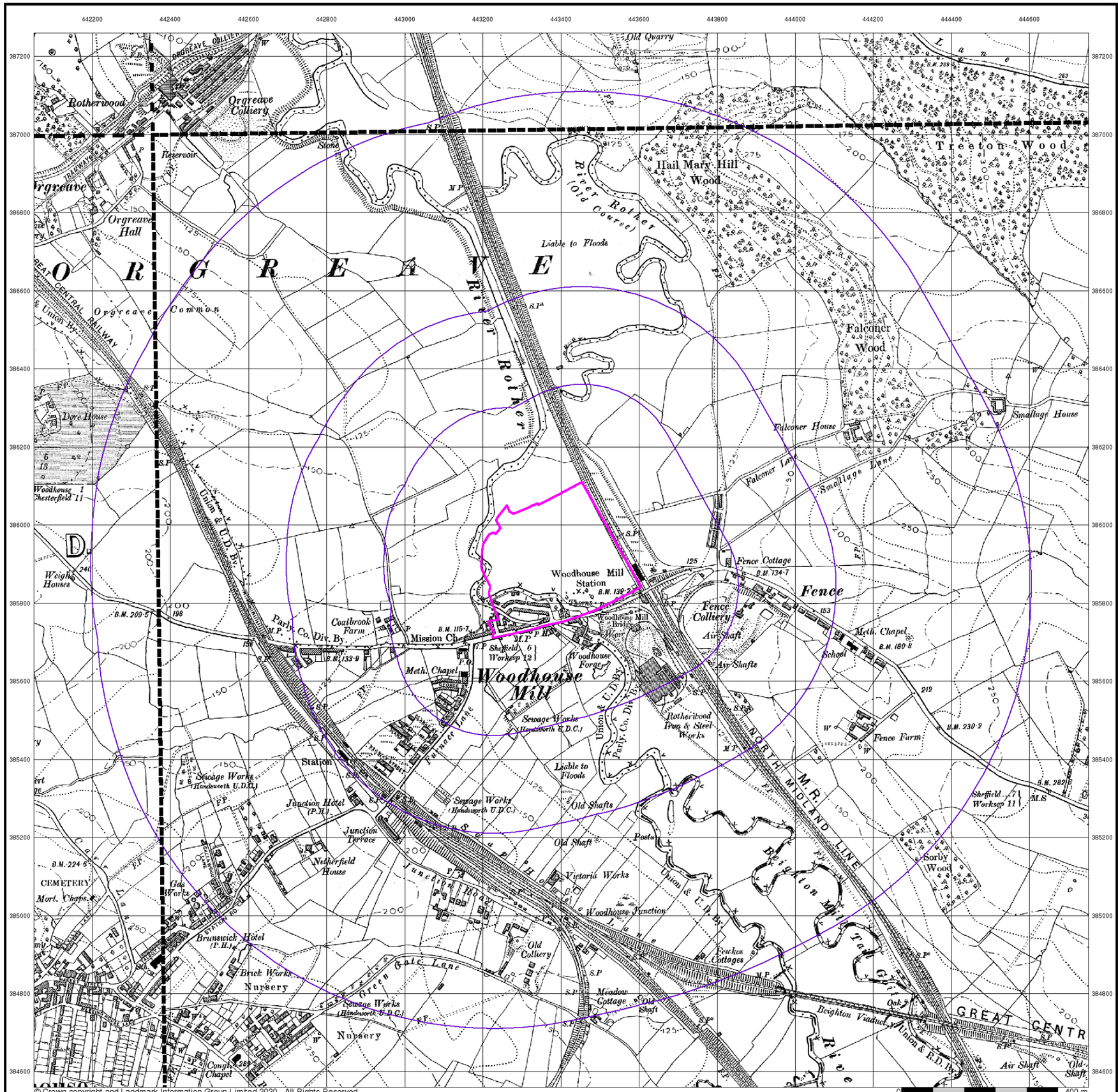

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LANDMARK INFORMATION GROUP®

Yorkshire

Published 1904 - 1906

Source map scale - 1:10,560

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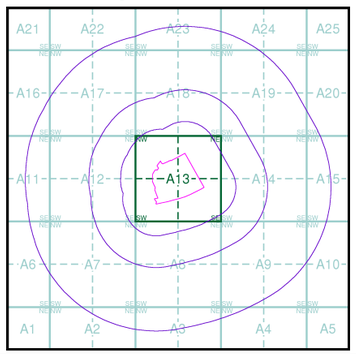
Map Name(s) and Date(s)

295NW 1906 1:10,560	295NE 1904 1:10,560
295SW 1906 1:10,560	295SE 1905 1:10,560

Historical Map - Slice A



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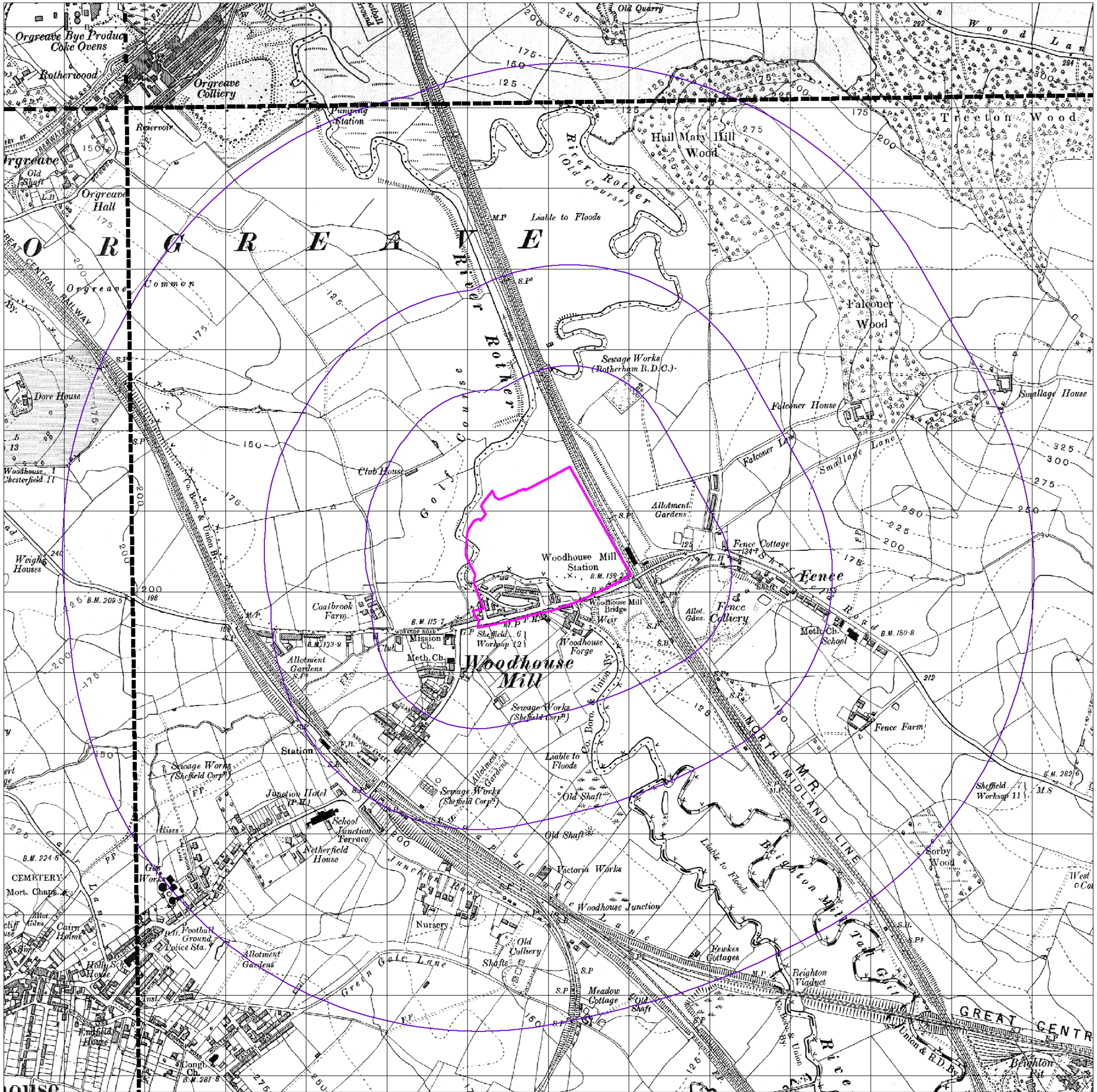

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LANDMARK INFORMATION GROUP®

Yorkshire

Published 1924

Source map scale - 1:10,560

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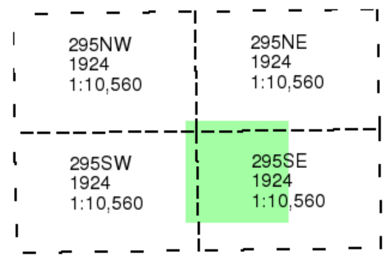
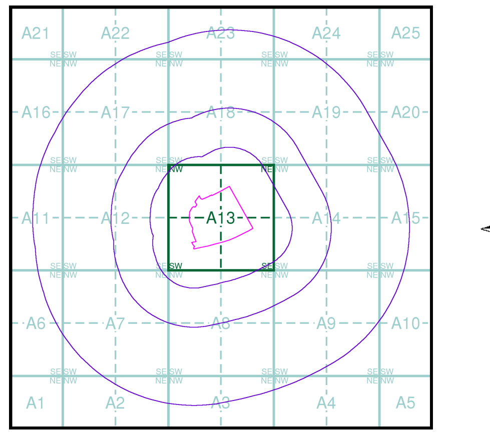
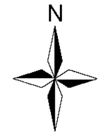


Historical Map - Slice A





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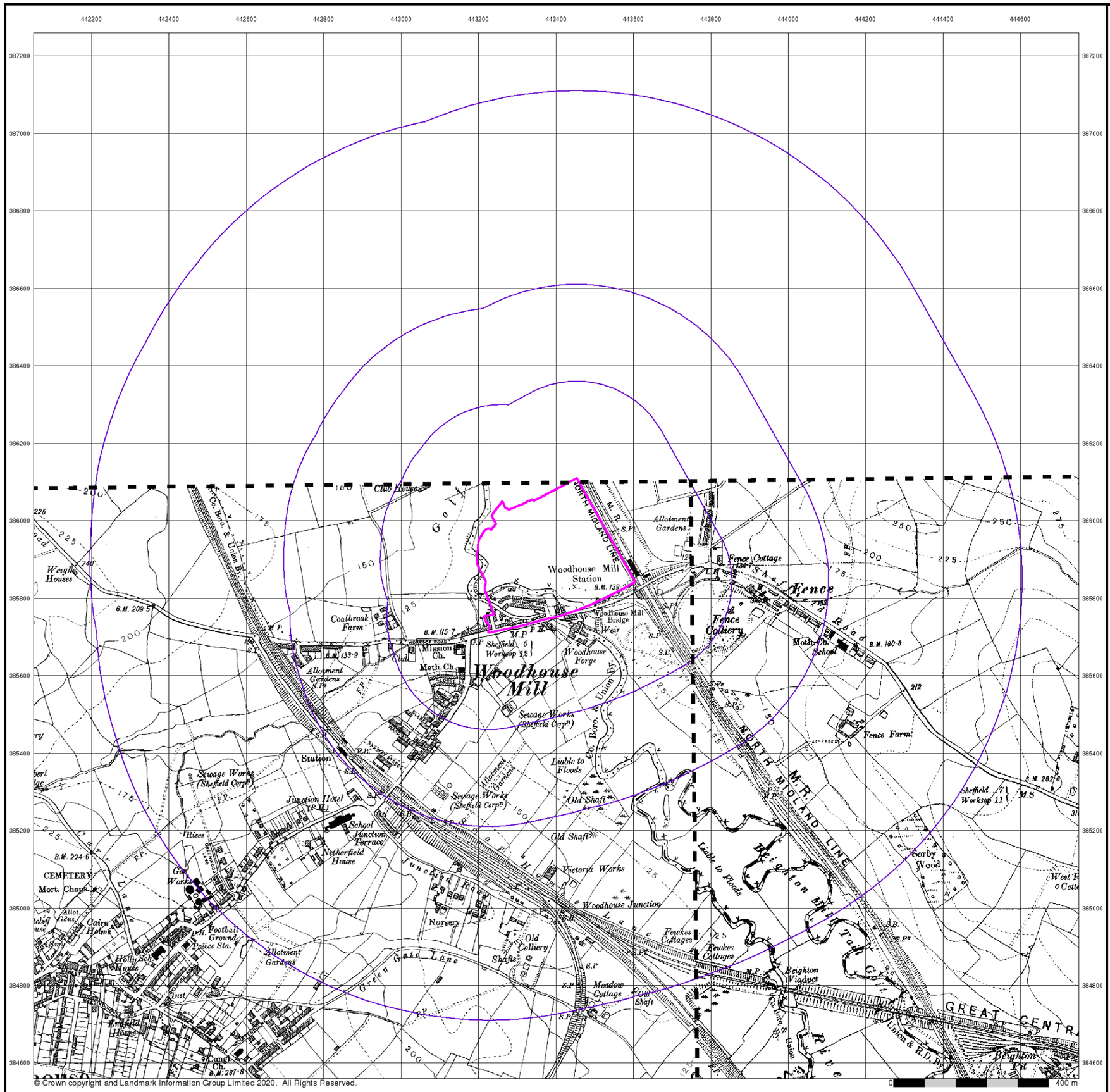

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LANDMARK INFORMATION GROUP®

Derbyshire

Published 1924

Source map scale - 1:10,560

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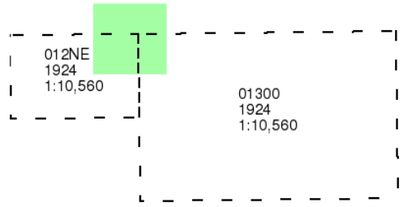
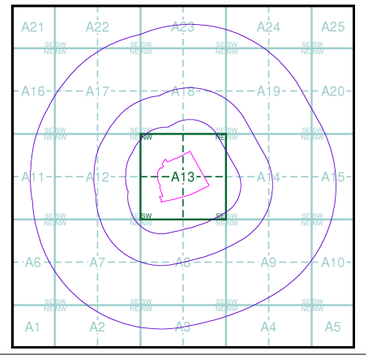


Historical Map - Slice A



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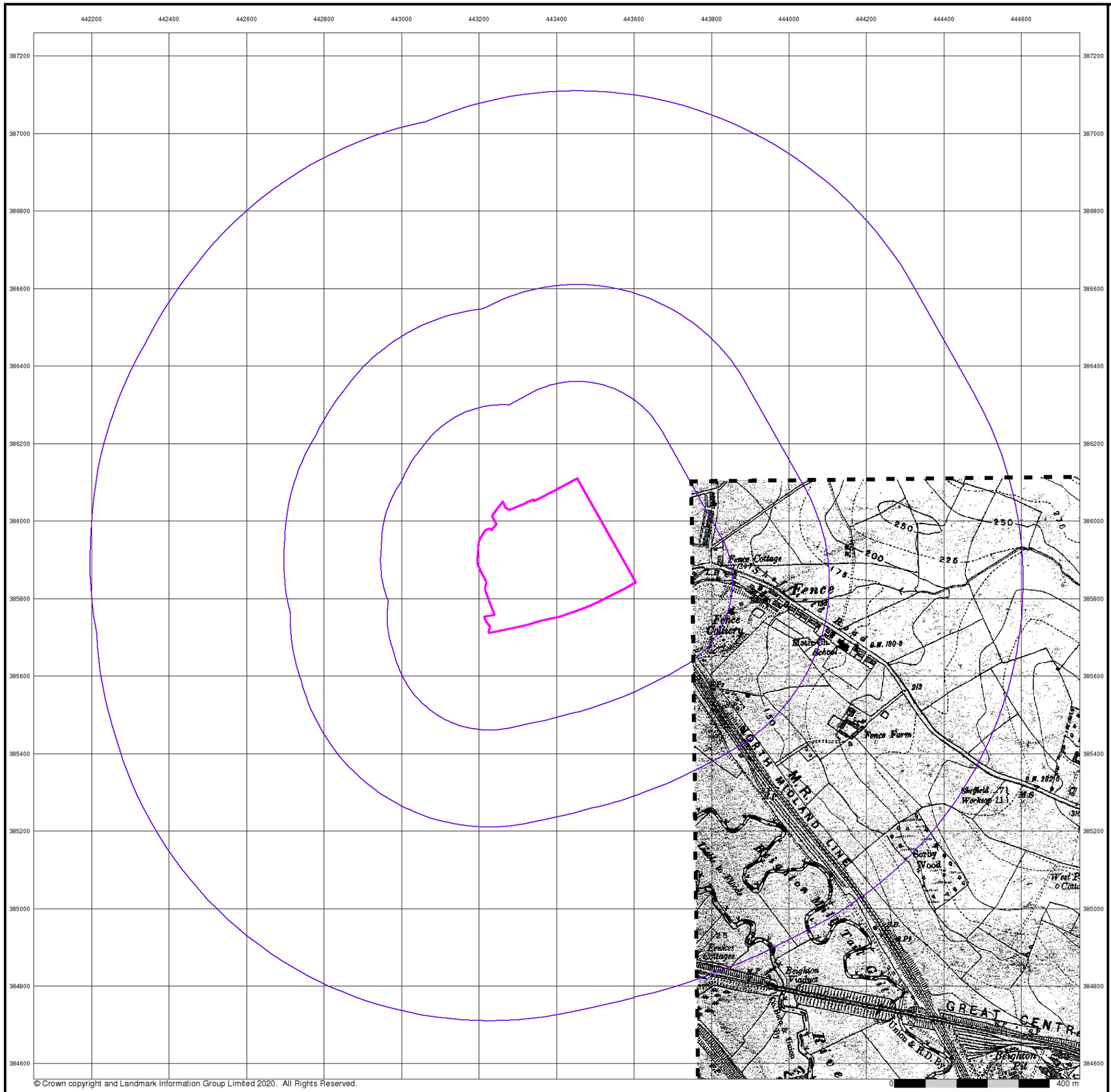

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LANDMARK INFORMATION GROUP®

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Published 1924

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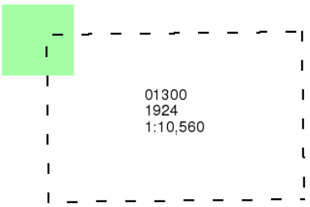
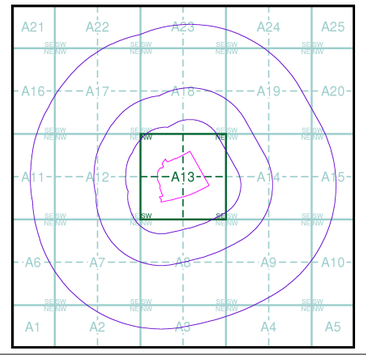


Historical Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

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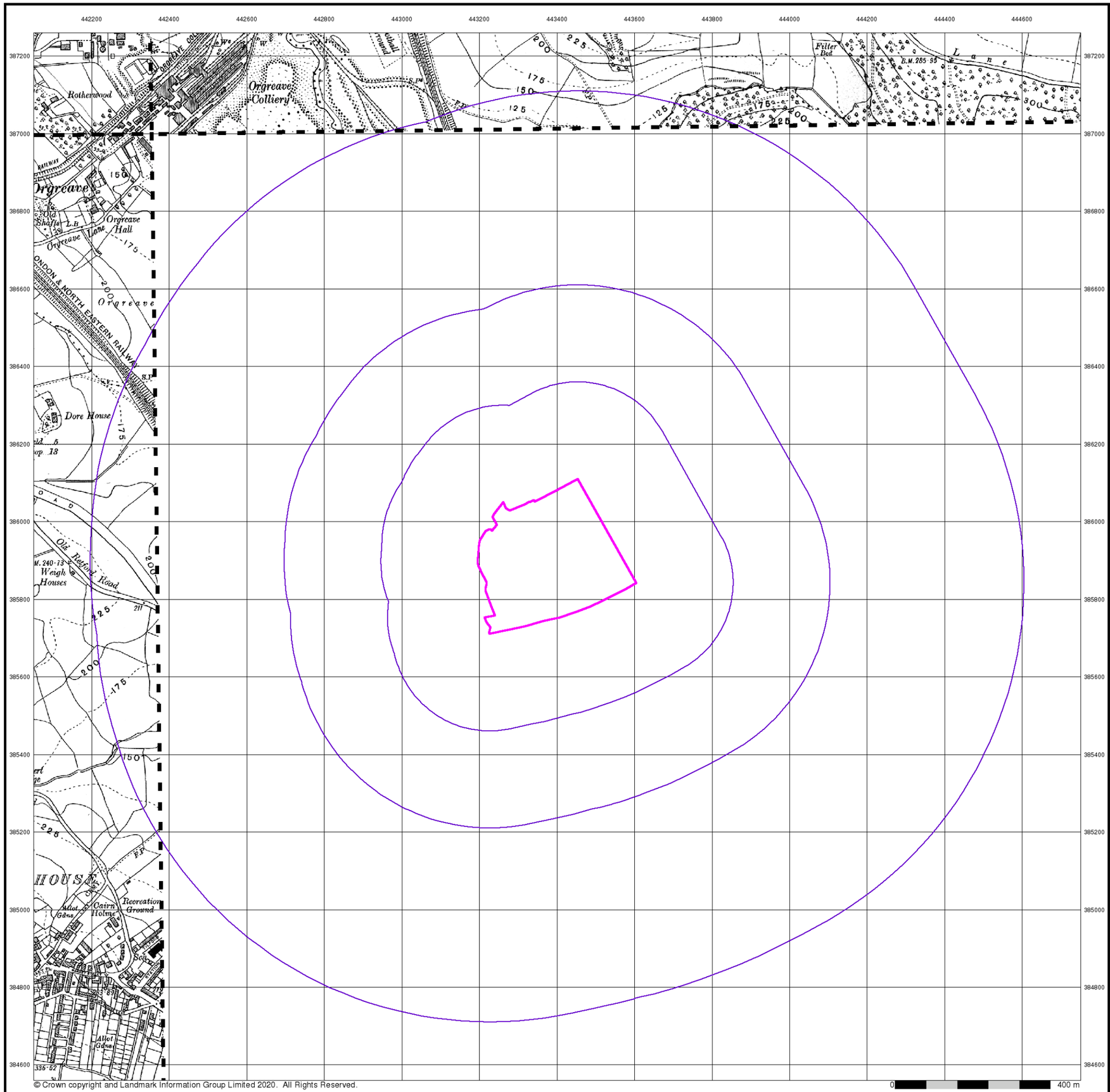

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LANDMARK INFORMATION GROUP®

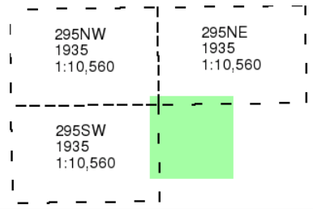
Yorkshire

Published 1935

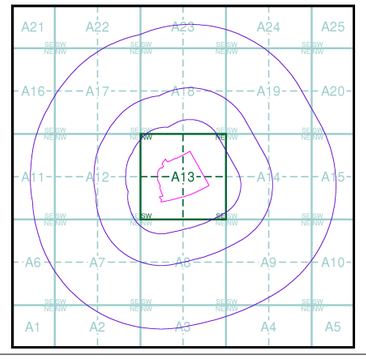
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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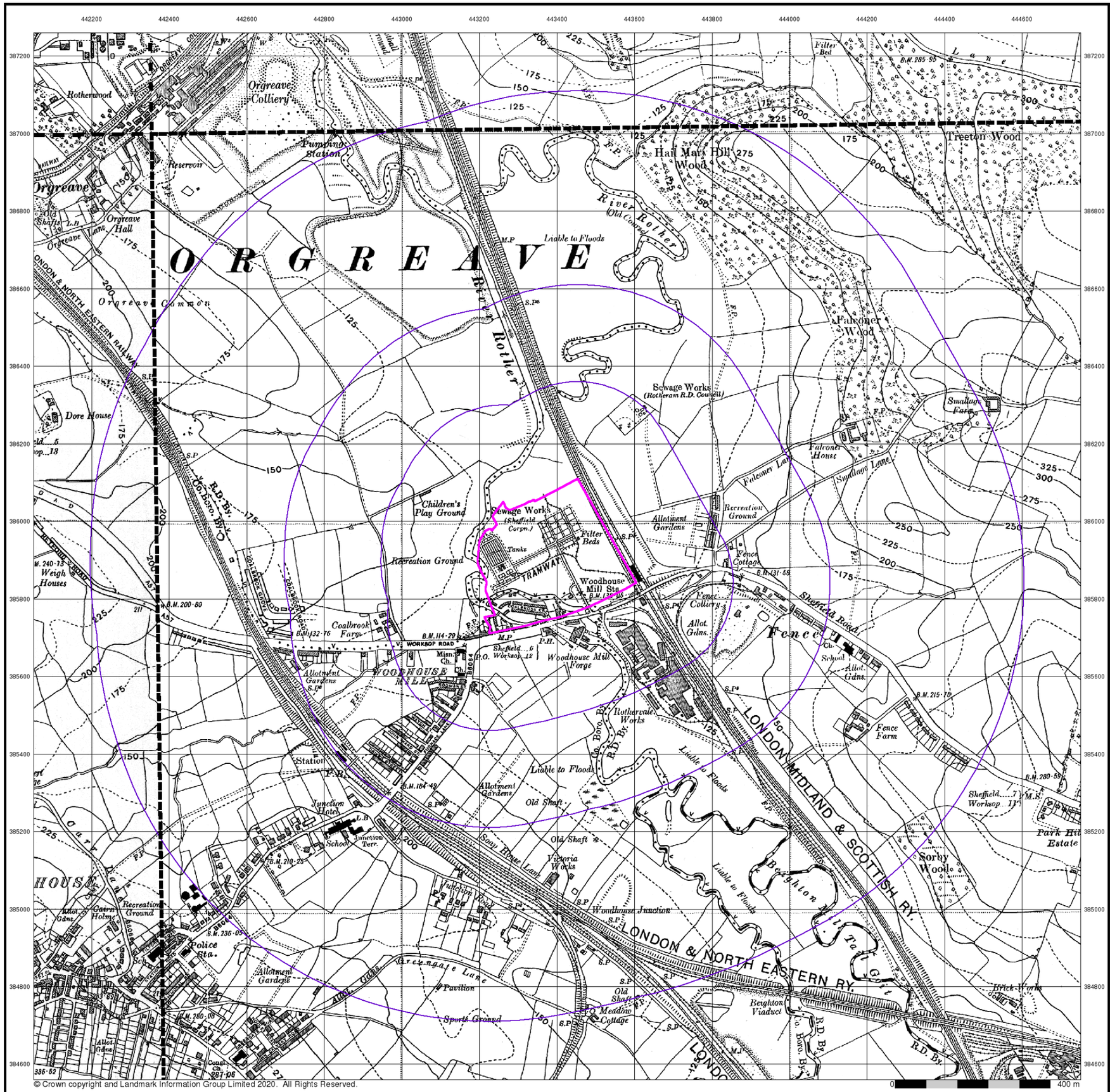

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Yorkshire

Published 1938

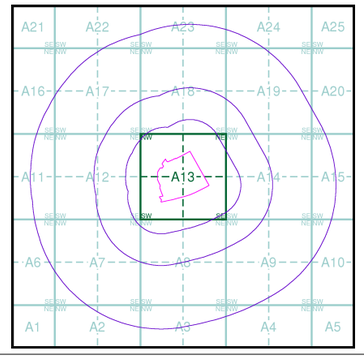
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

295NW 1938 1:10,560	295NE 1938 1:10,560
295SW 1938 1:10,560	295SE 1938 1:10,560

Historical Map - Slice A



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Yorkshire

Published 1938 - 1948

Source map scale - 1:10,560

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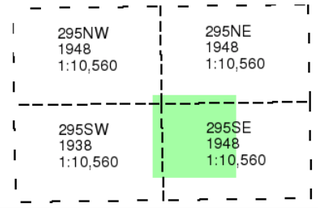
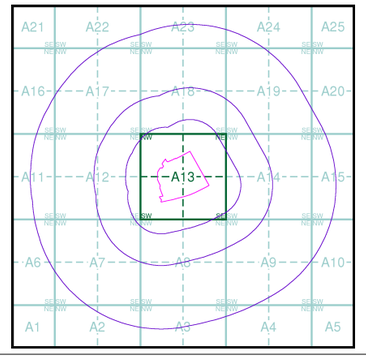
Map Name(s) and Date(s)



Historical Map - Slice A



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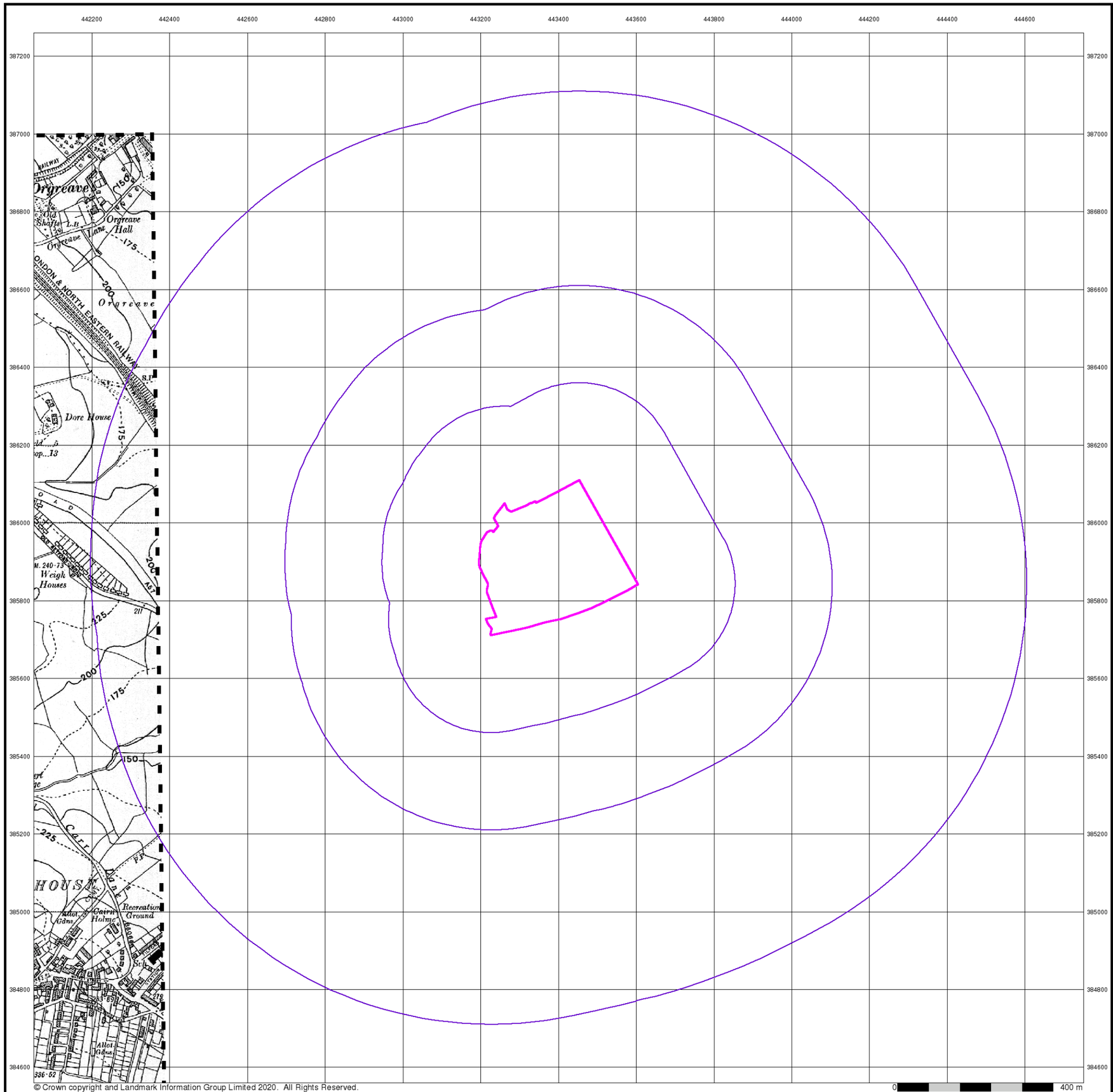

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Yorkshire

Published 1949

Source map scale - 1:10,560

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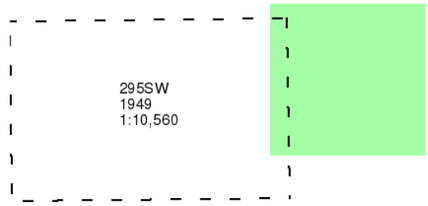
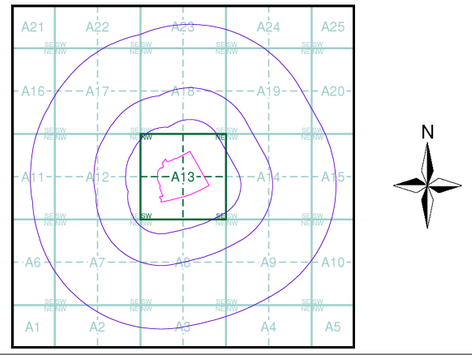
Map Name(s) and Date(s)



Historical Map - Slice A



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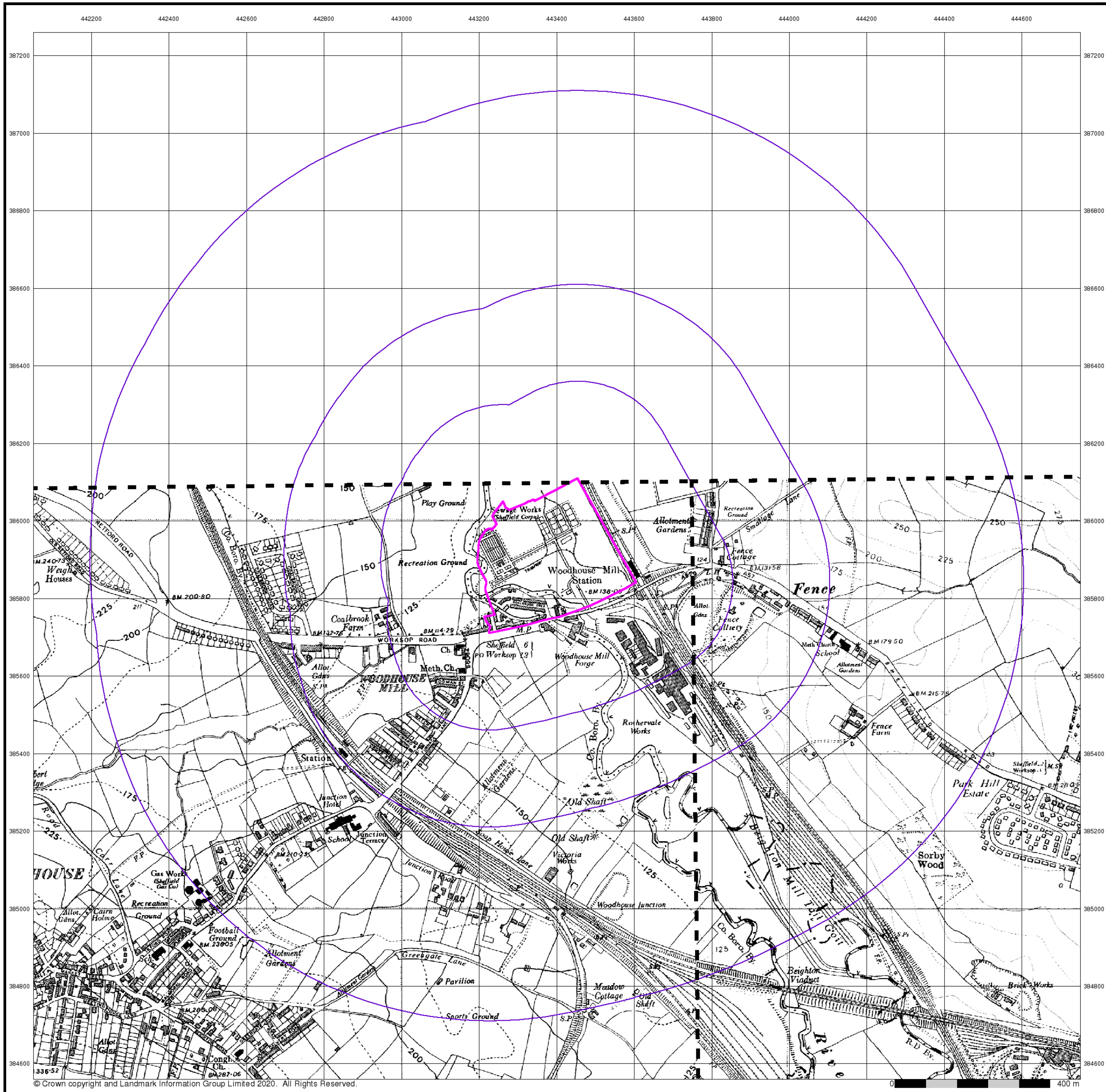

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LANDMARK INFORMATION GROUP®

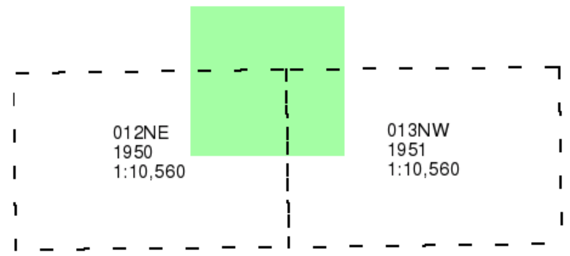
Derbyshire

Published 1950 - 1951

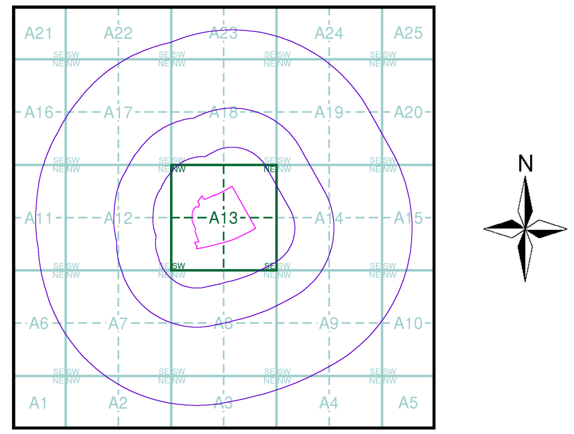
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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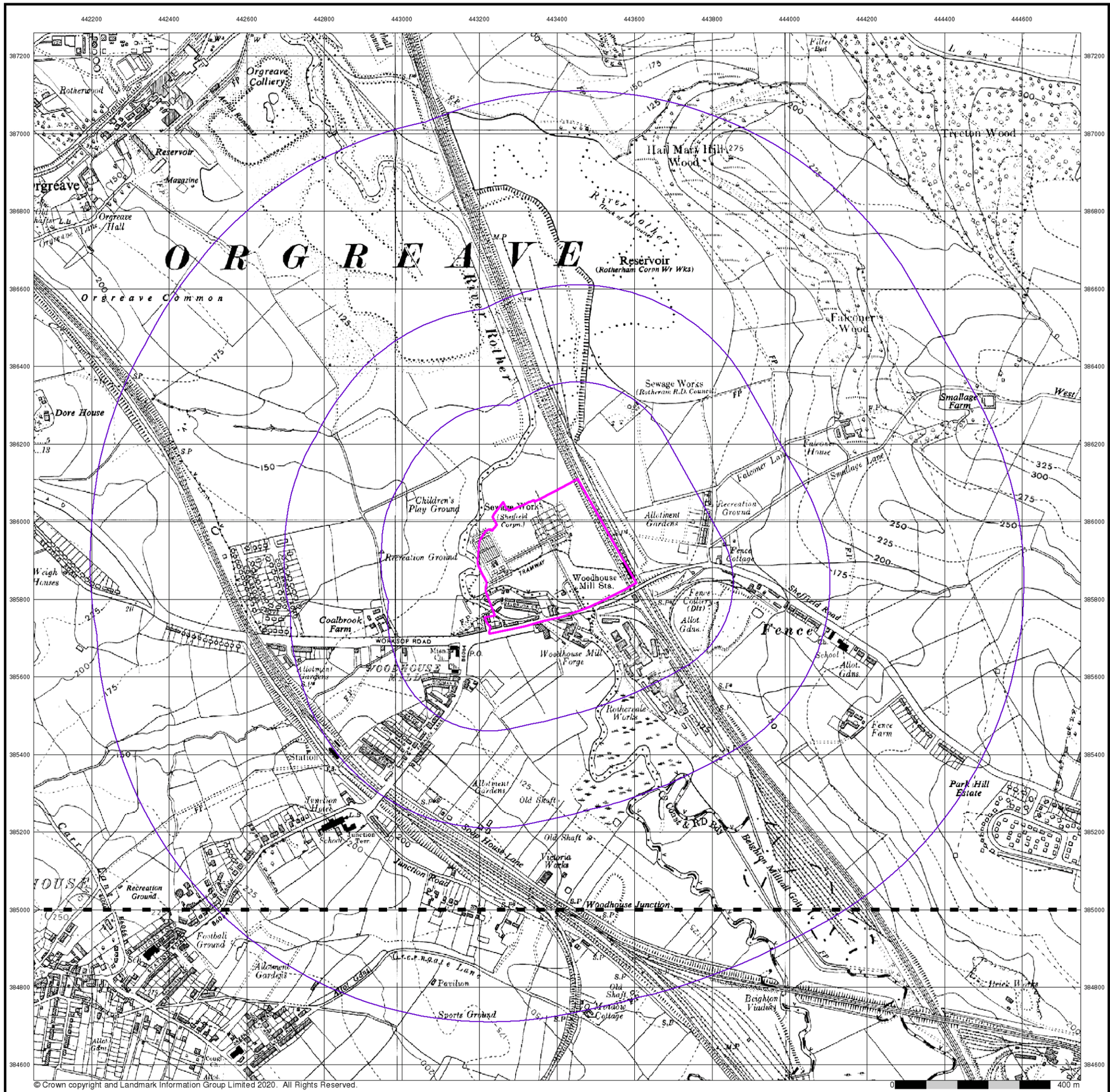

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Ordnance Survey Plan

Published 1956

Source map scale - 1:10,000

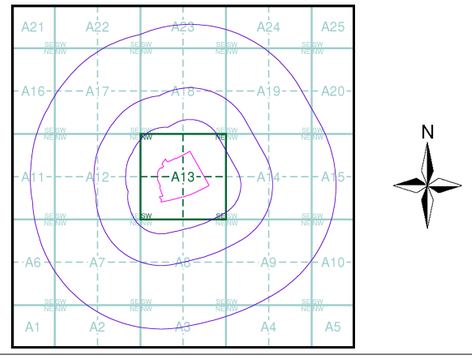
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SK48NW
1956
1:10,560

SK48SW
1956
1:10,560

Historical Map - Slice A



Order Details

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Site Details

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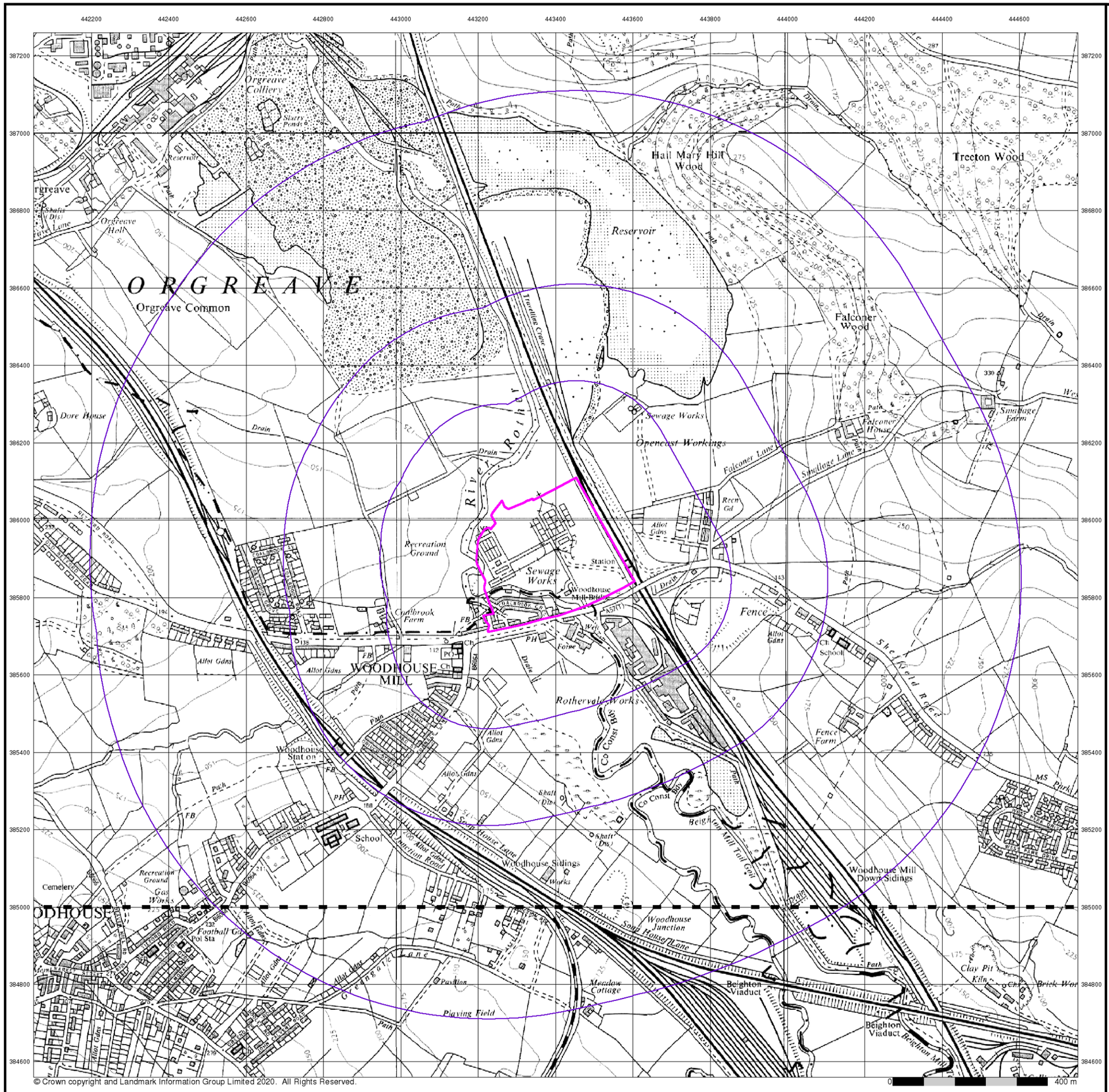

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Ordnance Survey Plan

Published 1967

Source map scale - 1:10,000

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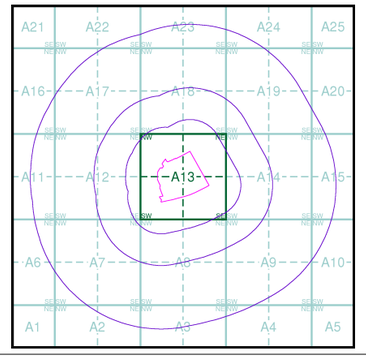
Map Name(s) and Date(s)

SK48NW
1967
1:10,560

SK48SW
1967
1:10,560

Historical Map - Slice A



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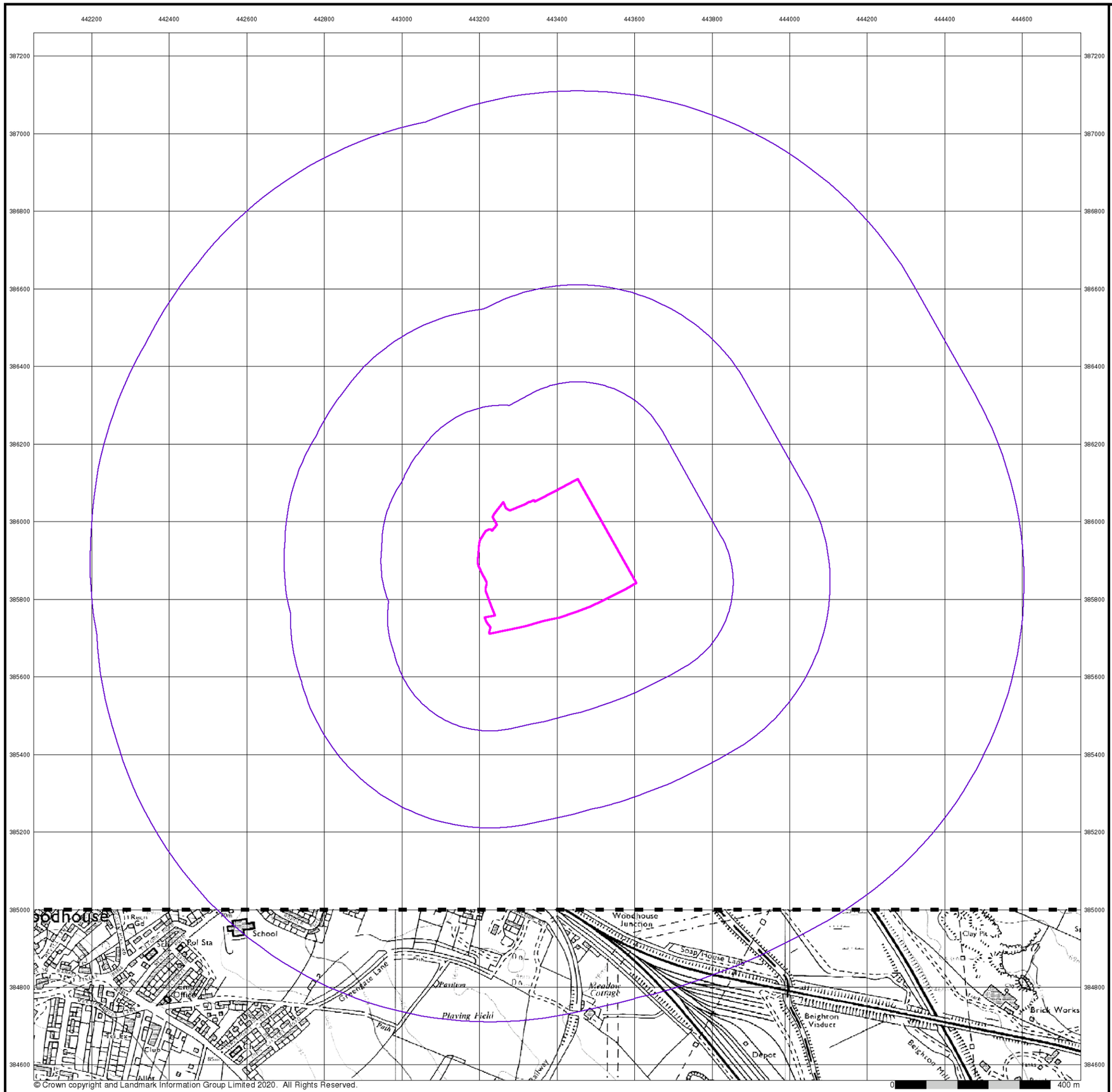

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Ordnance Survey Plan

Published 1977

Source map scale - 1:10,000

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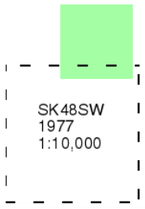
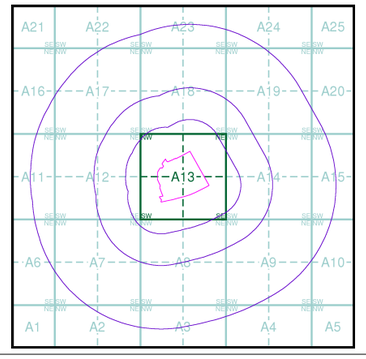
Map Name(s) and Date(s)



Historical Map - Slice A



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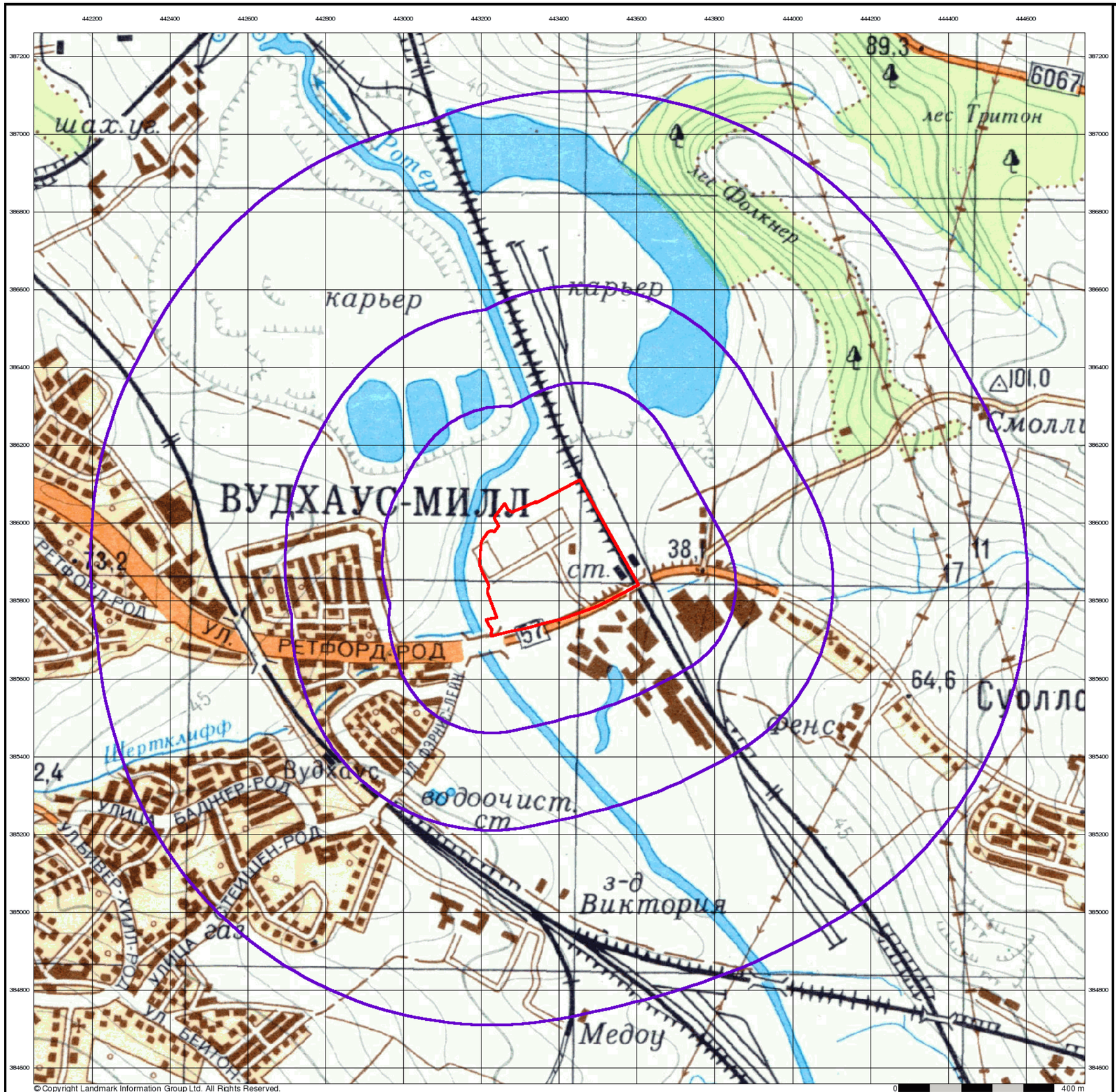

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Sheffield

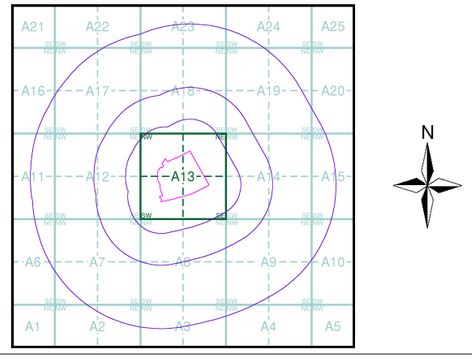
Published 1977

Source map scale - 1:25,000

These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use.
They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)

Russian Map - Slice A



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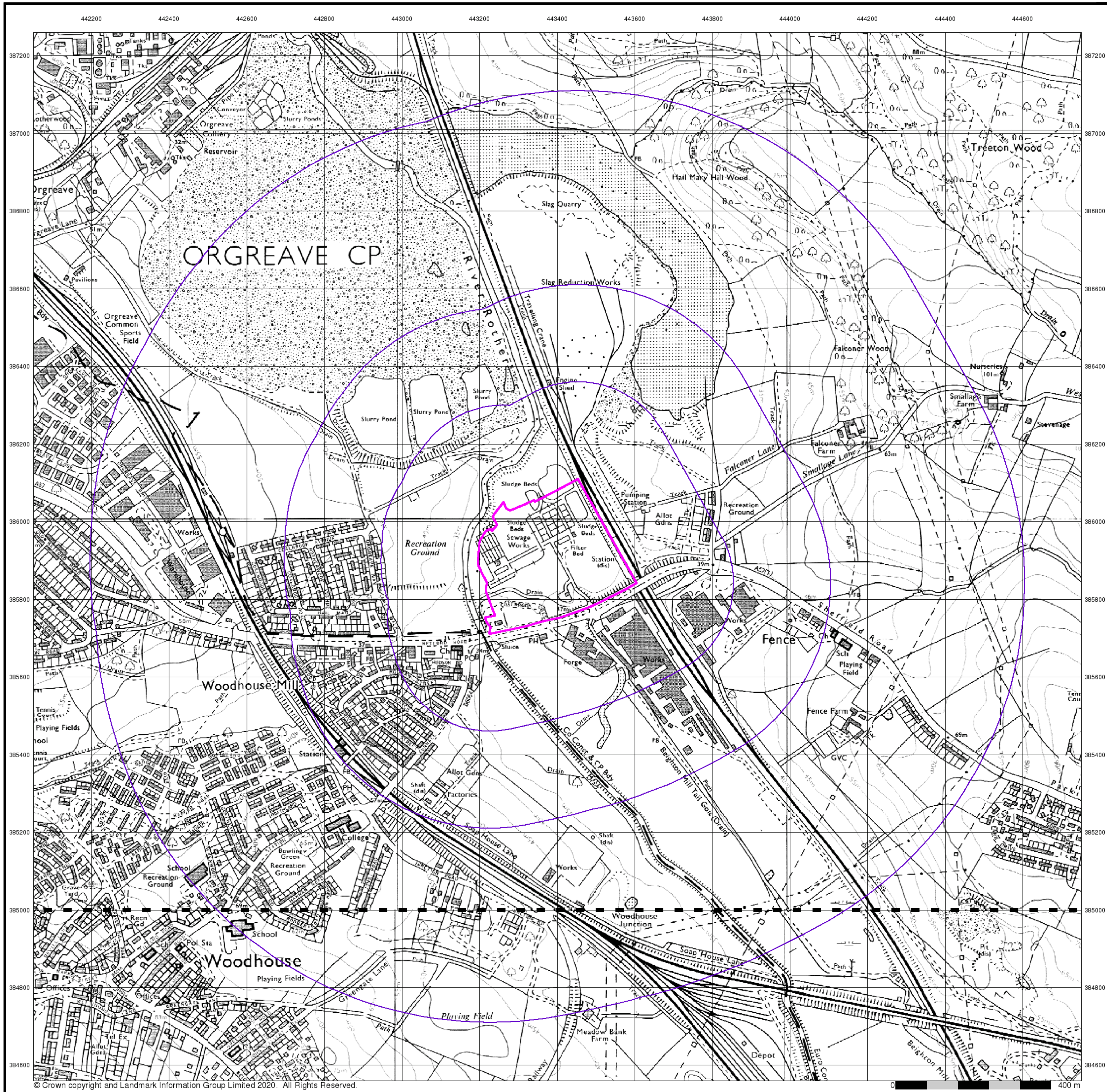

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Ordnance Survey Plan

Published 1981 - 1984

Source map scale - 1:10,000

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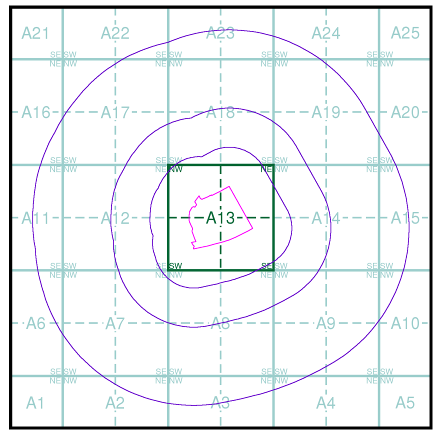
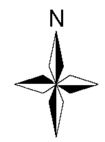
Map Name(s) and Date(s)

SK48NW
1981
1:10,000

SK48SW
1984
1:10,000

Historical Map - Slice A





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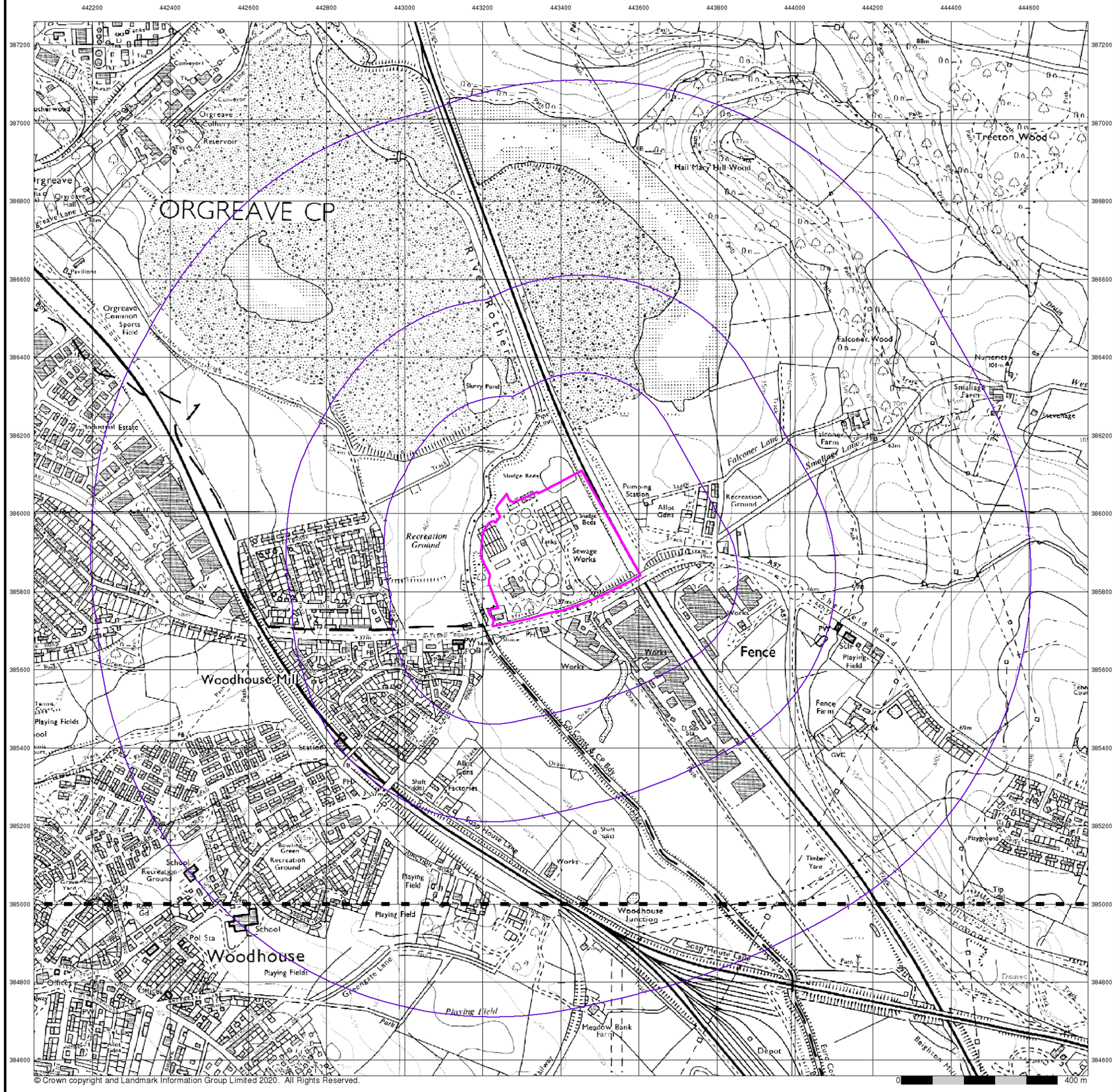

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Ordnance Survey Plan

Published 1990 - 1991

Source map scale - 1:10,000

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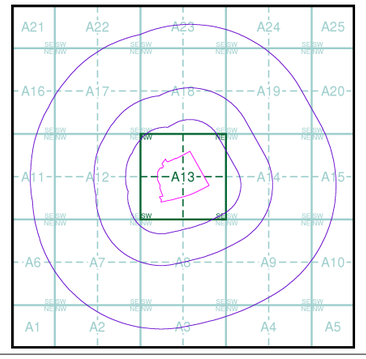
Map Name(s) and Date(s)

SK48NW
1991
1:10,000

SK48SW
1990
1:10,000

Historical Map - Slice A



Order Details

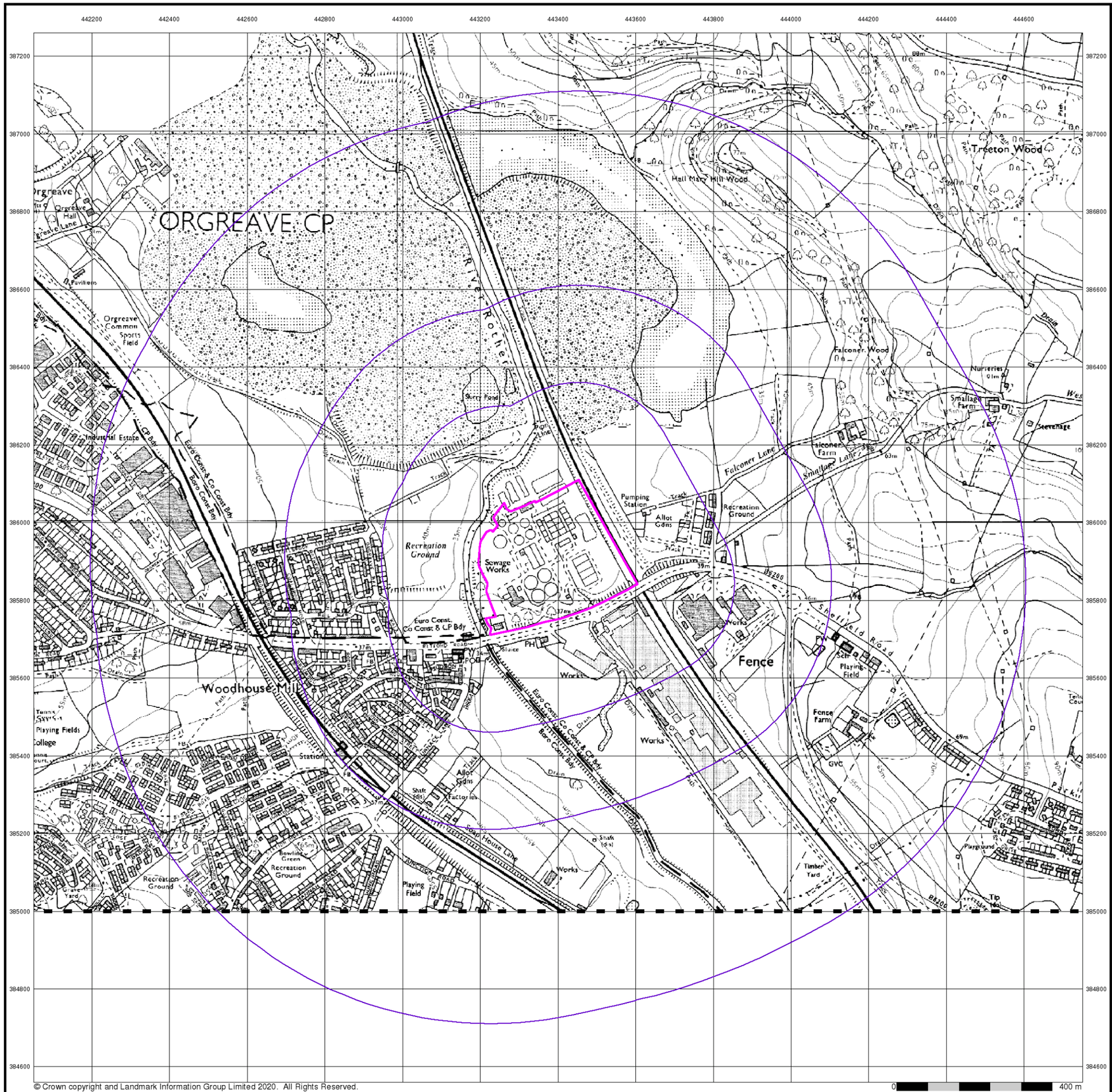
Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Landmark INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP®

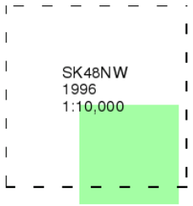
Ordnance Survey Plan

Published 1996

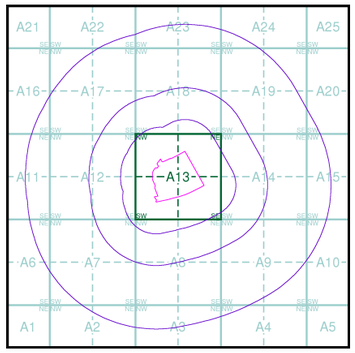
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Landmark® INFORMATION GROUP

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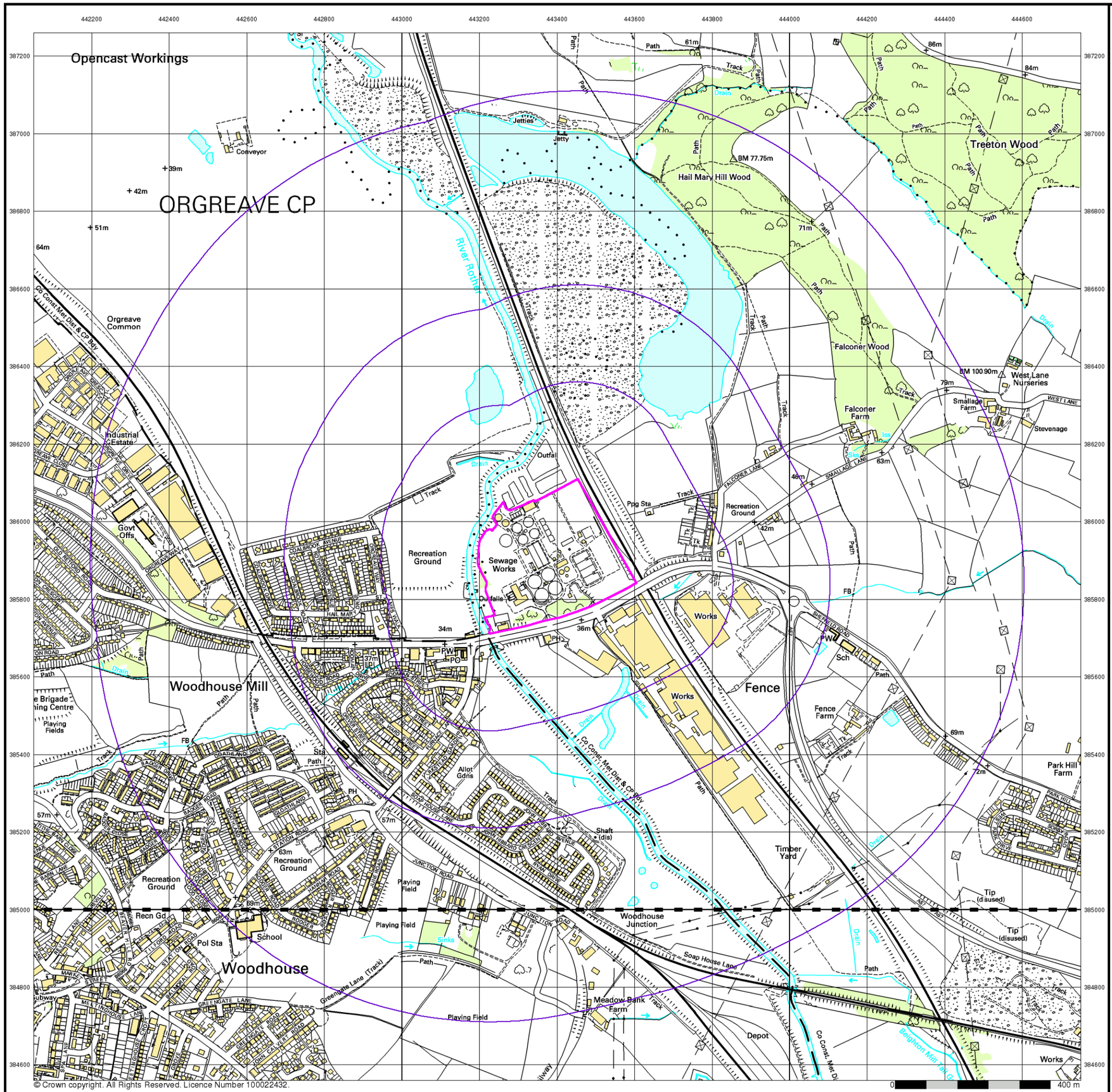

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10k Raster Mapping

Published 2000

Source map scale - 1:10,000

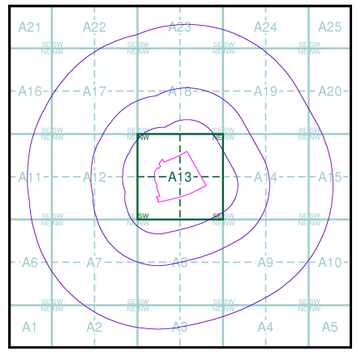
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SK48NW
2000
1:10,000

SK48SW
2000
1:10,000

Historical Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Landmark® INFORMATION GROUP

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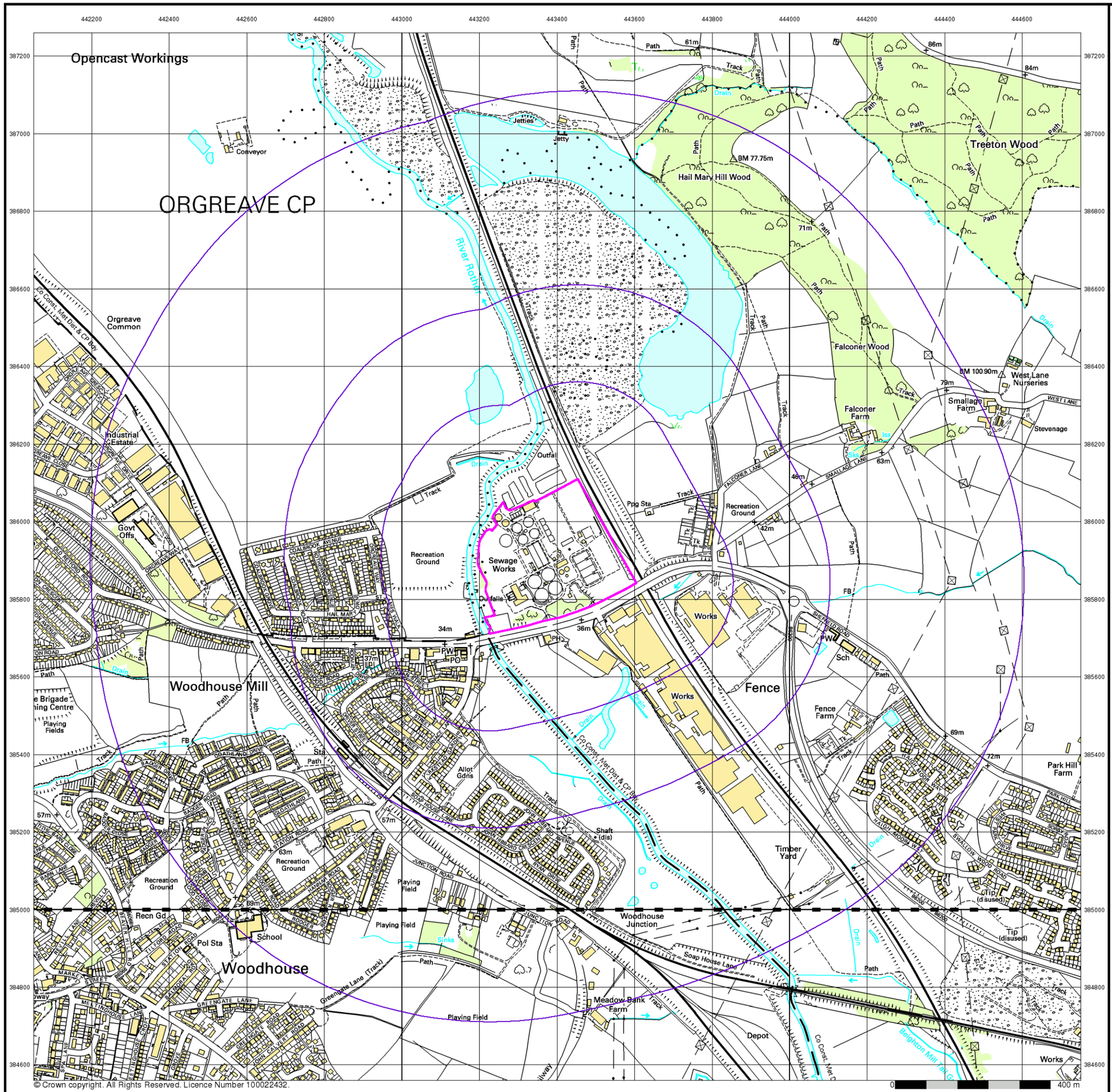


Envirocheck®

LANDMARK INFORMATION GROUP®

10k Raster Mapping

Published 2006

Source map scale - 1:10,000

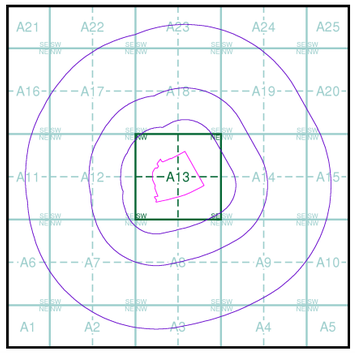
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SK48NW
2006
1:10,000

SK48SW
2006
1:10,000

Historical Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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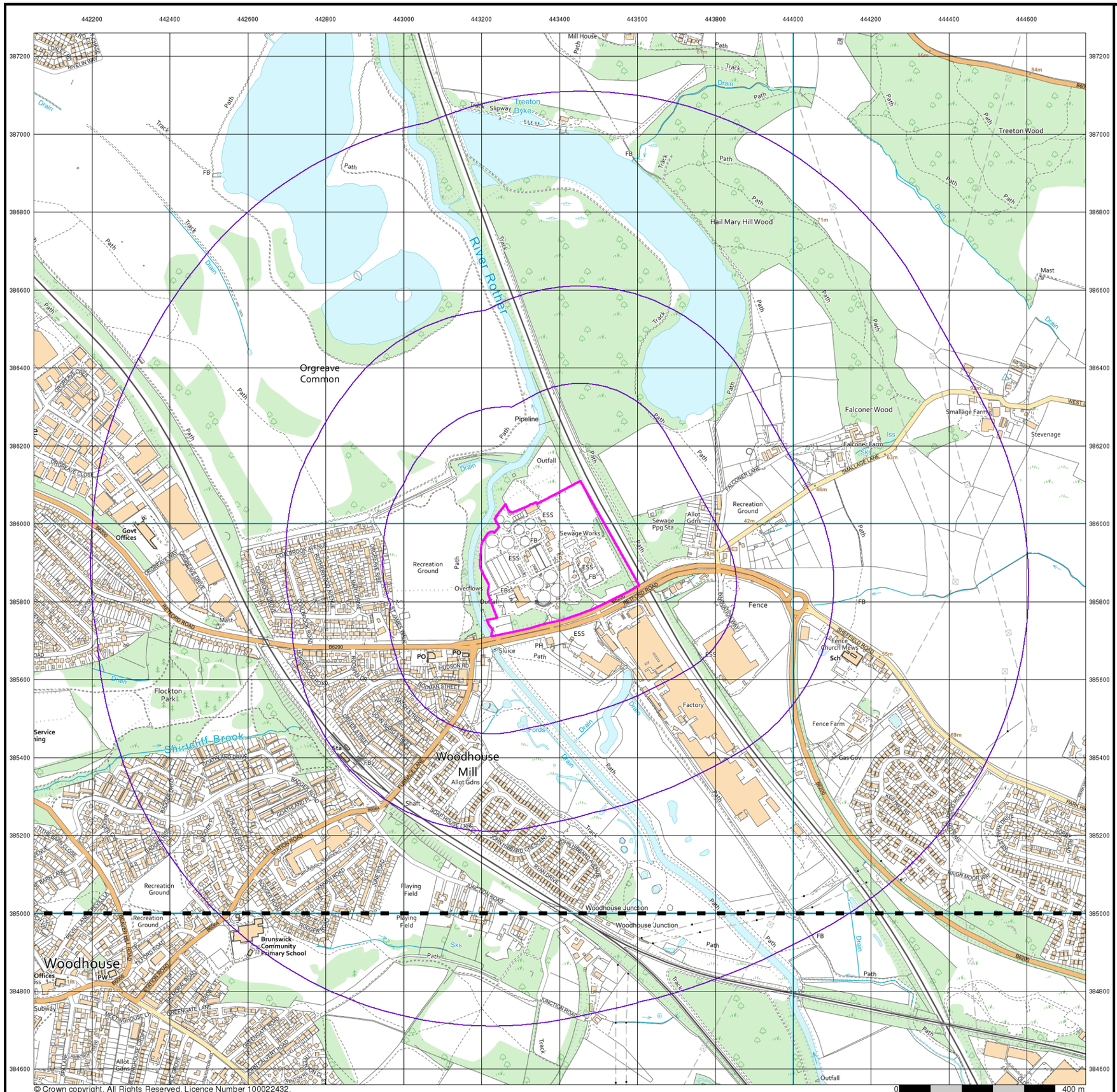

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LANDMARK INFORMATION GROUP®

VectorMap Local

Published 2020

Source map scale - 1:10,000

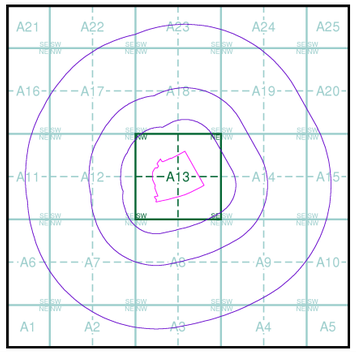
VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

SK48NW
2020
Variable

SK48SW
2020
Variable

Historical Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Landmark® INFORMATION GROUP

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Fax: 0844 844 9951
Web: www.envirocheck.co.uk

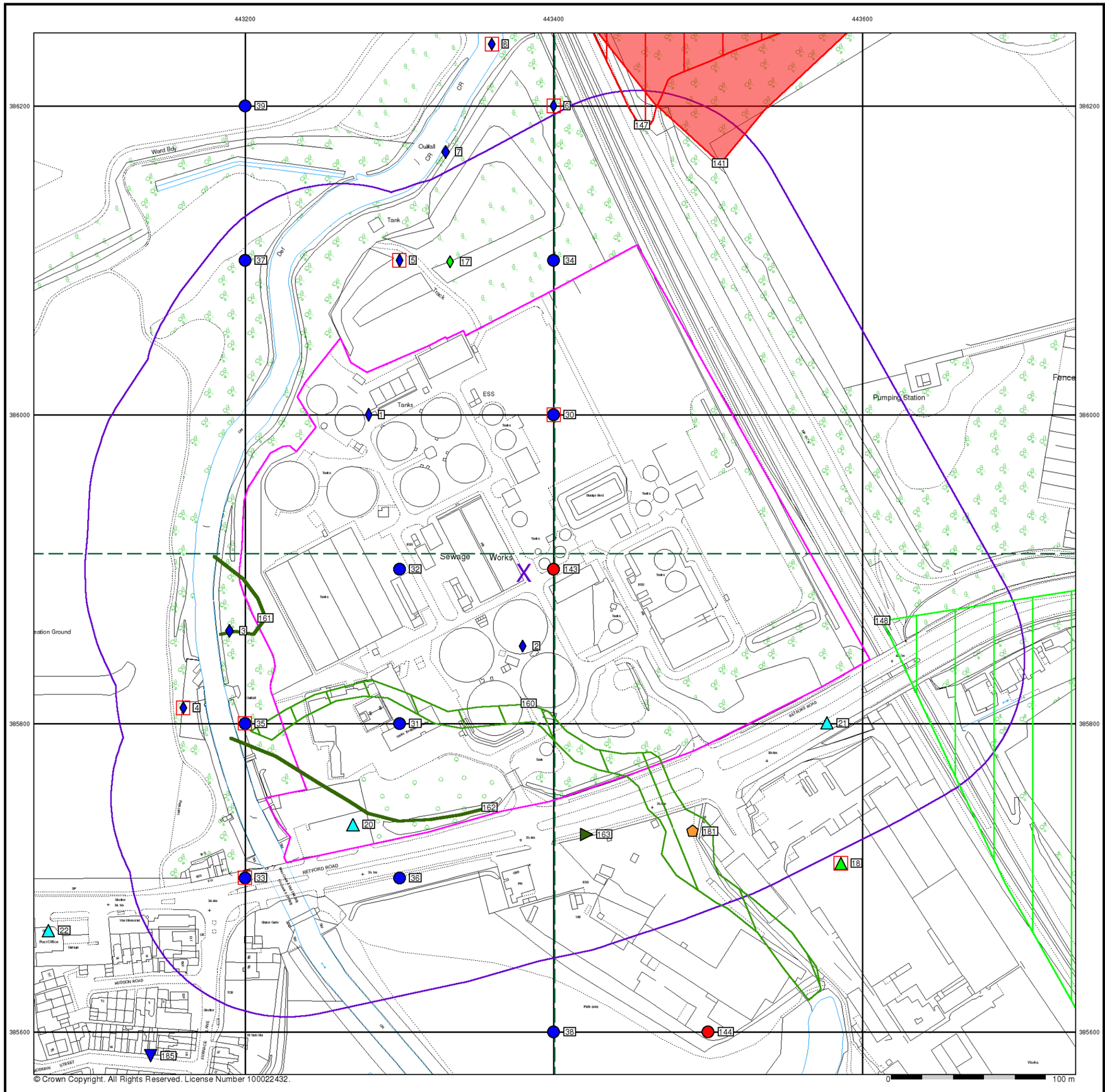
Order Details:								
Order Number: 261993045								
Customer Ref: 41527254								
National Grid Reference: 443380	385900							
Slice:								
Site Area (Ha): 10.21								
Search Buffer (m): 1000								
Site Details:								
Woodhouse Mill STW	Retford Road	SHEFFIELD	S13 9WG					
File Name	Map Series Name	Published	Source Scale	Survey Date	Revision Date	Addition Date	Edition Date	Published Date
261993045_1_A_EHM_County_Series_10560_ehm-drb-10560_1-1a_266372120.gif	Derbyshire	1875-1882	1:10,560	1875-1875				1882
261993045_1_A_EHM_County_Series_10560_ehm-yor-10560_1-2-1a_266372140.gif	Yorkshire	1904-1906	1:10,560	1890-1903-1891-1890	1901-1903-1901-1901		1905-1906-1904-1906	
261993045_1_A_EHM_County_Series_10560_ehm-yor-10560_1-0b_266372148.gif	Yorkshire	1893-1894	1:10,560	1890-1891-1891-1890				1894-1893-1894-1894

261993045_1_A_EHM_County_Series_10560_ehm-yor-10560_1-PRb_266372150.gif	Yorkshire	1938-1948	1:10,560	1851-1851-1851-1851		1948-1938-1948-1948	1935-1935-1935-1935	
261993045_1_A_EHM_County_Series_10560_ehm-yor-10560_1-PRc_266372152.gif	Yorkshire	1949	1:10,560	1851		1949	1935	
261993045_1_A_EHM_County_Series_10560_ehm-yor-10560_1-2-2a_266372158.gif	Yorkshire	1924	1:10,560	1851-1851-1851-1851	1922-1921-1921-1922		1924-1924-1924-1924	
261993045_1_A_EHM_County_Series_10560_ehm-yor-10560_1-PRa_266372160.gif	Yorkshire	1938	1:10,560	1851-1851-1851-1851		1938-1938-1938-1938	1935-1935-1935-1935	
261993045_1_A_EHM_County_Series_10560_ehm-yor-10560_1-0a_266372162.gif	Yorkshire	1855	1:10,560	1851				1855
261993045_1_A_EHM_County_Series_10560_ehm-drb-10560_1-2-1a_266372168.gif	Derbyshire	1899-1900	1:10,560	1890-1875	1897-1897		1900-1899	

261993045_1_A_EHM_County_Series_10560_ehm-drb-10560_1-2-2b_266372170.gif	Derbyshire	1924	1:10,560	1875	1914		1924	
261993045_1_A_EHM_County_Series_10560_ehm-drb-10560_1-PRa_266372174.gif	Derbyshire	1950-1951	1:10,560	1875-1875		1948-1948	1915-1938	1951-1950
261993045_1_A_EHM_County_Series_10560_ehm-drb-10560_1-2-2a_266372176.gif	Derbyshire	1924	1:10,560	1875-1875	1914-1915		1924-1924	
261993045_1_A_EHM_County_Series_10560_ehm-yor-10560_1-RVa_266372178.gif	Yorkshire	1935	1:10,560	1851-1851-1851	1935-1935-1935		1935-1935-1935	
261993045_1_A_EHM_OS_Plan_10000_ehm-ng-10000_3a_266372104.gif	Ordnance Survey Plan	1977	1:10,000	1975	1975			1977
261993045_1_A_EHM_OS_Plan_10000_ehm-ng-10000_5b_266372124.gif	Ordnance Survey Plan	1996	1:10,000	1985	1995			1996

261993045_1_A_EHM_OS_Plan_10000_ehm-ng-10000_1a_266372132.gif	Ordnance Survey Plan	1956	1:10,560		1951-1954			1956-1956
261993045_1_A_EHM_OS_Plan_10000_ehm-ng-10000_2a_266372142.gif	Ordnance Survey Plan	1967	1:10,560	1963-1963	1965			1967-1967
261993045_1_A_EHM_OS_Plan_10000_ehm-ng-10000_4a_266372144.gif	Ordnance Survey Plan	1981-1984	1:10,000	1981-1975	1982-1979			1984-1981
261993045_1_A_EHM_OS_Plan_10000_ehm-ng-10000_5a_266372180.gif	Ordnance Survey Plan	1990-1991	1:10,000	1987-1985	1989			1990-1991
261993045_1_A_Russian_25000_rmm-she42-25000_l00001_266372096.gif	Sheffield	1977	1:25,000					
261993045_1_A_10k_CRM_1999_10kcrm_l00001_266372156.gif	10K Raster Mapping	2000	1:10,000					
261993045_1_A_10k_CRM_2006_10kcrm_l00003_266372130.gif	10K Raster Mapping	2006	1:10,000					

261993045_1_A_VML_OSVMLR_I00027_266372146.gif	VectorMap Local	2020	Variable					



Envirocheck®

LANDMARK INFORMATION GROUP®

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location
- Pylon
- Overhead Transmission Line

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

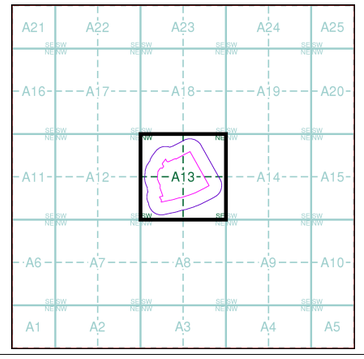
Geological

- BGS Recorded Mineral Site

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Segment A13



Order Details

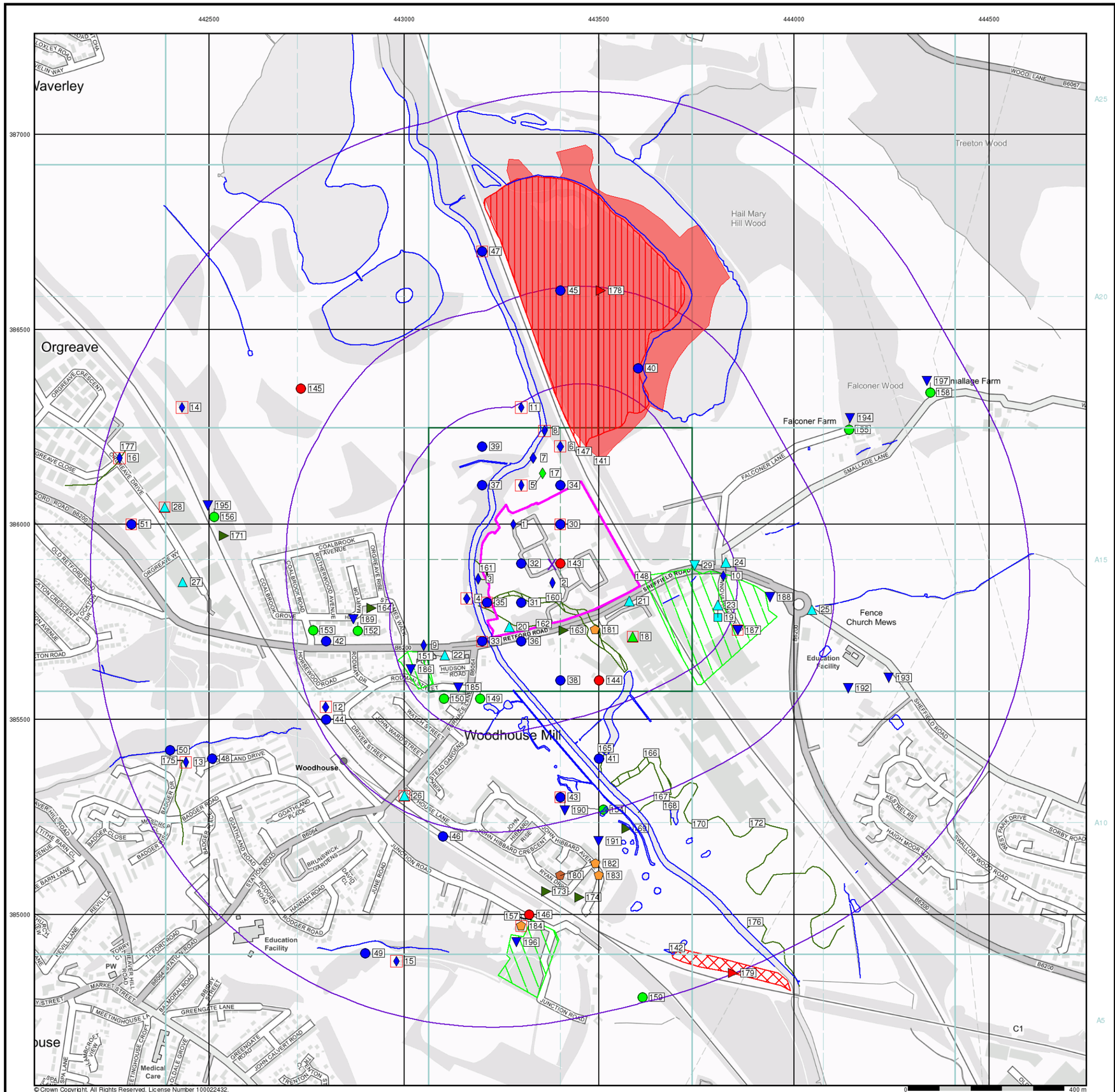
Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Plot Buffer (m):	100

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Landmark INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck®

LANDMARK INFORMATION GROUP®

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Geological

- BGS Recorded Mineral Site

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
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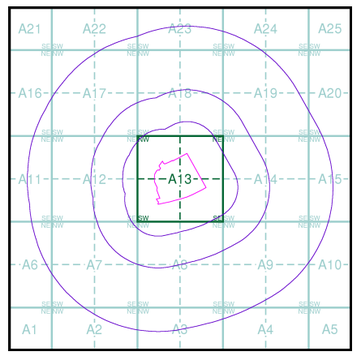
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Landmark® INFORMATION GROUP

Tel: 0844 844 9952
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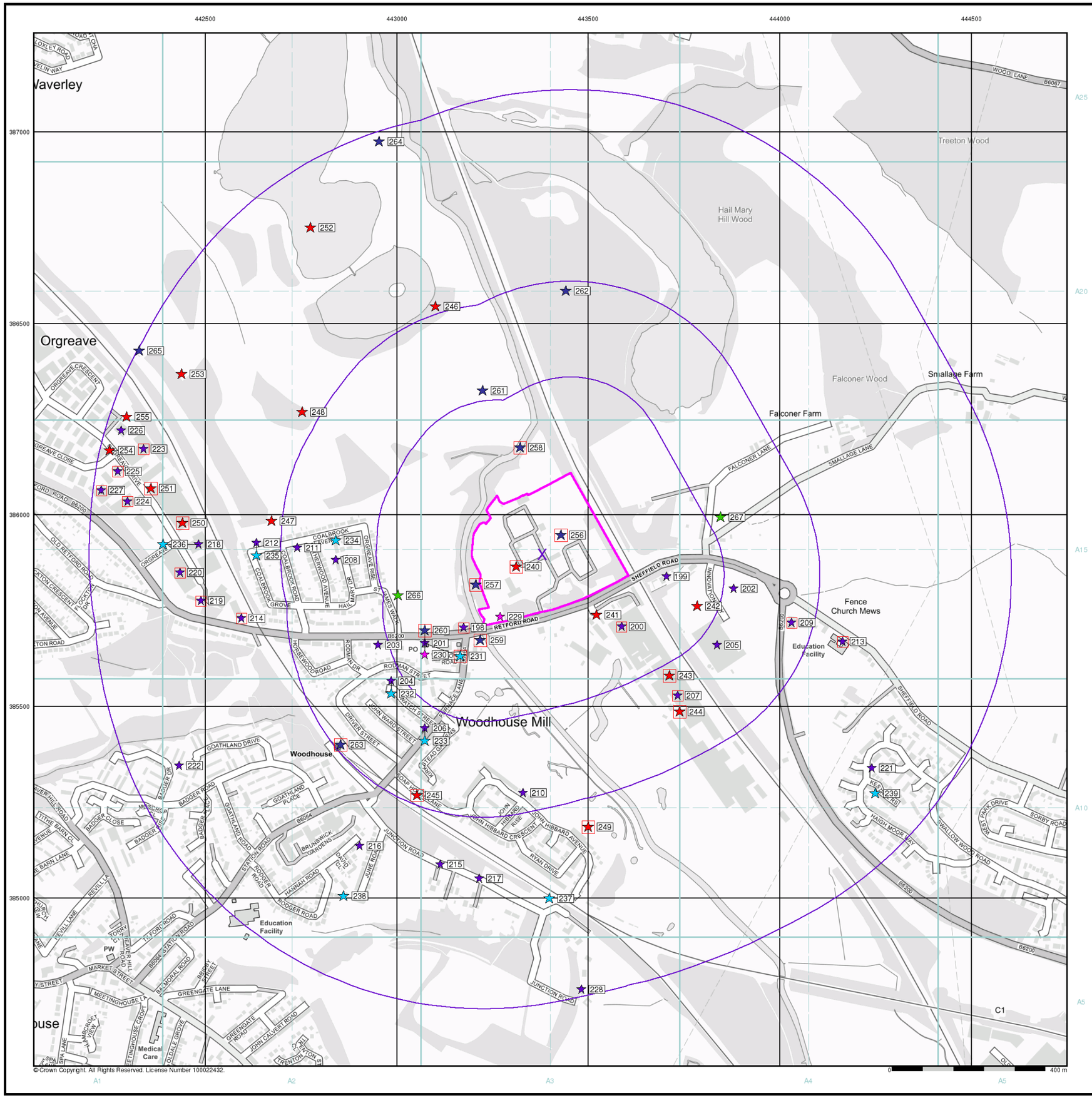
Web: www.envirocheck.co.uk



Envirocheck®

LANDMARK INFORMATION GROUP®

Industrial Land Use Map

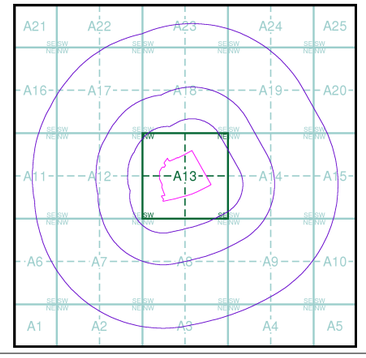
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Infrastructure
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

Industrial Land Use Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

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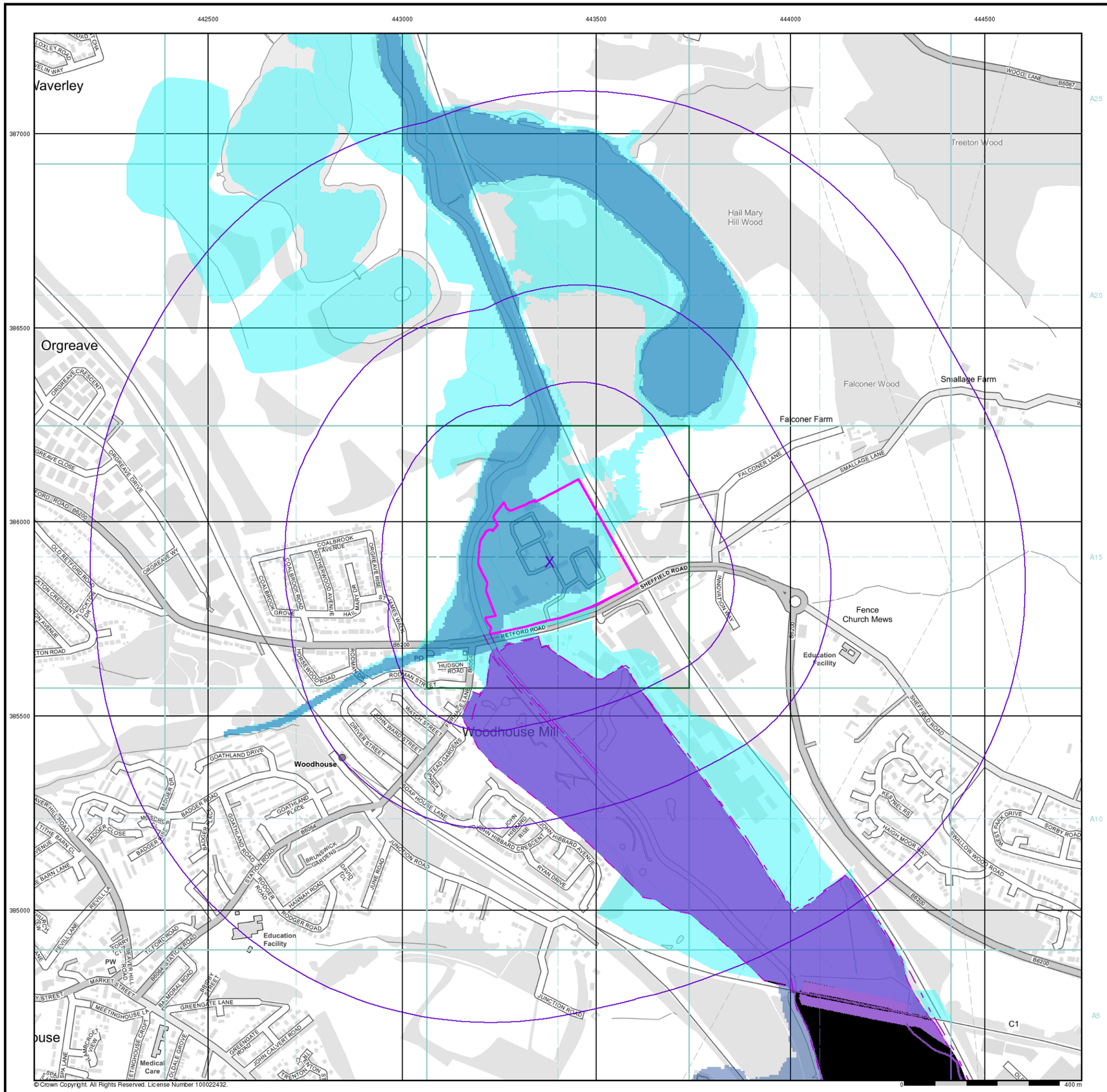


Envirocheck®

LANDMARK INFORMATION GROUP®

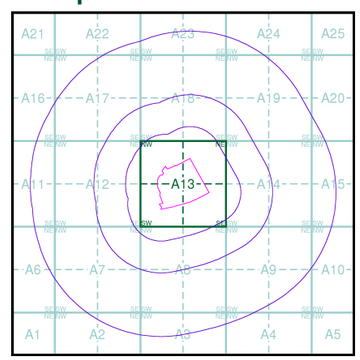
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

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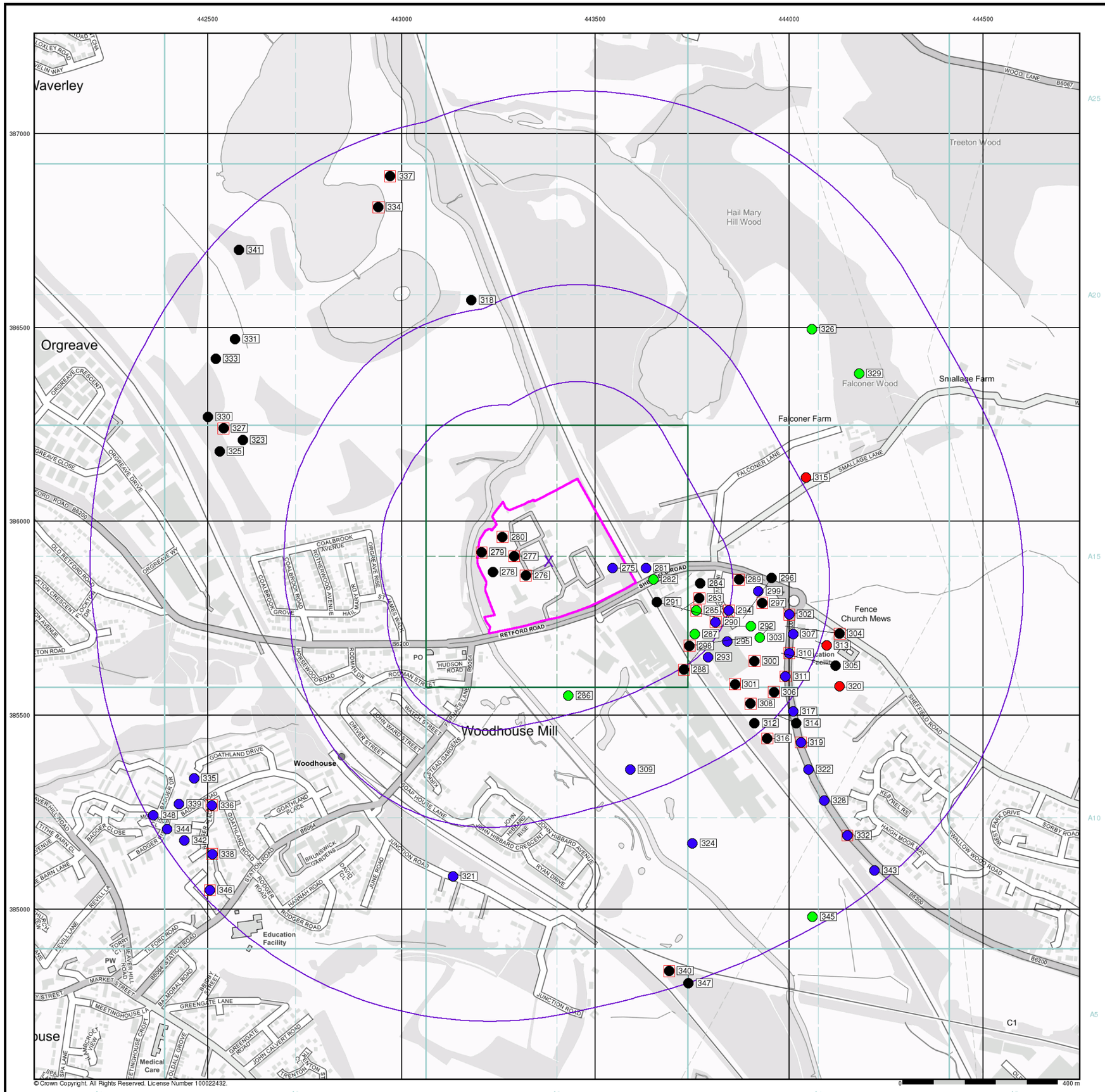


Envirocheck®

LANDMARK INFORMATION GROUP®

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

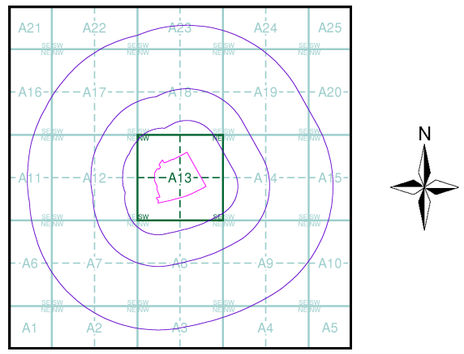
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

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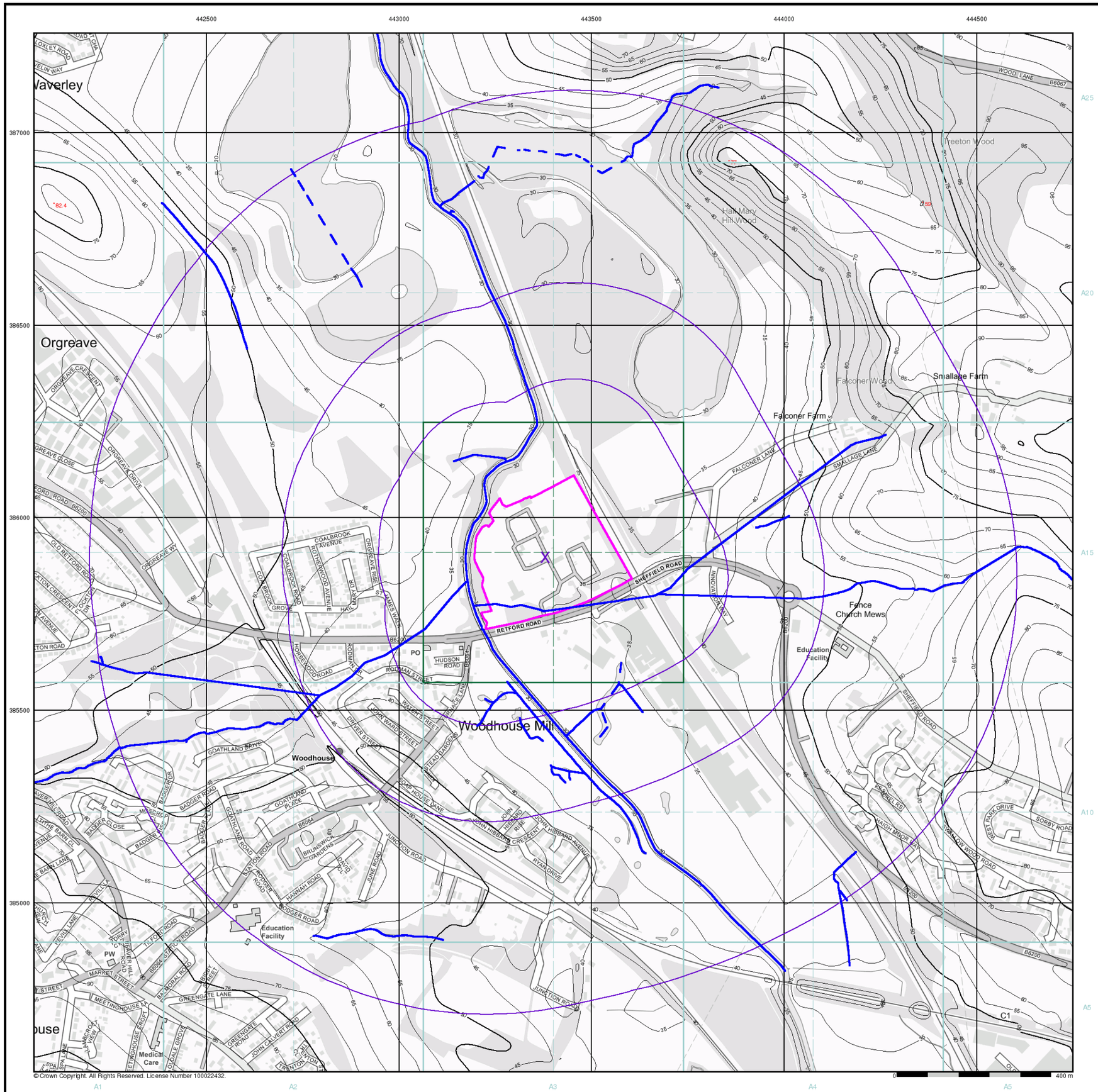
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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LANDMARK INFORMATION GROUP®

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

OS Water Network Data

- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

Contours (height in meters)

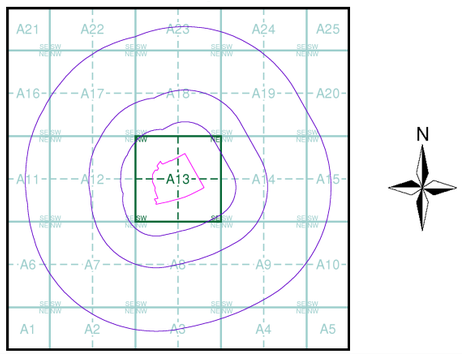
Standard Contour 105 100 95

Master Contour

Spot Height 167.3

- MLW Mean Low Water
- MHW Mean High Water

OS Water Network Map - Slice A



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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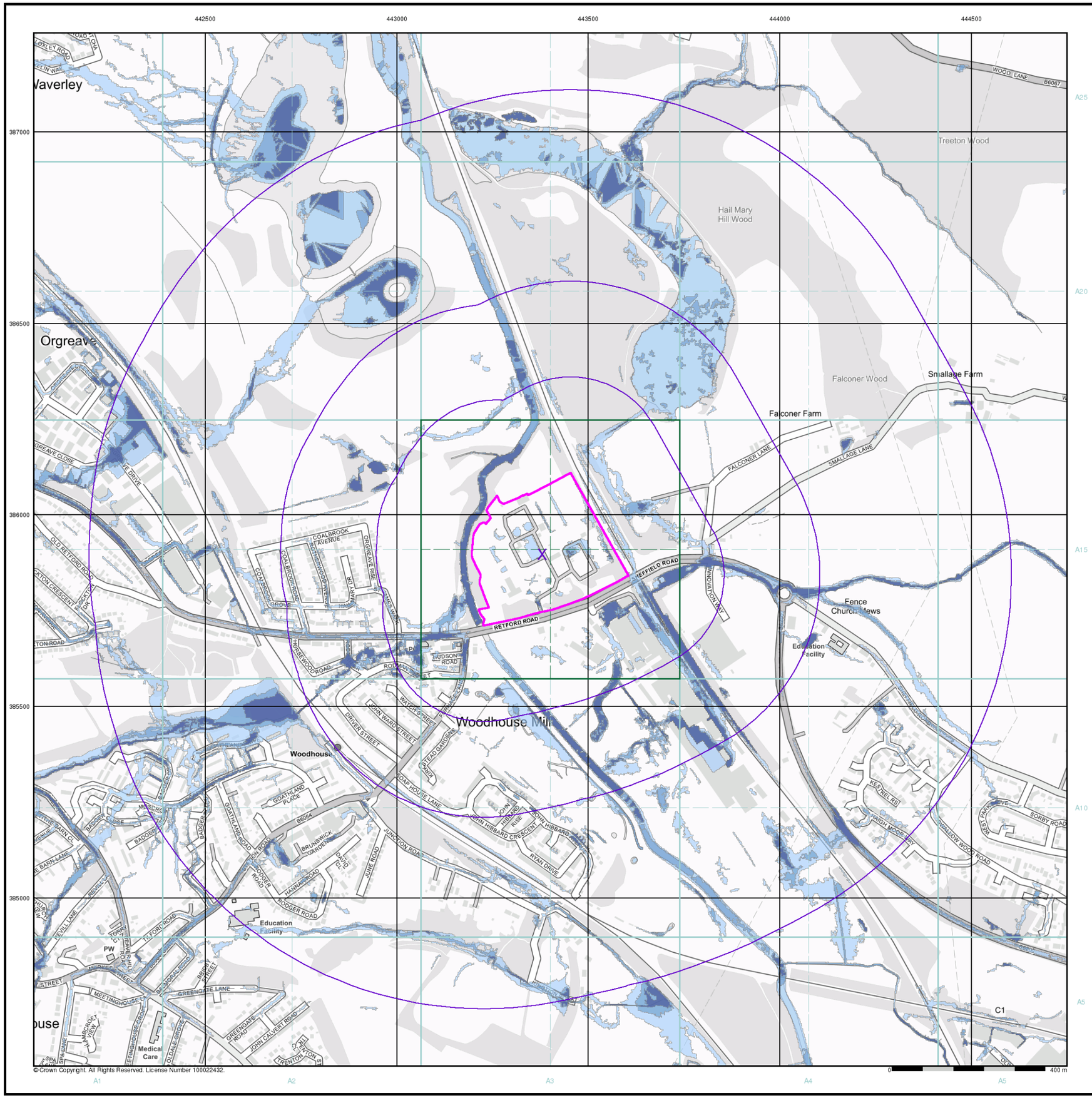

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LANDMARK INFORMATION GROUP®

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Risk of Flooding from Surface Water

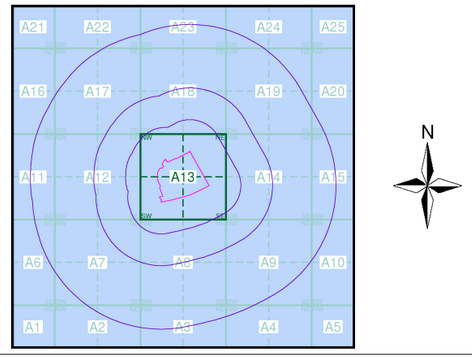
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



Order Details

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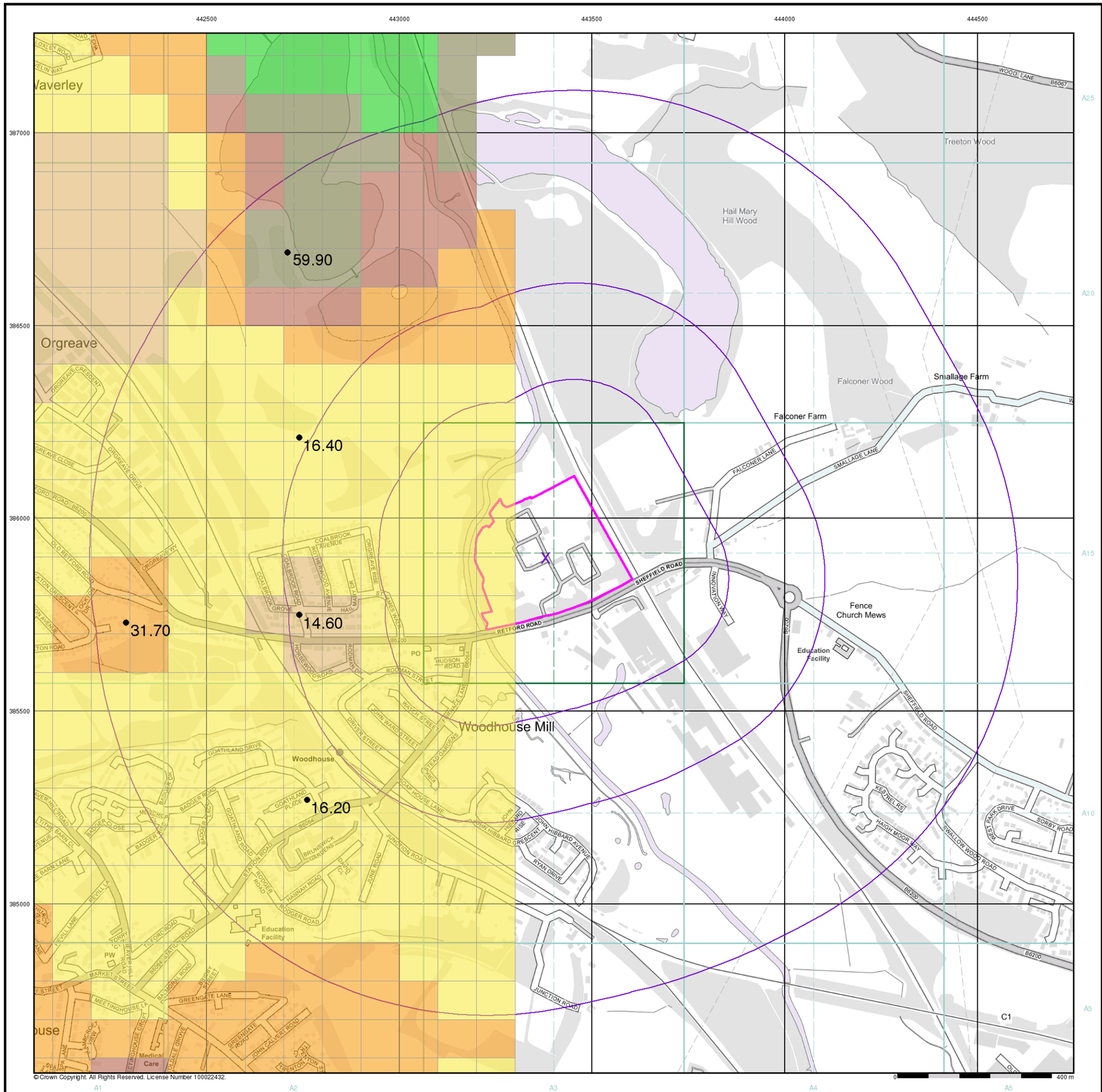

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General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

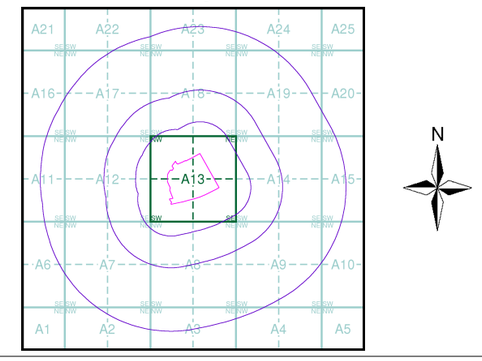
Urban Soil Chemistry Arsenic

BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Arsenic Concentrations mg/kg

- < 15
- 15 - 25
- 25 - 35
- 35 - 45
- 45 - 60
- 60 - 120
- > 120

Urban Soil Chemistry Arsenic - Slice A



Order Details

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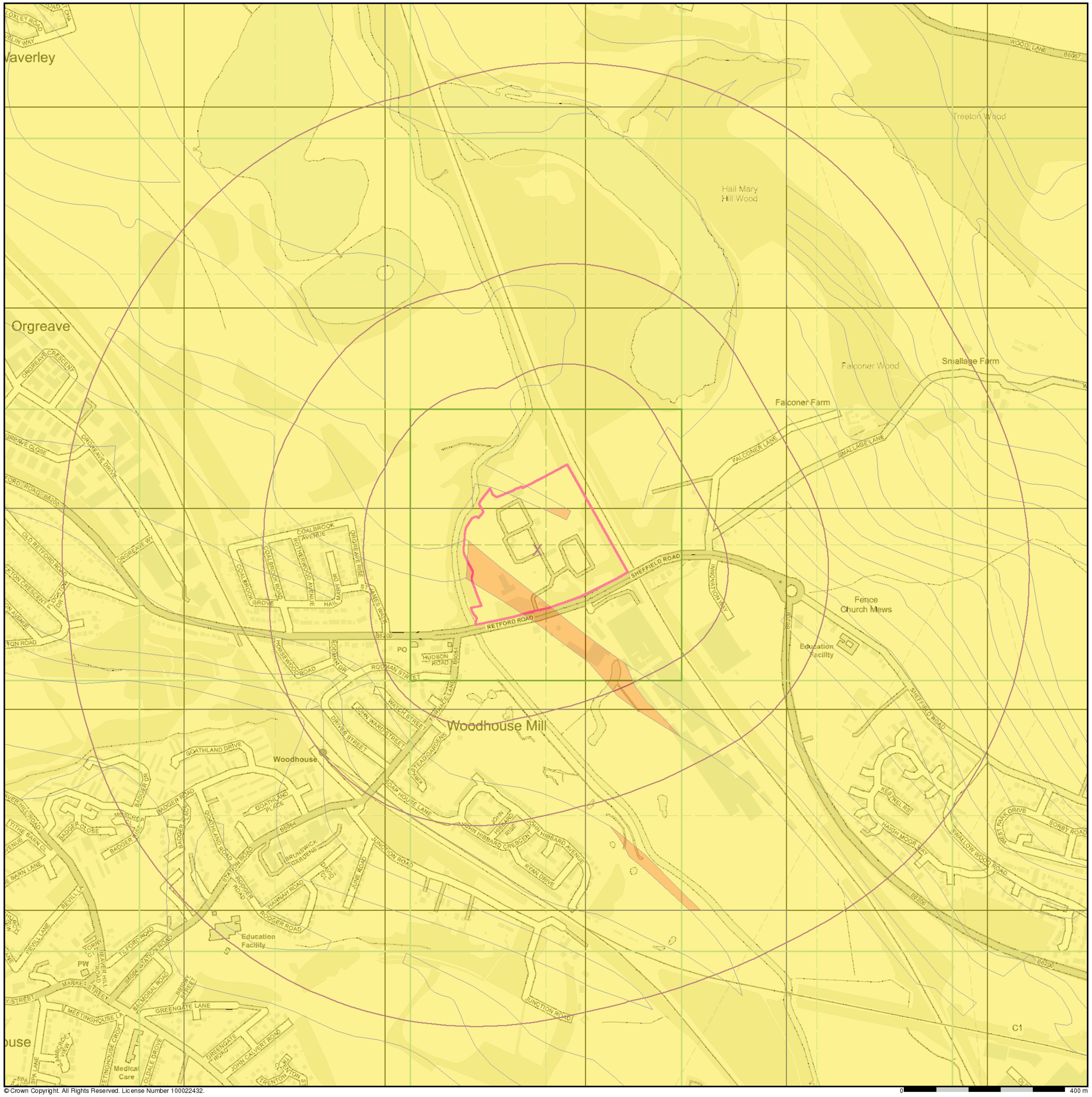

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General

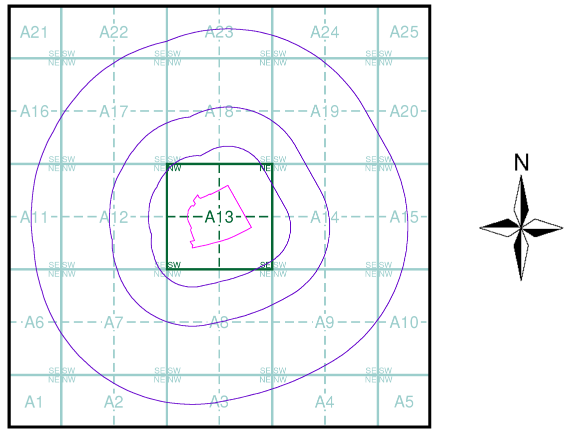
Specified Site　Specified Buffer(s)　X Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg

- < 15
- 15 - 25
- 25 - 35
- 35 - 45
- 45 - 60
- 60 - 120
- > 120

Estimated Soil Chemistry Arsenic - Slice A



Order Details

Order Details: 261993045_1_1
Customer Ref: 41527254
National Grid Reference: 443380, 385900
Slice: A
Site Area (Ha): 10.21
Search buffer (m): 1000

Site Details

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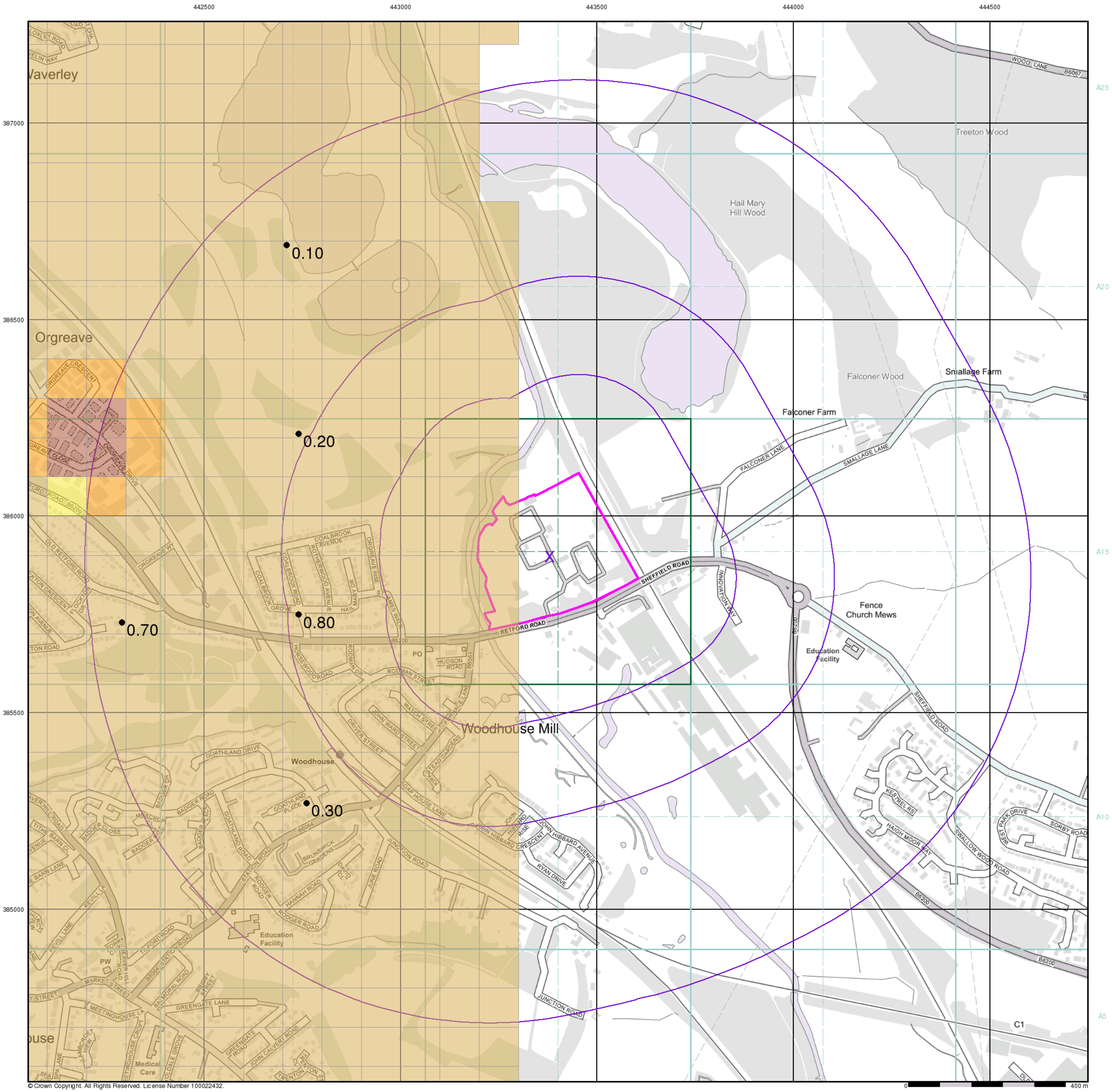

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General

Specified Site — Specified Buffer(s) — Bearing Reference Point

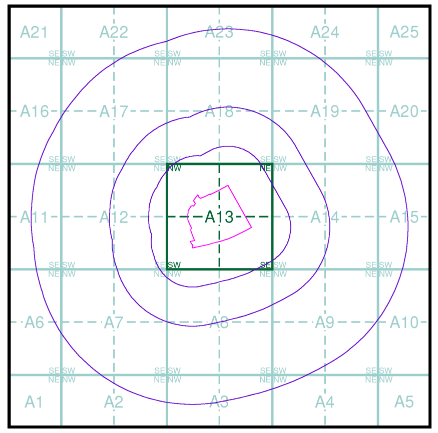
Urban Soil Chemistry Cadmium

BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

Urban Soil Chemistry Cadmium - Slice A



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Order Details

Order Details: 261993045_1_1
Customer Ref: 41527254
National Grid Reference: 443380, 385900
Slice: A
Site Area (Ha): 10.21
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Site Details

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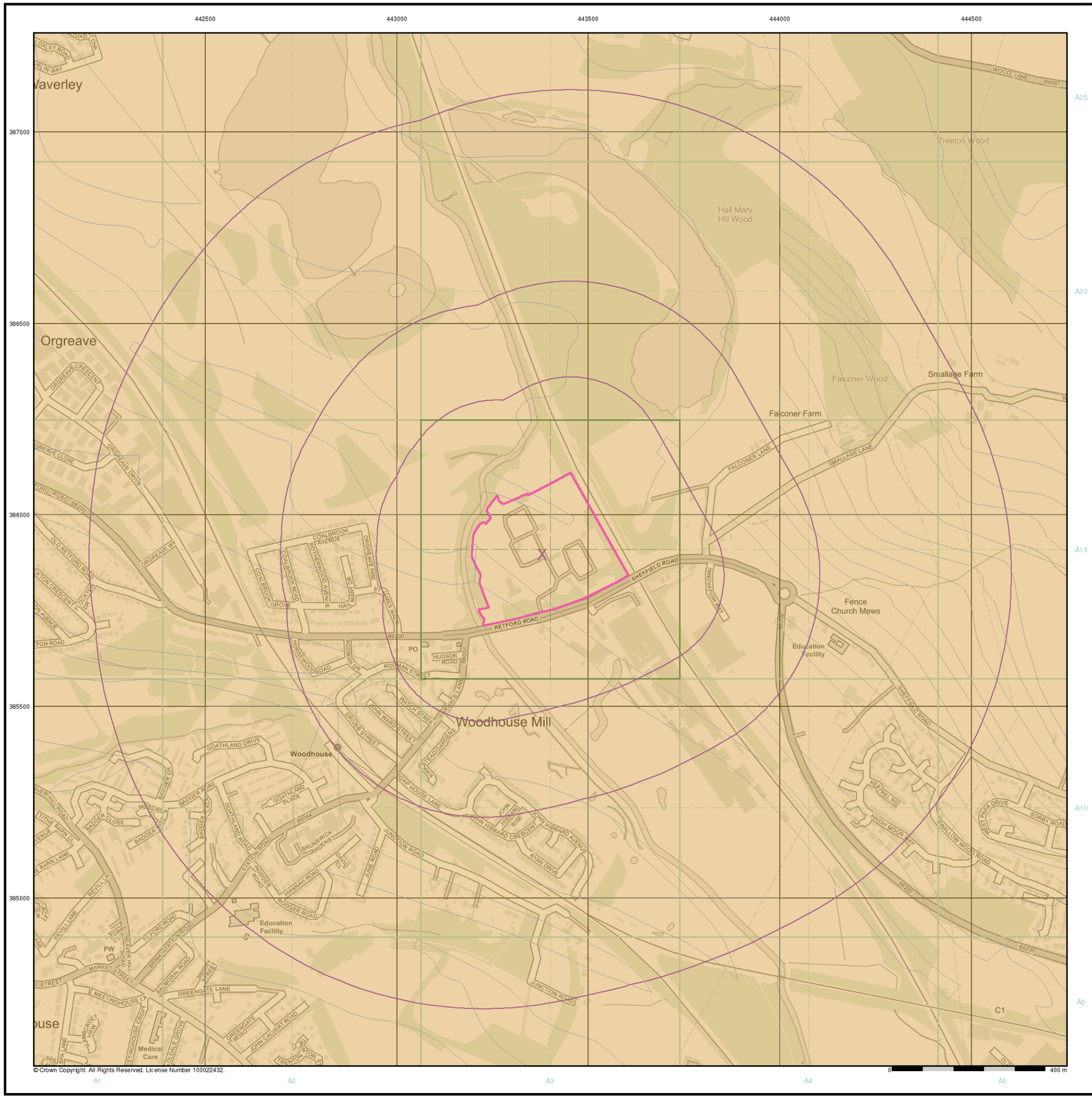

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LANDMARK INFORMATION GROUP®

General

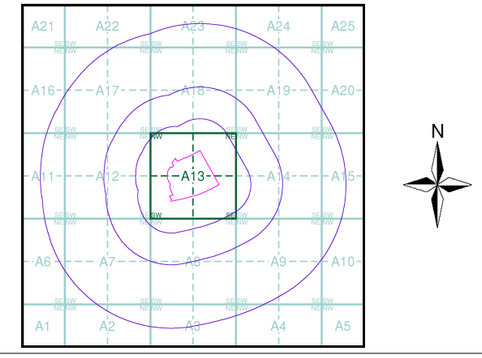
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

Estimated Soil Chemistry Cadmium - Slice A



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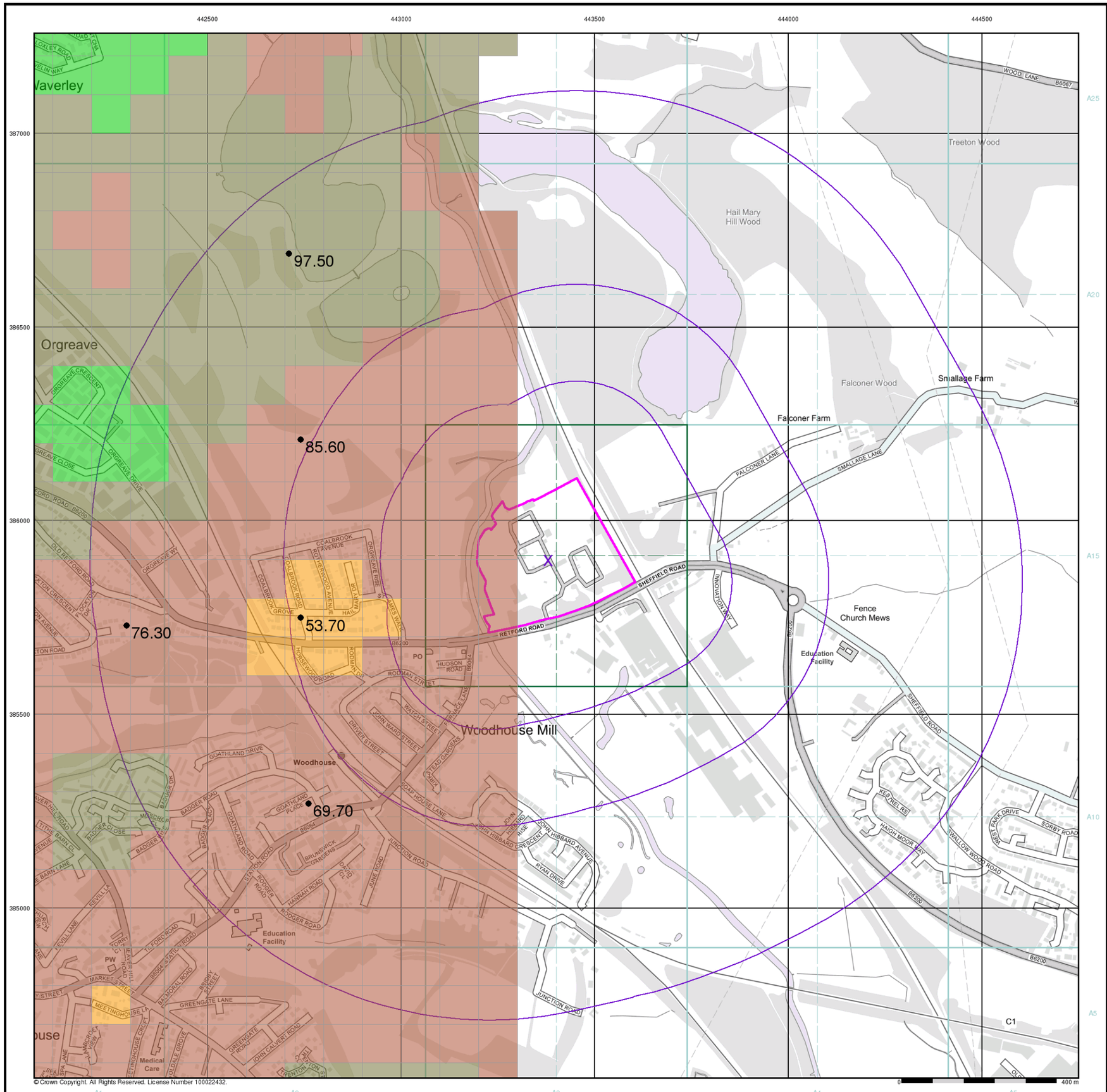

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General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

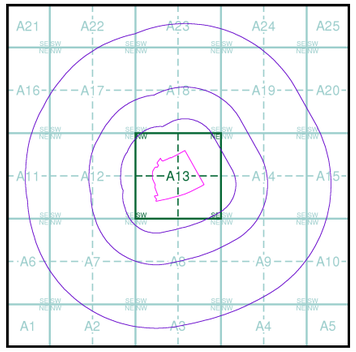
Urban Soil Chemistry Chromium

BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Chromium Concentrations mg/kg

- < 20
- 20 - 40
- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

Urban Soil Chemistry Chromium - Slice A



Order Details

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National Grid Reference:	443380, 385900
Slice:	A
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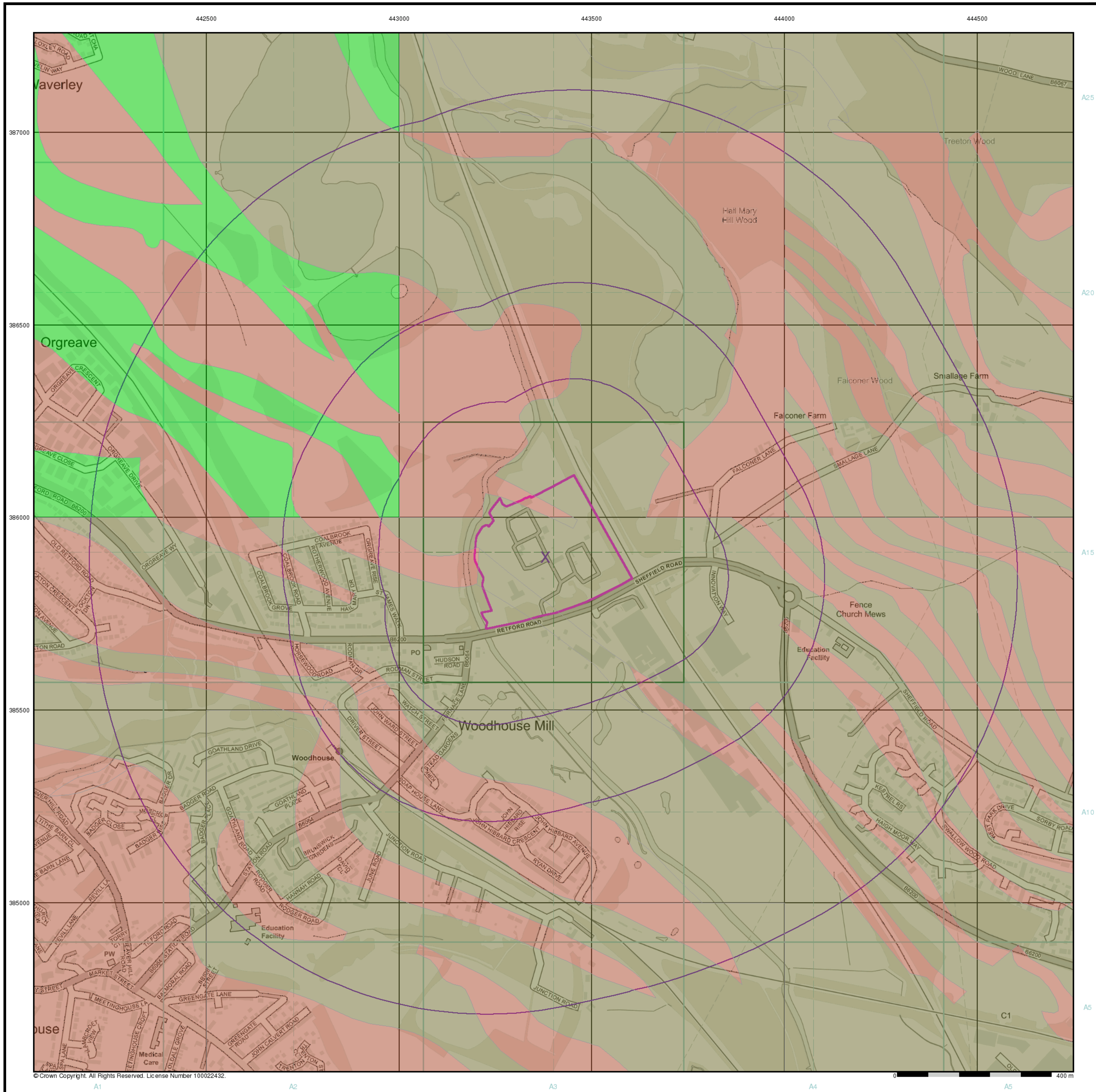

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General

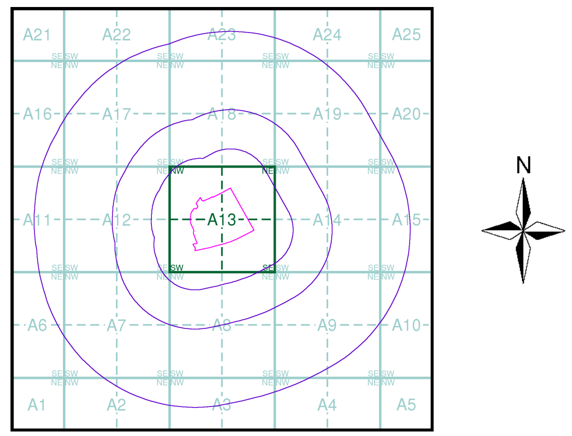
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg

- < 20
- 20 - 40
- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

Estimated Soil Chemistry Chromium - Slice A



Order Details

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Slice: A
Site Area (Ha): 10.21
Search buffer (m): 1000

Site Details

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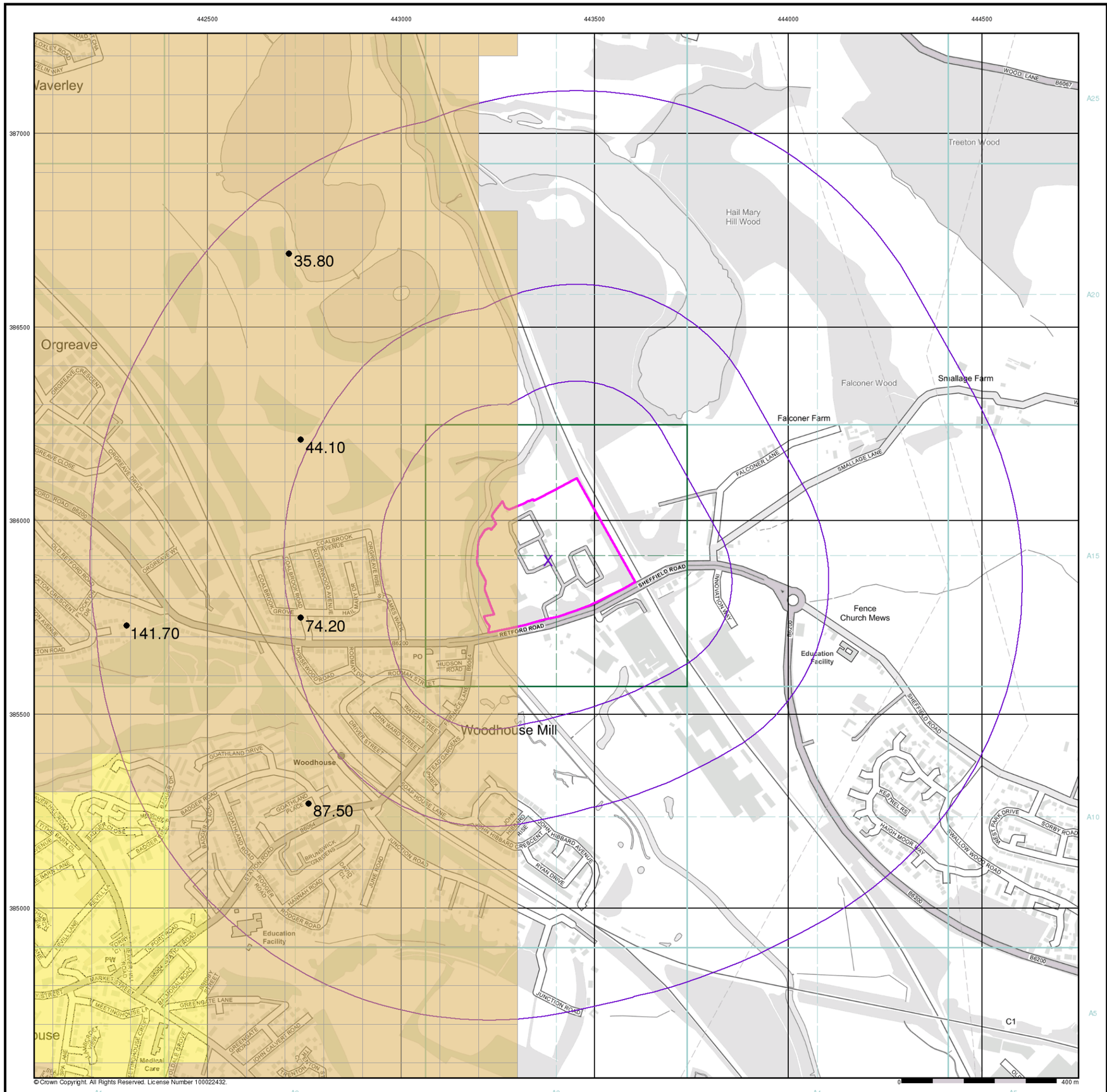

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General

Specified Site | Specified Buffer(s) | Bearing Reference Point

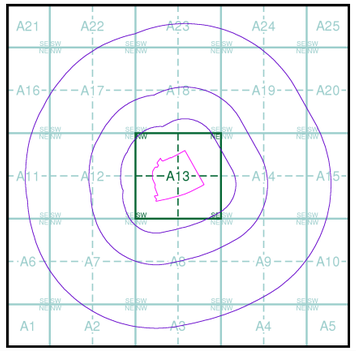
Urban Soil Chemistry Lead

BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Lead Concentrations mg/kg

- < 150
- 150 - 300
- 300 - 600
- 600 - 900
- > 900

Urban Soil Chemistry Lead - Slice A



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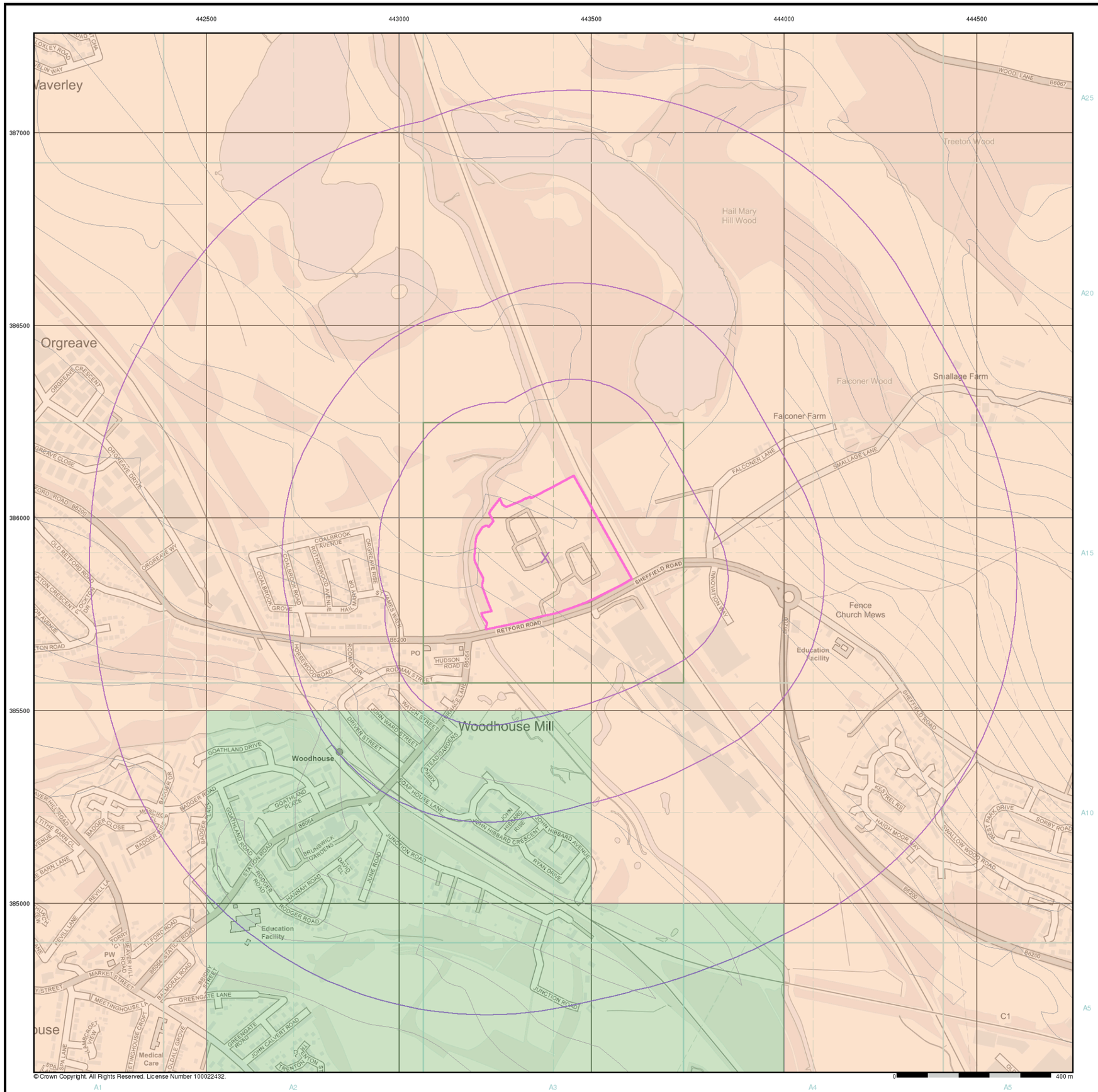

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LANDMARK INFORMATION GROUP®

General

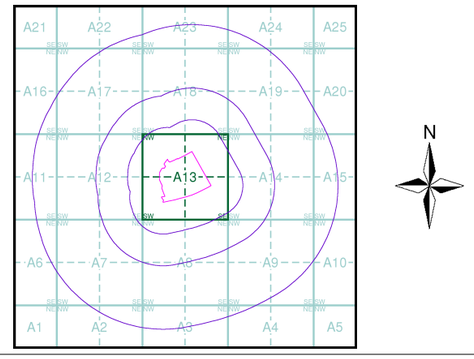
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg

- <100 mg/kg
- 100 - 200
- 200 - 300
- 300 - 600
- 600 - 1200
- >1200

Estimated Soil Chemistry Lead - Slice A



Order Details

Order Details:	261993045_1_1
Customer Ref:	41527254
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Slice:	A
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Site Details

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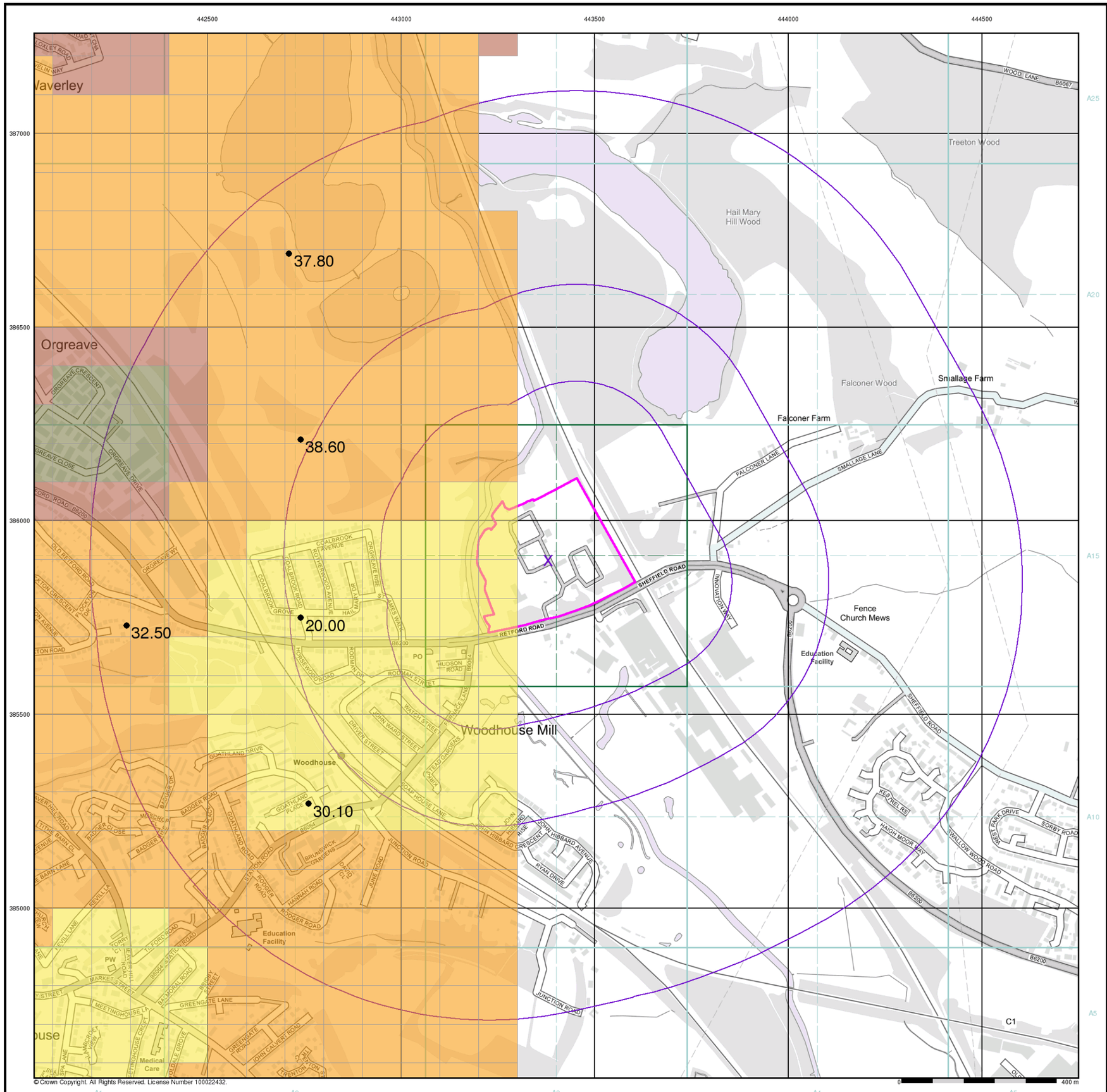

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General

Specified Site | Specified Buffer(s) | X Bearing Reference Point

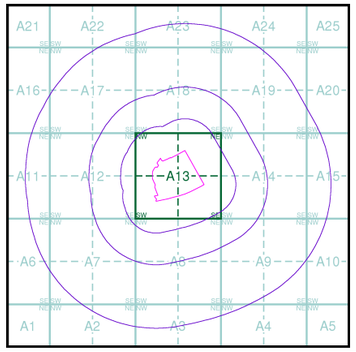
Urban Soil Chemistry Nickel

BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

Urban Soil Chemistry Nickel - Slice A



Order Details

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Site Details

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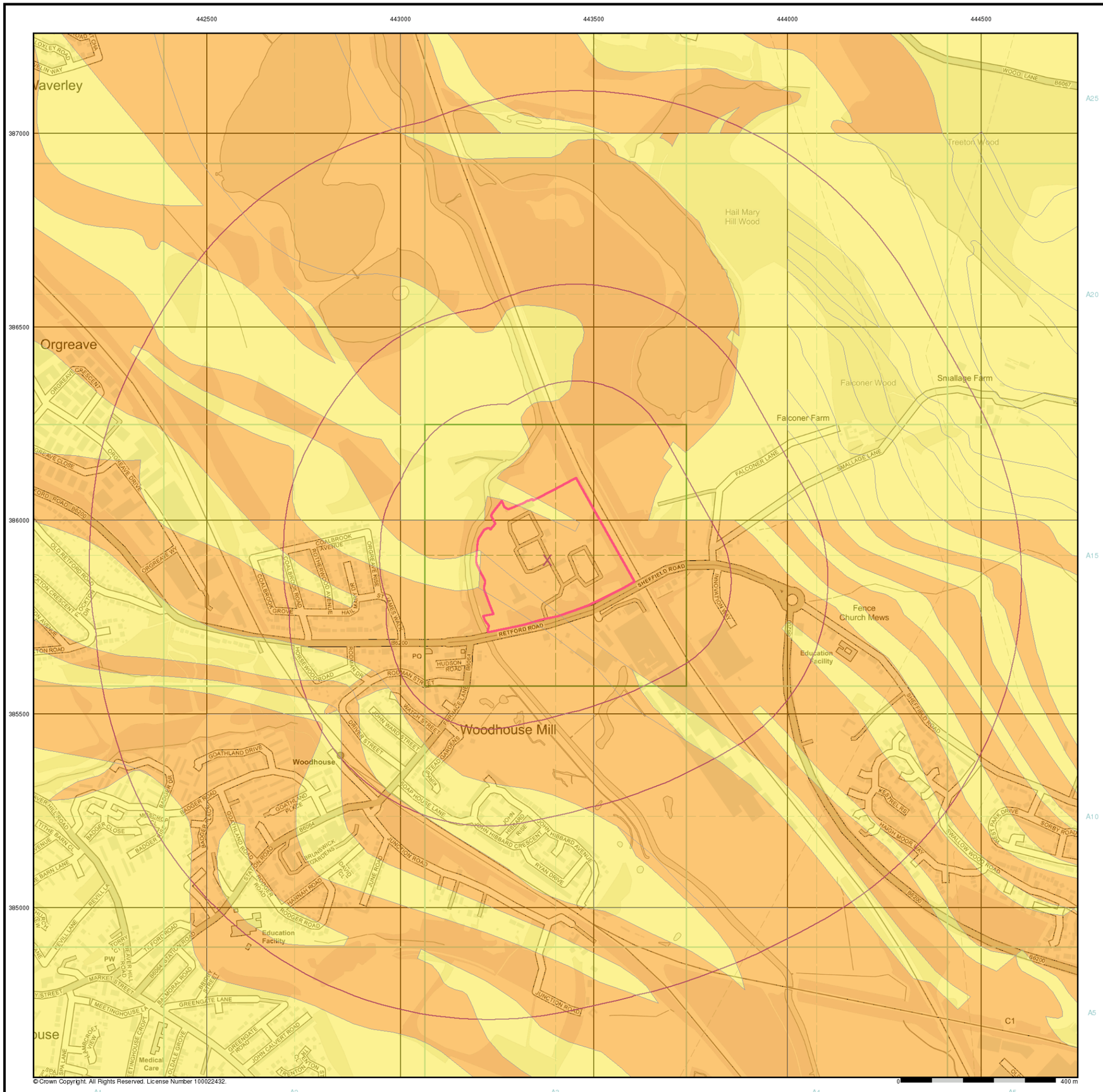

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General

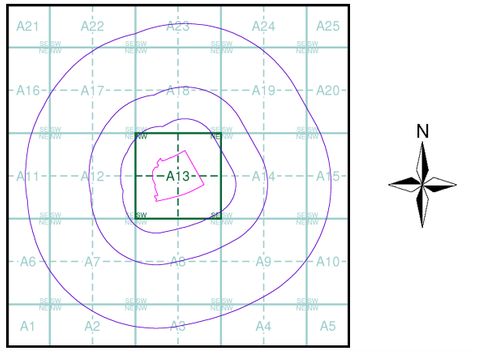
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

Estimated Soil Chemistry Nickel - Slice A



Order Details

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Customer Ref:	41527254
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Site Details

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Order Details:										
Order Number: 261993045										
Customer Ref: 41527254										
National Grid Reference: 443380	385900									
Slice: A										
Site Area (Ha): 10.21										
Search Buffer: 1000										
Site Details: Woodhouse Mill STW	Retford Road	SHEFFIELD	S13 9WG							
A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.										
BGS Boreholes										
Map ID:	Easting:	Northing:	Distance:	Quadrant Reference:	Quadrant Reference:	Bearing Ref:	BGS Reference:	Drilled Length (m):	Borehole Name:	Link to Borehole Scan:

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291	443820	385750	234	A14	SW	E	Sk48nw 719	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws213	Not Available
292	443820	385730	243	A14	SW	E	Sk48nw 458	18	Fence Works Rotherham 4	http://scans.bgs.ac.uk/sobi_scans/boreholes/15612662

293	443790	385650	267	A14	SW	SE	Sk48nw 469	9.1	Fence Works Rotherham 15	http://scans.bgs.ac.uk/sobi_scans/boreholes/15612688
294	443870	385760	278	A14	SW	E	Sk48nw 464	5.25	Fence Works Rotherham 10	http://scans.bgs.ac.uk/sobi_scans/boreholes/15612680
294	443880	385730	297	A14	SW	E	Sk48nw 468	3	Fence Works Rotherham 14	http://scans.bgs.ac.uk/sobi_scans/boreholes/15612686
295	443840	385690	280	A14	SW	SE	Sk48nw 461	4.5	Fence Works Rotherham 7	http://scans.bgs.ac.uk/sobi_scans/boreholes/15612671
296	443880	385750	291	A14	SW	E	Sk48nw 718	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws211	Not Available
297	443900	385800	299	A14	SW	E	Sk48nw 723	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws217	Not Available

297	443900	385770	304	A14	SW	E	Sk48nw 722	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws216	Not Available
297	443920	385820	316	A14	SW	E	Sk48nw 694	Not Supplied	Rotherham Tp152	Not Available
297	443930	385800	328	A14	SW	E	Sk48nw 693	Not Supplied	Rotherham Tp151	Not Available
297	443930	385790	330	A14	SW	E	Sk48nw 684	Not Supplied	Rotherham 103	Not Available
297	443950	385780	351	A14	SW	E	Sk48nw 708	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws201	Not Available
298	443870	385700	301	A14	SW	E	Sk48nw 711	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws204	Not Available
298	443880	385700	310	A14	SW	E	Sk48nw 698	Not Supplied	Rotherham Tp156	Not Available
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298	443880	385700	310	A14	SW	E	Sk48nw 700	Not Supplied	Rotherham Tp158	Not Available
298	443860	385660	314	A14	SW	SE	Sk48nw 712	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws205	Not Available
298	443890	385700	319	A14	SW	E	Sk48nw 687	Not Supplied	Rotherham 106	Not Available
298	443910	385710	333	A14	SW	E	Sk48nw 710	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws203	Not Available

298	443930	385730	344	A14	SW	E	Sk48nw 709	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws202	Not Available
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299	443920	385820	316	A14	SW	E	Sk48nw 466	2.8	Fence Works Rotherham 12	http://scans.bgs.ac.uk/sobi_scans/boreholes/15612683
300	443880	385650	336	A14	SW	SE	Sk48nw 713	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws206	Not Available
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300	443950	385670	386	A14	SW	E	Sk48nw 729	Not Supplied	Fence Workshop Woodhouse Mill Sheffield Ws224	Not Available
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302	443960	385780	361	A14	SW	E	Sk48nw 467	10	Fence Works Rotherham 13	http://scans.bgs.ac.uk/sobi_scans/boreholes/15612685
302	444000	385760	404	A14	SW	E	Sk48nw 76	6	A57 Aston Relief Rd B1	http://scans.bgs.ac.uk/sobi_scans/boreholes/786127

302	444010	385730	421	A14	SW	E	Sk48nw 93	6	A57 Aston Relief Rd C1	http://scans.bgs.ac.uk/sobi_scans/boreholes/786144
303	443950	385730	363	A14	SW	E	Sk48nw 465	12.6	Fence Works Rotherham 11	http://scans.bgs.ac.uk/sobi_scans/boreholes/15612681
304	443960	385750	367	A14	SW	E	Sk48nw 692	Not Supplied	Rotherham Tp150	Not Available
304	443970	385720	385	A14	SW	E	Sk48nw 703	Not Supplied	Rotherham Tp161	Not Available
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306	443930	385580	418	A14	SW	SE	Sk48nw 736	Not Supplied	Land Adjacent To Laycast Mill Tp207	Not Available
306	443960	385560	454	A9	NW	SE	Sk48nw 733	Not Supplied	Land Adjacent To Laycast Mill Tp204	Not Available

306	443970	385570	456	A9	NW	SE	Sk48nw 734	Not Supplied	Land Adjacent To Laycast Mill Tp205	Not Availabl e
306	443970	385540	474	A9	NW	SE	Sk48nw 743	Not Supplied	Land Adjacent To Laycast Mill Tp214	Not Availabl e
306	443980	385550	476	A9	NW	SE	Sk48nw 744	Not Supplied	Land Adjacent To Laycast Mill Tp215	Not Availabl e
306	443980	385530	488	A9	NW	SE	Sk48nw 742	Not Supplied	Land Adjacent To Laycast Mill Tp213	Not Availabl e
307	444010	385710	427	A14	SW	E	Sk48nw 87	6	A57 Aston Relief Rd A1	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786138
308	443900	385530	430	A9	NW	SE	Sk48nw 737	Not Supplied	Land Adjacent To Laycast Mill Tp208	Not Availabl e
308	443920	385510	458	A9	NW	SE	Sk48nw 741	Not Supplied	Land Adjacent To Laycast Mill Tp212	Not Availabl e
309	443590	385360	431	A8	NE	S	Sk48nw 96	9.8	A57 Aston Relief Rd D2	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786147

310	444000	385660	435	A14	SW	E	Sk48nw 77	5	A57 Aston Relief Rd B2	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786128
310	444000	385630	449	A14	SW	SE	Sk48nw 94	7	A57 Aston Relief Rd C2	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786145
311	443990	385600	455	A14	SW	SE	Sk48nw 78	10	A57 Aston Relief Rd B3	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786129
311	443990	385560	478	A9	NW	SE	Sk48nw 88	10	A57 Aston Relief Rd A2	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786139
312	443910	385480	474	A9	NW	SE	Sk48nw 738	Not Supplied	Land Adjacent To Laycast Mill Tp209	Not Availabl e
313	444067	385691	487	A14	SW	E	Sk48nw 17	35.97	Orgreav e No.6 Bh	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786068
314	443970	385500	500	A9	NW	SE	Sk48nw 740	Not Supplied	Land Adjacent To Laycast Mill Tp211	Not Availabl e

315	444043	386113	516	A14	NW	E	Sk48nw 7	254.51	Orgreave Collieries No.1 (Fench Surface Bh)	http://scans.bgs.ac.uk/sobi_scans/boreholes/786057
316	443950	385450	522	A9	NW	SE	Sk48nw 739	Not Supplied	Land Adjacent To Laycast Mill Tp210	Not Available
316	443980	385440	550	A9	NW	SE	Sk48nw 730	Not Supplied	Land Adjacent To Laycast Mill Tp201	Not Available
316	443980	385430	557	A9	NW	SE	Sk48nw 731	Not Supplied	Land Adjacent To Laycast Mill Tp202	Not Available
316	443980	385410	572	A9	NW	SE	Sk48nw 732	Not Supplied	Land Adjacent To Laycast Mill Tp203	Not Available
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317	444010	385510	524	A9	NW	SE	Sk48nw 79	6	A57 Aston Relief Rd B4	http://scans.bgs.ac.uk/sobi_scans/boreholes/786130
318	443180	386570	527	A18	SW	N	Sk48nw 362	Not Supplied	Orgrave Colliery 39	Not Available

319	444020	385460	564	A9	NW	SE	Sk48nw 80	2	A57 Aston Relief Rd B5	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786131
319	444030	385430	592	A9	NW	SE	Sk48nw 89	3	A57 Aston Relief Rd A3	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786140
320	444129	385575	589	A14	SE	SE	Sk48nw 18	33.53	Orgreav e No.7 Bh	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786069
321	443133	385085	633	A8	SW	S	Sk48nw 32	5.18	Suspect ed Shaft At No.33 Junction Rd Woodho use	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786083
322	444050	385360	656	A9	NW	SE	Sk48nw 81	3	A57 Aston Relief Rd B6	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786132
323	442590	386210	664	A12	NW	W	Sk48nw 349	Not Supplied	Orgrave, Sheffield 2	Not Availabl e
324	443750	385170	666	A9	SW	SE	Sk48nw 97	9.7	A57 Aston Relief Rd D3	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786148
325	442530	386180	710	A12	NW	W	Sk48nw 348	Not Supplied	Orgrave, Sheffield 1	Not Availabl e

326	444059	386496	718	A19	SW	NE	Sk48nw 10	14.94	Orgreave Colliery No.2 Ugbh	http://scans.bgs.ac.uk/sobi_scans/boreholes/786060
327	442540	386230	718	A12	NW	W	Sk48nw 350	Not Supplied	Orgrave, Sheffield 3	Not Available
327	442540	386230	718	A12	NW	W	Sk48nw 352	Not Supplied	Orgrave, Sheffield 3b	Not Available
328	444090	385280	743	A9	NE	SE	Sk48nw 82	5	A57 Aston Relief Rd B7	http://scans.bgs.ac.uk/sobi_scans/boreholes/786133
329	444180	386381	766	A19	SE	NE	Sk48nw 9	12.8	Orgreave Colliery No.1 Ugbh	http://scans.bgs.ac.uk/sobi_scans/boreholes/786059
330	442500	386270	771	A17	SW	NW	Sk48nw 351	Not Supplied	Orgrave, Sheffield 4	Not Available
331	442570	386470	806	A17	SW	NW	Sk48nw 372	Not Supplied	Orgrave Colliery 48	Not Available
332	444140	385230	813	A9	SE	SE	Sk48nw 90	4	A57 Aston Relief Rd A4	http://scans.bgs.ac.uk/sobi_scans/boreholes/786141
332	444150	385190	850	A9	SE	SE	Sk48nw 83	3	A57 Aston Relief Rd B9	http://scans.bgs.ac.uk/sobi_scans/boreholes/786134

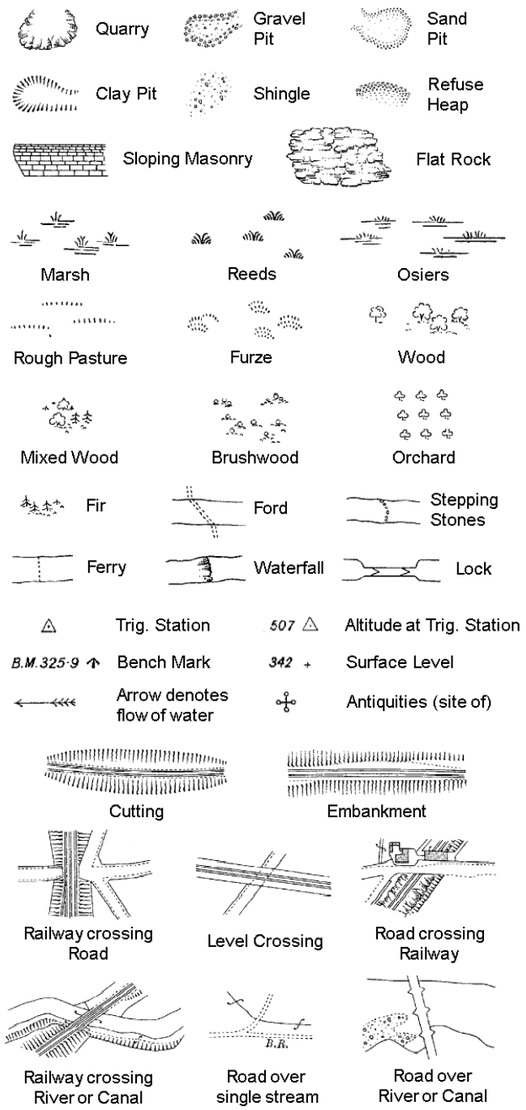
332	444190	385160	899	A9	SE	SE	Sk48nw 91	4	A57 Aston Relief Rd A5	http://scans.bgs.ac.uk/sobi_scans/boreholes/786142
333	442520	386420	823	A17	SW	NW	Sk48nw 373	Not Supplied	Orgrave Colliery 49	Not Available
334	442940	386810	826	A17	NE	NW	Sk48nw 363	Not Supplied	Orgrave Colliery 40	Not Available
334	442960	386850	856	A17	NE	NW	Sk48nw 364	Not Supplied	Orgrave Colliery 41	Not Available
335	442464	385337	850	A7	NW	SW	Sk48nw 40	1	Badger Estate Woodhouse Tp 8	http://scans.bgs.ac.uk/sobi_scans/boreholes/786091
336	442498	385268	853	A7	NW	SW	Sk48nw 41	1	Badger Estate Woodhouse Tp 9	http://scans.bgs.ac.uk/sobi_scans/boreholes/786092
336	442477	385226	893	A7	SW	SW	Sk48nw 51	2	Brookwood Pk Sch,Woodhouse Bh2	http://scans.bgs.ac.uk/sobi_scans/boreholes/786102
337	442980	386880	877	A17	NE	N	Sk48nw 366	Not Supplied	Orgrave Colliery 43	Not Available
337	442970	386890	890	A17	NE	N	Sk48nw 365	Not Supplied	Orgrave Colliery 42	Not Available
338	442511	385142	914	A7	SW	SW	Sk48nw 50	1	Brookwood Pk Sch,Woodhouse Bh1	http://scans.bgs.ac.uk/sobi_scans/boreholes/786101

338	442478	385111	960	A7	SW	SW	Sk48nw 47	1	Badger Estate Woodhouse Tp 15	http://scans.bgs.ac.uk/sobi_scans/boreholes/786098
339	442425	385271	915	A7	NW	SW	Sk48nw 39	2	Badger Estate Woodhouse Tp 7	http://scans.bgs.ac.uk/sobi_scans/boreholes/786090
340	443650	384860	925	A3	NE	S	Sk48sw 260	Not Supplied	Beighton Sidings Be23	Not Available
340	443690	384840	956	A3	NE	S	Sk48sw 259	Not Supplied	Beighton Sidings Tp Be22	Not Available
341	442580	386700	942	A17	NW	NW	Sk48nw 371	Not Supplied	Orgrave Colliery 47	Not Available
342	442439	385179	951	A7	SW	SW	Sk48nw 52	1	Brookwood Pk Sch,Woodhouse Bh3	http://scans.bgs.ac.uk/sobi_scans/boreholes/786103
343	444220	385100	964	A9	SE	SE	Sk48nw 84	4	A57 Aston Relief Rd B10	http://scans.bgs.ac.uk/sobi_scans/boreholes/786135
344	442395	385206	973	A7	SW	SW	Sk48nw 42	2	Badger Estate Woodhouse Tp 10	http://scans.bgs.ac.uk/sobi_scans/boreholes/786093

345	444060	384980	974	A9	SW	SE	Sk48sw 101	10.3	A57 Aston Relief Rd D4	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 758030
346	442505	385049	979	A7	SW	SW	Sk48nw 46	1	Badger Estate Woodho use Tp 14	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786097
346	442467	385080	988	A7	SW	SW	Sk48nw 54	1	Brookwo od Pk Sch,Wo odhouse Bh6	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786105
347	443740	384830	981	A4	NW	S	Sk48sw 258	Not Supplied	Beighton Sidings Tp Be21	Not Availabl e
348	442359	385243	986	A6	NE	SW	Sk48nw 43	1	Badger Estate Woodho use Tp 11	http:// scans.bg s.ac.uk/ sobi_sca ns/ borehole s/ 786094

Historical Mapping Legends

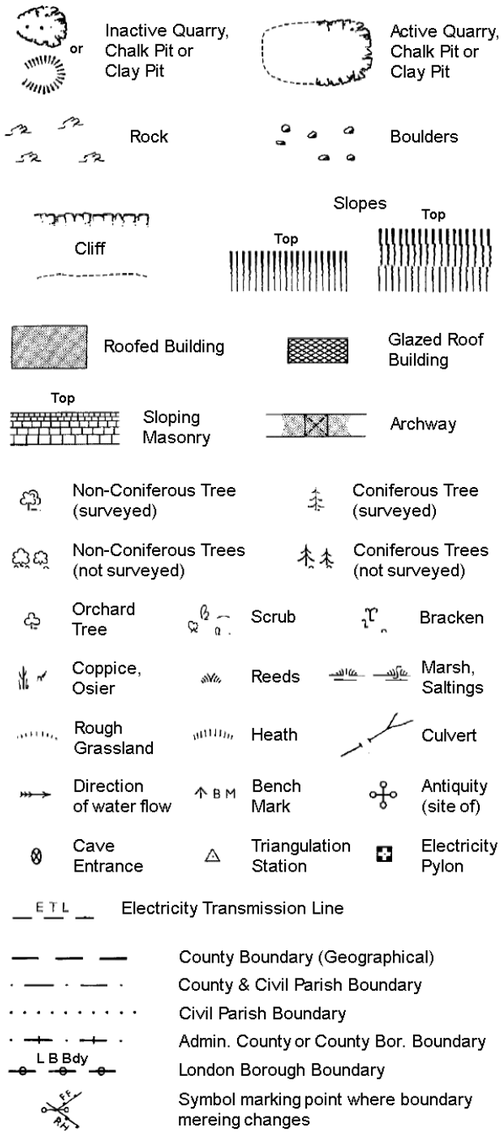
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

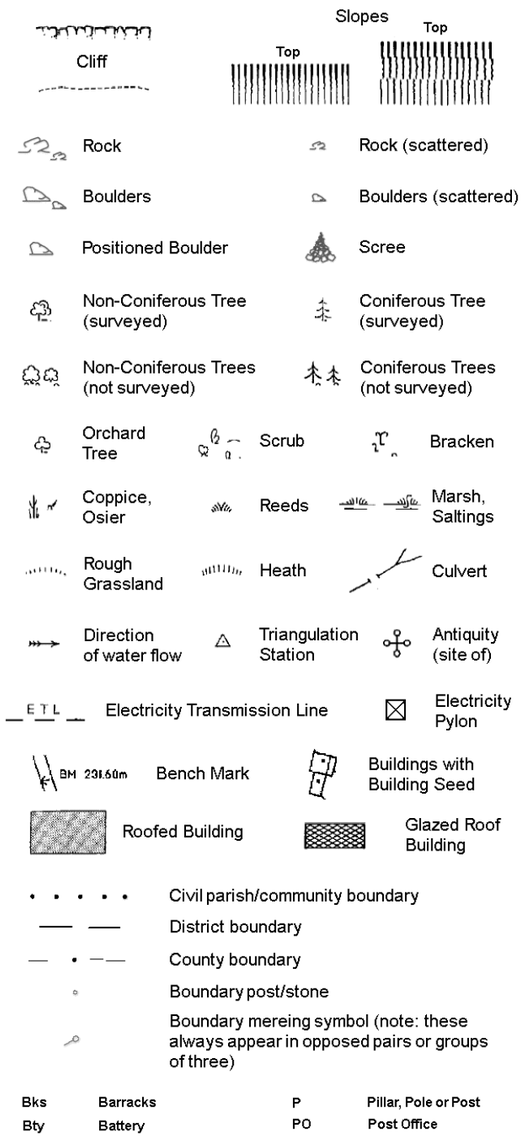
Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



County Boundary (Geographical)
County & Civil Parish Boundary
Civil Parish Boundary
Admin. County or County Bor. Boundary
L B Bdy London Borough Boundary
Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Civil parish/community boundary
District boundary
County boundary
Boundary post/stone
Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

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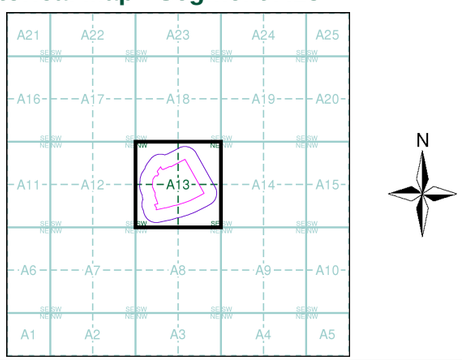
Historical Mapping & Photography included:

Historical Map - Segment A13



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	100

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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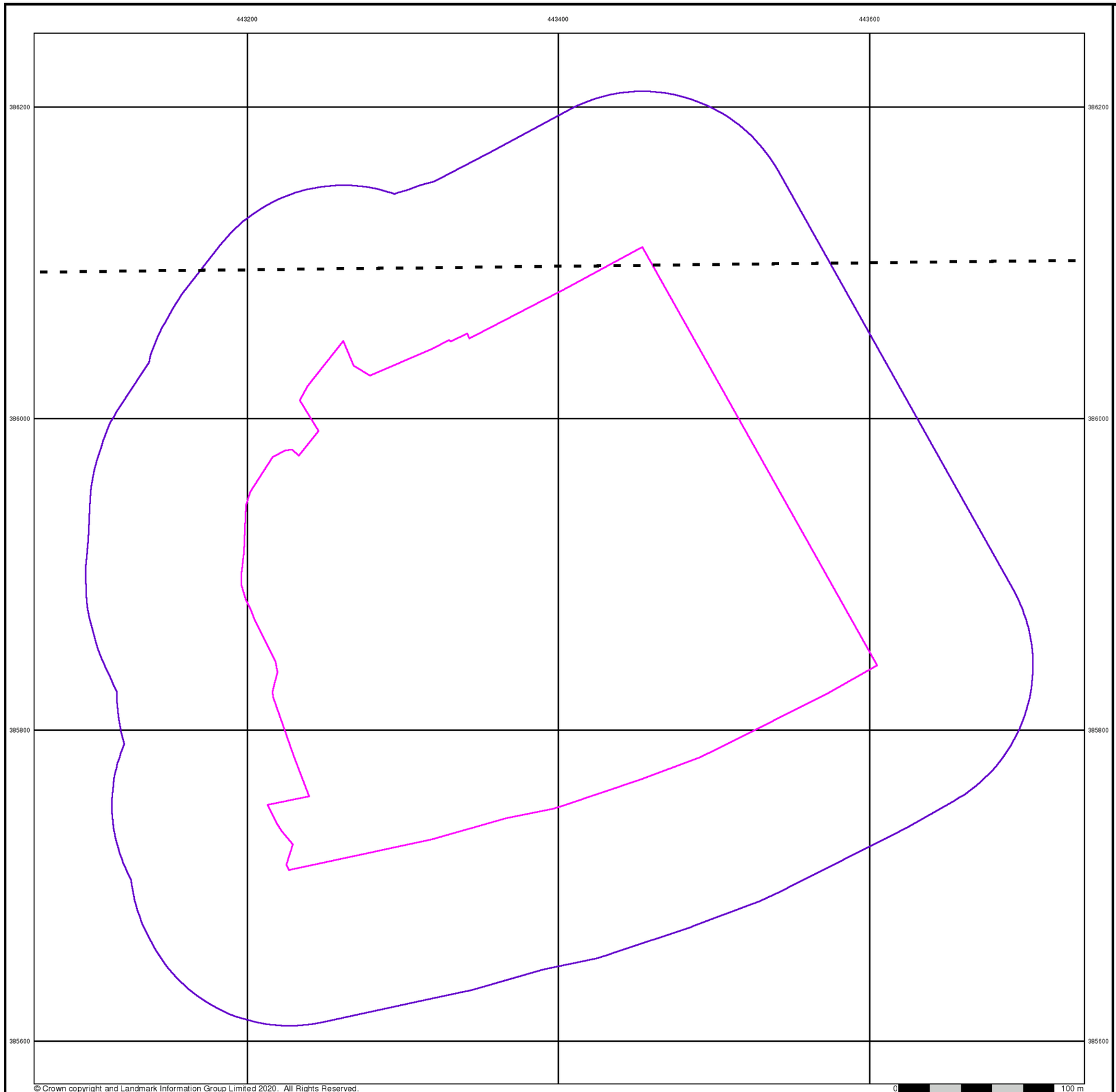
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck®

LANDMARK INFORMATION GROUP®

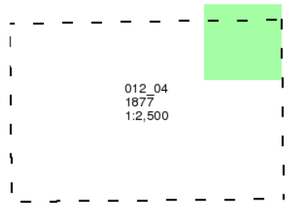
Derbyshire

Published 1877

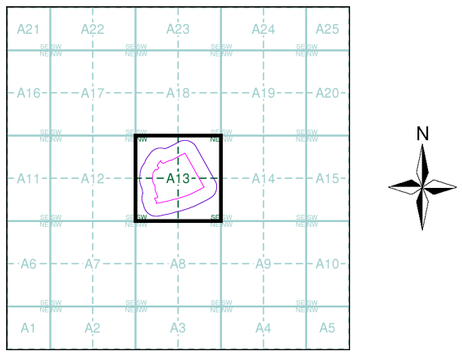
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	100

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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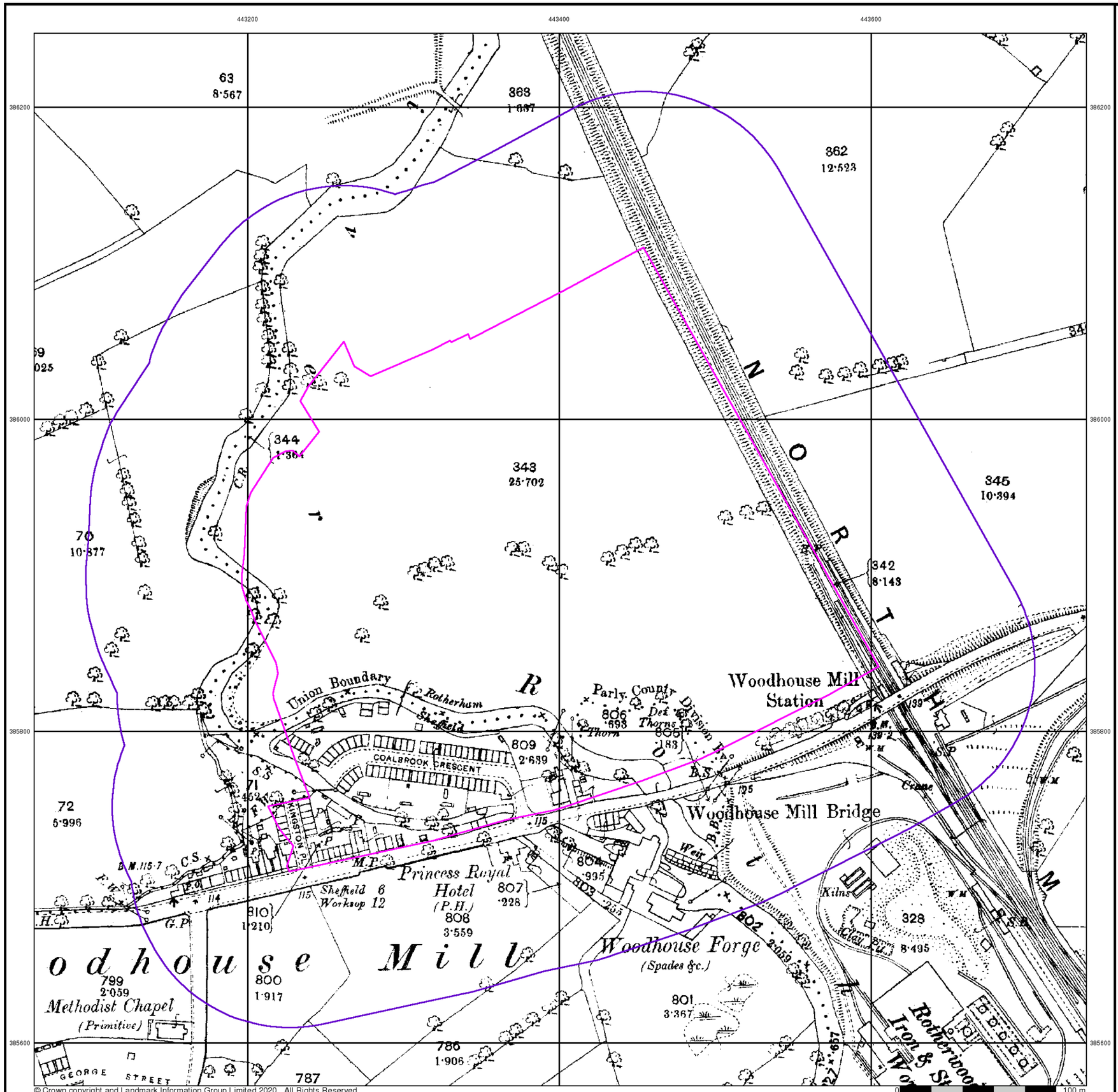

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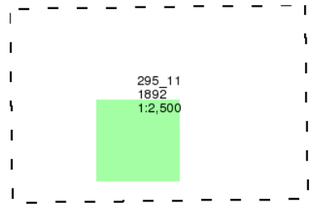
Yorkshire

Published 1892

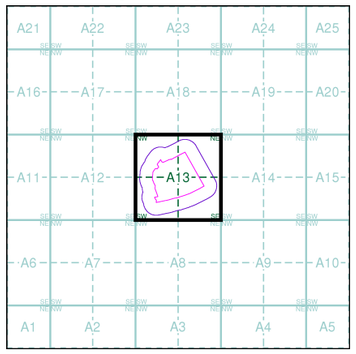
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	100

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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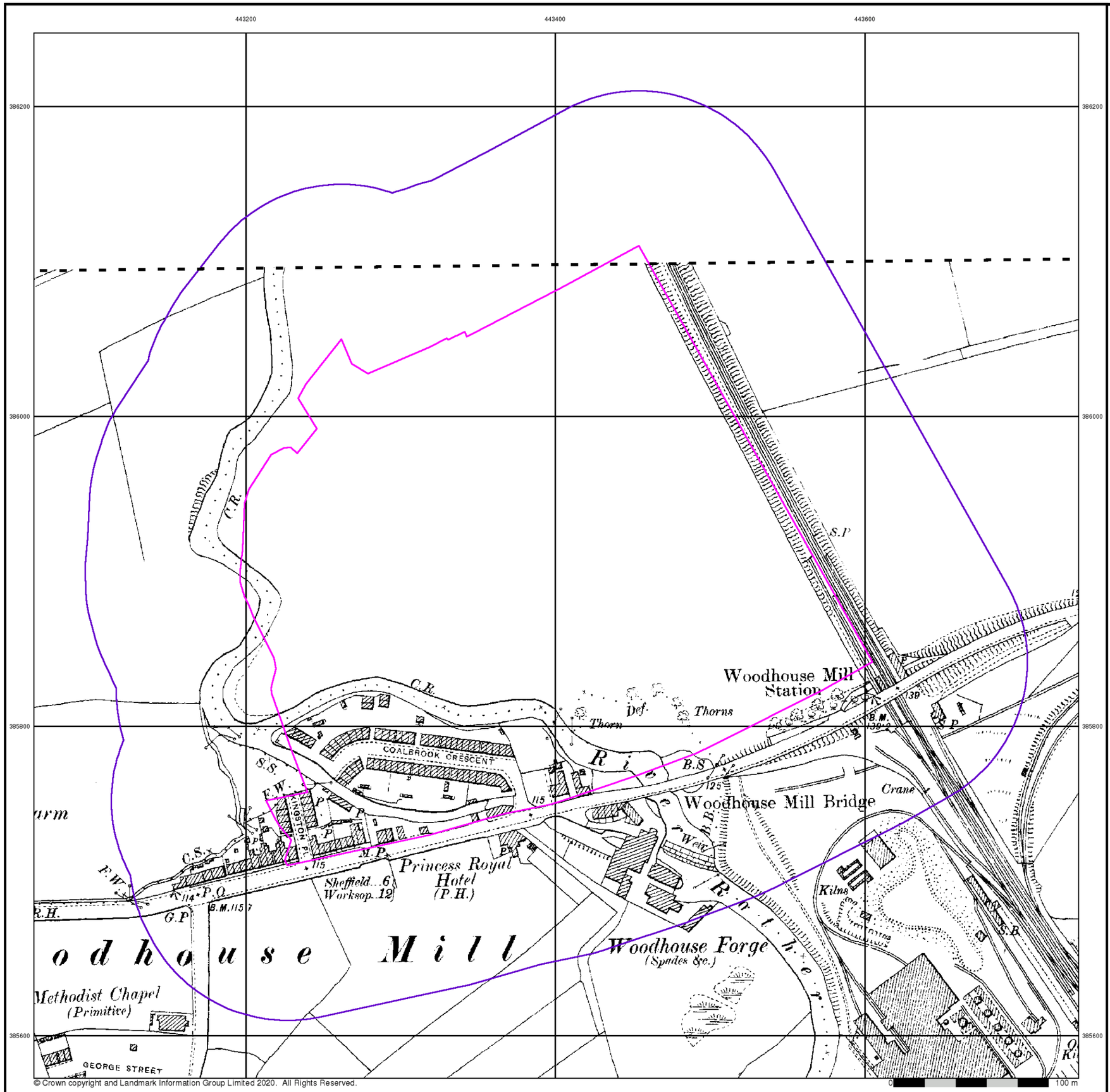
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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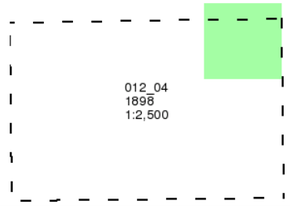
Derbyshire

Published 1898

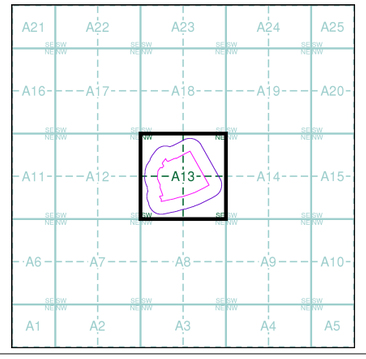
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



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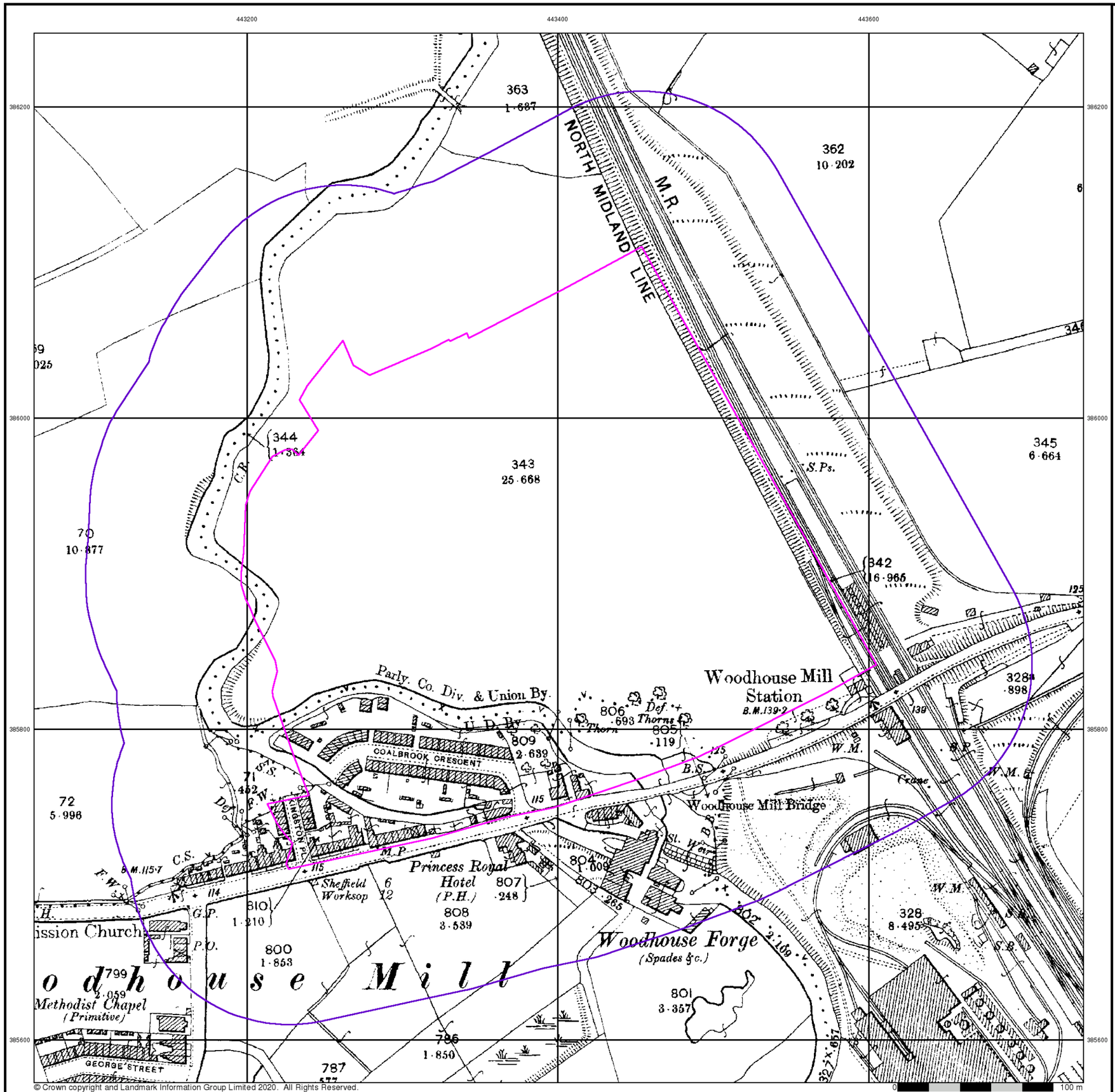

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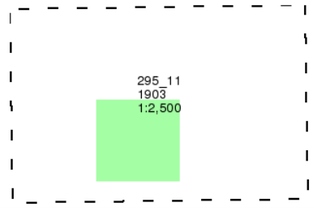
Yorkshire

Published 1903

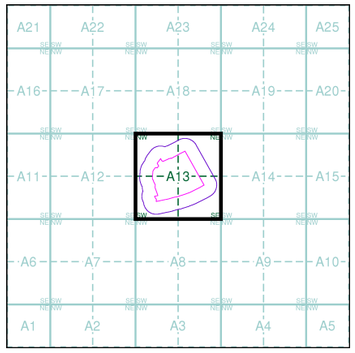
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



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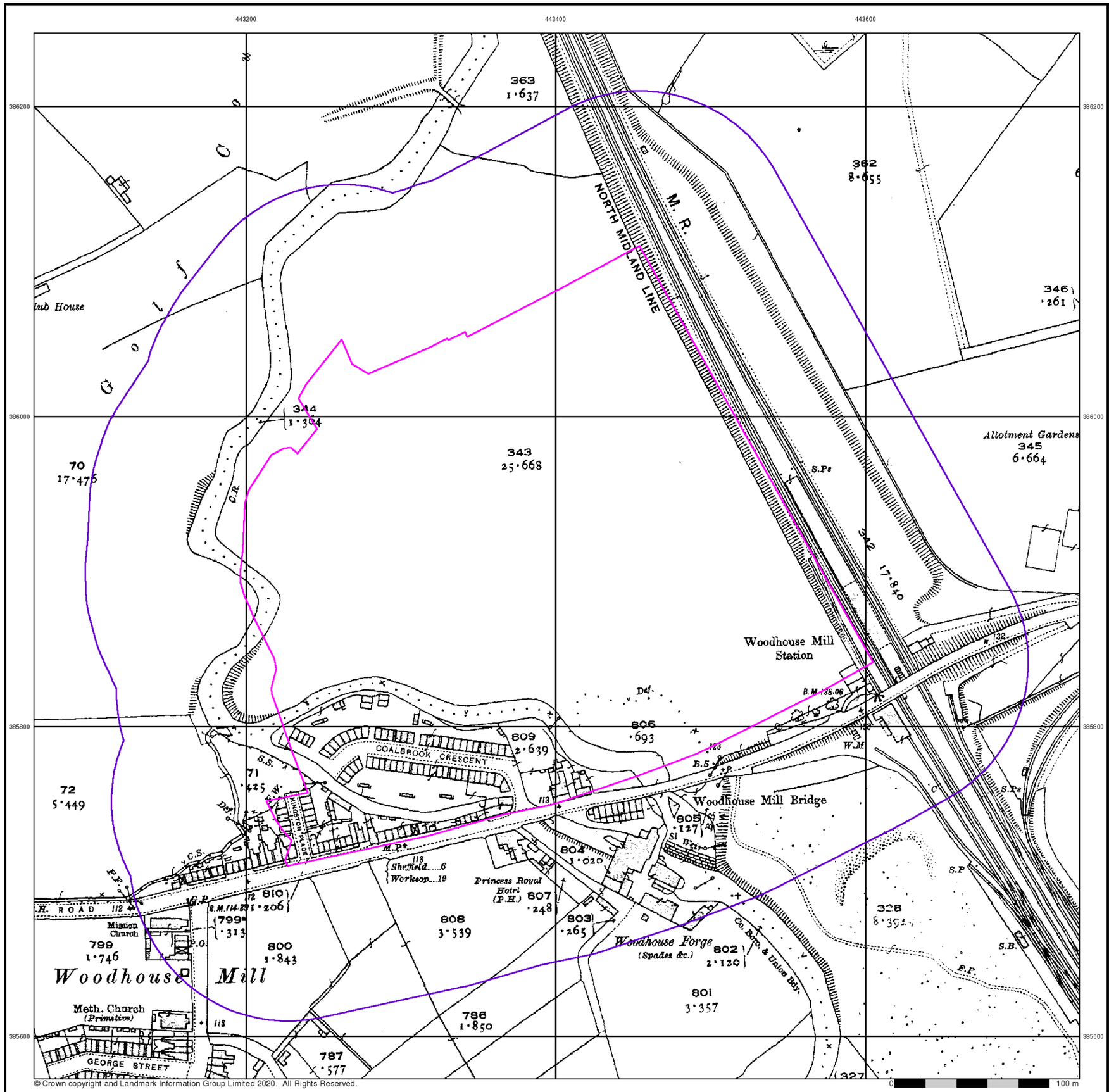

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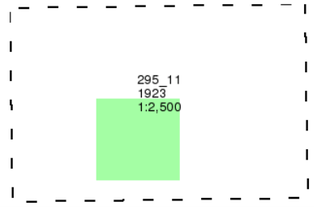
Yorkshire

Published 1923

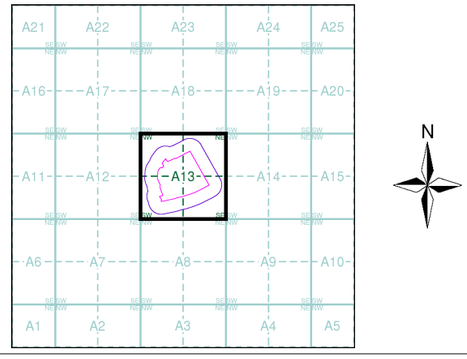
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



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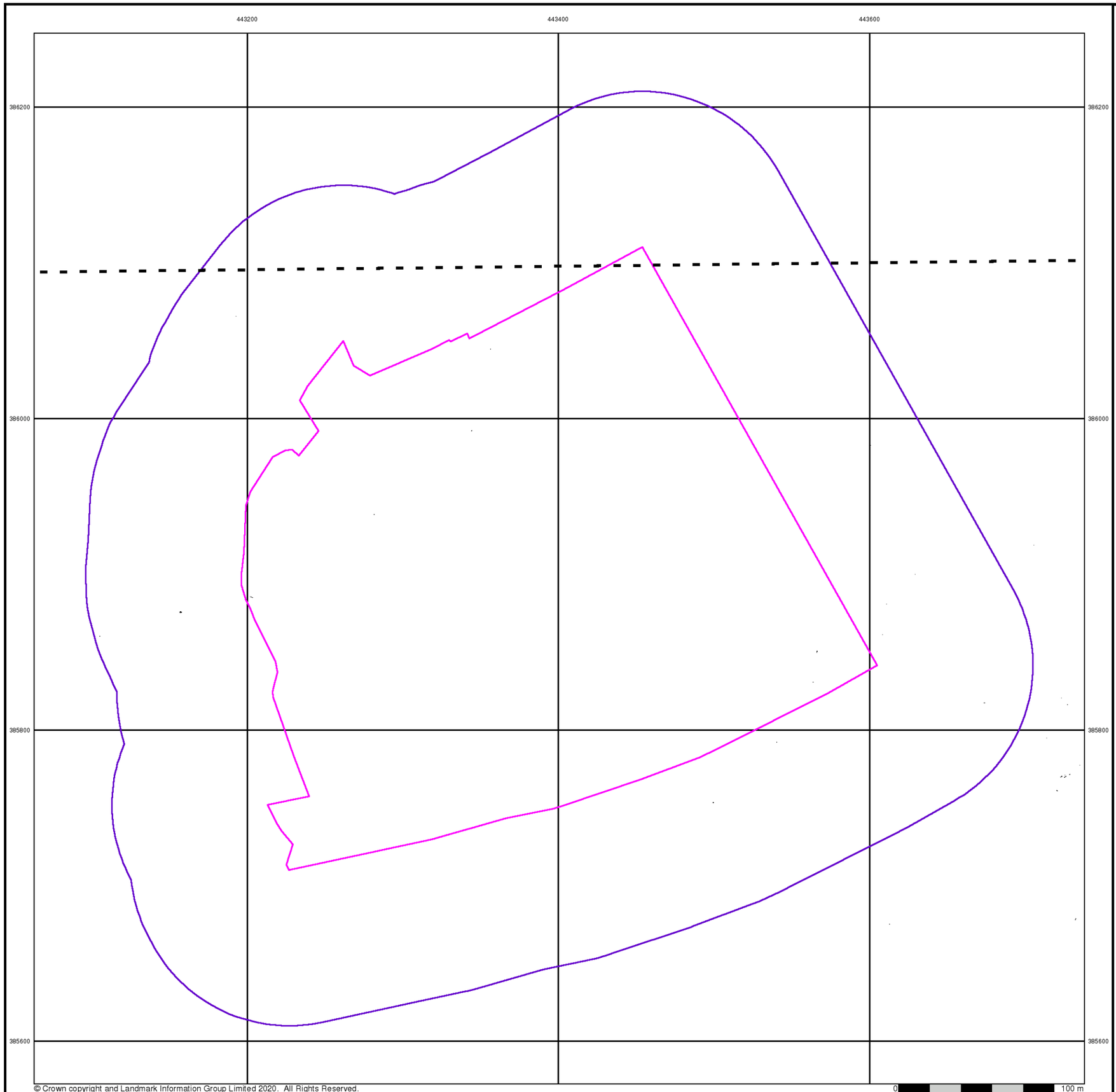

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Derbyshire

Published 1923

Source map scale - 1:2,500

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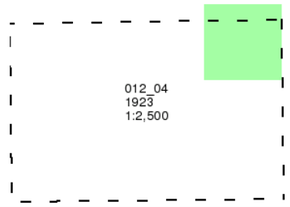
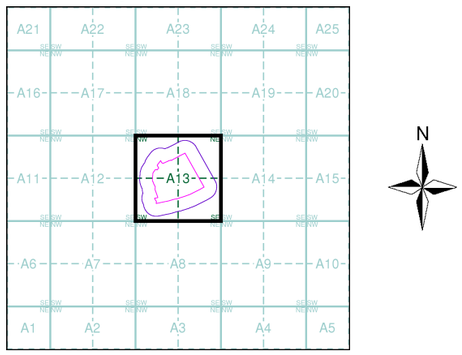
Map Name(s) and Date(s)



Historical Map - Segment A13



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Slice:	A
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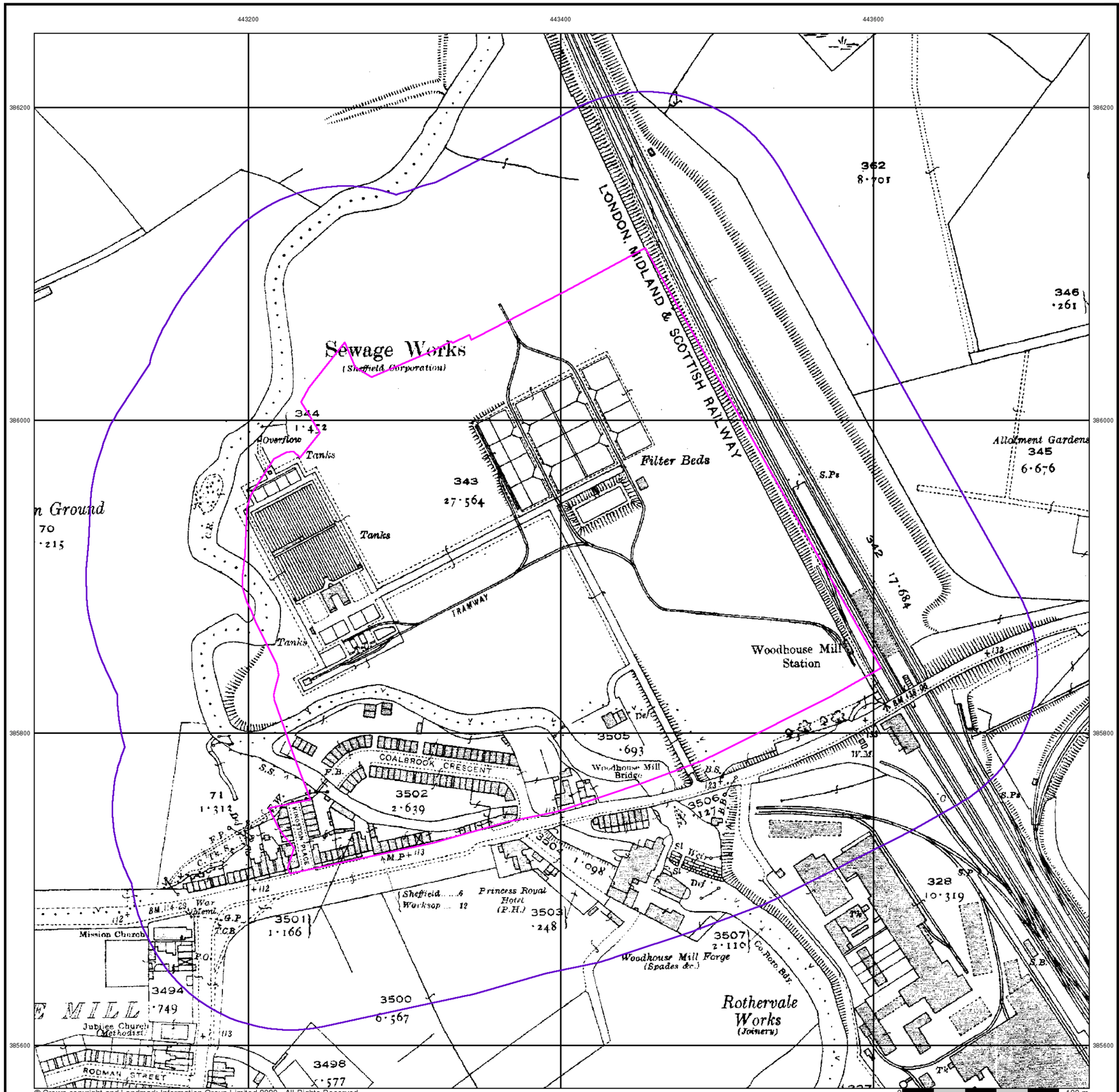

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Yorkshire

Published 1935

Source map scale - 1:2,500

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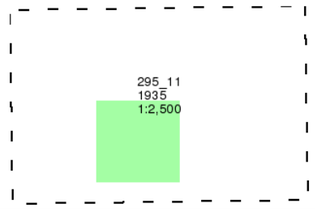
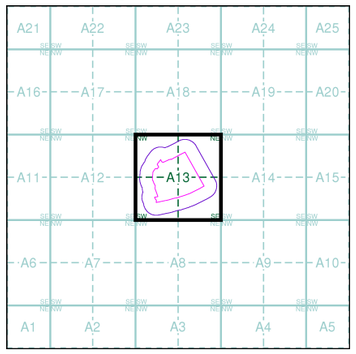
Map Name(s) and Date(s)



Historical Map - Segment A13



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Ordnance Survey Plan

Published 1956

Source map scale - 1:2,500

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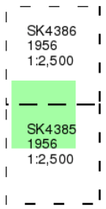
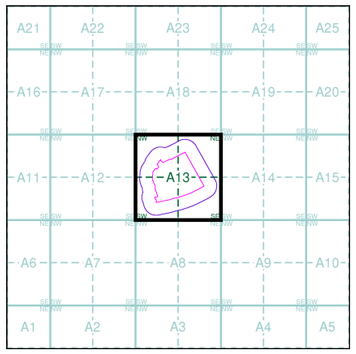


Historical Map - Segment A13



Order Details

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Ordnance Survey Plan

Published 1969

Source map scale - 1:1,250

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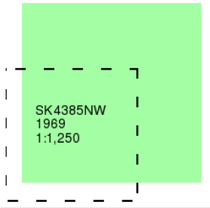
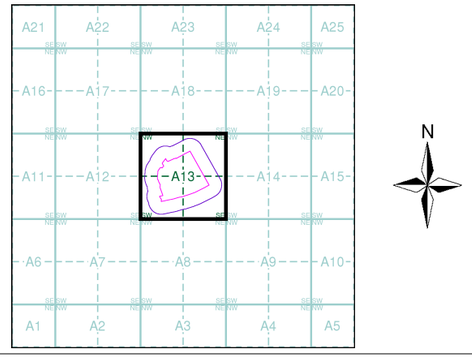
Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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Site Details

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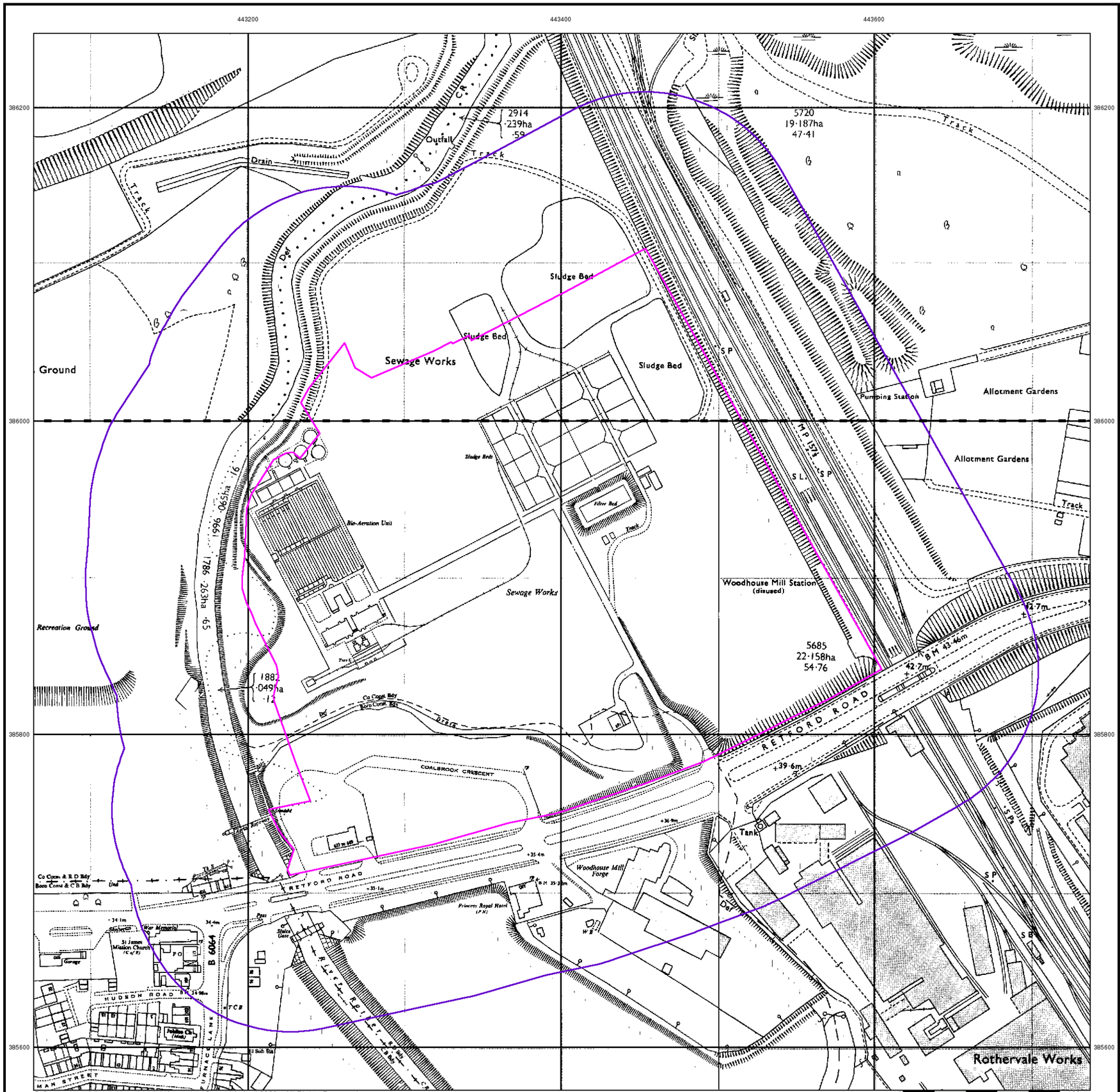

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Ordnance Survey Plan

Published 1971 - 1975

Source map scale - 1:2,500

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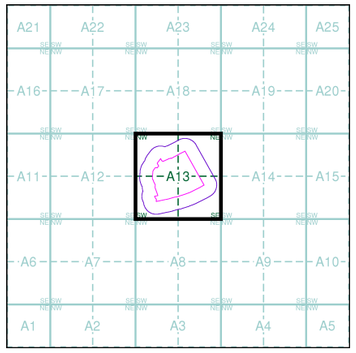
Map Name(s) and Date(s)

SK4386
1975
1:2,500

SK4385
1971
1:2,500

Historical Map - Segment A13



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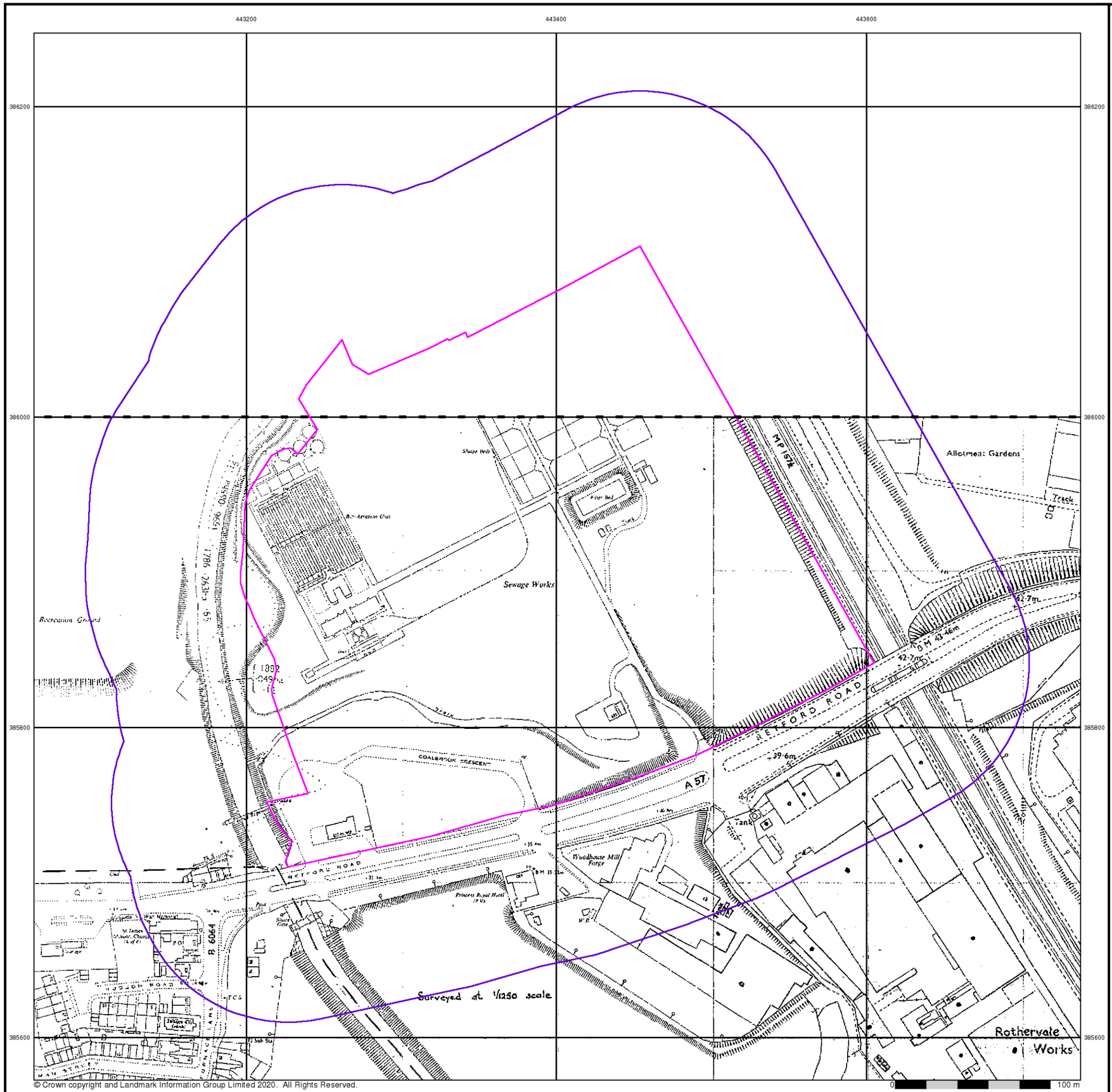

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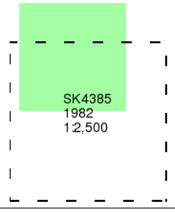
Additional SIMs

Published 1982

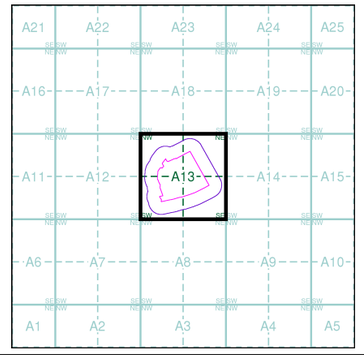
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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Ordnance Survey Plan

Published 1983

Source map scale - 1:1,250

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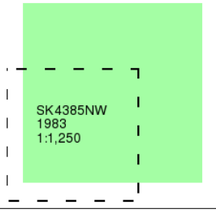
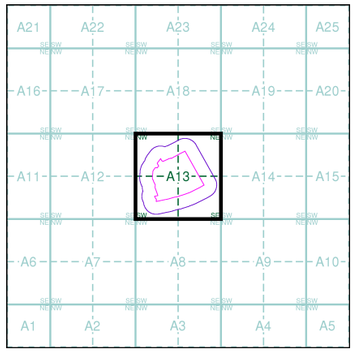


Historical Map - Segment A13



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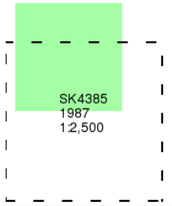
Additional SIMs

Published 1987

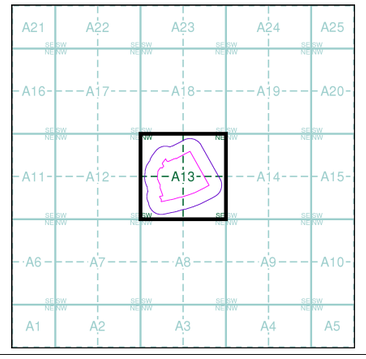
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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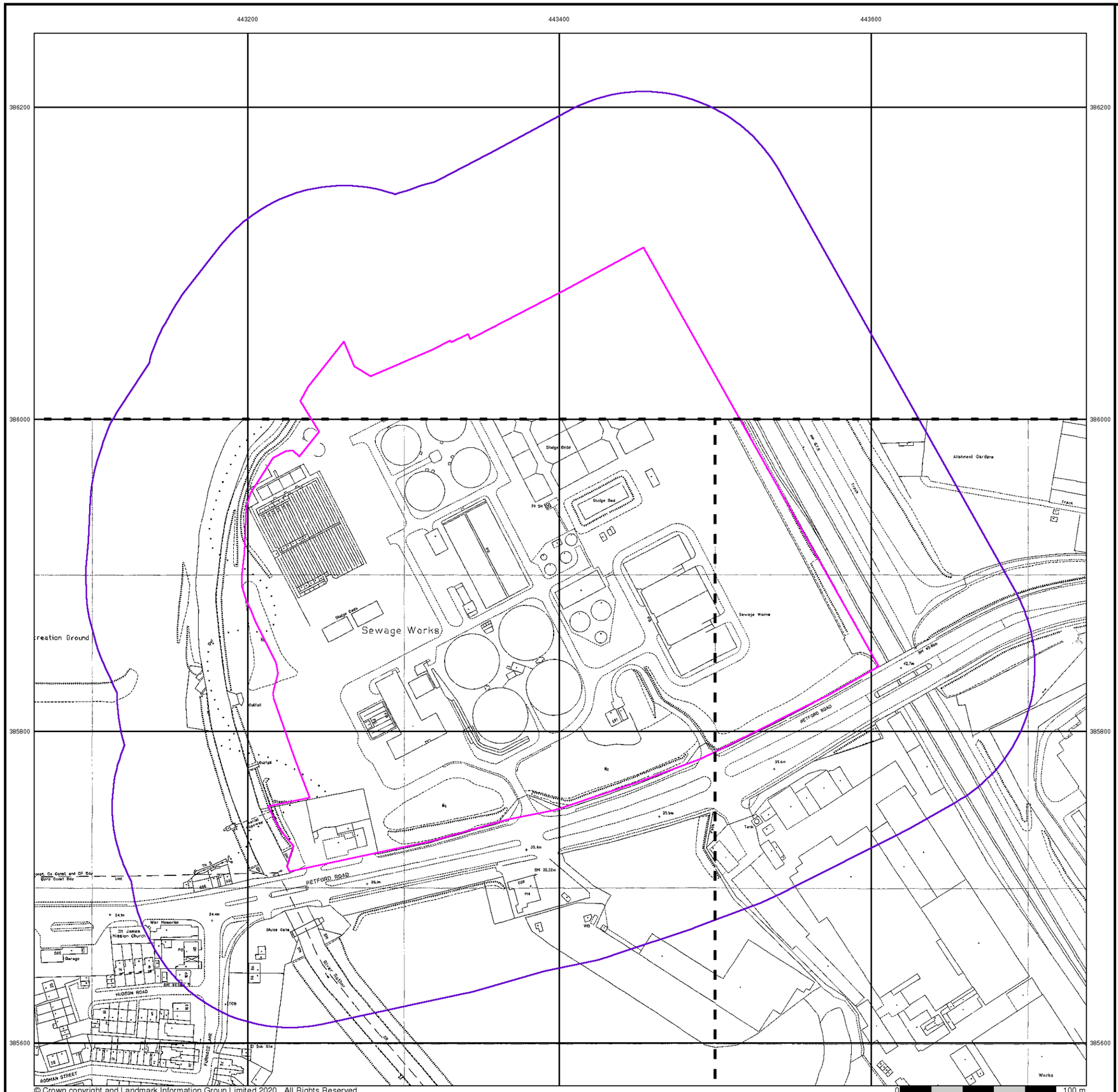

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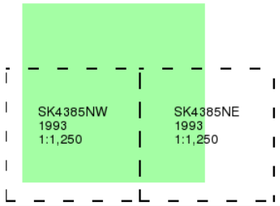
Large-Scale National Grid Data

Published 1993

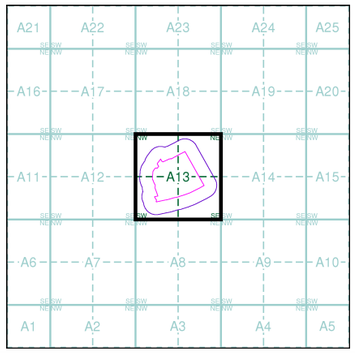
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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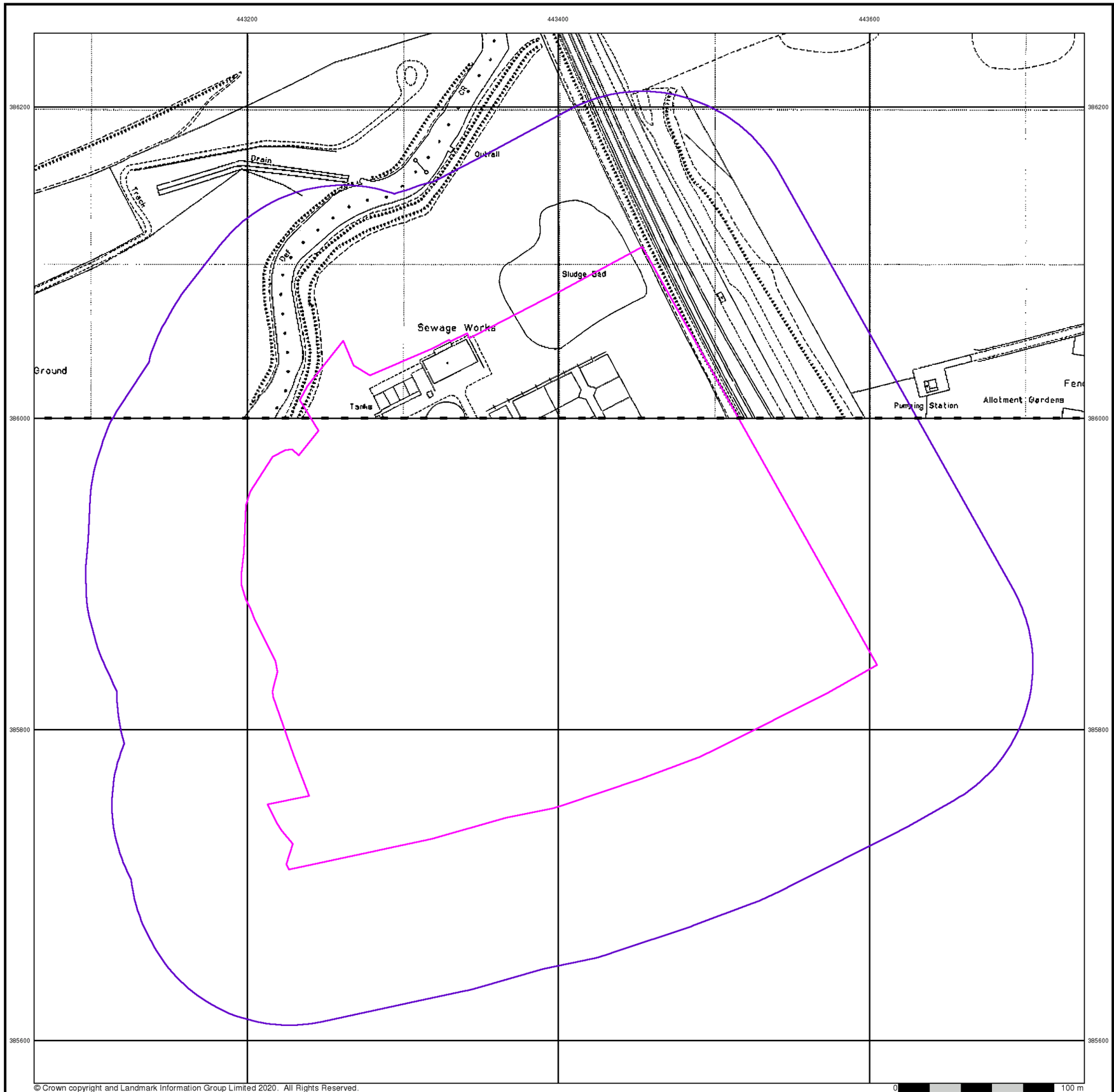
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	100

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Landmark® INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck®

LANDMARK INFORMATION GROUP®

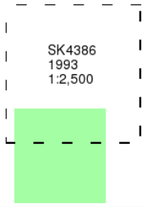
Large-Scale National Grid Data

Published 1993

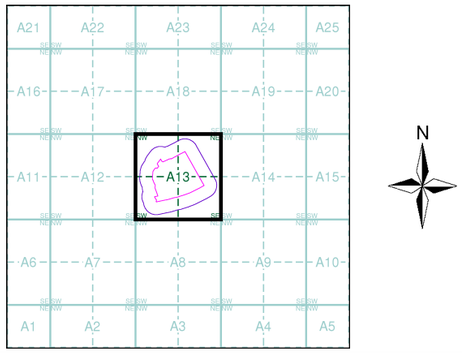
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	100

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

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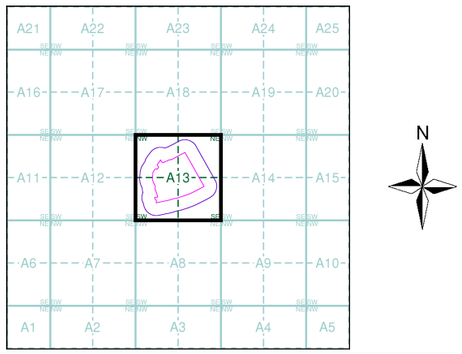
Historical Aerial Photography

Published 1999

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Slice:	A
Site Area (Ha):	10.21
Search Buffer (m):	100

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

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Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Order Details:			
Order Number: 261993045			
Customer Ref: 41527254			
National Grid Reference: 443380	385900		
Slice:			
Site Area (Ha): 10.21			
Search Buffer (m): 1000			
Site Details:			
Woodhouse Mill STW	Retford Road	SHEFFIELD	S13 9WG
File Name	Map Series Name	Published Dates	Source Scale
261993045_1_A13_County_Series_2500_ep5-2500_b6_266372098.gif	Ordnance Survey Plan	1971-1975	1:2,500
261993045_1_A13_County_Series_2500_yor-2500_ep1_266372106.gif	Yorkshire	1892	1:2,500
261993045_1_A13_County_Series_2500_yor-2500_ep4_266372110.gif	Yorkshire	1935	1:2,500
261993045_1_A13_County_Series_2500_yor-2500_ep3_266372112.gif	Yorkshire	1923	1:2,500
261993045_1_A13_County_Series_2500_ep5-2500_a5_266372116.gif	Ordnance Survey Plan	1956	1:2,500
261993045_1_A13_County_Series_2500_drb-2500_ep3_266372134.gif	Derbyshire	1923	1:2,500
261993045_1_A13_County_Series_2500_yor-2500_ep2_266372154.gif	Yorkshire	1903	1:2,500
261993045_1_A13_County_Series_2500_drb-2500_ep2_266372164.gif	Derbyshire	1898	1:2,500
261993045_1_A13_County_Series_2500_drb-2500_ep1_266372172.gif	Derbyshire	1877	1:2,500
261993045_1_A13_County_Series_1250_ep5-1250_b6_266372128.gif	Ordnance Survey Plan	1983	1:1,250
261993045_1_A13_County_Series_1250_ep5-1250_a5_266372136.gif	Ordnance Survey Plan	1969	1:1,250
261993045_1_A13_SIM_2500_sm-2500_1_266372100.gif	Additional SIMs	1982	1:2,500
261993045_1_A13_SIM_2500_sm-2500_2_266372138.gif	Additional SIMs	1987	1:2,500
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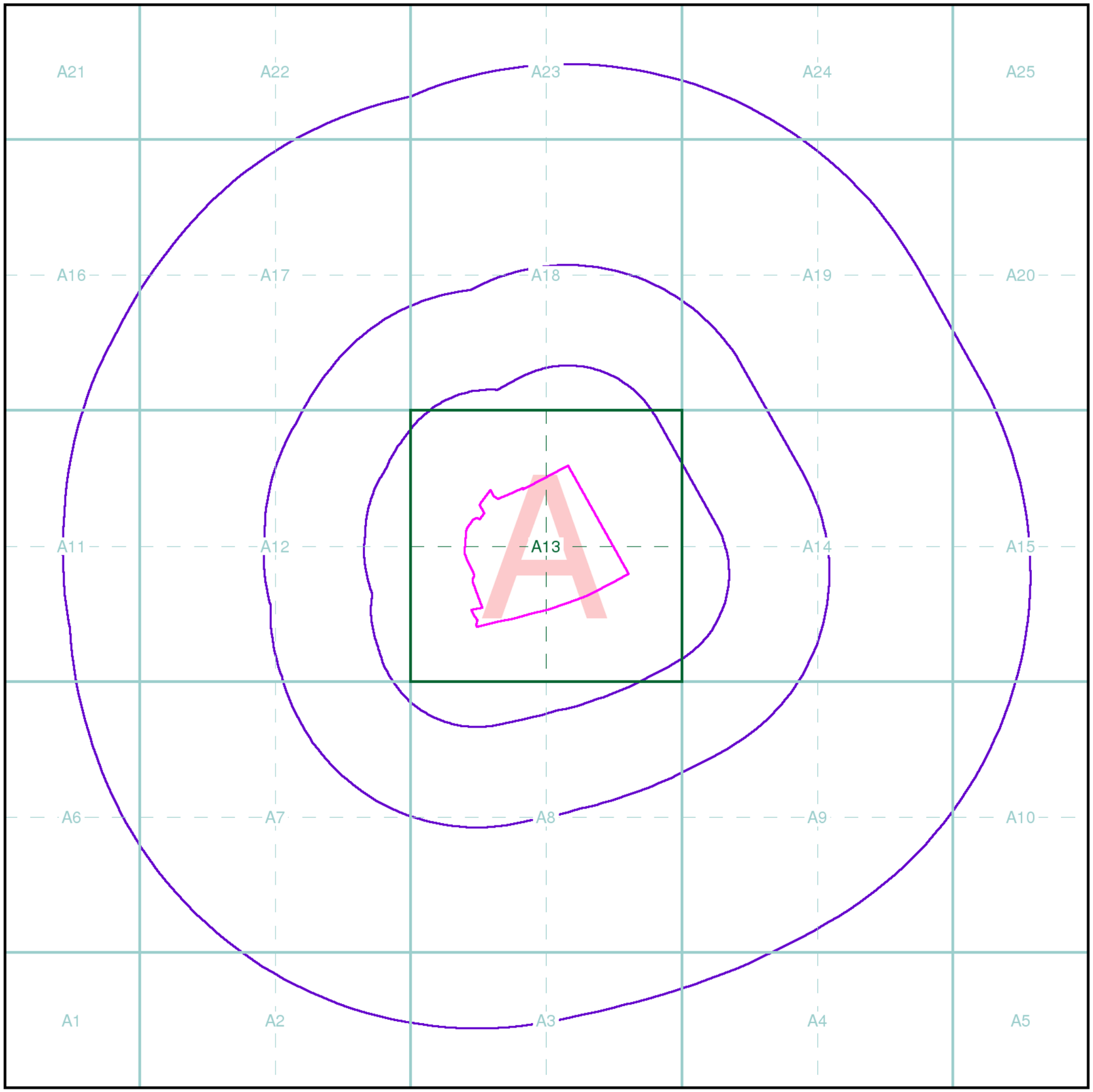

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Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:

Map data

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

NATURAL ENGLAND

Envirocheck reports are compiled from 136 different sources of data.

Client Details

Mr E Parsons, Stantec UK Ltd, 1 Papermill Drive, Kesley House, Redditch, B98 8QJ

Order Details

Order Number:	261993045_1_1
Customer Ref:	41527254
National Grid Reference:	443380, 385900
Site Area (Ha):	10.21
Search Buffer (m):	1000

Site Details

Woodhouse Mill STW, Retford Road, SHEFFIELD, S13 9WG

Full Terms and Conditions can be found on the following link:
http://www.landmarkinfo.co.uk/Terms/Show/515

Landmark® INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Appendix 3 Coal Authority Report (2020)

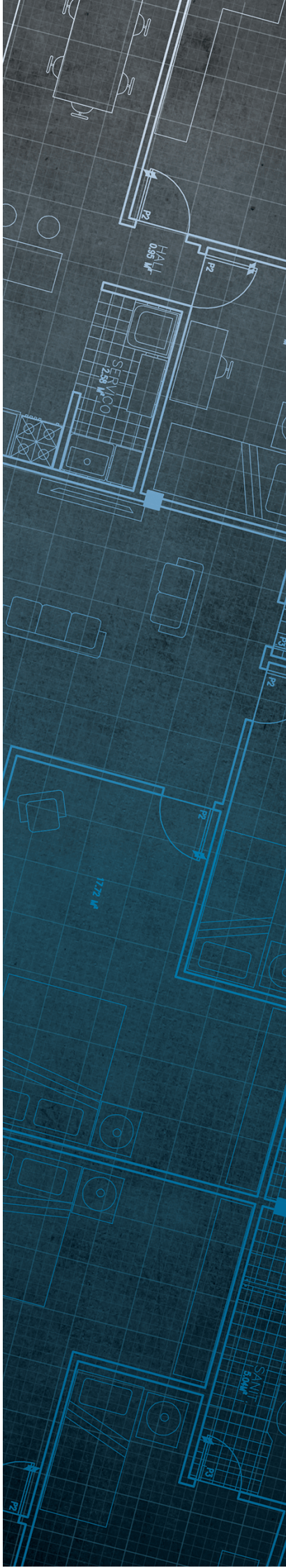
The Coal Authority

Consultants

Coal Mining Report

Woodhouse Mill Stw,retford
Road,sheffield,s13 9wg
South Yorkshire

Date of enquiry:	**14 October 2020**
Date enquiry received:	**14 October 2020**
Issue date:	**14 October 2020**
Our reference:	**51002324150001**
Your reference:	**261993045_2**



Consultants

Coal Mining Report

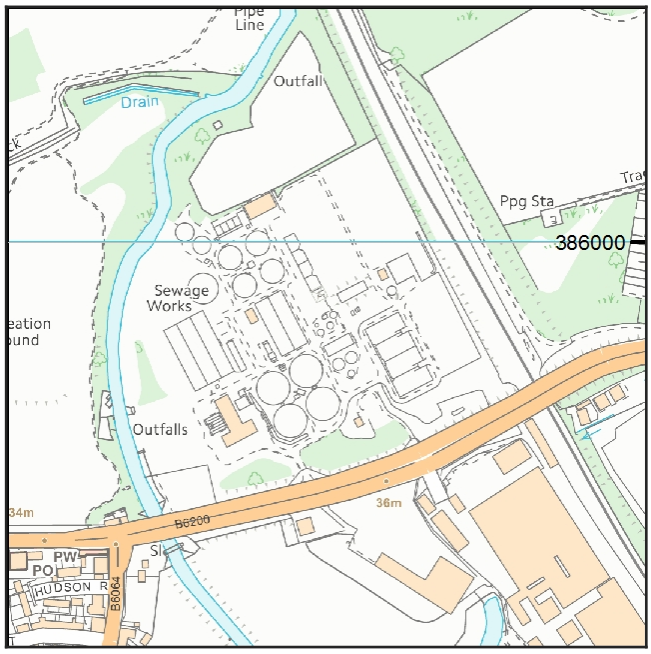
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

NLIS Hub

Enquiry address

Woodhouse Mill Stw,retford Road,sheffield,s13 9wg
South Yorkshire



Approximate position of property

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
TREETON	HIGH HAZEL	Coal	4P8J	45	South-East	4.3	North-East	112	1857
ORGREAVE	TOP HARD BARNSLEY	Coal	4R5D	63	Beneath Property	5.2	North-East	150	1878
COALBROOK	TOP HARD BARNSLEY	Coal	4P8N	71	Beneath Property	4.1	North-East	122	1855
FENCE	TOP HARD BARNSLEY	Coal	4R5E	76	Beneath Property	5.2	North-East	150	1870
DORE	TOP HARD BARNSLEY	Coal	4R5C	94	South-West	7.2	North-East	150	1881
FENCE	TOP HARD BARNSLEY	Coal	4P8L	97	Beneath Property	8.9	North-East	137	1870
ORGREAVE	SWALLOW WOOD	Coal	4R5H	199	Beneath Property	6.2	North-East	175	1972
FENCE	FLOCKTON	Coal	4P8P	240	South-East	6.3	North-East	129	1959
unnamed	FLOCKTON	Coal	4R5I	273	Beneath Property	6.6	North-East	135	1939
unnamed	FLOCKTON	Coal	4R5J	301	Beneath Property	6.1	North-East	120	1964
ORGREAVE	PARKGATE	Coal	4PAC	301	Beneath Property	7.4	North-East	164	1936
ORGREAVE	PARKGATE	Coal	4PAE	302	Beneath Property	8.3	North-East	164	1914
UNAMED	PARKGATE	Coal	4R7L	331	Beneath Property	7.3	North-East	138	1922
EAST BIRLEY	SILKSTONE	Coal	4P8U	377	South	6.6	North-East	160	1909
BROOKHOUSE	SILKSTONE	Coal	4P8W	381	Beneath Property	7.2	North-East	160	1913
unnamed	SILKSTONE	Coal	4R5L	400	Beneath Property	6.4	North-East	183	1913
unnamed	SILKSTONE	Coal	4R5M	436	North-West	6.6	North-East	183	1921
EAST BIRLEY	SILKSTONE	Coal	4P8V	462	North-East	0.0	East	160	1929

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

NE888	FGB834	M68
NE340	FGB429	NE637
CT16	NEST58	R382A

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
FURNACE	Coal	Yes	Within	N/A	120
FURNACE	Coal	Yes	Within	N/A	302
HIGH HAZEL	Coal	Yes	Within	N/A	303
TWO FOOT	Coal	Yes	Within	N/A	297
TWO FOOT	Coal	Yes	Within	N/A	307

Geological faults, fissures and breaklines

Please refer to the 'Summary of findings' map (on separate sheet) for details of any geological faults, fissures or breaklines either within or intersecting the enquiry boundary.

Fault under or close to the property recorded.

Opencast mines

Please refer to the “Summary of findings” map (on separate sheet) for details of any opencast areas within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing

Status	Licence type	Distance (m)	Direction
Past	Opencast	100.6	East

See Section 4 for further information.

Court orders
None recorded.

Section 46 notices
No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices
The property is in an area where a notice to withdraw support was given in 1943.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Coal mining licensing

The report has highlighted that the site is close to a Coal Authority license area for coal mining operations. Please contact us if you require further information.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes
Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining
Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing
Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders
Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

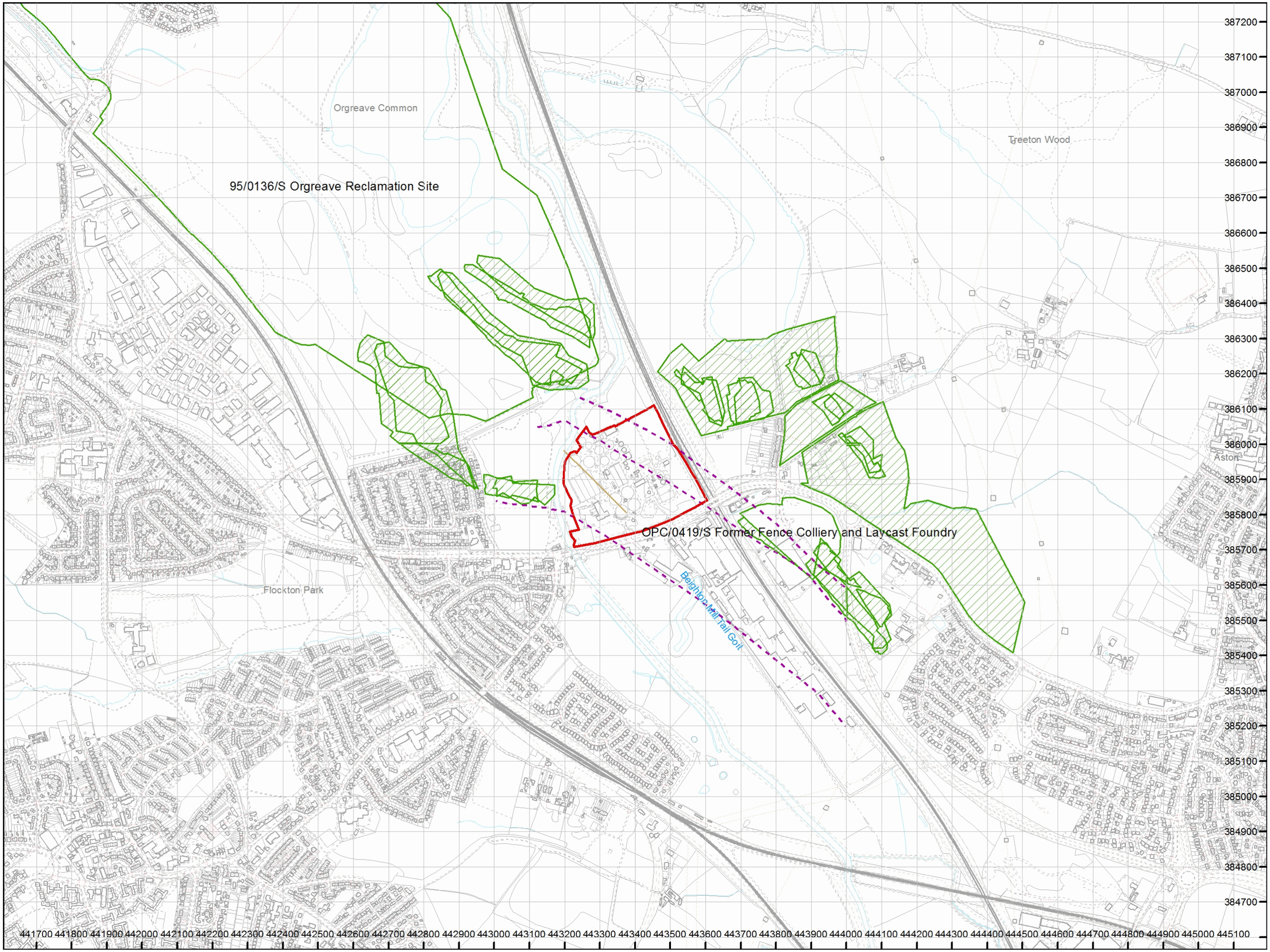
The Coal Authority

Summary of findings

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown
- Outcrop (Conjectured)
- Geological faults
- Opencast mine licence area
- Unlicensed opencast site



How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

Appendix 4 Locations of Historical Site Investigation Locations

KEY.

INSTALLATION BOUNDARY

- Borehole & trial pit records (1970)
- Soil Mechanics (A3111) Woodhouse Mill WwTW (2003)
- ETM Woodhouse Mill Sludge Thickening (2003)
- ESG digester refurbishment (2012)

VERSION	DRWN	CHKD	REVD		DATE
A	MD	SW	JP	FOR PERMITTING	09.21

YorkshireWater

Stantec

YORKSHIRE WATER SERVICES LTD
ENVIRONMENTAL PERMITTING

WOODHOUSE MILL SLUDGE TREATMENT FACILTY
SITE CONDITION REPORT
SHEET 1 of 1

SCALE	SHEET SIZE
1:1,500	A3
DRAWING NUMBER	REVISION
Appendix 4 - GI Locations	A

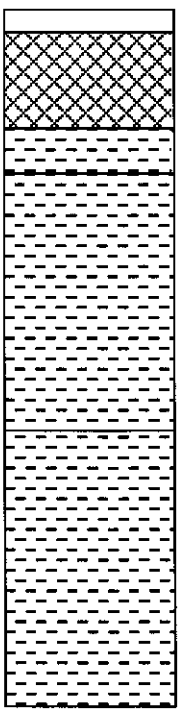
Appendix 5 Borehole Logs

TRIAL PIT RECORD

EARTH TECH ENGINEERING LIMITED
A tyco INTERNATIONAL LTD. COMPANY

Client: Yorkshire Water
Engineer: R M Lester
Scheme: Woodhouse Mill Sludge Thickening
Project No: M0400
Scheme Site: Woodhouse Mill WWTW

EXPLORATORY HOLE REF: TP1

Stratum Ref.	Depth (mbgl)	Lithology	Description	Testing & Sampling
1	G.L - 0.15		Grass turf overlying brown sandy TOPSOIL.	
2	0.15 - 0.8		MADE GROUND comprising loose light brown slightly clayey gravelly fine to coarse SAND. Clay is present usually in clods up to 15 cm in diameter.	
3	0.8- 1.1		Stiff brown slightly sandy CLAY.	
4	1.1 – 2.8		Soft to firm friable light orange-brown mottled grey sandy CLAY. (ALLUVIUM)	
5	2.8 - 4.65		Soft damp light blue-green-grey SILT/CLAY. Some dark organic peaty material below approximately 3.8 m bgl. (ALLUVIUM)	
		Base of excavation @ 4.65 m bgl		Tub samples @ 1.2, 2.2, 3.4, 4.0 m bgl.

Notes:

1 Groundwater not encountered.

2 Stability – sides remained vertical.

3 Excavation easy. Terminated at reach of plant.

Date Excavated: 18.06.03
Date Backfilled: 18.06.03

Weather:
Cloudy, warm (approx. 10-20 degrees Celsius), occasional very light shower

Plant: JCB JCX backacter with 600 mm bucket

Shoring: None

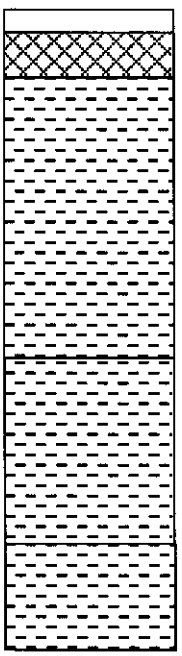
Logged By: R M Lester
Checked By: A J Hall

TRIAL PIT RECORD

EARTH TECH ENGINEERING LIMITED
A tyco INTERNATIONAL LTD. COMPANY

Client: Yorkshire Water
Engineer: R M Lester
Scheme: Woodhouse Mill Sludge Thickening
Project No: M0400
Scheme Site: Woodhouse Mill WWTW

EXPLORATORY HOLE REF: TP2

Stratum Ref.	Depth (mbgl)	Lithology	Description	Penetrometer & Shear Vane
1	G.L - 0.15		Grass turf overlying sandy TOPSOIL.	
2	0.15 - 0.45		MADE GROUND comprising loose brown-orange clayey sandy fine to coarse sub-angular GRAVEL. Sand is fine to coarse. Rare cobbles of slag. Piece of woven sacking.	SV 1.0 m bgl: 55, 50, 50
3	0.45- 2.3		Firm becoming soft friable grey mottled orange-brown sandy CLAY. (ALLUVIUM)	SV 2.2 m bgl: 25, 24, 20
4	2.3 – 3.6		Soft to very soft damp light blue-grey SILT/CLAY. (ALLUVIUM)	SV 2.5 m bgl: 13, 14, 18
5	3.6 – 4.3		Soft damp blue-grey organic peaty SILT/CLAY. Organic material is mainly dark decomposed wood. (ALLUVIUM)	
		Base of excavation @ 4.3 m bgl		Tub samples @ 2.0, 2.5, 3.8 m bgl

Notes:

1 Groundwater not encountered.

2 Stability – sides remained vertical.

3 Excavation easy. Terminated at reach of plant.

4 Shear Vane (SV) testing was carried out using a Pilcon hand vane with results showing undrained shear strength c_u in kN/m^2.

Date Excavated: 18.06.03
Date Backfilled: 18.06.03

Weather:
Cloudy, warm (approx. 10-20 degrees Celsius), occasional very light shower

Plant: JCB JCX backacter with 600 mm bucket

Shoring: None

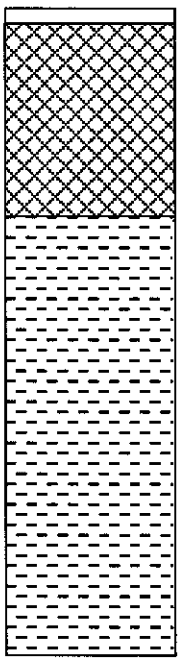
Logged By: R M Lester
Checked By: A J Hall

TRIAL PIT RECORD

EARTH TECH ENGINEERING LIMITED
A tyco INTERNATIONAL LTD. COMPANY

Client: Yorkshire Water
Engineer: R M Lester
Scheme: Woodhouse Mill Sludge Thickening
Project No: M0400
Scheme Site: Woodhouse Mill STW

EXPLORATORY HOLE REF: TP3

Stratum Ref.	Depth (mbgl)	Lithology	Description	Penetrometer & Shear Vane
1	G.L - 0.1		Rough grass overlying TOPSOIL.	
2	0.1 - 1.4		MADE GROUND comprising loose light brown very sandy fine to coarse GRAVEL. Gravel includes brick fragments, light-blue slag, occasional piece of plastic bag, occasional piece of glass, building rubble and a piece of woven polymeric strip. Rare small boulders.	
3	1.4 - 4.3		Firm becoming soft to very soft, becoming damp, friable light grey mottled orange-brown sandy CLAY. Occasional dark organic material. (ALLUVIUM)	SV 2.0 m bgl: 54, 50, 46 SV 2.9 m bgl: 22, 29, 28, 18 SV 4.3 m bgl: 19, 19, 20
		Base of excavation @ 4.3 m bgl		Tub samples @ 2.0, 4.2 m bgl

Notes:

1 Groundwater not encountered.

2 Stability – sides remained vertical.

3 Excavation easy, terminated at reach of plant.

4 Shear Vane (SV) testing was carried out using a Pilcon hand vane with results showing undrained shear strength c_u in kN/m^2.

Date Excavated: 18.06.03
Date Backfilled: 18.06.03

Weather:
Cloudy, warm (approx. 10-20 degrees Celsius), occasional very light shower

Plant: JCB JCX backacter with 600 mm bucket

Shoring: None

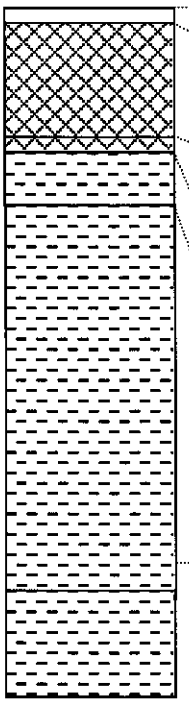
Logged By: R M Lester
Checked By: A J Hall

TRIAL PIT RECORD

EARTH TECH ENGINEERING LIMITED
A tyco INTERNATIONAL LTD. COMPANY

Client: Yorkshire Water
Engineer: R M Lester
Scheme: Woodhouse Mill Sludge Thickening
Project No: M0400
Scheme Site: Woodhouse Mill WWTW

EXPLORATORY HOLE REF: TP4

Stratum Ref.	Depth (mbgl)	Lithology	Description	Penetrometer & Shear Vane
1	G.L - 0.1		Rough grass overlying TOPSOIL.	
2	0.1 – 0.85		MADE GROUND comprising brown sandy fine to coarse GRAVEL. Gravel includes brick fragments with pieces of timber, pottery, sacking and a thin steel rod. Rare small boulder.	
3	0.85 – 0.95		MADE GROUND comprising dark blue black slightly clayey sandy fine to coarse GRAVEL. Gravel includes brick fragments. Occasional cobbles of timber.	
4	0.95 - 1.3		Stiff dark blue-grey slightly sandy CLAY with occasional dark organic material. (ALLUVIUM)	SV 1.2 m bgl: 102, 108, 104
5	1.3 – 3.9		Soft to firm friable light brown mottled grey sandy CLAY with occasional organic material. Slight organic odour. (ALLUVIUM)	SV 2.2 m bgl: 40, 42, 35, 38, 33 SV 2.8 m bgl: 30, 25, 52, 28, 36 SV 3.5 m bgl: 27, 26, 25 SV 3.8 m bgl: 52, 52, 58
6	3.9 - 4.6		Soft light blue with dark blue patches peaty SILT/CLAY with a little organic material. (ALLUVIUM)	SV 4.1 m bgl: 20, 20, 38, 30, 28 SV 4.3 m bgl: 36, 24, 30
		Base of excavation @ 4.6 m bgl		Tub samples @ 1.4, 4.4 m bgl

Notes:

1 Groundwater not encountered.

2 Stability – sides remained vertical.

3 Excavation easy, terminated due to limited reach of plant.

4 Shear Vane (SV) testing was carried out using a Pilcon hand vane with results showing undrained shear strength c_u in kPa.

Date Excavated: 18.06.03
Date Backfilled: 18.06.03

Weather:
Cloudy, warm (approx. 10-20 degrees Celsius), occasional very light shower

Plant: JCB JCX backacter with 600 mm bucket

Shoring: None

Logged By: R M Lester
Checked By: A J Hall

Borehole Log

Soil Mechanics

Drilled by BJ Logged by EM Checked by PH	Start 03/07/2003 End 03/07/2003	Equipment, Methods and Remarks Hand dug inspection pit.	Depth from to Diameter Casing Depth	Ground Level - Coordinates - National Grid -

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.00-0.90	B 1	0.00-0.90 Hand dug inspection pit		

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
TOPSOIL. (Foreman's description)	0.10		
Brown mottled yellow sandy gravelly CLAY with occasional angular cobble size fragments of concrete and red ceramic piping. Sand is fine to coarse. Gravel is angular to subangular medium to coarse of mudstone, concrete and occasional tile. 0.90 m 100mm yellow plastic pipe.	(0.80)		
(MADE GROUND)	0.90		
EXPLORATORY HOLE ENDS AT 0.90 m			

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks

From	to (m)	
0.00	0.90	Hand dug inspection pit

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	WOODHOUSE MILL WWTW
Project No.	A3111
Carried out for	Earth Tech-Morrison

Borehole

BH1

Sheet 1 of 1

Borehole Log

Soil Mechanics

Drilled by BJ/NE Logged by EM/SS Checked by PH	Start 04/07/2003 End 17/07/2003	Equipment, Methods and Remarks Cable percussion boring. Rotary core drilling (PWF size) core with coreline using air mist flush.	Depth from / to / Diameter / Casing Depth 0.00m 8.40m 150mm 8.20m 8.40m 20.10m 121mm 8.20m	Ground Level - Coordinates - National Grid -		

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.00-1.20	B 1	0.00-1.20 Hand dug inspection pit.		
1.50-1.95	U 2	30 blows	1.50	dry
2.05	D 3			
2.50-2.95	SPT S	N=6 (1,1/1,1,2,2)	2.50	dry
2.50-2.95	D 4			
2.50-3.00	B 5			
3.50-3.95	U 6	29 blows	3.00	dry
4.05-4.95	D 7			
4.50-4.88	SPT S	N=3 (1,-/1,1,1,-)	4.50	dry
4.50-4.95	D 8			
4.50-5.00	B 9			
5.50-5.95	U 10	20 blows	5.50	dry
6.05	D 11			
6.50-6.95	SPT S	N=44 (6,8/8,9,10,17)	6.00	dry
6.50-6.95	D 12			
6.50-7.00	B 13			
7.20-7.65	SPT S	N=59 (9,13/13,15,15,16)	7.20	4.70
7.20-7.65	D 14			
7.20-7.65	B 15			
7.20	W 16			
7.80-8.00	SPT S	50 (12,13 for 30mm/ 27,23 for 20mm)	7.80	6.30
7.80-8.00	D 17			
8.20-8.40	SPT C	50 (10,15 for 20mm/ 30,20 for 30mm)	8.20	6.70
8.20-8.40	D 18		04/07/2003	6.70
			~~8.20~~	
			17/07/2003	0800
			8.20	5.60
8.40-11.40				

55
25
0

Depth	Type & No	Records	Date Casing	Time Water

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
TOPSOIL.	0.10		
Dark grey mottled brown sandy gravelly CLAY with rare subangular size fragments of concrete. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of mudstone, brick and concrete. Occasional rootlets. (MADE GROUND)	(1.50)		
Soft grey very sandy CLAY. Frequent 3mm pockets of fine to medium sand. (ALLUVIAL DEPOSITS)	1.60		
2.50-3.00 m Dark Brown mottled orange slightly sandy slightly gravelly CLAY. Gravel is angular fine of sandstone and mudstone. Frequent organic material (wood fragments and ~~reeds~~)	(2.10)		
Very soft blue grey slightly sandy organic CLAY. Sand is fine to coarse. Rare angular fine gravel of mudstone. (ALLUVIAL DEPOSITS)	3.70		
4.50-5.00 m Grey orange slightly sandy CLAY. Occasional gravel sized fragments of decayed organic material	(2.30)		
~~5.95 m one~~ fragment (60 x 40mm) of black decaying wood.	6.00		
Brown very clayey gravelly fine to coarse SAND. Gravel is angular to subangular medium to coarse of sandstone. (ALLUVIAL DEPOSITS)	6.10		
Very stiff blue grey slightly gravelly CLAY. Gravel is angular fine of mudstone lithorelicts. (Weathered MUDSTONE - MIDDLE COAL MEASURES)	(1.70)		
7.80-8.40 m Recovered as tabular, angular fine to coarse gravel	7.80		
Weak blue grey MUDSTONE. Occasional carbonaceous material. Fractures are subhorizontal dip 10-15 deg, very closely to extremely closely spaced, smooth, planar surfaces. (MIDDLE COAL MEASURES)	(3.18)		
8.40-9.76 m AZCL.			
9.76-10.00 m NI, recovered as			
Stratum continued next sheet			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	7.20	Rose to 4.70 m after 20 minutes.	-

Depth Related Remarks

From	to (m)	
0.00	1.20	Hand dug inspection pit.

Chiselling

Depths (m)	Time	Tools used
7.30 -7.50	30 mins	
7.80 -8.20	60 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project: WOODHOUSE MILL WWTW

Project No.: A3111

Carried out for: Earth Tech-Morrison

Borehole

BH1A

Sheet 1 of 3

Borehole Log

Soil Mechanics

Drilled by	BJ/NE	Start	04/07/2003	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level	-
Logged by	EM/SS	End	17/07/2003		0.00m	8.40m	150mm	8.20m	Coordinates	-
Checked by	PH				8.40m	20.10m	121mm	8.20m	National Grid	-

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
		NI 20 60			
11.40-14.40	100 78 45				
			Flush: 8.40-20.10 , 90 %		
14.40-17.10	100 74 55	NI 150 700			
17.10-20.10	96 93 63				

Strata

Description		Depth, Level (Thickness)
Weak blue grey MUDSTONE. Occasional carbonaceous material. Fractures are subhorizontal dip 10-15 deg, very closely to extremely closely spaced, smooth, planar surfaces. (MIDDLE COAL MEASURES)	clayey gravel. 10.07-10.24 m zone of very closely spaced, randomly orientated fractures. 10.51-10.53 m moderately strong, reddish, blue grey MUDSTONE.	10.98
Weak dark grey black carbonaceous MUDSTONE. (MIDDLE COAL MEASURES)		(0.42) 11.40
Weak to moderately weak thinly laminated dark blue grey carbonaceous MUDSTONE. Frequent plant remains. Fractures dip subhorizontal to 30 deg, very closely to extremely closely spaced, rough, planar surfaces, occasionally smooth, occasionally stepped due to laminations. (MIDDLE COAL MEASURES)	11.85-11.87 m NI. 12.00-12.04 m NI. 12.30-12.38 m NI. 12.40-12.50 m subvertical fracture, curviplanar, smooth surface.	(0.40) 11.80 12.00 (0.60) 12.60
Moderately weak thinly laminated dark blue grey carbonaceous sandy MUDSTONE. (MIDDLE COAL MEASURES)	12.96-13.90 m subvertical fracture, curviplanar with rough surface, stained with iron.	
Weak to moderately weak thinly laminated dark blue grey MUDSTONE. (MIDDLE COAL MEASURES)		(2.35)
Moderately weak to moderately strong thinly laminated light blue grey SANDSTONE. Occasional laminations are of carbonaceous mudstone. Fractures are closely to very closely, occasionally moderately spaced, subhorizontal and subvertical, rough, planar surfaces. Surfaces are occasionally mottled with iron staining. (MIDDLE COAL MEASURES)	14.00-14.75 m subvertical fracture, curviplanar, rough, green brown mottled surface. 14.00-14.03m, NI. 14.89-14.95 m NI, recovered as gravelly SANDSTONE and MUDSTONE.	14.95
Weak dark grey blue MUDSTONE. Fractures are very closely spaced, subhorizontal, smooth, planar surfaces. (MIDDLE COAL MEASURES)	15.88-15.94 m NI.	(1.11) 16.06
Moderately weak to moderately strong thinly to thickly laminated ight blue grey SANDSTONE. (MIDDLE COAL MEASURES)	16.16-16.20 m NI, recovered as gravelly SANDSTONE. 16.45-16.50 m NI, gravelly sandstone. 16.90-17.10 m NI. 17.10-17.18 m AZCL. 17.40-17.43 m NI.	(1.44) 17.50
Weak to moderately weak dark grey MUDSTONE with occasional lenses of fine sandstone. Fractures dip subhorizontal to 30 deg, closely to very closely spaced, smooth, planar surfaces. (MIDDLE COAL MEASURES)	17.54-17.57 m fracture dips 30 deg, smooth, planar surface. 17.95-18.11 m fracture dips 30 deg, smooth, planar surface. 18.16-18.19 m fracture dips 30 deg, smooth, planar surface.	(1.03) 18.53
Moderately strong to moderately weak thinly to thickly laminated light blue grey SANDSTONE. Frequent soft sediment deformation structures. Fractures are closely to very closely spaced, occasionally medium rarely widely spaced, dips subhorizontal to 30 deg. (MIDDLE COAL MEASURES)	19.34-19.37 m fracture dips 50 deg, rough, planar surface.	(1.57)
Stratum continued next sheet		

Legend

Backfill/ Instruments

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks

From to (m)

Chiselling

Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

AGS

Project WOODHOUSE MILL WWTW

Project No. A3111

Carried out for Earth Tech-Morrison

Borehole

BH1A

Sheet 2 of 3

Borehole Log

Soil Mechanics

Drilled by BJ/NE Logged by EM/SS Checked by PH	Start 04/07/2003 End 17/07/2003	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level - Coordinates - National Grid -
			0.00m	8.40m	150mm	8.20m	
			8.40m	20.10m	121mm	8.20m	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Moderately strong to moderately weak thinly to thickly laminated light blue grey SANDSTONE. Frequent soft sediment deformation structures. Fractures are closely to very closely spaced, occasionally medium rarely widely spaced, dips subhorizontal to 30 deg.	20.10		
(MIDDLE COAL MEASURES)			
EXPLORATORY HOLE ENDS AT 20.10 m			

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks

From to (m)

Chiselling

Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project WOODHOUSE MILL WWTW

Project No. A3111

Carried out for Earth Tech-Morrison

Borehole

BH1A

Sheet 3 of 3

Borehole Log

Soil Mechanics

Drilled by DS/NE Logged by EM/SS Checked by PH	Start 07/07/2003 End 17/07/2003	Equipment, Methods and Remarks Cable percussion boring. Rotary core drilling (PWF size) with coreline using air mist flush.	Depth from / to / Diameter / Casing Depth 0.00m 7.00m 150mm 6.50m 7.00m 16.00m 121mm 6.50m	Ground Level - Coordinates - National Grid -	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.00-1.45	D 1	0.00-1.20 Hand dug inspection pit.		
1.45-1.50	D 2			
1.50-2.15	U	28 blows No recovery		
1.50-2.15	D 3			
2.15-2.60	U 4	20 blows	2.00	
2.60-2.80	D 5			
2.80-3.25	SPT S	N=5 (1,1/1,1,1,2)	2.80	dry
2.80-3.25	D 6			
3.25-3.50	D 7			
3.50-3.95	U 8	27 blows	3.20	dry
3.95-4.15	D 9			
4.15-4.60	SPT S	N=5 (1,0/1,2,1,1)	3.20	dry
4.15-4.60	D 10			
4.70-4.80	D 11			
4.80-5.25	U 12	33 blows	4.50	dry
5.25-5.45	D 13			
5.60-6.00	D 14			
6.00-6.45	SPT S	N=14 (5,5/2,4,3,5)	6.00	dry
6.00-6.45	D 15			
6.50-7.00	D 16			
			07/07/2003	1800
			6.50	dry
7.00-7.20	SPT S	50 (17,8 for 35mm/ 36,14 for 15mm)		
7.00-7.20	D 17		17/07/2003	1400
			6.50	dry
7.00-10.00	20 7 0	NI 20 60		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
TOPSOIL.	0.10		
Orange brown mottled dark grey slightly clayey gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium of mudstone, concrete and occasional brick fragments. Frequent gravel sized pockets of ash. (MADE GROUND)	(1.35)		
Soft to firm orange brown mottled grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse with occasional ash. Gravel is angular to subangular fine of sandstone and carbonaceous mudstone. (ALLUVIAL DEPOSITS)	1.45 (2.05)		
Soft grey slightly sandy slightly gravelly CLAY with frequent pockets (3mm) of fine to medium sand. Gravel is angular fine of sandstone. (ALLUVIAL DEPOSITS)	3.50 (0.70)		
Soft grey mottled black organic CLAY. (ALLUVIAL DEPOSITS)	4.20 (0.50)		
Orange brown very clayey fine to medium SAND with occasional pockets (50mm) of slightly sandy SILT. Sand is fine. (ALLUVIAL DEPOSITS)	4.70 (0.90)		
Yellow grey mottled black slightly clayey gravelly fine to coarse SAND. Gravel is angular fine of mudstone, carbonaceous mudstone and siltstone. (ALLUVIAL DEPOSITS)	5.60 (0.70)		
Thinly laminated grey CLAY. (Weathered MUDSTONE - MIDDLE COAL MEASURES)	6.30 6.50 (0.50)		
Weak black carbonaceous MUDSTONE with occasional coal. (MIDDLE COAL MEASURES) — 7.00-7.20 m Very weak black COAL; 7.00-9.40 m AZCL.	7.00		
ZONE OF LOW CORE RECOVERY Weak light blue grey carbonaceous MUDSTONE. Frequent fossil plant remains. Fractures are very to extremely closely spaced, subhorizontal, planar, stepped. Locally recovered as clayey gravel with occasional coal. Foreman reports coal seam from 7.00 to 7.20m extending to 8.05m (MIDDLE COAL MEASURES) — 9.40-9.57 m NI, recovered as clayey gravel of coal and mudstone. 9.57-9.67 m	(3.48)		
Stratum continued next sheet			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
None observed (see Key Sheet)			

Depth Related Remarks

From	to (m)	
0.00	1.20	Hand dug inspection pit.

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	WOODHOUSE MILL WWTW
Project No.	A3111
Carried out for	Earth Tech-Morrison

Borehole

BH2

Borehole Log

Soil Mechanics

Drilled by	DS/NE
Logged by	EM/SS
Checked by	PH

Start 07/07/2003
End 17/07/2003

Equipment, Methods and Remarks

Depth from	to	Diameter	Casing Depth
0.00m	7.00m	150mm	6.50m
7.00m	16.00m	121mm	6.50m

Ground Level -
Coordinates -
National Grid -

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.00-13.00	93 80 58	NI 120 550	Flush: 7.00-16.00 90 %		
13.00-16.00	100 77 72				

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
ZONE OF LOW CORE RECOVERY :: 9.57m - weak blue grey carbonaceous MUDSTONE with frequent plant remains. 10.00-10.32 m NI, recovered as clayey gravel.	10.48		
Weak light blue grey carbonaceous MUDSTONE. Frequent fossil plant remains. Fractures are very to extremely closely spaced, subhorizontal, planar, stepped. Locally recovered as clayey gravel with occasional coal. Foreman reports coal seam from 7.00 to 7.20m extending to 8.05m (MIDDLE COAL MEASURES) 11.03-11.22 m subvertical fracture, rough, planar surface, speckled with green/black dots.			
Moderately strong light blue grey fine grained SANDSTONE with frequent thin cross laminations of mudstone. Occasional fossil plant remains. Fractures are closely spaced , occasionally very closely spaced, subhorizontal and subvertical, planar, curviplanar with rough, occasionally smooth surfaces. Surfaces are mottled or speckled black and are frequently iron stained. (MIDDLE COAL MEASURES) 11.46-11.55 m subvertical fracture, smooth, planar surface, speckled black, slight iron staining. 11.58-11.67 m subvertical fracture, rough, planar surface, slightly iron stained fracture. 12.49-14.27 m vertical fracture, curviplanar with rough iron stained surfaces. 12.50-12.80m, zone of very closely spaced, horizontal fractures associated with vertical fracture termination.	(3.82)		
Weak thinly laminated dark blue grey carbonaceous MUDSTONE. (MIDDLE COAL MEASURES) Surfaces are rough, planar and iron stained. 14.40-15.00m, subvertical fracture, curviplanar, rough surface, mottled black and iron stained.	14.30 14.40		
Moderately strong light blue grey fine grained SANDSTONE with frequent thin cross laminations of mudstone. Occasional fossil plant remains. (MIDDLE COAL MEASURES)	(1.60)		
EXPLORATORY HOLE ENDS AT 16.00 m	16.00		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

None observed (see Key Sheet)

Depth Related Remarks
From to (m)

Chiselling
Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project WOODHOUSE MILL WWTW
Project No. A3111
Carried out for Earth Tech-Morrison

Borehole
BH2
Sheet 2 of 2

Borehole Log

Soil Mechanics

Drilled JS/PG **Logged** JMH **Checked** MW	**Start** 19/03/2012 **End** 20/03/2012	**Equipment, Methods and Remarks** Dando 150 & Beretta T44. Cable percussion boring & rotary core drilling (PWF size). SPT: hammer ID 135, rods B.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 5.80m / 200mm / 5.80m 5.80m / 15.90m / 121mm / 5.80m	**Ground Level** - **Coordinates** X 965.50 **Local Grid** Y 1245.99 **Chainage**	

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
		0.00-1.20 m Hand excavated inspection pit.		
0.45-0.70	B 1			
0.70-1.20	B 2			
1.20-1.65	SPT S	N=2 (1,0/0,1,0,1)		
1.20-1.65	D 3			
1.20-1.70	B 4			
2.00-2.45	U 5	7 blows	2.00	0.70
2.45-2.60	D 6			
3.00-3.45	SPT S	N=11 (1,1/2,2,2,5)	3.00	
3.00-3.45	D 7			
3.00-3.50	B 8			
3.50-4.00	B 9			
4.00-4.45	SPT C	N=31 (2,3/7,8,9,7)	4.00	
4.00-4.50	B 10			
5.00-5.45	SPT C	N=22 (1,1/3,4,7,8)	5.00	
5.00-5.50	B 11			
5.60-5.80	B 12		19/03/2012 5.80	3.40
5.80-6.05	SPT C	50 (11,13/36,14 for 20mm)	5.80 20/03/2012 5.80	0800 2.30
5.80-7.30	TCR 97 SCR 39 RQD 16	NA		
7.30-8.80	TCR 100 SCR 18 RQD 8	NI NI 120 Flush: 5.80-10.30 Water, 100 %		
8.80-10.30	TCR 100 SCR 89 RQD 13	NI 110 190		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
Reinforced CONCRETE. (MADE GROUND)	(0.45)		
Soft grey mottled brown CLAY.	0.45		
Firm grey and brown, locally mottled yellowish brown CLAY.	0.70 (0.60)		
Soft, becoming firm below 3.00m, grey silty CLAY with occasional decaying organic matter.	1.30 (2.20)		
Grey and brown slightly sandy clayey angular to subangular fine to coarse GRAVEL of sandstone and mudstone.	3.50 (0.50)		
Dense, becoming medium dense below 5.00m, brown slightly sandy subangular to subrounded fine to coarse GRAVEL of sandstone, mudstone and siltstone with low cobble content. Cobbles are subrounded of sandstone.	4.00 (1.60)		
Strong brown fine grained SANDSTONE. Recovered as angular coarse gravel. 5.80-5.85 m AZCL	5.60 5.80		
Medium strong thinly laminated brown fine grained SANDSTONE. Recovered non intact. 6.30-6.39 m recovered as gravelly clay	(0.50) 6.30		
Extremely weak to very weak thinly laminated light grey fine grained SANDSTONE with frequent brown laminations. Weathering is complete loss of structure to gravelly clay. 6.46-7.10 m 1No. vertical planar smooth open fracture Fractures are: 1 No recovered as non intact. 2 No subhorizontal, extremely closely to closely spaced, planar, smooth, open. 7.55-7.80 m medium strong	(2.75)		
Extremely weak to very weak thinly laminated light grey MUDSTONE with occasional laminations of fine grained sandstone. Weathering is localised loss of structure to clayey gravel. Fractures 9.10-9.50 m 1No. 80 deg. undulating rough open and closed fracture 9.73-9.82 m NI	9.05 (1.75)		
Stratum continues to 10.80 m			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	0.70	-	1.00
2	4.00	Rose to 3.40 m after 20 minutes.	-

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
0.00 -0.45	150 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project	**WOODHOUSE MILL WwTW DIGESTER REFURBISHMENT, SHEFFIELD**
Project No.	**A2015-12**
Carried out for	**ETM**

Borehole

BHD1

Borehole Log

Soil Mechanics

Drilled JS/PG **Logged** JMH **Checked** MW	**Start** 19/03/2012 **End** 20/03/2012	**Equipment, Methods and Remarks** Dando 150 & Beretta T44. Cable percussion boring & rotary core drilling (PWF size). SPT: hammer ID 135, rods B.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 5.80m / 200mm / 5.80m 5.80m / 15.90m / 121mm / 5.80m	**Ground Level** - **Coordinates** X 965.50 **Local Grid** Y 1245.99 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.30-11.80	91 49 33	NA	Flush: 10.30-13.20 Water, 50 %		
		500 500 500			
11.80-13.20	107 88 49	NI 90 210			
		NI 100 150			
13.20-14.70	95 66 25	NI 110 270	Flush: 13.20-15.90 Water, 100 %		
14.70-15.90	87 45 8	NI 50 100		20/03/2012 5.80	0.00

Strata

Description
(Continued from Sheet 1)

are 10 to 15 deg. very closely to closely spaced, planar, rough, open.
10.10-10.13 m NI
10.27-10.30 m NI
10.30-10.45 m AZCL
10.45-10.60 m NI

10.80 (0.40)

Extremely weak black vitreous COAL.

11.20 (0.50)

Very weak thinly laminated grey MUDSTONE with occasional light brown siltstone inclusions up to 10mm in diameter.

11.70 (1.05)

Medium strong to weak thinly laminated light grey fine grained SANDSTONE with occasional siltstone laminations. Weathering not apparent. Fractures are subhorizontal, very closely to medium spaced, planar smooth open.
11.80-11.96 m 1 No vertical planar smooth open fracture
11.96-12.04 m NI
12.08-12.09 m NI
12.29-12.98 m 1 No 80 degree planar smooth open fracture

12.75 (0.45)

Medium strong thinly laminated grey SILTSTONE. Weathering not apparent. Fractures are 10 degrees, very closely to closely spaced, planar smooth open.
12.92-13.26 m 1 No 75 degree planar smooth open fracture
12.97-13.04 m NI

13.20 (2.25)

Very weak to weak thinly laminated grey MUDSTONE. Weathering is localised loss of structure to clayey gravel. Fractures are subhorizontal, very closely to medium spaced, planar rough to smooth open.
13.20-13.28 m AZCL
13.34-13.37 m 1 No 85 degree planar smooth open fracture
13.43-13.47 m NI
13.75-13.83 m NI
13.95-13.97 m NI
14.19-14.24 m NI
14.34-14.54 m NI
14.64-14.67 m NI
14.70-14.86 m AZCL
14.86-15.08 m NI
15.17-15.27 m NI

15.45 (0.45)

Very weak to weak thinly laminated dark grey carbonaceous MUDSTONE. Weathering not apparent. Fractures are subhorizontal, very closely to closely spaced, planar smooth open.
15.50-15.57 m NI
15.65-15.80 m 1 No 70 degree planar smooth open fracture
15.83-15.85 m NI

15.90

EXPLORATORY HOLE ENDS AT 15.90 m

Depth, *Level* (Thickness)	Legend	Backfill/ Instruments

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project WOODHOUSE MILL WwTW DIGESTER REFURBISHMENT, SHEFFIELD
Project No. A2015-12
Carried out for ETM

Borehole
BHD1

Borehole Log

Soil Mechanics

Drilled JS/PG **Logged** JMH **Checked** MW	**Start** 19/03/2012 **End** 21/03/2012	**Equipment, Methods and Remarks** Dando 150 & Beretta T44. Cable percussion boring & rotary core drilling (PWF size). SPT: hammer ID 135, rods B.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 5.60m / 200mm / 5.60m 5.60m / 15.80m / 121mm / 5.60m	**Ground Level** - **Coordinates** X 983.15 **Local Grid** Y 1250.39 **Chainage**	

Samples and Tests

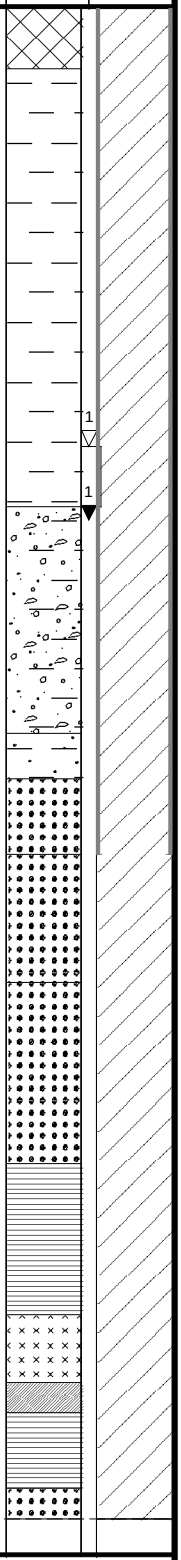
Depth	Type & No	Records	Date Casing	Time Water
		0.00-1.20 m Hand excavated inspection pit.		
0.40-1.20	B 1			
1.20-1.65	SPT S	N=4 (1,0/1,1,1,1)	1.20	dry
1.20-1.65	D 2			
1.20-1.70	B 3			
2.00-2.45	U 4	11 blows	2.00	dry
2.45-2.60	D 5			
3.00-3.45	SPT S	N=13 (1,1/2,3,5,3)	3.00	2.10
3.00-3.45	D 6			
3.00-3.50	B 7			
3.50-4.00	B 8			
4.00-4.45	SPT C	N=27 (2,5/5,7,7,8)	4.00	2.10
4.00-4.50	B 9			
4.80	D 10			
5.00-5.33	SPT S	50 (1,3/8,23,19 for 25mm)	5.00	2.10
5.00-5.18	D 11			
5.30-5.46	SPT S	50 (25/44,6 for 10mm)	5.30	2.10
			19/03/2012	
			4.90	2.10
			21/03/2012	0800
			4.90	2.30
5.60-7.10	65 23 0	NI		
		NI 60 110		
7.10-8.40	100 89 8	NI 50 70		
8.40-9.90	100 65 58	NI 60 130		
		If /NA/		
		500 500 500		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Strata

Description	Depth, *Level* (Thickness)
Reinforced CONCRETE. (MADE GROUND)	(0.40)
	0.40
Soft, becoming firm below 3.00m, mottled grey and brown CLAY.	(2.90)
	3.30
Medium dense brown slightly sandy, locally slightly clayey, subangular to subrounded fine to coarse GRAVEL of sandstone, mudstone and siltstone.	(1.50)
	4.80
Firm light grey sandy CLAY.	(0.30)
	5.10
Extremely weak light grey fine grained SANDSTONE. Recovered as angular fine to coarse gravel.	(0.50)
	5.60
Medium strong thinly laminated brown fine grained SANDSTONE. Recovered non intact. 5.60-6.18 m AZCL	(0.85)
	6.45
Very weak to weak thinly laminated light grey fine grained SANDSTONE with frequent grey laminations. Weathering is localised loss of structure to gravel. Fractures are: 1No. subhorizontal, very closely to closely spaced, planar, smooth, open. 2No. recovered as non intact. 6.50-6.80 m 1 No 60 deg undulating smooth fracture	(1.20)
	7.65
Very weak thinly laminated light grey MUDSTONE. Weathering is clay infilling of fracture surfaces. Fractures are very closely to closely spaced, planar, rough, closed. 8.53-8.57 m NI	(1.00)
	8.65
Weak thinly laminated grey SILTSTONE. Weathering is localised loss of structure to clayey gravel. Fractures are subhorizontal, very closely to closely spaced, planar, rough, open. 8.71-8.77 m NI; 8.86-8.87 m NI; 9.01-9.02 m NI	(0.45)
	9.10
Extremely weak black vitreous COAL.	9.30
Very weak thinly laminated grey 9.80-9.90 m 1 No 60 deg planar	(0.50)
	9.80
Stratum continues to 11.10 m	

Legend / Backfill/ Instruments



Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1	3.30	Rose to 2.90 m after 20 minutes.	-

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used
5.00 -5.30	15 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project WOODHOUSE MILL WwTW DIGESTER REFURBISHMENT, SHEFFIELD
Project No. A2015-12
Carried out for ETM

Borehole

BHD2

Borehole Log

Soil Mechanics

Drilled JS/PG **Logged** JMH **Checked** MW	**Start** 19/03/2012 **End** 21/03/2012	**Equipment, Methods and Remarks** Dando 150 & Beretta T44. Cable percussion boring & rotary core drilling (PWF size). SPT: hammer ID 135, rods B.	**Depth from** / **to** / **Diameter** / **Casing Depth** 0.00m / 5.60m / 200mm / 5.60m 5.60m / 15.80m / 121mm / 5.60m	**Ground Level** - **Coordinates** X 983.15 **Local Grid** Y 1250.39 **Chainage**	

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
9.90-11.30	96 11 0	NI NI 160	Flush: 5.60-15.80 Water, 100 %		
11.30-12.80	100 79 9	NI 40 130			
12.80-14.30	93 70 55	NI 220			
		NI 60 100			
14.30-15.80	95 68 34	NI 70 90			
		NI 100 180		21/03/2012 5.60	

Strata

Description (Continued from Sheet 1)		Depth, *Level* (Thickness)	Legend	Backfill/ Instruments
9.30m - 9.80m : MUDSTONE. Weathering is loss of structure to clay.	:: 9.80m - smooth open fracture	(1.30)		
9.80m - 11.10m : Very weak to weak thinly laminated light grey fine grained SANDSTONE. Weathering is widespread loss of structure to gravel. Fractures are: 1 No recovered as non intact. 2 No subhorizontal, very closely spaced, planar, rough, open. 3 No subvertical, undulating, planar, rough, open.	11.37-11.41 m NI	11.10		
Very weak to extremely weak thinly laminated light grey MUDSTONE. Weathering is localised loss of structure to clayey gravel. Fractures are subhorizontal, extremely to closely spaced, planar, rough, open and closed.	11.73-12.13 m 1 No 75 deg planar smooth open fracture 11.75-12.27 m 1No 85 deg planar smooth open fracture 11.80-11.91 m NI	(1.50)		
Very weak to weak thinly laminated grey MUDSTONE. Weathering not apparent. Fractures are subhorizontal, closely spaced, planar, smooth, open.	12.05-12.07 m NI 12.55-12.60 m NI 12.80-12.90 m AZCL 12.90-13.02 m NI 13.18-13.21 m NI 13.44-13.45 m NI	12.60 (1.10)		
Very weak to weak thinly laminated dark grey carbonaceous MUDSTONE. Weathering not apparent. Fractures are subhorizontal, very closely to closely spaced, planar, smooth, open.	13.75-13.97 m 1 No 65 deg undulating smooth open fracture 14.20-14.24 m NI 14.30-14.37 m	13.70 (0.75)		
Very weak thinly laminated light grey MUDSTONE. Weathering not apparent. Fractures are subhorizontal, very closely spaced, planar, rough, open.	AZCL 14.37-14.45 m NI 14.56-14.59 m NI 14.63-14.67 m NI 14.71-14.81 m 1 No 45 deg planar smooth closed fracture	14.45 (0.40)		
Weak to medium strong thinly laminated light grey fine grained SANDSTONE with frequent laminations of grey siltstone. Weathering is localised loss of structure to clayey gravel. Fractures are subhorizontal, very closely to closely spaced, planar, smooth, open.	15.03-15.06 m NI 15.34-15.53 m 1 No 55 deg planar smooth open fracture 15.74-15.80 m NI	14.85 (0.95)		
EXPLORATORY HOLE ENDS AT 15.80 m		15.80		

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)

Depth Related Remarks *

From	to (m)

Chiselling

Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

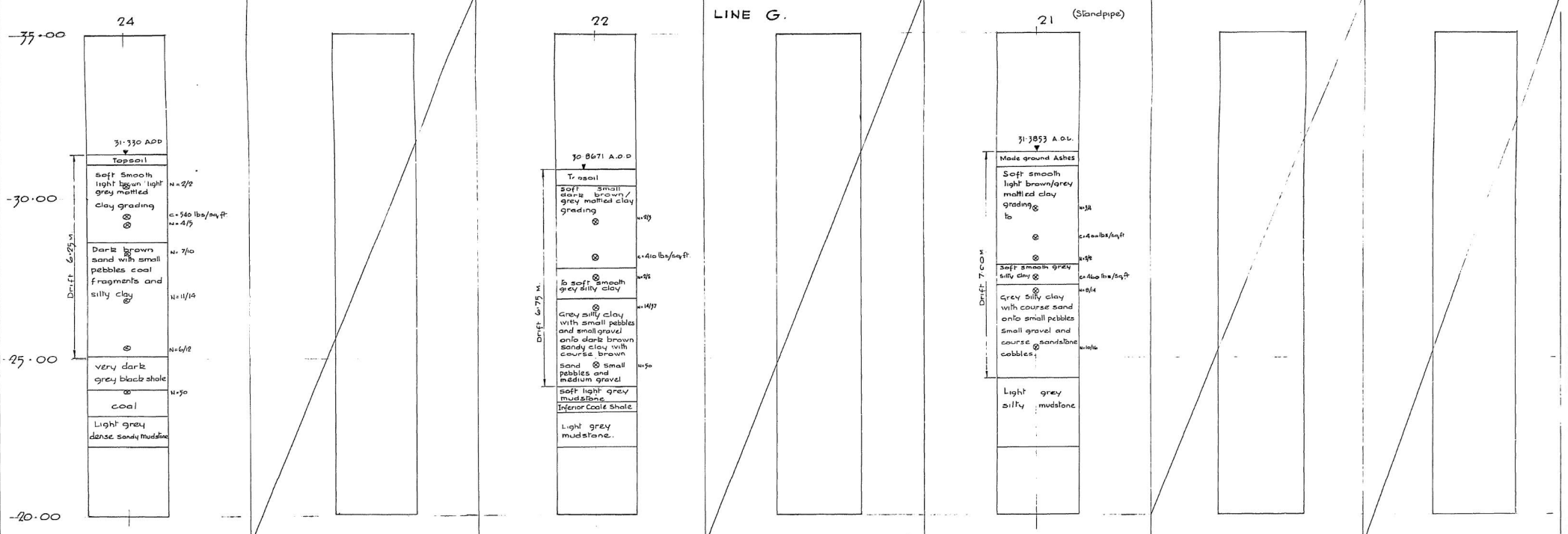
Scale 1:50

Project	**WOODHOUSE MILL WwTW DIGESTER REFURBISHMENT, SHEFFIELD**
Project No.	**A2015-12**
Carried out for	**ETM**

Borehole

BHD2

LINE G.



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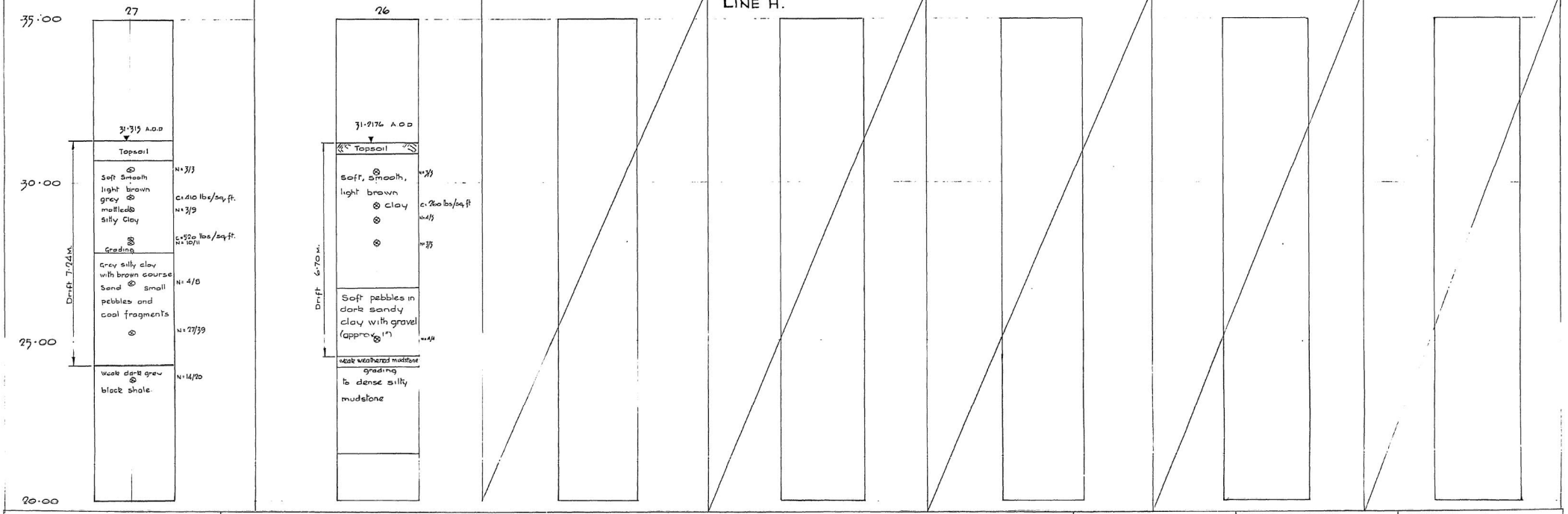


CITY OF SHEFFIELD
SEWAGE DISPOSAL DEPARTMENT
H. B. TENCH, B.Sc., F.R.I.C., M.Inst.W.P.C.
GENERAL MANAGER

WOODHOUSE MILL WORKS.

BOREHOLE DETAILS. LINES G & H.

REVISIONS

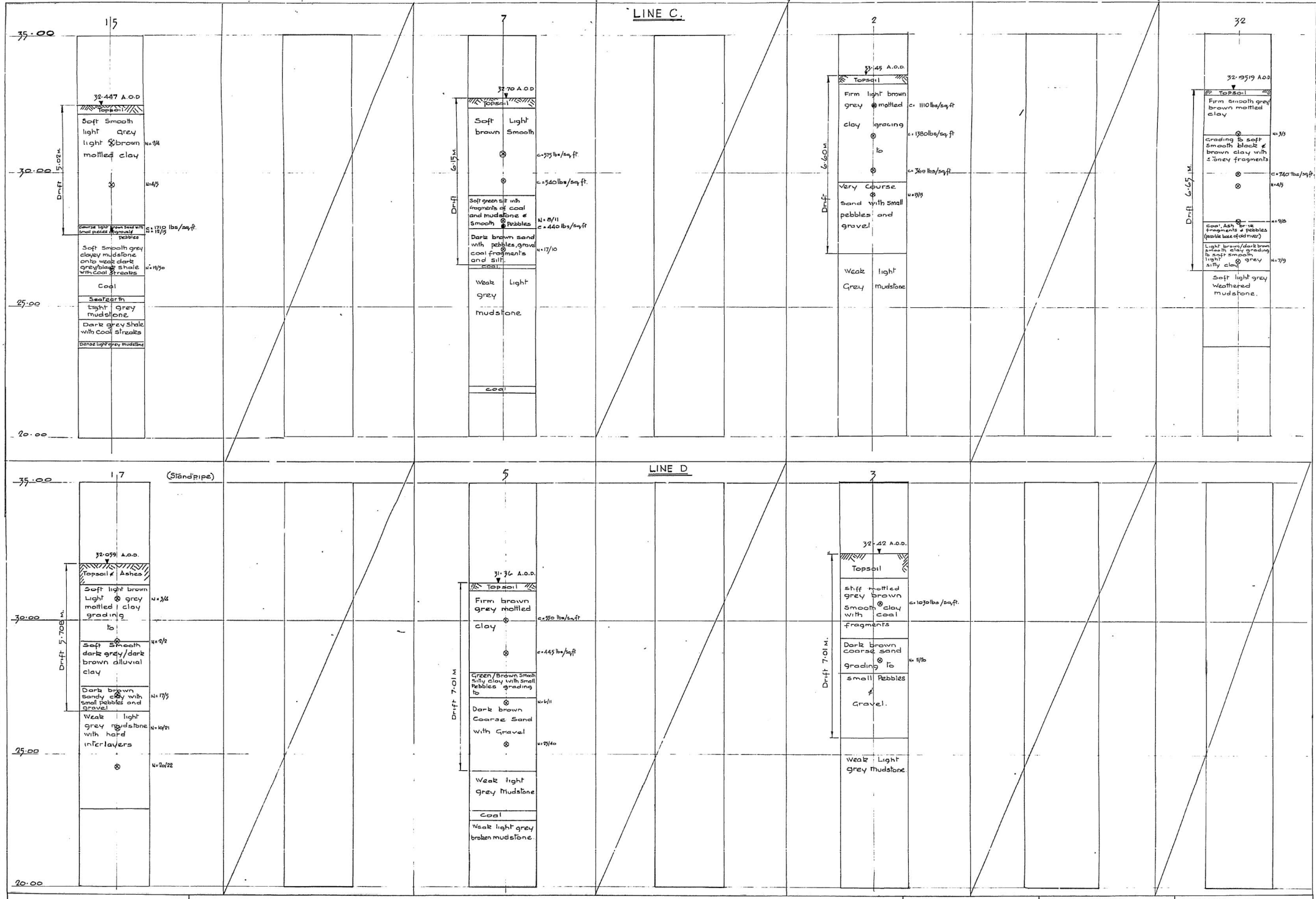
RELATE DRAWINGS
Borehole Layout Plan 3/0/1/1

SCALE 1:50 Metric

APPROVED

WORKS	UNIT	TYPE	NO.
DRG	3	P	02	4

DRN.	TCD.	CKD.	DATE
T.M.M.			22·1·71



CITY OF SHEFFIELD
SEWAGE DISPOSAL DEPARTMENT
H. B. TENCH, B.Sc., F.R.I.C., M.Inst.W.P.C.
GENERAL MANAGER

WOODHOUSE MILL WORKS RECONSTRUCTION.

BOREHOLE RECORDS – LINES C & D.

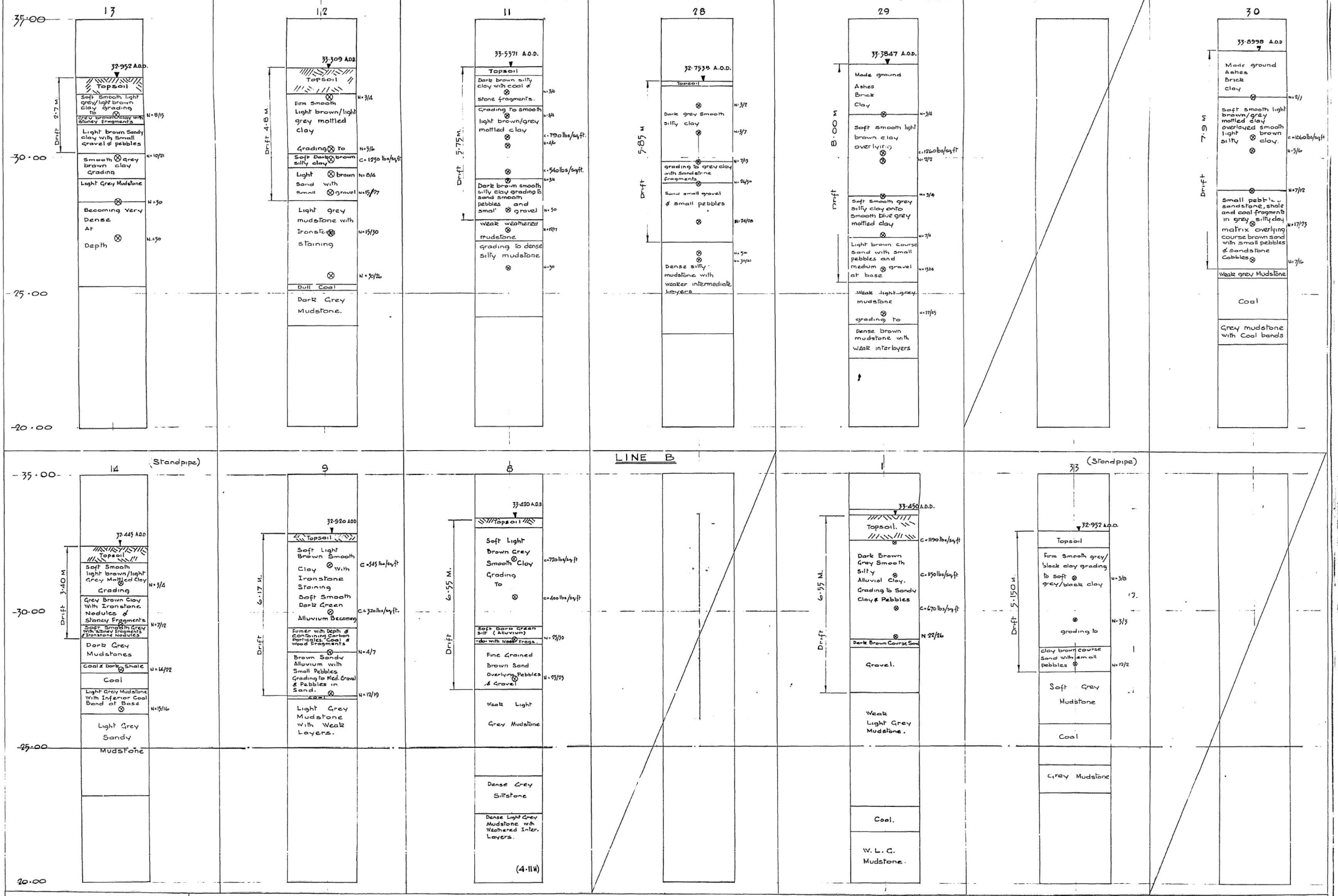
REVISIONS

RELATE DRAWINGS
Borehole layout Plan OD/WM/1.

APPROVED

	WORKS	UNIT	TYPE	No.
DRG.	3	P	02	2

DRN. IMM. | TCD. | CKD. | DATE 9·11·56



CITY OF SHEFFIELD
SEWAGE DISPOSAL DEPARTMENT
H. B. TENCH, B.Sc., F.R.I.C., M.Inst.W.P.C.
GENERAL MANAGER

WOODHOUSE MILL WORKS

BOREHOLE RECORDS. — LINES A & B.

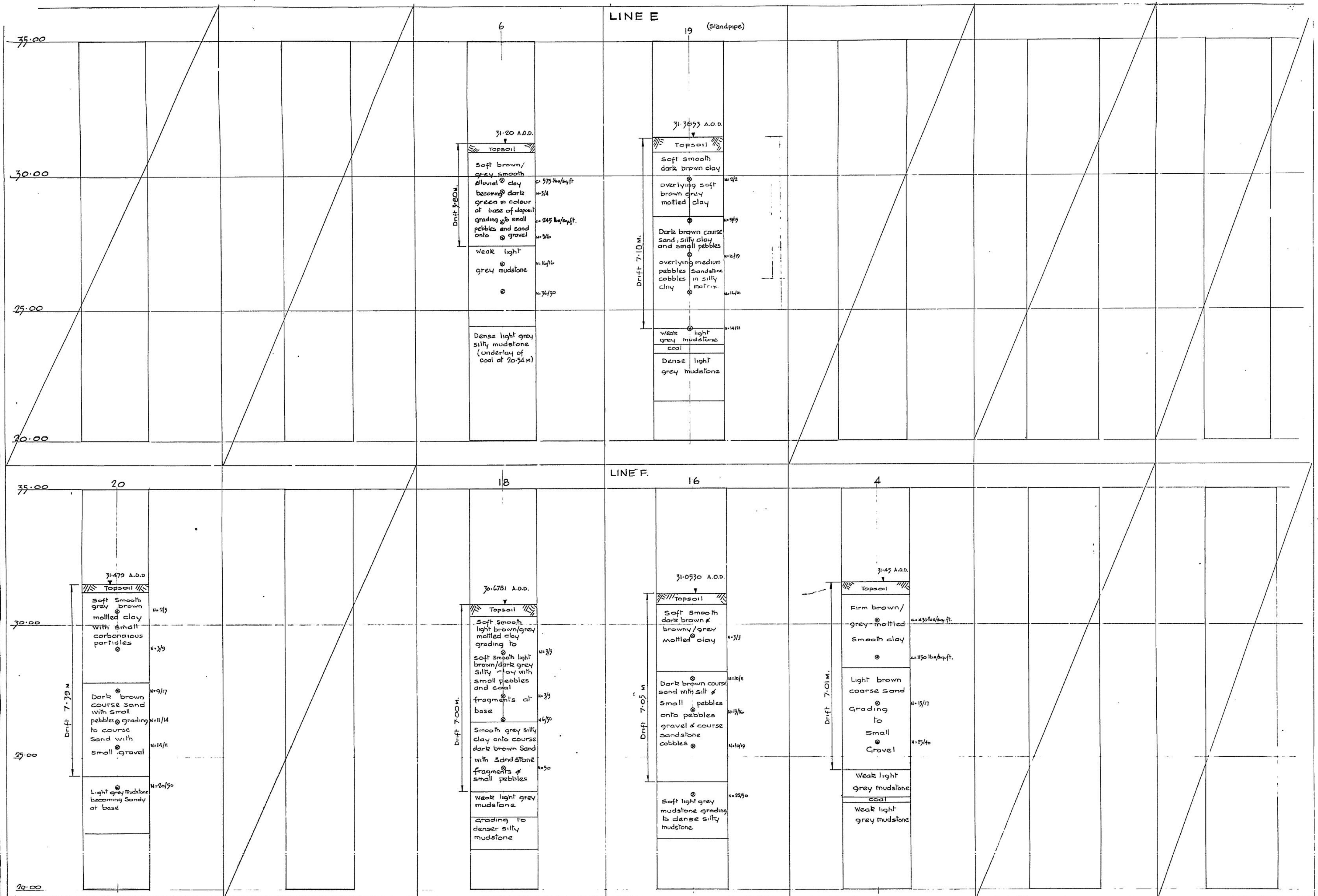
REVISIONS

RELATE DRAWINGS
Borehole Layout Plan OD/WM/1.

APPROVED

	WORKS	UNIT	TYPE	No.
DRG	3	P	O2	1

DRN. | TCD. | CKD. | DATE



CITY OF SHEFFIELD
SEWAGE DISPOSAL DEPARTMENT
H. B. TENCH, B.Sc., F.R.I.C., M.Inst.W.P.C.
GENERAL MANAGER

WOODHOUSE MILL WORKS RECONSTRUCTION.

BOREHOLE RECORDS LINES E & F

REVISIONS

RELATE DRAWINGS
Borehole layout Plan 3/P/1/1

APPROVED

	Works	Unit	Type	No.
DRG	3	P	02	3

Appendix 6 BAT Assessment

BAT No.	Topic	Brief Description	BAT	Applicable BAT- AEL	Compliant now?	Derogation needed?	Provide brief comments on how compliance with BAT is (or will be) achieved Where "N/A" or "other" is given, please explain why
General BAT conclusions							
1	Overall performance	EMS *Applicability* The scope (e.g. level of detail) and nature of the EMS (e.g. standardised or non-standardised) will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined also by the type and amount of wastes processed).	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:				
			i) commitment of the management, including senior management;		Yes	No	Yes, this is an integral part of the ISO 14001 system. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems
			ii) definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation;		Yes	No	Yes, this is an integral part of the ISO 14001 system. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems
			iii) planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment;		Yes	No	Yes, this is an integral part of the ISO 14001 system. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems
			iv) 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;		Yes	No	Yes, this is an integral part of the ISO 14001 system. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems
			v) checking performance and taking corrective action, paying particular attention to: (a) monitoring and measurement (see also the JRC Reference Report on Monitoring of emissions to air and water from IED installations – ROM), (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;		Yes	No	Yes, this is an integral part of the ISO 14001 system. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems
			vi) review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness;		Yes	No	Yes, this is an integral part of the ISO 14001 system. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems
			vii) following the development of cleaner technologies;		Yes	No	The Innovations Team at YW undertakes regular monitoring and review of new and innovative technologies and equipment to ensure the business continually improves its operations and activities. This includes consideration of cleaner technologies and improved environmental performance. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems
			viii) 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;		Yes	No	Yes, this is an integral part of the ISO 14001 system. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems. See also see Section V: Appendix 5 Site Condition Report.
			ix) application of sectoral benchmarking on a regular basis;		Yes	No	Yes, sectoral and cross-sector benchmarking also takes place as required. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems
			x) waste stream management (see BAT 2);		Yes	No	ISO 14001 system. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems. See also BAT 2 below.
			xi) an inventory of waste water and waste gas streams (see BAT 3);		Yes	No	Refer to Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land. See also BAT 3, 8 and 34 below. YW is committed to undertake a period of monitoring to further characterise process liquors returned to Woodhouse Mill WwTW and therefore no long term derogation is required.
			xii) residues management plan (see description in Section 6.5);		Yes	No	Yes, this is an integral part of the ISO 14001 system. Refer to Section III: Supporting Information, Form C2, Question 3d Management systems and also information provided in response to Form C3, Question 6.
			xiii) accident management plan (see description in Section 6.5);		Yes	No	This is provided in response to Section III: Supporting Information, Form C2, Question 6-8.
2	Overall performance	Improvement of overall environmental performance	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		Yes	No	Refer to Appendix 13 Waste pre-acceptance, acceptance and rejection Procedure. All sludges arriving at Woodhouse Mill STF are either indigenous primary and secondary sludges from Woodhouse Mill WwTW or imported sludge from other YW sites. The volume, % dry solids and source of imports to the site is recorded by WaSP loggers.
			b) Set up and implement waste acceptance procedures		Yes	No	Refer to Appendix 13 Waste pre-acceptance, acceptance and rejection Procedure. All sludges arriving at Woodhouse Mill STF are either indigenous primary and secondary sludges from Woodhouse Mill WwTW or imported sludge from other YW sites. The volume, % dry solids and source of imports to the site is recorded by WaSP loggers.
			c) Set up and implement a waste tracking system and inventory		Yes	No	Refer to Section II: Technical Description and Section III: Supporting Information, Form C2, Question 3d Management systems and comments noted above. The volume and source of imports to the site is recorded by WaSP loggers.
			d) Set up and implement an output quality management system		Yes	No	Refer to Section II: Technical Description and Section III: Supporting Information, Form C2, Question 3d Management systems. HACCP processes are in place to manage and maintain the quality of digested sludge to ensure its suitability for land spreading.
			e) Ensure waste segregation		N/A (explain)	No	Waste received on site comprises only sewage sludge. Waste segregation, sorting and waste compatibility considerations are not relevant
			f) Ensure waste compatibility prior to mixing or blending of waste		N/A (explain)	No	Waste received on site comprises only sewage sludge. Waste segregation, sorting and waste compatibility considerations are not relevant
			g) Sort incoming solid waste		N/A (explain)	No	Waste received on site comprises only sewage sludge. Waste segregation, sorting and waste compatibility considerations are not relevant
3	Overall performance	Inventory *Applicability* The scope (e.g. level of detail) and nature of the inventory will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined also by the type and	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:				
			(i) 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 waste water/waste gas treatment at source including their performances;		Yes	No	Refer to Section II: Technical Description and Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land.

BAT No.	Topic	Brief Description	BAT	Applicable BAT- AEL	Compliant now?	Derogation needed?	Provide brief comments on how compliance with BAT is (or will be) achieved Where "N/A" or "other" is given, please explain why
General BAT conclusions							
		amount of wastes processed).	(ii) information about the characteristics of the waste water 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);		Other (explain)	No	All liquor from sludge thickening and dewatering processes, condensate (e.g. from biogas handling), cleaning / washdown effluent and surface water runoff is collected and discharged via underground drainage systems to Woodhouse Mill WwTW for full treatment prior to discharge to the River Rother. As both Woodhouse Mill STF and Woodhouse Mill WwTW are owned and operated by YW, separate monitoring of Woodhouse Mill STF discharges has not been necessary or required under any permitting regime. YW do not currently undertake any routine monitoring of these discharges (other than checks for process control purposes). YW recognises that there is a change in permitting regime and therefore commits to undertake initially a one-off programme of monitoring return liquors in order to obtain further information about the characteristics of the waste streams. The monitoring programme will comprise collection of wastewater samples from each emission point over a 12 month period. Further information is provided in response to Form C2, Question 6-8.
			(iii) 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).		Yes	No	Refer to Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land.
4	Overall performance	Techniques for storage of waste	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		Yes	No	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. 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.
			b) Adequate storage capacity		Yes	No	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. 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.
			c) Safe storage operation		Yes	No	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. 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.
			d) Separate area for storage and handling of packaged hazardous waste		Yes	No	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. Very limited quantities of hazardous waste are generated by site activities. These are segregated and stored in suitable, fit for purpose containers.
5	Overall performance	Techniques for handling and transfer of waste	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.		Yes	No	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 and Section III: Supporting Information, Form C2, Question 3d Management systems. Waste procedures are included within the YW management system and training is provided to staff as required.
6	Monitoring	Waste water - Monitor key parameters	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).		Other (explain)	No	There are no direct emissions to water and no wastewater treatment is undertaken within the installation boundary. Wastewater is returned to Woodhouse Mill WwTW for full treatment prior to discharge. In respect of characterisation monitoring for return liquors refer to commitments made in BAT 3 above and Section III: Supporting Information, Form C2, Question 6-9.
7	Monitoring	Waste water - Monitoring frequencies and standards	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.	See 'Water emissions tables' tab	Other (explain)	No	All liquor from sludge thickening and dewatering processes, condensate (e.g. from biogas handling), cleaning / washdown effluent and surface water runoff is collected and discharged via underground drainage systems to Woodhouse Mill WwTW for full treatment prior to discharge to the River Rother. As both Woodhouse Mill STF and Woodhouse Mill WwTW are owned and operated by YW, separate monitoring of Woodhouse Mill STF discharges has not been necessary or required under any permitting regime. YW do not currently undertake any routine monitoring of these discharges (other than checks for process control purposes). YW recognises that the inventory of emissions to sewer is currently incomplete and commits to undertake the sampling and analysis of effluent discharged to Woodhouse Mill WwTW in line with BAT3 requirements. This emissions characterisation programme will be carried out by sampling every month for a 12-month period in order to fully characterise wastewater emissions. Further information is provided in response to Form C2, Question 6-9. The data will be used to undertake an environmental impact assessment in accordance with Environment Agency guidance. The findings of the monitoring, analysis and impact assessment will be provided to the Environment Agency within 18 months of permit issue. Requirements for ongoing monitoring will be established after this has been completed.
8	Monitoring	Channelled air emissions - Monitoring frequencies and standards	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.	See 'Air emissions tables' tab	Yes	No	Refer to Appendix 10 - Odour Management Plan in respect of monitoring provisions (olfactometric and process). Monitoring will be undertaken in accordance with BAT 8 requirements and will include emissions monitoring at the OCU stack on a 6-monthly basis.
9	Monitoring	Diffuse emissions - Monitor organic compounds	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.		N/A (explain)	NA	Relevant activities are not carried out at this site.
			a) Measurement		N/A (explain)	NA	Relevant activities are not carried out at this site.
			b) Emissions factors		N/A (explain)	NA	Relevant activities are not carried out at this site.
			c) Mass balance		N/A (explain)	NA	Relevant activities are not carried out at this site.
10	Monitoring	Odour - Monitor emissions *Applicability* The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.	BAT is to periodically monitor odour emissions. (The monitoring frequency is determined in the odour management plan (see BAT 12).)		Other (explain)	No	Refer to Appendix 10 Odour Management Plan which provides details of the proposed programme of sniff testing.
11	Monitoring	Monitor annual consumption and generation of waste outputs	BAT 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.		Yes	No	Refer to Section II: Technical Description and Section III: Supporting Information, Form C2, Question 3d Management systems (sub-section 'Monitoring') and Form C3, Questions 6a, b, c, d and e
12	Emissions to air	Odour Management Plan *Applicability* The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.	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: — 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.		Yes	No	Refer to Appendix 10 Odour Management Plan

BAT No.	Topic	Brief Description	BAT	Applicable BAT- AEL	Compliant now?	Derogation needed?	Provide brief comments on how compliance with BAT is (or will be) achieved Where "N/A" or "other" is given, please explain why
General BAT conclusions							
13	Emissions to air	Odour reduction techniques	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.		Yes	No	Refer to Appendix 10 Odour Management Plan
			a) Minimising residence times		Yes	No	Refer to Appendix 10 Odour Management Plan
			b) Using chemical treatment		Yes	No	Refer to Appendix 10 Odour Management Plan. Chemical treatment is not routinely used but could be considered in order to respond to an abnormal / significant odour issue.
			c) Optimising aerobic treatment		N/A (explain)	NA	Relevant activities are not carried out at this site.
14	Emissions to air	Diffuse emission reduction techniques	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		Other (explain)	No	Refer to Section III: Supporting Information, Form C2, Question 6-6 review of diffuse and point source emissions and proposed improvement programme, Appendix 13 LDAR procedure and also Section II: Technical Description, Section III Supporting Information, Form C3, Question 3b General Requirements – LDAR programme, Section V: Appendix 8 Odour Risk Assessment, and Section V: Appendix 10 Odour Management Plan. Refer to Proposed Improvement Programme for commitments to tank covering - no long term derogation is required.
			b) Selection and use of high- integrity equipment		Yes	No	Plant is compliant with YW engineering standards and subject to ongoing formal inspection and maintenance regimes.
			c) Corrosion prevention		Yes	No	Plant is compliant with YW engineering standards and subject to ongoing formal inspection and maintenance regimes.
			d) Containment, collection and treatment of diffuse emissions		Other (explain)	No	Some, but not all, odour sources on site are covered and contained and meet the requirements of BAT 14d. Refer to Section III: Supporting Information, Form C2, Question 6-6 review of diffuse and point source emissions. The use of enclosed equipment or buildings for control of diffuse odour emissions from secondary maturation of digested cake on the cake pad is constrained by the volume of waste. YW commits to improvements to meet BAT 14d requirements; these are listed in Proposed Improvement Programme section of the main application document.
			e) Dampening		N/A (explain)	NA	Materials are already wet or liquid
			f) Maintenance		Yes	No	Planned maintenance systems in place. Refer to Appendix 13 LDAR procedure and also Section II: Technical Description and Section III: Supporting Information, Form C2, Question 3d Management systems.
			g) Cleaning of waste treatment and storage areas		Yes	No	Regular cleaning is undertaken, where required and appropriate
			h) Leak detection and repair (LDAR) programme		Yes	No	Refer to Appendix 13 LDAR procedure and also Form C3, Question 3b General Requirements – LDAR programme
15	Emissions to air	Flare use minimisation techniques	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		Yes	No	Refer to Section II: Technical Description (sub-section Biogas Storage and Use)
			b) Plant management		Yes	No	Refer to Section II: Technical Description (sub-section Biogas Storage and Use)
16	Emissions to air	Flare emissions minimisation techniques	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		Yes	No	Refer to Section II: Technical Description (sub-section Biogas Storage and Use)
			b) Monitoring and recording as part of flare management		Yes	No	Refer to Form C3, Question 4 Monitoring, Table C3: 4a-1 and 4a-2 .
17	Noise and vibrations	Noise management plan *Applicability* The applicability is restricted to cases where a noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated.	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:		N/A (explain)	NA	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. Complaints handling and response procedures are in place – refer to Section III: Supporting Information, Form C2, Question 3d Management systems.
			i) a protocol containing appropriate actions and timelines;		N/A (explain)	NA	See above
			ii) a protocol for conducting noise and vibration monitoring;		N/A (explain)	NA	See above
			iii) a protocol for response to identified noise and vibration events, e.g. complaints;		N/A (explain)	NA	See above
			iv) 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.		N/A (explain)	NA	See above
18	Noise and vibrations	Noise and vibration reduction techniques	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.		Yes	No	Noise is minimised using a combination of techniques appropriate to the nature of installation activities and the risk of noise nuisance. Refer to Section V: Appendix 9 Noise impact assessment.
			a) Appropriate location of equipment and buildings		Yes	No	See above.
			b) Operational measures		Yes	No	See above
			c) Low-noise equipment		Yes	No	See above
			d) Noise and vibration control equipment		Yes	No	See above
			e) noise attenuation		Yes	No	See above
19	Emissions to water	Water management techniques	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		Yes	No	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. 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.
			b) water recirculation		N/A (explain)	No	Relevant activities are not carried out at this site. 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.
			c) impermeable surface		Yes	No	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, Q 6-8), Appendix 5: Site Condition Report and Appendix 11: Secondary Containment Risk Assessment.
			d) Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels		Other (explain)	No	Refer to Appendix 11 Secondary Containment Risk Assessment. A secondary containment risk assessment has been undertaken to assess whether existing measures to protect the environment in the event of a failure of containment of primary storage tanks are adequate. This study has identified that some additional mitigation measures are required in order to enhance environmental protection for the identified sensitive receptors. YW will implement the required improvements in order to meet BAT 19d requirements, and therefore no long term derogation is necessary.
			e) Roofing of waste storage and treatment areas		Other (explain)	No	Digested sludge cake is transferred from the centrifuges onto the cake pad. The cake pad is not covered, but engineered to direct run-off generated (during periods of rainfall), via return liquor flows, to Woodhouse Mill WwTW for full treatment. This treatment provision is considered adequate and negates the need to cover the cake pad for the purpose of run-off reduction.
			f) Segregation of water streams		Other (explain)	No	In order to reduce pollution risks rainwater runoff is collected and returned to Woodhouse Mill WwTW for treatment (with the exception of runoff from some limited areas of site, which are due to be redirected to the WwTW) in addition to process liquors and cleaning washwater etc. Roofwater runoff is limited due to small number/surface area of buildings within the installation boundary. Refer to Section II: Technical Description, Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land and Figure 4 Drainage Plan.

BAT No.	Topic	Brief Description	BAT	Applicable BAT- AEL	Compliant now?	Derogation needed?	Provide brief comments on how compliance with BAT is (or will be) achieved Where "N/A" or "other" is given, please explain why
General BAT conclusions							
			g) Adequate drainage infrastructure		Yes	No	All process liquors, cleaning washwater and surface water runoff from the site (with the exception of runoff from some limited areas of site, which are due to be redirected to the WwTW) are returned to Woodhouse Mill WwTW for treatment. Refer to Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land and Figure 4 Drainage Plan.
			h) Design and maintenance provisions to allow detection and repair of leaks		Yes	No	Measures are in place for the protection of land and groundwater during operation of the permit - refer to Appendix 11 Secondary Containment Risk Assessment. This study has identified that some additional mitigation measures are required in order to enhance environmental protection for the identified sensitive receptors. YW will implement the required improvements in order to meet BAT 19h requirements, and therefore no long term derogation is necessary.
			i) Appropriate buffer storage capacity		Yes	No	Wastewater is returned for treatment at the co-located Woodhouse Mill WwTW where there is adequate buffer storage capacity.
20	Emissions to water	Water emission reduction techniques	In order to reduce emissions to water, BAT is to treat waste water using an appropriate combination of the techniques given below.	See 'Water emissions tables' tab			Process liquor, including most surface water runoff is directed to Woodhouse Mill WwTW for full treatment. Refer to Section II: Technical Description and Section III: Supporting Information, Form C3, Question 2 Point source emissions to air, water and land
			a) equalisation		Yes	No	Wastewater flow from the STF is mixed with UWwTD wastewater (outside of the installation in the wider WwTW), providing adequate balancing of flow and composition.
			b) neutralisation		Yes	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			c) Physical separation, e.g. screens, sieves, grit separators, grease separators, oil-water separation or primary settlement tanks		Yes	No	Sludge screens are located within the STF. UWWTD flow is screened at Woodhouse Mill WwTW.
			d) adsorption		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			e) distillation/rectification		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			f) precipitation		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			g) chemical oxidation		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			h) chemical reduction		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			i) evaporation		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			j) ion exchange		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			k) stripping		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			l) activated sludge process		Yes	No	Undertaken at Woodhouse Mill WwTW
			m) membrane bioreactor		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			n) Nitrification/denitrification when the treatment includes a biological treatment		Yes	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			o) coagulation and flocculation		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			p) sedimentation		Yes	No	Primary settlement tanks at Woodhouse Mill WwTW enable solids settlement to occur.
			q) Filtration (e.g. sand filtration, microfiltration, ultrafiltration)		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
			r) floatation		N/A (explain)	No	Not applicable - treatment processes in place ensure that discharge permit conditions are met.
21	Emissions from accidents and incidents	Prevention and limitation techniques	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).		Yes	No	Refer to Accident Management Plan Table C2: 6-8.
			a) protection measures		Yes	No	Refer to Accident Management Plan Table C2: 6-8.
			b) Management of incidental/accidental emissions		Yes	No	Refer to Accident Management Plan Table C2: 6-8.
			c) Incident/accident registration and assessment system		Yes	No	Refer to Accident Management Plan Table C2: 6-8.
22	Material efficiency	Material efficiency *Applicability* Some applicability limitations derive from the risk of contamination posed by the presence of impurities (e.g. heavy metals, POPs, salts, pathogens) in the waste that substitutes other materials. Another limitation is the compatibility of the waste substituting other materials with the waste input (see BAT 2).	In order to use materials efficiently, BAT is to substitute materials with waste.		Yes	No	Opportunities to substitute materials with waste are very limited. However, treated final effluent is used in preference to mains water supply wherever feasible. Refer also to Section III: Supporting Information, Form C3, Question 6e.
23	Energy efficiency	Energy efficiency techniques	In order to use energy efficiently, BAT is to use both of the techniques given below.		Yes	No	Refer to Section III: Supporting Information, Form C3, Question 6a and 6b
			a) energy efficient plant		Yes	No	Refer to Section III: Supporting Information, Form C3, Question 6a and 6b
			b) energy balance record		Yes	No	Refer to Section III: Supporting Information, Form C3, Question 6a and 6b
24	Reuse of packaging	Reuse of packaging *Applicability* Some applicability restrictions derive from the risk of contamination of the waste posed by the reused packaging.	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).		Yes	No	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
General BAT conclusions for the biological treatment of waste							
33	Overall performance		In order to reduce odour emissions and to improve the overall environmental performance, BAT is to select the waste input.		Yes	No	Waste is only received from YW WwTW sites. Refer to Section II: Technical Description and Section III: Supporting Information, Form C2, Question 3d Management systems. Refer also to BAT 2 above.
34	Emissions to air		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.	See 'Air emissions tables' tab	Yes	No	OCU in used and is working efficiently. OCU process and emissions monitoring will be undertaken in compliance with accordance with BAT 8 requirements.
			a) adsorption - see table 6.1		Yes	No	See above
			b) biofilter - see table 6.1		Yes		See above
			c) fabric filter - see table 6.1		N/A (explain)		See above
			d) thermal oxidation - see table 6.1		N/A (explain)		See above
			e) wet scrubbing - see table 6.1		N/A (explain)		See above
35	Emissions to water and usage		In order to reduce the generation of waste water and to reduce water usage, BAT is to use all of the techniques given below.				
			a) segregation of water streams		Yes	No	Treated final effluent is used in preference to mains water supply wherever feasible. Surface water runoff is limited and is directed to Woodhouse Mill WwTW for full treatment prior to discharge.
			b) water recirculation		Yes	No	Wastewater is minimised within the constraints of existing plant. Treated final effluent is used in preference to mains water supply wherever feasible.
			c) minimisation of the generation of leachate		Yes	No	Digested sludge is dewatered using centrifuges in order to minimise leachate generation from digested sludge cake. Sludge is contained within tanks and pipework at all other times.
BAT conclusions for the aerobic treatment of waste							

BAT No.	Topic	Brief Description	BAT	Applicable BAT- AEL	Compliant now?	Derogation needed?	Provide brief comments on how compliance with BAT is (or will be) achieved Where "N/A" or "other" is given, please explain why
General BAT conclusions							
36	Overall environmental performance	control key waste and process parameters	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.		N/A (explain)	NA	Relevant activities are not carried out at this site.
37	Odour and diffuse emissions to air	reduce diffuse emissions to air of dust, odour and bioaerosols	In order to reduce diffuse emissions to air of dust, odour and bioaerosols from open-air treatment steps, BAT is to use one or both of the techniques given below.		N/A (explain)	NA	Relevant activities are not carried out at this site.
			a) use of semipermeable membrane covers		N/A (explain)	NA	Relevant activities are not carried out at this site.
			b) adaptation f operations to the meteorological conditions		N/A (explain)	NA	Relevant activities are not carried out at this site.
BAT conclusions for the anaerobic treatment of waste							
38	Emissions to air	Monitor and control key waste and process parameters	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.		Yes	No	YW carries out an extensive level of process monitoring (Refer to Section II: Technical Description and Section III: Form C3, Question 4a: Monitoring Table C3: 4a-2 Key process monitoring provision). Digester process operation is controlled, including control of foaming (refer to Section II: Technical Description, 'sludge digestion' sub-section). Process monitoring parameters for the OCU are established in the Odour Management Plan.
BAT conclusions for the mechanical biological treatment (MBT) of waste							
39	Emissions to air	Segregation and recirculation of waste gas streams	In order to reduce emissions to air, BAT is to use both of the techniques given below.		N/A (explain)	NA	Relevant activities are not carried out at this site.
			a) segregation of the waste gas streams		N/A (explain)	NA	Relevant activities are not carried out at this site.
			b) recirculation of waste gas		N/A (explain)	NA	Relevant activities are not carried out at this site.
BAT conclusions for the physico-chemical treatment of solid and/or pasty waste							
40	Monitor waste input	Monitoring of content of wastes during pre-acceptance and acceptance	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).		Yes	No	Relevant activities are not carried out at this site.
41	Emissions to air	Abatement systems and BAT-AELS	In order to reduce emissions of dust, organic compounds and NH3 to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below.	See 'Air emissions tables' tab	N/A (explain)	NA	Relevant activities are not carried out at this site.
			a) adsorption - see section 6.1				
			b) biofilter - see section 6.1				
			c) fabric filter - see section 6.1				
			d) wet scrubbing - see section 6.1				

Appendix 7 Air Emissions Risk Assessment

Woodhouse Mill

Air Emissions Risk Assessment

On behalf of

Project Ref:331001762/100.2301 | Rev: Issued | Date: September 2021

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Project Name: **Woodhouse Mill**
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Report Title: **Air Emissions Risk Assessment**
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	Name	Position	Signature	Date
Prepared by:	Laura Smart	Air Quality Scientist	LS	September 2021
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For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved
Draft	September 2021	Draft for client comment	LS	PB	KH
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Appendices

1 Introduction

1.1 Background

1.1.1 Yorkshire Water Services Ltd has commissioned Stantec UK Ltd (Stantec) to undertake an Air Emission Risk Assessment (AERA) to support the Environmental Permit (EP) application under the Industrial Emissions Directive (IED) for Anaerobic Digestion activities at Woodhouse Mill Sludge Treatment Facility (STF).

1.1.2 The Installation is located within the administrative boundary of Rotherham Metropolitan Borough Council (RMBC). The location of the Site is shown in **Figure 1, Appendix E**.

1.1.3 The Installation includes a biogas combustion plant comprising two Combined Heat and Power (CHP) plant units and one boiler.

1.2 Report Scope

1.2.1 The scope of the assessment is limited to the point source combustion emissions to air at the Installation (as defined above). Consistent with Environment Agency (EA) guidance (Environment Agency, 2021), for a gas engine fired on biogas, the principal release of oxides of nitrogen (NOx) have been assessed alongside sulphur dioxide (SO_2) due to the potential sulphur content of biogas.

1.2.2 Emissions of NOx (in the form of nitrogen dioxide (NO_2)) and SO_2 have been assessed against the relevant Air Quality Standards for NO_2 and SO_2 for the protection of human health. An assessment has also been carried against the relevant Critical Levels (C_{Le}) for NOx and SO_2, and Critical Loads (C_{Lo}) for nitrogen and acid deposition which are designed for the protection of designated ecological sites.

1.2.3 This report outlines the approach, methodology and results of the AERA that has been undertaken, utilising atmospheric dispersion modelling, to support the EP application.

1.2.4 The results of the assessment have been interpreted in accordance with the requirements of the EA to identify if impacts represent ‘significant pollution’ as required by the EA to determine an EP application.

1.2.5 The AERA has been undertaken in accordance with relevant legislation, policy and guidance.

2 Legislation and Relevant Guidance

2.1 Environmental Permitting Guidance

2.1.1 Guidance Notes produced by DEFRA provide a framework for regulation of installations and additional technical guidance produced by the EA are used to provide the basis for permit conditions.

2.1.2 Of particular relevance to the assessment is the '*Air emissions risk assessment for your environmental permit*', also known as the AERA Guidance (Environment Agency, 2021). The purpose of the AERA Guidance is to assist operators to assess risks to the environment and human health when applying for a permit under the EP Regulations. Included in the AERA guidance are:

- an approach to screening assessment;
- guidance on when detailed atmospheric dispersion modelling is required; and
- Environmental Assessment Levels (EALs) for a range of pollutants not covered by other regulations, against which impact may be assessed.

2.2 National Air Quality Legislation and Guidance

Air Quality Standards

2.2.1 The Air Quality Standards Regulations 2010 (the AQSR) transposed the Air Quality Directive (2008/50/EC) and Fourth Daughter Directive (2004/107/EC). The Regulations include Limit Values, Target Values, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment.

2.2.2 Following the Transition Period after the UK's departure from the EU in January 2020, the Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (and subsequent amendments for the devolved administrations) have amended the AQ Standards Regulations 2010 to reflect the fact that the UK has left the EU, but do not change the pollutants assessed or the numerical thresholds.

National Air Pollution Plan for NO_2 in the UK

2.2.3 The national Air Quality Plan for NO_2 (DEFRA, 2018) sets out how the Government plans to deliver reductions in NO_2 throughout the UK, with a focus on reducing concentrations to below the EU Limit Values throughout the UK within the 'shortest possible time'.

2.2.4 The plan requires all Local Authorities (LAs) in England which DEFRA identified as having exceedances of the Limit Values in their areas past 2020 to develop local plans to improve air quality and identify measures to deliver reduced emissions, with the aim of meeting the Limit Values within their area within "*the shortest time possible*". Potential measures include changing road layouts, encouraging public and private ultra-low emission vehicle (ULEV) uptake, the use of retrofitting technologies and new fuels and encouraging public transport. In cases where these measures are not sufficient to bring about the required change within 'the shortest time possible' then LAs may consider implementing access restrictions on more polluting vehicles (e.g. Clean Air Zones (CAZs)). A CAZ is defined within the plan as being "*an area where targeted action is taken to improve air quality and resources are prioritised and coordinated in a way that delivers improved health benefits and supports economic growth*" and may be charging or non-charging.

Air Quality Strategy

2.2.5 The Air Quality Strategy (AQS) 2007 for England, Scotland, Wales and Northern Ireland sets out a comprehensive strategic framework within which air quality policy will be taken forward in the short to medium term, and the roles that Government, industry, the Environment Agency, local

government, business, individuals and transport have in protecting and improving air quality (DEFRA, 2007). The AQS contains Air Quality Objectives (AQOs) based on the protection of both human health and vegetation (ecosystems). The AQOs are maximum ambient pollutant concentrations that are not to be exceeded, either without exception or with a permitted number of exceedances allowable over a specified timescale. The AQOs are generally in accordance with the Limit Values specified in the AQSRs, however requirements for compliance differ slightly.

2.2.6 The Clean Air Strategy (2019) aims to lower national emissions of pollutants, thereby reducing background pollution and minimising human exposure to harmful concentrations of pollution. The Strategy aims to create a stronger and more coherent framework for action to tackle air pollution (DEFRA, 2019).

2.2.7 The Environment Agency's role in relation to the AQS is as follows:

"The Environment Agency is committed to ensuring that any industrial installation or waste operation we regulate will not contribute significantly to breaches of an AQS objective.

It is a mandatory requirement of EPR legislation that we ensure that no single industrial installation or waste operation we regulate will be the sole cause of a breach of an EU air quality limit value. Additionally, we have committed that no installation or waste operation will contribute significantly to a breach of an EU air quality limit value." (Environment Agency, 2008)

2.3 Standards for Air Quality

2.3.1 The standards applied in this assessment are taken from the AERA Guidance which are in accordance with the AQS and AQSR. The EALs that have been applied in this assessment are provided in **Table 2-1**.

Table 2-1 Applied EALs

Pollutant	Averaging Period	EAL (µg/m^3)	Source
Nitrogen dioxide (NO_2)	Annual Mean	40	AQS and AQSR
	1-hour Mean	200 (1-hour) not to be exceeded more than 18 times per year	AQS and AQSR
Sulphur Dioxide (SO_2)	15 minutes	266 µg/m^3 not to be exceed more than 35 times a year	AQS
	1-hour	350 µg/m^3 not to be exceeded more than 24 times a year	AQS and AQSR
	24-hour	125 µg/m^3 not to be exceeded more than 3 times a year	AQS and AQSR

2.3.2 DEFRA has published technical guidance for use in Local Air Quality Management (LAQM). According to LAQM.TG (16), air quality strategy objectives should only apply to locations where "*members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective*". Authorities should not consider

exceedances of the objectives at any location where relevant public exposure would not be realistic. Thus, short term objectives such as the 1-hour objective should apply to footpaths and other areas which may be regularly frequented by the public even for a short period of time. Longer term objectives such as annual means, should apply at houses or other locations which the public can be expected to occupy on a continuous basis. These objectives do not apply to exposure at the workplace.

Table 2-2 Relevant Public Exposure

Averaging Period	Air quality objectives should apply at:	Air quality objectives don't apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour and 8-hour mean	All locations where the annual mean NAQO would apply, together with hotels and gardens of residences.	Kerbside sites Any other location where public exposure is expected to be short term.
1-hour mean	Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where public would not be expected to have regular access
15-minute mean	All locations where members of the public might reasonably be regularly exposed for a period of 15 minutes or longer.	Locations where members of the public would not reasonably be expected to be regularly exposed for a period of 15 minutes or longer.

2.4 Protection of Ecological Receptors

2.4.1 Sites of nature conservation importance at a national and local level, are provided environmental protection from developments, including from atmospheric emissions. EALs for the protection of ecological receptors are known as Critical Levels (C_{Le}) for airborne concentrations and Critical Loads (C_{Lo}) for deposition to land from air.

2.4.2 The AERA Guidance requires that ecological habitats should be screened against relevant standards if they are located within the following set distances from the facility:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Ramsar sites within 10km of the Installation; and
- Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) and Ancient Woodland (AW) within 2km of the Installation.

Critical Levels (C_{Le})

2.4.3 C_{Le} are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. The relevant C_{Le} for the protection of vegetation and ecosystems are specified within the UK Air Quality Regulations and AERA Guidance (see **Table 2-3**).

Table 2-3 Relevant C_{Le} for the Protection of Vegetation and Ecosystems

Pollutant	Concentration (µg/m^3)	Habitat and Averaging Period	Source
Nitrogen Oxides (NOx)	30	Annual mean (all ecosystems)	AQSR
	75	Daily mean (all ecosystems)	AERA
Sulphur Dioxide (SO_2)	10	Annual Mean (lichens and bryophytes)	AERA
	20	Annual Mean	AQSR

Critical Loads (C_{Lo})

2.4.4 C_{Lo} are a quantitative estimate of exposure to deposition of one or more pollutants, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. Critical loads are set for the deposition of various substances to sensitive ecosystems. In relation to combustion emissions critical loads for eutrophication and acidification are relevant which can occur via both wet and dry deposition; however, on a local scale only dry (direct deposition) is considered significant.

2.4.5 Empirical C_{Lo} for eutrophication (derived from a range of experimental studies) are assigned based for different habitats, including grassland ecosystems, mire, bog and fen habitats, freshwaters, heathland ecosystems, coastal and marine habitats, and forest habitats and can be obtained from the UK Air Pollution Information System (APIS) website (APIS, 2021).

2.4.6 C_{Lo} for acidification have been set in the UK using an empirical approach for non-woodland habitats on a 1km grid square based upon the mineralogy and chemistry of the dominant soil series present in the grid square, and the simple mass balance (SMB) equation for both managed and unmanaged woodland habitats.

3 Assessment Methodology

3.1 Model Setup

3.1.1 Detailed atmospheric dispersion modelling has been undertaken using the most recent version (v.19191) of the AERMOD dispersion model which has been developed in conjunction with, and approved for use by, the US EPA. The dispersion modelling has been undertaken with due consideration to relevant guidance. The modelling approach is based upon the following stages:

- identification of sensitive receptors;
- review of process design and emission sources;
- compilation of the existing air quality baseline and review of LAQM status; and
- calculation of process contribution to ground level concentrations and evaluation against relevant environmental standards for both human and ecological receptors.

3.1.2 The AERMOD model calculates time-averaged ground level concentrations over any set of distances from the source. A variable density Cartesian grid with 15m spacing up to 1.5km and 30m spacing up to 3km was used to predict the maximum predicted contribution to ground level (1.5m) concentrations. The pollutant concentrations were also predicted at specific human and ecological receptor locations.

3.1.3 The model requires inputs for:

- building effects;
- nature of the surface;
- physical characteristics of the emissions; and
- meteorology.

Building Effects

3.1.4 Buildings can influence the dispersion of pollutants from sources and can increase the maximum predicted ground level concentrations. The main effect of a building is to entrain pollutants into the cavity region in the immediate leeward side of the building, bringing them rapidly down to ground level. Therefore, concentrations near the building are increased but further away concentrations are decreased.

3.1.5 The buildings that are nearest (or attached) to the sources have been considered in the model. Buildings located horizontally within the distance equivalent to five stack heights of the stack and taller than approximately a third of the stack height have been included, in accordance with advice from the software provider. Details of buildings input to the model are provided in **Table 3-1** and **Table 3-2** below and shown in **Figure 2, Appendix E**. Building heights were obtained from OS Mastermap.

Table 3-1 Building Parameters – Rectangular Buildings

Building ID	X	Y	X Length (m)	Y Length (m)	Height above Ground (m)
1	443423.9	385903.1	30.7	12.2	5.5
2	443445.9	385909	15.5	3.8	2.5

Building ID	X	Y	X Length (m)	Y Length (m)	Height above Ground (m)
3	443446	385898.7	3.2	4.7	2.1
4	443453.8	385883.4	3.2	6.9	2.5
5	443456.4	385878.7	3.2	6.8	2.7

Table 3-2 Building Parameters – Circular Buildings

Building ID	X	Y	Radius (m)	Height above Ground (m)
6	443394	385903.8	3.8	1.5
7	443404.2	385911.3	3.8	4.5
8	443407.6	385922.6	3.8	4.6
9	443471.9	385906.3	6.9	14.7
10	443479.4	385892.3	6.8	14.7
11	443440.1	385863.2	4.4	5.9

Terrain

3.1.6 Topographical data covering the extent of the receptor grid and specific receptor locations has been included in the model and was obtained from the OS Land-Form Panorama dataset.

Meteorology

3.1.7 The model utilises a meteorological dataset that contains hourly values for wind speed, wind direction, and atmospheric stability to compute the dispersion of the emissions.

3.1.8 The assessment has used the five-year (2016 to 2020) sequential meteorological dataset from Doncaster Sheffield meteorological station which is considered to be representative of meteorological conditions at the Site. The 2016 to 2020 windroses from Doncaster Sheffield meteorological station are provided in **Appendix A**.

3.2 Emissions to Atmosphere

3.2.1 The technical specifications of the combustion plant are:

- two MAN E2848LE322 V4 ROLLO CHP plants (265kW output and 610kWth thermal input); and
- one Unigas M.AB.S.GB.A.0.40 boiler (523kWth output, 620kWth thermal input).

3.2.2 The quantification of the pollutant emission rates for the CHPs has been based on physical discharge characteristics and stack emission monitoring data. For the boiler, the quantification of pollutant emission rates has been based on typical physical discharge characteristics and the manufacturers specification.

3.2.3 The emission release rates have been calculated from the 'normalised' flue gas flow rates (see **Table 3-3**) and the relevant ELVs. For the two CHPs, the NOx release rate is calculated to be

0.09562 g/s using the MCP ELV of 190 mg/Nm^3 (@STP, dry, 15%O_2). The SO_2 release rate is 0.03020 g/s, calculated from the MCP ELV of 60 mg/Nm^3 (@ STP, dry, 15% O_2).

3.2.4 For the boiler, the NOx release rate is calculated to be 0.04098 g/s using the MCP ELV of 250 mg/Nm^3 (@STP, dry, 3%O_2). The SO_2 release rate is 0.03278 g/s calculated from the MCP ELV of 200 mg/Nm^3 (@ STP, dry, 3% O_2). The boiler flue has been modelled as a capped source in AERMOD to take into account the effect of the rain cover on dispersion.

3.2.5 As a worst-case scenario, the boilers and CHP plant have been assumed to operate throughout the year for 24-hours a day (8,760 hours per annum). This assumption is considered conservative; real-world boiler use in particular is substantially below this level of utilisation. All plant is periodically taken off-line for servicing which would also reduce total available annual operating hours.

3.2.6 The dispersion model requires input relating to the emissions. **T**he source parameters and emission rates used for the assessment of emissions are shown in **Table 3-3**. Emissions from each CHP plant and the boiler are discharged via individual stacks (i.e. three stacks in total).

Table 3-3 Applied Physical Discharge Characteristics to Estimate Emissions and Estimated Emission Rates

Parameter / Source	CHP1 Flue	CHP2 Flue	Boiler Flue
Stack Locations (x, y)	443462.16,385877.95	443459.58,385882.81	443420.33,385901.23
Stack Height (m AGL)	6	6	6
Emission Temperature (ºC)	120	120	120
Stack Internal Diameter (m)	0.14	0.14	0.3
Emission Velocity (m/s)	22.29	22.29	6.91
Actual flow rate (Am^3/s)	0.34	0.34	0.49
Normalised flow rate, dry, 15% oxygen (Nm^3/s)	0.46	0.46	-
Normalised flow rate, dry, 3% oxygen (Nm^3/s)	-	-	0.16
NOx Emission Rate (g/s)	0.09562	0.09562	0.04098
SO_2 Emission Rate (g/s)	0.03020	0.03020	0.03278

3.3 Assessment of Impacts on Air Quality

NOx to NO_2 Conversion

3.3.1 Emissions of NOx from combustion sources include both NO_2 and NO, with the majority being in the form of NO. In ambient air, NO is oxidised to form NO_2, and it is NO_2 which has the greater potential health impacts. For this assessment, the conversion of NO to NO_2 has been estimated using the worst-case assumptions set out in EA AERA guidance, namely that:

- For the assessment of long term (annual mean) impacts at receptors, 70% of NOx is NO_2; and
- For the assessment of short term (hourly mean) impacts at receptors, 35% of NOx is NO_2.

3.3.2 The oxidation of NO to NO_2 is not, however, an instantaneous process and where the maximum impacts occur within up to 1km of the stacks the EA AERA guidance assumptions lead to a conservative assessment.

15-minute SO_2 Concentrations

3.3.3 In this assessment, the 99.9th percentiles of 1-hour mean SO_2 concentrations have been converted into 99.9th percentiles of 15-minute mean concentrations using a conversion factor 1.34, as recommended in the EA AERA guidance.

Assessment of Impact and Significance

3.3.4 To assess the potential impact on air quality, the predicted exposure is compared to the EALs, and the results of the dispersion modelling have been presented in the form of:

- tabulated concentrations at discrete receptor locations to facilitate the discussion of results; and
- illustrations of the impact as isopleths (contours of concentration) for the criteria selected enabling determination of impact at any locations within the study area.

3.3.5 In accordance with the EA's AERA guidance, the impact is considered to be insignificant or negligible if:

- the long-term process contribution is <1% of the long term EAL; and
- the short-term process contribution is <10% of the short term EAL.

3.3.6 For process contributions that cannot be considered insignificant further assessment has been undertaken and the Predicted Environmental Concentration (PEC: PC + existing background pollutant concentration) determined for comparison as a percentage of the relevant EAL. DEFRA 2018-based background maps for 2019 (DEFRA, 2021) have been applied to calculate the NO_2 PECs at receptor locations, whilst background monitoring data from DEFRA's Barnsley Gawber Automatic Urban and Rural Network (AURN) monitoring site has been applied to calculate the SO_2 PECs at receptor locations.

3.3.7 The EA's AERA guidance indicates that no further assessment is required, and impacts do not constitute 'significant pollution' if the resulting PEC is below the EAL and the applied emission levels comply with the BAT requirements.

3.4 Assessment of Impacts on Vegetation and Ecosystems

Calculation of Deposition Rates

3.4.1 Deposition rates were calculated using empirical methods recommended by the EA AQTAG06 (EA, 2014). Dry deposition flux was calculated using the following equation:

Dry deposition flux ($\mu g/m^2/s$) = ground level concentration ($\mu g/m^3$) x deposition velocity (m/s)

3.4.2 Wet deposition occurs via the incorporation of the pollutant into water droplets which are then removed in rain or snow and is not considered significant over short distances (AQTAG06) compared with dry deposition. Therefore, for the purposes of this assessment, wet deposition has not been considered.

3.4.3 The dry deposition velocities and conversion factors for NO_2 and SO_2 were taken from the EA's guidance document AQTAG 06 (EA, 2014) and are set out in **Table 3-4**.

Table 3-4 Applied Deposition Velocities

Chemical Species	Habitat	Recommended deposition velocity (m/s)	Conversion µg/m²/s to kgN/ha/yr	Conversion µg/m²/s to keq/ha/yr
NO_2	Grassland	0.0015	96.0	6.84
	Woodland	0.003		
SO_2	Grassland	0.012	-	9.84
	Woodland	0.024		

Assessment of Impact and Significance

3.4.4 In addition to the AERA guidance, the EA's Operational Instruction 66_12 (EA, 2012a) details how the air quality impacts on ecological sites should be assessed. This guidance provides risk-based screening criteria to determine whether impacts will have 'no likely significant effects (alone and in-combination)' for European sites, 'no likely damage' for SSSI's and 'no significant pollution' for other sites, as follows:

- PC <1% long-term C_{Le} and/or C_{Lo} or that the PEC <70% long-term C_{Le} and/or C_{Lo} for European sites and SSSIs;
- PC <10% short-term C_{Le} for NOx for European sites and SSSIs;
- PC <100% long-term C_{Le} and/or C_{Lo} other conservation sites; and
- PC <100% short-term C_{Le} for NOx (if applicable) for other conservation sites.

3.4.5 Where impacts cannot be classified as resulting in 'no likely significant effect', more detailed assessment may be required depending on the sensitivity of the feature in accordance with EAs Operational Instruction 67_12 (EA, 2012b). This can require the consideration of the potential for in-combination effects, the actual distribution of sensitive features within the site, and local factors (such as the water table).

3.4.6 The guidance provides the following further criteria:

- if the PEC<100% of the appropriate limit, it can be assumed there will be no adverse effect;
- if the background is below the limit, but a small PC leads to an exceedance – decision based on local considerations;
- if the background is currently above the limit and the additional PC will cause a small increase – decision based on local considerations;
- if the background is below the limit, but a significant PC leads to an exceedance – cannot conclude no adverse effect; and
- if the background is currently above the limit and the additional PC is large - cannot conclude no adverse effect.

4 Baseline Environment

4.1 Site Setting and Sensitive Receptors

4.1.1 The Site location is shown in **Figure 1, Appendix E**. A railway line lies directly to the east of the Woodhouse Mill Wastewater Treatment Works (WwTW) boundary, beyond which is an area of open fields and properties off Falconer Lane. Retford Road runs east to west to the south of the Site beyond the WwTW boundary. Beyond Retford Road is an area of industrial uses. The area to the west of the Site is predominantly residential, with a playing field bordering the western boundary of the WwTW. Directly to the north of the WwTW there are two locally designated ecological sites: Orgreave Lakes Local Wildlife Site (LWS) and Treeton Dyke LWS. A large residential development is also currently being constructed to the north of the Site, however residential properties within the development will be located approximately 1.3km from the Installation. The modelled sensitive human and ecological receptor locations in proximity to the Site are detailed in the following sections.

Human Receptors

4.1.2 According to LAQM.TG(16), air quality standards should apply to locations where members of the public may be reasonably likely to be exposed to air pollution for the duration of the relevant limit value. The dispersion modelling has been completed using a receptor grid which allows the maximum ground level impact to be assessed including potential short-term exposure locations. As such, the impact concentration has been assessed at all potential exposure locations surrounding the Site. In addition, sensitive existing residential properties and a school have been modelled, details of which are shown in **Table B-1, Appendix B** and their locations are shown in **Figure 3, Appendix E**.

Ecological Receptors

4.1.3 Local designated sites within the relevant AERA screening distances are presented in **Table B-2, Appendix B** and shown in **Figure 4, Appendix E**. There are no international or national designated sites within 10km or SSSIs within 2km of the Installation.

4.2 Ambient Air Quality

Local Air Quality Management

4.2.1 RMBC has investigated air quality within its area as part of its responsibilities under the LAQM regime. The Council currently has six AQMAs: the M1 AQMA, A6021 (Wellgate) AQMA and Parkgate AQMA have been declared due to exceedances of the annual mean NO_2 AQO, whilst the Wales M1 AQMA, A629 (Bradgate) AQMA and Fitzwilliam Road/A630 AQMA have been declared due to exceedances of both the annual and 1-hour mean NO_2 AQO.

4.2.2 The neighbouring local authority, Sheffield City Council (SCC), has also declared an AQMA encompassing the whole urban area of the City of Sheffield (excluding the Peak Park area) due to exceedances of the annual and one-hour mean NO_2 AQO and the 24-hour mean PM_{10} AQO.

4.2.3 The closest AQMA to the Site is the SCC AQMA, located approximately 250m away at its closest point.

Local Air Quality Monitoring Data

4.2.4 RMBC carries out monitoring of NO_2 concentrations at a number of locations across, as does the neighbouring authority SCC. The closest and most representative locations are described below and shown in **Figure 1, Appendix E**. 2018 and 2019 monitoring data for these sites are presented in **Table 4-1**. Monitoring began at these sites in 2018 therefore data prior to 2018 is not available.

4.2.5 **Table 4-1** shows that there were no exceedances of the annual mean NO_2 AQO in 2018 or 2019 at the closest monitoring locations to the Installation.

Table 4-1 Measured NO_2 concentrations, 2018 and 2019

Site ID	Site Type	Annual Mean (µg/m³)	
		2018	2019
RMBC Diffusion Tube			
RDT63 – Gulliver's site, A57 roundabout opposite Elmwood Farm Pub	Roadside	30.3	28.2
SCC Diffusion Tube			
A57 Layby	Roadside	30	34
AQO		**40**	

RMBC data obtained from the RMBC 2019 Air Quality Annual Status Report (RMBC, 2019).
SCC data obtained from the SCC Air Quality Annual Results 2003 to 2019 (SCC, 2019).

4.3 Predicted Background Concentrations

4.3.1 Modelled background pollutant concentration data on a 1km x 1km spatial resolution is provided by DEFRA through the UK AIR website (DEFRA, 2020) and are routinely used to support LAQM and Air Quality Assessments.

4.3.2 The latest available background pollutant concentrations for NO_2 are based upon a 2018 base year and projected to future years. The projected 2019 background concentrations for the grid squares containing the Site and modelled receptor locations have been applied in this AERA and are shown in **Table 4-2**. Background NO_2 concentrations are well below the AQO.

Table 4-2 Estimated Annual Mean NO_2 Background Concentrations 2019 (µg/m³)

Location (x_y)	Annual Mean (µg/m³)	
	NOx	NO_2
442_385	17.0	12.6
443_385	17.6	13.0
443_386	15.9	11.9
444_385	16.3	12.2

4.3.3 The latest available modelled background pollutant data for SO_2 available from DEFRA is for 2001. Therefore, it has been considered more appropriate to use more recent SO_2 background monitoring data available from DEFRA's AURN.

4.3.4 The 2019 annual mean SO_2 concentration from the Barnsley Gawber background AURN monitoring site is provided in **Table 4-3**. The Barnsley Gawber AURN site is the closest and most representative SO_2 monitoring site to the Installation with sufficient data capture in 2019. The measured annual mean SO_2 background concentration from the Barnsley Gawber monitoring site has been applied to all modelled human receptor locations in this AERA.

Table 4-3 Annual Mean SO_2 Measured Background Concentration

Site Name	Location (x,y)	2019 Annual Mean SO_2 Concentration (µg/m³)
Barnsley Gawber AURN	432524,407478	1.36

4.4 Baseline Air Quality at Ecological Receptors

4.4.1 The APIS website, a support tool for assessment of potential effects of air pollutants on habitats and species developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology, has been used to provide information on relevant C_{Lo} and current deposition rates for nutrient nitrogen and for acidity. These are provided in **Table 4-4** and **Table 4-5**. Baseline concentrations of NOx and SO_2 are provided in **Table 4-6** and have also been obtained from the APIS website.

Table 4-4 Nitrogen and Acid Deposition Critical Loads

Receptor	Designated Site	Assigned Habitat	Critical Load	
			Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keqN/ha/yr)
ER01	Treeton Dyke LWS	Broadleaved, mixed and yew woodland	10	3.28
ER02	Hail Mary Hill Wood AW	Broadleaved, mixed and yew woodland	10	3.28
ER03	Treeton Wood AW/LWS	Broadleaved, mixed and yew woodland	10	1.53
ER04	Hail Mary Hill Wood AW	Broadleaved, mixed and yew woodland	10	1.53
ER05	Woodhouse Washlands LWS	Coastal and floodplain grazing marsh	10	Not Sensitive to Acidity
ER06	Pithouse West LWS	Broadleaved, mixed and yew woodland	10	3.31
ER07	River Rother, Beighton LWS	Broadleaved, mixed and yew woodland	10	3.31
ER08	Beighton Marsh LWS	Fen, marsh and swamp	10	Not Sensitive to Acidity
ER09	Woodhouse East and Disused Railway LWS	Broadleaved, mixed and yew woodland	10	1.59
ER10	Linley Bank Meadow LWS	Neutral grassland	20	4.86
ER11	Woodhouse Banks and Sally Clarks LWS	Broadleaved, mixed and yew woodland	10	1.59
ER12	Lower Shirtcliffe Valley LWS	Neutral grassland	20	5.07
ER13	Shirtcliff Wood AW	Broadleaved, mixed and yew woodland	10	1.57
ER14	Orgreave Lakes LWS	Neutral grassland	20	5.07
ER15	Burnt Wood AW/LWS	Broadleaved, mixed and yew woodland	10	1.53

Table 4-5 Baseline Deposition Rates

Receptor	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition	
		Nitrogen (keq N/ha/yr)	Sulphur (keq S/ha/yr)
ER01	35.7	2.55	0.32
ER02	35.7	2.55	0.32
ER03	35.7	2.55	0.32
ER04	35.7	2.55	0.32
ER05	21.8	1.56	0.27
ER06	34.2	2.44	0.30
ER07	34.2	2.44	0.30
ER08	20.9	1.49	0.25
ER09	34.2	2.44	0.30
ER10	20.9	1.49	0.25
ER11	34.2	2.44	0.30
ER12	21.8	1.56	0.27
ER13	35.7	2.55	0.32
ER14	21.8	1.56	0.27
ER15	35.7	2.55	0.32

Table 4-6 Baseline Concentrations

Receptor	Annual Mean Concentration (µg/m^3)	
	NOx	SO_2
ER01	17.8	2.0
ER02	17.8	2.0
ER03	16.8	2.0
ER04	16.8	2.0
ER05	19.7	2.0
ER06	20.1	1.7
ER07	20.1	1.7
ER08	18.2	1.7
ER09	18.2	1.7

Receptor	Annual Mean Concentration (µg/m^3)	
	NOx	SO_2
ER10	18.2	1.7
ER11	17.8	1.7
ER12	19.1	2.0
ER13	19.1	2.0
ER14	17.8	2.0
ER15	17.2	2.0

5 Assessment Results

5.1.1 Dispersion modelling has been undertaken using the input data specified in this report. **Figure 5** to **Figure 9, Appendix E** should be referred to for graphical visualisations of modelling results. The impacts at modelled human and ecological receptor locations are described in the following sections.

5.2 Impacts on Sensitive Human Receptors

Nitrogen Dioxide (NO_2)

5.2.1 **Figure 5, Appendix E** illustrates the predicted annual mean NO_2 PC contour whilst **Figure 6, Appendix E** shows the 1-hour mean NO_2 PC contour. Contours are presented for the year of the maximum PC which is 2017 for annual mean NO_2 and 2019 for 1-hour mean NO_2. Predicted annual mean NO_2 concentrations at sensitive receptor locations are summarised in **Table C-1, Appendix C,** whilst predicted 1-hour mean NO_2 concentrations are provided in **Table C-2, Appendix C**. Results for the worst-case meteorological year of the five years assessed (2016 - 2020) are presented.

5.2.2 The predicted annual mean NO_2 PC exceeds 1% of the EAL at sensitive receptors R01 – R04, R09 – R11 and R15. For all remaining receptors, the predicted annual mean NO_2 PC is less than 1% of the EAL and can therefore be considered as 'insignificant'.

5.2.3 As the predicted annual mean NO_2 concentrations are below the relevant EAL at all sensitive human receptor locations, the predicted annual mean NO_2 impacts do not constitute 'significant pollution'.

5.2.4 The predicted 1-hour mean NO_2 PC only exceeds 10% of the EAL at receptor locations R01 – R04. For all remaining receptors, the predicted 1-hour mean NO_2 PC is less than 10% of the EAL and can therefore be considered 'insignificant'.

5.2.5 For R01 – R04, the predicted 1-hour mean NO_2 concentrations are below the relevant EAL. Therefore, the predicted 1-hour mean NO_2 impacts do not constitute 'significant pollution'.

Sulphur Dioxide (SO_2)

5.2.6 **Figures 7, Appendix E** illustrates the predicted 24-hour mean SO_2 PC contour, **Figure 8, Appendix E** shows the 1-hour mean SO_2 PC contour and **Figure 9, Appendix E** shows the 15-minute mean SO_2 contour. Contours are presented for the year of the maximum PC which is 2020 for 24-hour mean SO_2, 2017 for 1-hour mean SO_2 and 2019 for 15-minute mean SO_2. Predicted SO_2 concentrations at sensitive receptor locations are summarised in **Table C-3 – C-6, Appendix C**. Results for the worst-case meteorological year of the five years assessed (2016 - 2020) are presented.

5.2.7 The predicted 24-hour mean, and 1-hour mean SO_2 PCs, do not exceed 10% of the EAL at any of the modelled sensitive receptor locations and can therefore be considered as being 'insignificant'.

5.2.8 The predicted 15-minute mean SO_2 PCs exceed 10% of the EAL at the majority of modelled sensitive receptor locations. However, the predicted 15-minute mean SO_2 PECs are well below the relevant EAL and therefore do not constitute 'significant pollution'.

5.2.9 Impact predictions have been based on a worst-case assessment scenario of the boilers and CHP plant operating constantly throughout the year and emitting the maximum permitted NOx concentration. Therefore, the predicted concentrations presented in this report are likely to be overestimations of the actual impacts of the Installation.

5.3 Impacts on Ecological Receptors

Nitrogen Oxides (NO_x)

5.3.1 Predicted annual and 24-hour mean NO_x concentrations at sensitive ecological receptor locations are summarised in **Table D-1** and **Table D-2, Appendix D.** Results for the worst-case meteorological year of the five years assessed (2016 - 2020) are presented.

5.3.2 The predicted annual mean NOx and 24-hr NOx PCs are less than 100% of the C_{Le} at all of the locally designated ecological receptor locations and can therefore be considered 'insignificant'.

Sulphur Dioxide (SO_2)

5.3.3 Predicted annual mean SO_2 concentrations at sensitive ecological receptor locations are summarised in **Table D-3, Appendix D.**

5.3.4 The predicted annual mean SO_2 PCs are less than 100% of the C_{Le} at all of the locally designated ecological receptor locations and can therefore be considered 'insignificant'.

Nitrogen and Acid Deposition

5.3.5 Predicted annual mean nitrogen and acid deposition rates at sensitive ecological receptor locations are summarised in **Table D-4** and **Table D-5, Appendix D.**

5.3.6 The predicted annual nitrogen and acid deposition PCs are less than 100% of the C_{Lo} at all modelled ecological receptor locations and can therefore be considered 'insignificant'.

5.3.7 Impact predictions have been based on a worst-case assessment scenario of the boilers and CHP plant operating constantly throughout the year and emitting the maximum permitted NOx concentration. Therefore, the predicted concentrations and deposition rates presented in this report are likely to be overestimations of the actual impacts of the Installation.

6 Summary and Conclusions

6.1.1 An Air Emission Risk Assessment utilising atmospheric dispersion modelling has been undertaken to support the EP application under the IED for Anaerobic Digestion activities at Woodhouse Mill STF. The Installation includes biogas combustion plant comprising two CHP plant units and one boiler.

6.1.2 In relation to human health, where impacts are not classified as 'insignificant' (i.e. PC less than 1% of the EAL for long-term concentrations or 10% for short-term) the predicted impacts of the Installation do not lead to any exceedances of EALs and do not constitute 'significant pollution'.

6.1.3 In relation to the impact of the Installation on ecologically sensitive sites, there are no international or national designated sites within the distances requiring assessment under the Environment Agency's Air Emissions Risk Assessment Guidance. At all local designated sites, the predicted PCs from the Installation are less than 100% of the applicable annual C_{Le} or C_{Lo}. Therefore, the impacts of the Installation are considered 'insignificant' at all designated ecological sites.

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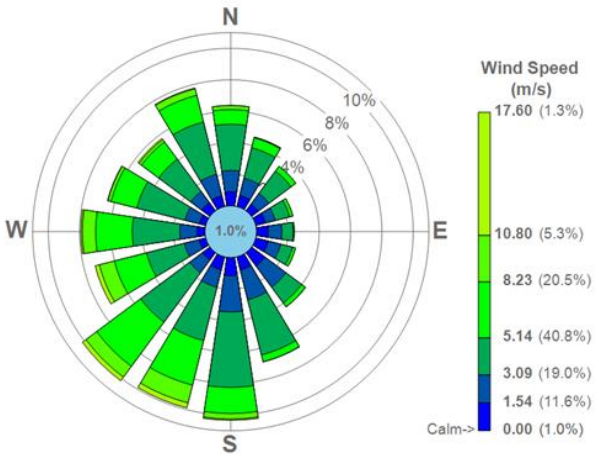
Appendix A Doncaster Sheffield 2016 – 2020 Windroses



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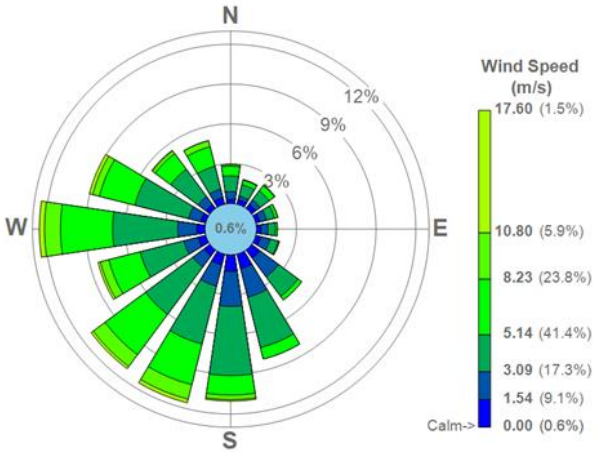

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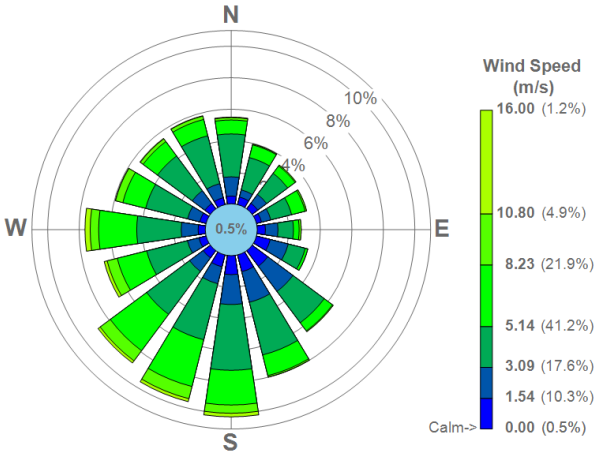

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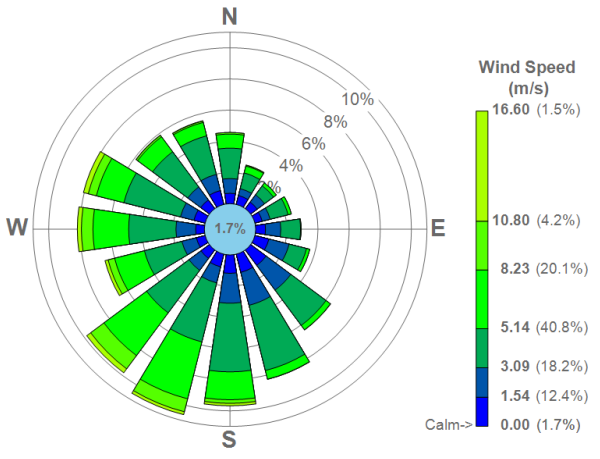
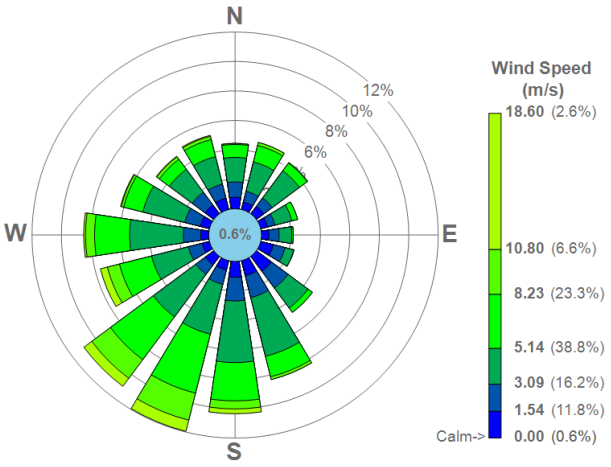


2019


N
E
S
W
12%
10%
8%
6%
0.6%
Wind Speed
(m/s)
18.60 (2.6%)
10.80 (6.6%)
8.23 (23.3%)
5.14 (38.8%)
3.09 (16.2%)
1.54 (11.8%)
Calm-> 0.00 (0.6%)

2020

Appendix B Modelled Receptor Locations

Table B-1 Modelled Human Receptor Locations

Receptor	Description	X Coordinate	Y Coordinate	Height (m)	Approximate Distance from Installation (m)
R01	Playing Field	443150.5	385837.8	1.5	277
R02	98, Retford Road	443207.7	385651.8	1.5	328
R03	611, Retford Road	443187.6	385712.6	1.5	300
R04	3, Retford Road	443168.1	385665.6	1.5	345
R05	15, St James Walk	442971.6	385760.7	1.5	470
R06	4, Orgreave Rise	442962.1	385832.8	1.5	463
R07	20, Orgreave Rise	442952.4	385879.1	1.5	468
R08	34, Orgreave Rise	442942.5	385946.3	1.5	480
R09	28, Falconer Lane	443803.2	386072.7	1.5	397
R10	1, Falconer Lane	443788.5	385937.1	1.5	337
R11	351, Retford Road	443759.8	385860.9	1.5	304
R12	Fence Church Mews, Sheffield Road	444101.4	385718.8	1.5	665
R13	Aston Fence Junior and Infant School, Sheffield Road	444125.7	385660.2	1.5	704
R14	Fence Farm, Sheffield Road	444158.6	385513.6	1.5	791
R15	Waverley Development	443293.7	386159.1	1.5	287

Table B-2 Modelled Ecological Sites

Receptor	Grid Reference		Site Name (Designation)	Interest Status	Approximate Distance and Direction from Installation (m)
	X	Y			
ER1	443587.7	386017.2	Treeton Dyke LWS	Local	185
ER2	443859.2	386602.5	Hail Mary Hill Wood AW	Local	826
ER3	444386.2	386769.5	Treeton Wood AW/LWS	Local	1,282
ER4	444166	386152.3	Hail Mary Hill Wood AW	Local	761
ER5	443352	385700.9	Woodhouse Washlands LWS	Local	210
ER6	444903.1	384583.3	Pithouse West LWS	Local	1,941
ER7	444564.1	384322.1	River Rother Beighton LWS	Local	1,912
ER8	443695.8	384732.9	Beighton Marsh LWS	Local	1,175
ER9	443133.4	384991.3	Woodhouse East and Disused Railway	Local	951
ER10	443096	384301	Lynley Bank Meadow LWS	Local	1,624
ER11	442620.1	384339.3	Woodhouse Banks and Sally Clarks LWS	Local	1,758
ER12	442744.8	385470.1	Lower Shirtcliffe Valley LWS	Local	827
ER13	441998.9	385299.2	Shirtcliff Wood AW	Local	1,575
ER14	443293.4	386158.8	Orgreave Lakes LWS	Local	322
ER15	444295.2	387681.7	Burnt Wood AW/LWS	Local	1,977

Appendix C Modelled Human Receptor Results

Table C-1 Predicted Annual Mean NO_2 Concentrations

Receptor	Annual Mean NO_2 Concentration (µg/m^3)			
	PC	PC as % of EAL	PEC	PEC as % of EAL
R01	0.6	**1.5%**	13.6	34.1%
R02	0.6	**1.6%**	13.7	34.2%
R03	0.7	**1.7%**	13.7	34.2%
R04	0.6	**1.4%**	13.6	34.0%
R05	0.3	0.7%	12.9	32.3%
R06	0.3	0.7%	12.9	32.3%
R07	0.3	0.7%	12.9	32.3%
R08	0.3	0.7%	12.9	32.3%
R09	0.8	**1.9%**	12.7	31.6%
R10	1.2	**2.9%**	14.2	35.4%
R11	1.3	**3.3%**	14.3	35.8%
R12	0.3	0.7%	12.5	31.2%
R13	0.2	0.6%	12.4	31.0%
R14	0.2	0.5%	12.3	30.9%
R15	1.2	**3.1%**	13.1	32.8%

Table C-2 Predicted 1-hour Mean NO_2 Concentrations

Receptor	99.79%ile 1-hour Mean NO_2 Concentration (µg/m^3)			
	PC	PC as % of EAL	PEC	PEC as % of EAL
R01	23.9	**11.9%**	49.9	25.0%
R02	22.7	**11.4%**	48.8	24.4%
R03	29.6	**14.8%**	55.6	27.8%
R04	23.2	**11.6%**	49.3	24.6%
R05	15.4	7.7%	40.7	20.3%
R06	12.6	6.3%	37.9	19.0%
R07	11.4	5.7%	36.7	18.4%
R08	11.6	5.8%	36.9	18.4%
R09	14.9	7.5%	38.7	19.4%
R10	17.6	8.8%	43.6	21.8%

Receptor	99.79%ile 1-hour Mean NO_2 Concentration (µg/m^3)			
	PC	PC as % of EAL	PEC	PEC as % of EAL
R11	17.3	8.7%	43.4	21.7%
R12	6.6	3.3%	31.0	15.5%
R13	6.3	3.2%	30.7	15.3%
R14	5.4	2.7%	29.7	14.9%
R15	15.2	7.6%	39.0	19.5%

Table C-3 Predicted 24-hour Mean SO_2 Concentrations

Receptor	99.19%ile 24-hour Mean SO_2 Concentration (µg/m^3)			
	PC	PC as % of EAL	PEC	PEC as % of EAL
R01	5.0	4.0%	7.7	6.2%
R02	4.6	3.7%	7.3	5.9%
R03	4.2	3.4%	6.9	5.5%
R04	4.0	3.2%	6.7	5.4%
R05	2.8	2.3%	5.6	4.5%
R06	2.3	1.8%	5.0	4.0%
R07	2.1	1.7%	4.8	3.9%
R08	2.3	1.9%	5.1	4.0%
R09	2.9	2.3%	5.6	4.5%
R10	3.5	2.8%	6.2	5.0%
R11	3.6	2.9%	6.3	5.1%
R12	1.3	1.0%	4.0	3.2%
R13	1.3	1.0%	4.0	3.2%
R14	1.0	0.8%	3.7	2.9%
R15	5.3	4.2%	8.0	6.4%

Table C-4 Predicted 1-Hour Mean SO_2 Concentrations

Receptor	99.73%ile 1-hour Mean SO_2 Concentration (µg/m^3)			
	PC	PC as % of EAL	PEC	PEC as % of EAL
R01	24.5	7.0%	27.2	7.8%
R02	21.7	6.2%	24.4	7.0%
R03	24.3	7.0%	27.1	7.7%

Receptor	99.73%ile 1-hour Mean SO_2 Concentration (µg/m^3)			
	PC	PC as % of EAL	PEC	PEC as % of EAL
R04	21.0	6.0%	23.8	6.8%
R05	13.3	3.8%	16.0	4.6%
R06	13.4	3.8%	16.1	4.6%
R07	12.6	3.6%	15.3	4.4%
R08	12.7	3.6%	15.4	4.4%
R09	14.5	4.1%	17.2	4.9%
R10	17.5	5.0%	20.2	5.8%
R11	17.1	4.9%	19.8	5.7%
R12	6.9	2.0%	9.6	2.7%
R13	6.6	1.9%	9.3	2.7%
R14	5.3	1.5%	8.0	2.3%
R15	16.9	4.8%	19.6	5.6%

Table C-5 Predicted 15-minute Mean SO_2 Concentrations

Receptor	99.90%ile 15-minute Mean SO_2 Concentration (µg/m^3)			
	PC	PC as % of EAL	PEC	PEC as % of EAL
R01	69.6	**26.2%**	72.3	27.2%
R02	56.9	**21.4%**	59.6	22.4%
R03	58.8	**22.1%**	61.5	23.1%
R04	52.6	**19.8%**	55.3	20.8%
R05	37.9	**14.3%**	40.7	15.3%
R06	38.9	**14.6%**	41.6	15.6%
R07	31.8	**12.0%**	34.5	13.0%
R08	30.0	**11.3%**	32.7	12.3%
R09	52.1	**19.6%**	54.8	20.6%
R10	49.0	**18.4%**	51.8	19.5%
R11	35.1	**13.2%**	37.8	14.2%
R12	17.9	6.7%	20.6	7.7%
R13	14.9	5.6%	17.6	6.6%
R14	11.3	4.3%	14.0	5.3%
R15	27.9	**10.5%**	30.6	11.5%

Appendix D Modelled Ecological Receptor Results

Table D-1 Predicted Annual Mean NO_x Concentrations

Receptor	Designated Site	Annual Mean NOx Concentration (µg/m³)			
		PC	PC as % of EAL	PEC	PEC as % of EAL
ER1	Treeton Dyke LWS	4.1	13.5%	21.9	72.8%
ER2	Hail Mary Hill Wood AW	0.4	1.3%	18.2	60.6%
ER3	Treeton Wood AW/LWS	0.1	0.4%	17.0	56.5%
ER4	Hail Mary Hill Wood AW	0.3	1.1%	17.2	57.2%
ER5	Woodhouse Washlands LWS	2.3	7.8%	22.0	73.3%
ER6	Pithouse West LWS	0.1	0.2%	20.2	67.2%
ER7	River Rother, Beighton LWS	0.1	0.3%	20.2	67.3%
ER8	Beighton Marsh LWS	0.2	0.6%	18.4	61.2%
ER9	Woodhouse East and Disused Railway LWS	0.2	0.5%	18.3	61.1%
ER10	Linley Bank Meadow LWS	0.1	0.2%	18.2	60.8%
ER11	Woodhouse Banks and Sally Clarks LWS	0.0	0.1%	17.9	59.5%
ER12	Lower Shirtcliffe Valley LWS	0.2	0.6%	19.3	64.2%
ER13	Shirtcliff Wood AW	0.1	0.2%	19.1	63.7%
ER14	Orgreave Lakes LWS	1.8	6.0%	19.6	65.3%
ER15	Burnt Wood AW/LWS	0.1	0.2%	17.3	57.7%

Table D-2 Predicted 24-hour Mean NOx Concentrations

Receptor	Designated Site	24-hour Mean NOx Concentration (µg/m³)			
		PC	PC as % of EAL	PEC	PEC as % of EAL
ER1	Treeton Dyke LWS	28.5	38.0%	64.1	85.4%
ER2	Hail Mary Hill Wood AW	3.3	4.4%	38.9	51.9%
ER3	Treeton Wood AW/LWS	1.1	1.4%	34.8	46.4%
ER4	Hail Mary Hill Wood AW	3.4	4.4%	37.1	49.4%
ER5	Woodhouse Washlands LWS	36.1	45.7%	75.4	100.6%
ER6	Pithouse West LWS	1.2	1.5%	41.4	55.2%
ER7	River Rother, Beighton LWS	2.0	2.4%	42.2	56.2%
ER8	Beighton Marsh LWS	3.2	3.9%	39.6	52.8%
ER9	Woodhouse East and Disused Railway LWS	2.3	2.8%	38.7	51.5%

Receptor	Designated Site	24-hour Mean NOx Concentration (µg/m^3)			
		PC	PC as % of EAL	PEC	PEC as % of EAL
ER10	Linley Bank Meadow LWS	1.4	1.7%	37.8	50.4%
ER11	Woodhouse Banks and Sally Clarks LWS	0.5	0.6%	36.2	48.2%
ER12	Lower Shirtcliffe Valley LWS	4.9	5.7%	43.1	57.4%
ER13	Shirtcliff Wood AW	1.3	1.5%	39.4	52.5%
ER14	Orgreave Lakes LWS	16.0	18.2%	51.6	68.8%
ER15	Burnt Wood AW/LWS	0.6	0.6%	35.0	46.7%

Table D-3 Predicted Annual Mean SO_2 Concentrations

Receptor	Designated Site	Annual Mean SO_2 Concentration (µg/m^3)			
		PC	PC as % of EAL	PEC	PEC as % of EAL
ER1	Treeton Dyke LWS	1.5	7.7%	3.5	17.6%
ER2	Hail Mary Hill Wood AW	0.2	0.8%	2.1	10.7%
ER3	Treeton Wood AW/LWS	0.0	0.2%	2.0	10.1%
ER4	Hail Mary Hill Wood AW	0.1	0.6%	2.1	10.5%
ER5	Woodhouse Washlands LWS	1.0	4.8%	2.9	14.7%
ER6	Pithouse West LWS	0.0	0.1%	1.7	8.5%
ER7	River Rother, Beighton LWS	0.0	0.2%	1.7	8.6%
ER8	Beighton Marsh LWS	0.1	0.4%	1.8	8.8%
ER9	Woodhouse East and Disused Railway LWS	0.1	0.3%	1.7	8.7%
ER10	Linley Bank Meadow LWS	0.0	0.1%	1.7	8.5%
ER11	Woodhouse Banks and Sally Clarks LWS	0.0	0.1%	1.7	8.5%
ER12	Lower Shirtcliffe Valley LWS	0.1	0.4%	2.1	10.3%
ER13	Shirtcliff Wood AW	0.0	0.1%	2.0	10.0%
ER14	Orgreave Lakes LWS	0.8	3.9%	2.8	13.8%
ER15	Burnt Wood AW/LWS	0.0	0.1%	2.0	10.0%

Table D-4 Predicted Annual Nitrogen Deposition Rates

Receptor	Designated Site	Annual Nitrogen Deposition (kgN/ha/yr)			
		PC	PC as % of C_{Le}	PEC	PEC as % of C_{Le}
ER1	Treeton Dyke LWS	0.82	8.17%	36.5	365.2%
ER2	Hail Mary Hill Wood AW	0.08	0.78%	35.8	357.8%
ER3	Treeton Wood AW/LWS	0.02	0.23%	35.7	357.2%
ER4	Hail Mary Hill Wood AW	0.07	0.65%	35.8	357.7%
ER5	Woodhouse Washlands LWS	0.23	2.35%	22.1	220.7%
ER6	Pithouse West LWS	0.01	0.12%	34.2	341.7%
ER7	River Rother, Beighton LWS	0.02	0.16%	34.2	341.8%
ER8	Beighton Marsh LWS	0.02	0.18%	20.9	208.8%
ER9	Woodhouse East and Disused Railway LWS	0.03	0.33%	34.2	341.9%
ER10	Linley Bank Meadow LWS	0.01	0.03%	20.9	104.3%
ER11	Woodhouse Banks and Sally Clarks LWS	0.01	0.07%	34.2	341.7%
ER12	Lower Shirtcliffe Valley LWS	0.02	0.09%	21.9	109.3%
ER13	Shirtcliff Wood AW	0.01	0.11%	35.7	357.1%
ER14	Orgreave Lakes LWS	0.18	0.91%	22.0	110.1%
ER15	Burnt Wood AW/LWS	0.01	0.13%	35.7	357.1%

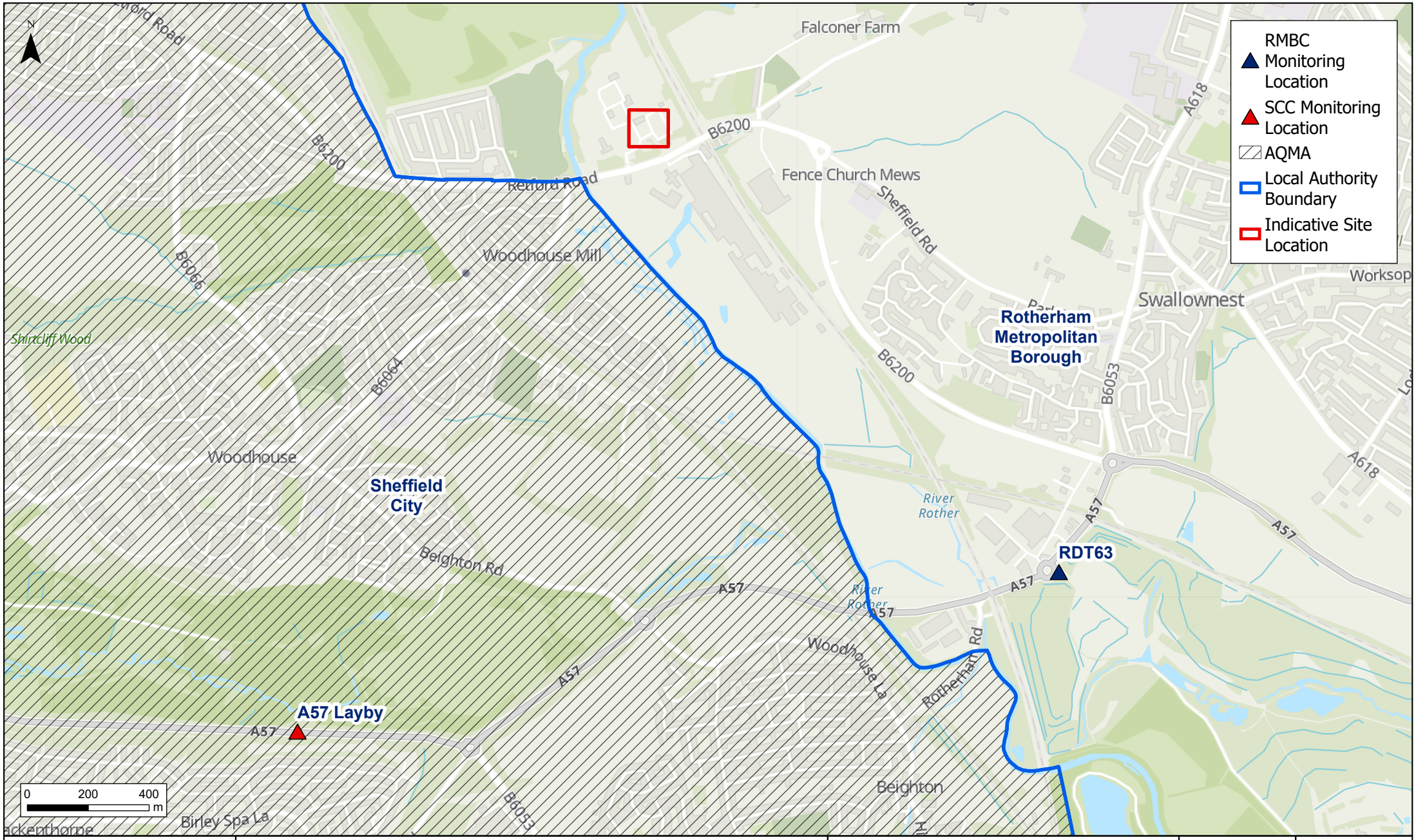
Table D-5 Predicted Annual Acid Deposition Rates

Receptor	Designated Site	Annual Acid Deposition (keq/ha/yr)			
		PC	PC as % of C_{Le}	PEC	PEC as % of C_{Le}
ER1	Treeton Dyke LWS	0.421	12.8%	3.3	100.4%
ER2	Hail Mary Hill Wood AW	0.042	1.3%	2.9	88.9%
ER3	Treeton Wood AW/LWS	0.013	0.8%	2.9	187.9%
ER4	Hail Mary Hill Wood AW	0.035	2.3%	2.9	189.4%
ER5	Woodhouse Washlands LWS	Not sensitive to acidity			
ER6	Pithouse West LWS	0.007	0.2%	2.7	83.0%
ER7	River Rother, Beighton LWS	0.008	0.3%	2.7	83.1%
ER8	Beighton Marsh LWS	Not sensitive to acidity			
ER9	Woodhouse East and Disused Railway LWS	0.018	1.1%	2.8	173.8%
ER10	Linley Bank Meadow LWS	0.004	0.1%	1.7	35.9%

Receptor	Designated Site	Annual Acid Deposition (keq/ha/yr)			
		PC	PC as % of C_{Le}	PEC	PEC as % of C_{Le}
ER11	Woodhouse Banks and Sally Clarks LWS	0.004	0.2%	2.7	172.3%
ER12	Lower Shirtcliffe Valley LWS	0.010	0.2%	1.8	36.3%
ER13	Shirtcliff Wood AW	0.006	0.4%	2.9	183.6%
ER14	Orgreave Lakes LWS	0.104	2.1%	1.9	38.1%
ER15	Burnt Wood AW/LWS	0.007	0.5%	2.9	187.6%

Appendix E Figures

Document Path: C:\Projects\Woodhouse Mill\Plans and Figures\ArcGIS\WoodhouseMill\WoodhouseMill_figures.aprx



Stantec

Woodhouse Mill

Air Quality Monitoring Locations

1:16,000 @ A4	Date: 24/09/2021
Drawn: LS	Checked: PB
Figure 01	Rev A

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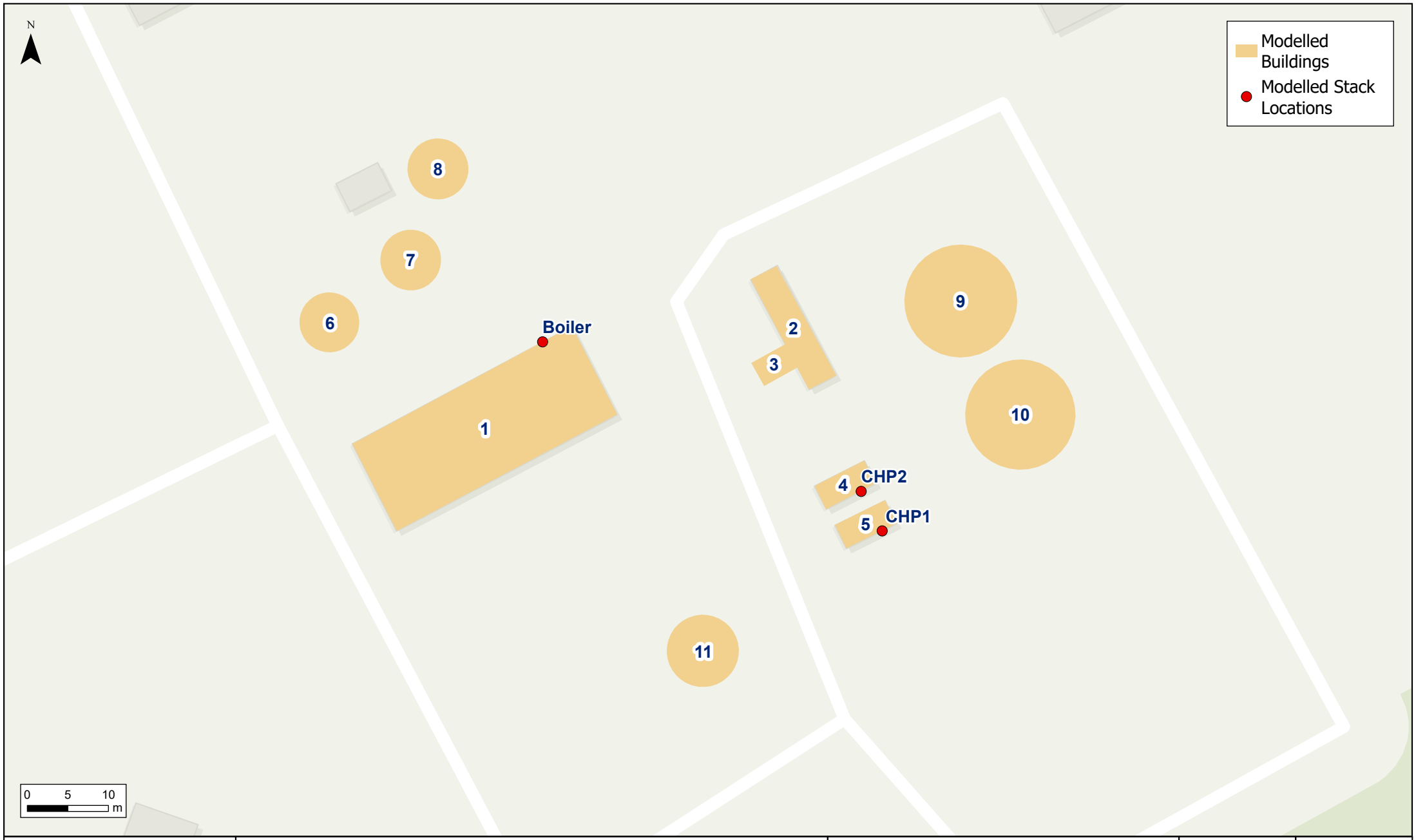

Stantec

Woodhouse Mill

Modelled Buildings and Stack Locations

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Figure 02	Rev A

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Woodhouse Mill

Modelled Human Receptor Locations

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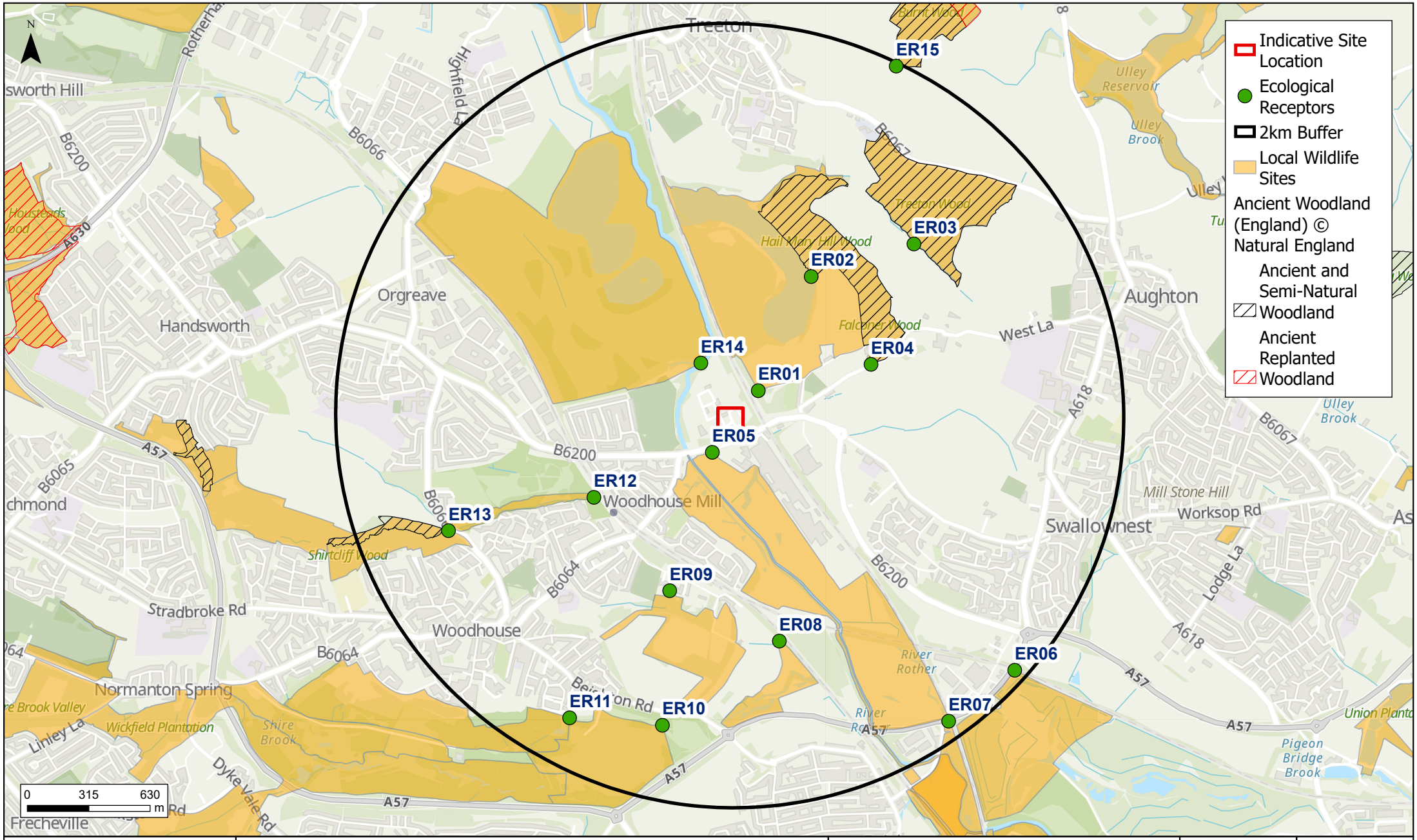

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Woodhouse Mill

Modelled Ecological Receptors within 2km of the Site

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Figure 04	Rev A

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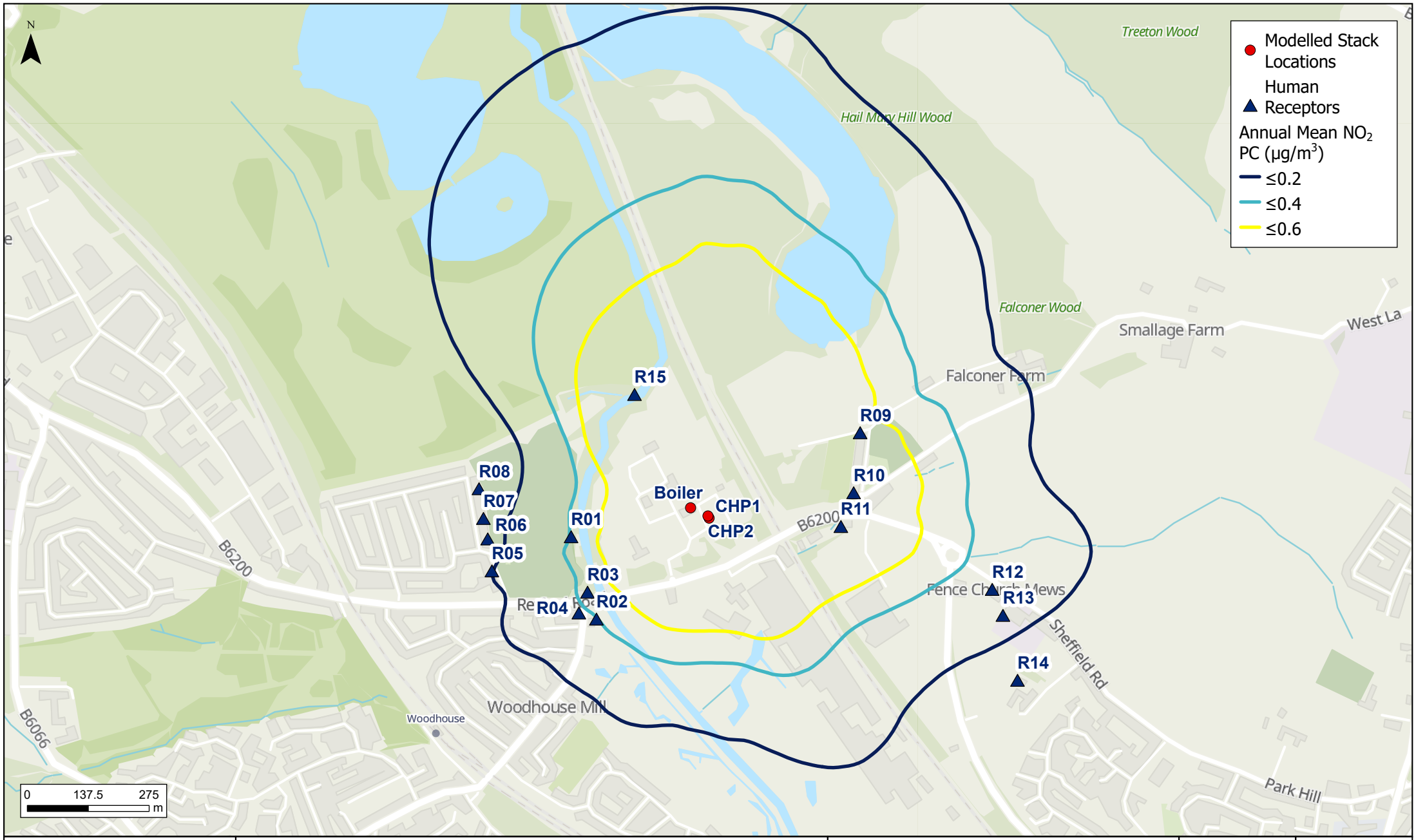

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Woodhouse Mill

2017 Predicted Annual Mean NO_2 Process Contribution (PC) Contour

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Figure 05	Rev A

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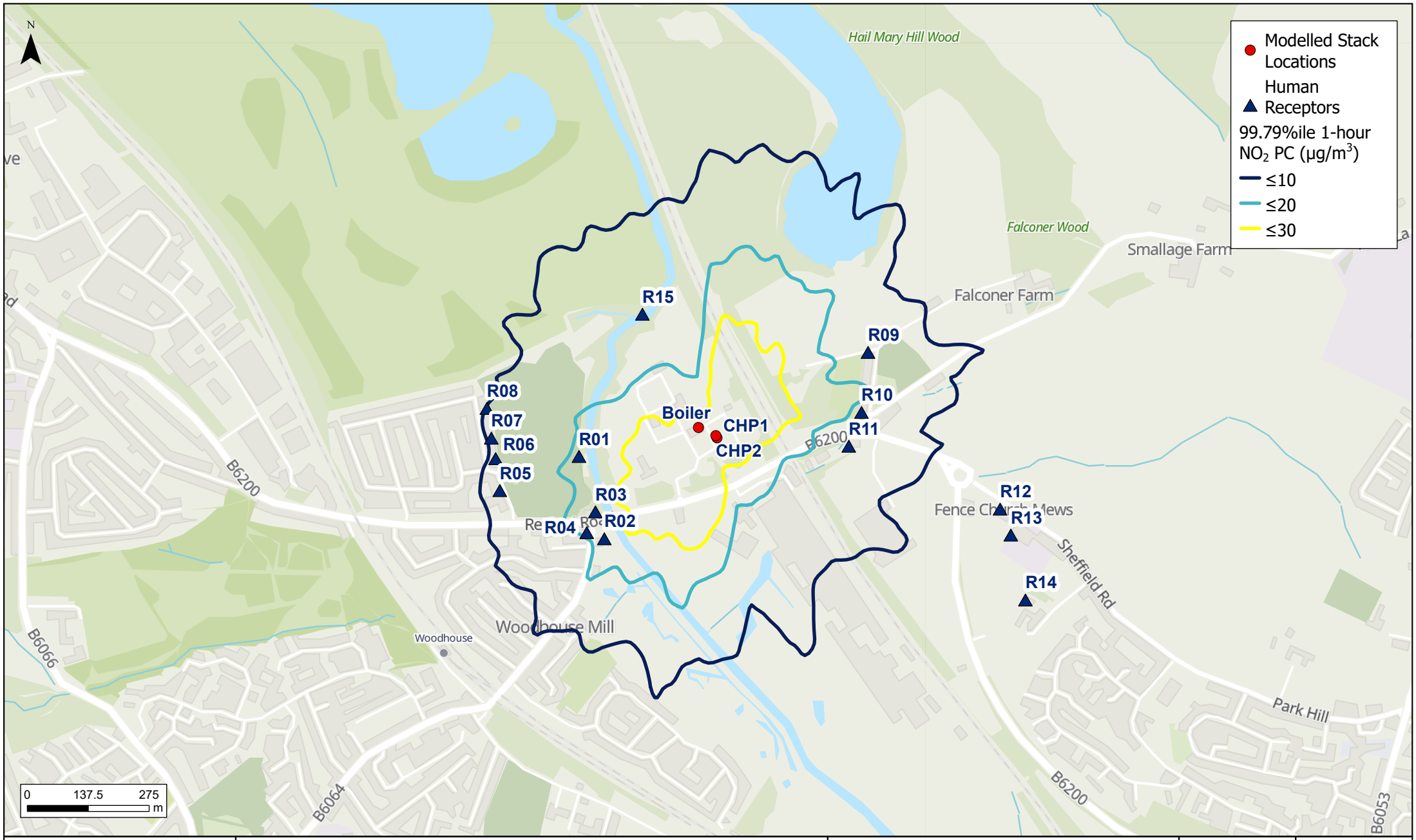

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Woodhouse Mill

2019 Predicted 1-hour Mean NO_2 (99.79%ile) Process (PC) Contribution Contour

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Figure 06	Rev A

Document Path: C:\Projects\Woodhouse Mill\Plans and Figures\ArcGIS\WoodhouseMill\WoodhouseMill_figures.aprx

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Woodhouse Mill

2020 Predicted 24-hour Mean (99.19%ile) SO_2 Process Contribution (PC) Contour

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Drawn: LS	Checked: PB
Figure 07	Rev A

Document Path: C:\Projects\Woodhouse Mill\Plans and Figures\ArcGIS\WoodhouseMill\WoodhouseMill_figures.aprx

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Woodhouse Mill

2017 Predicted 1-hour Mean (99.73%ile) SO_2 Process Contribution (PC) Contour

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Figure 08	Rev A

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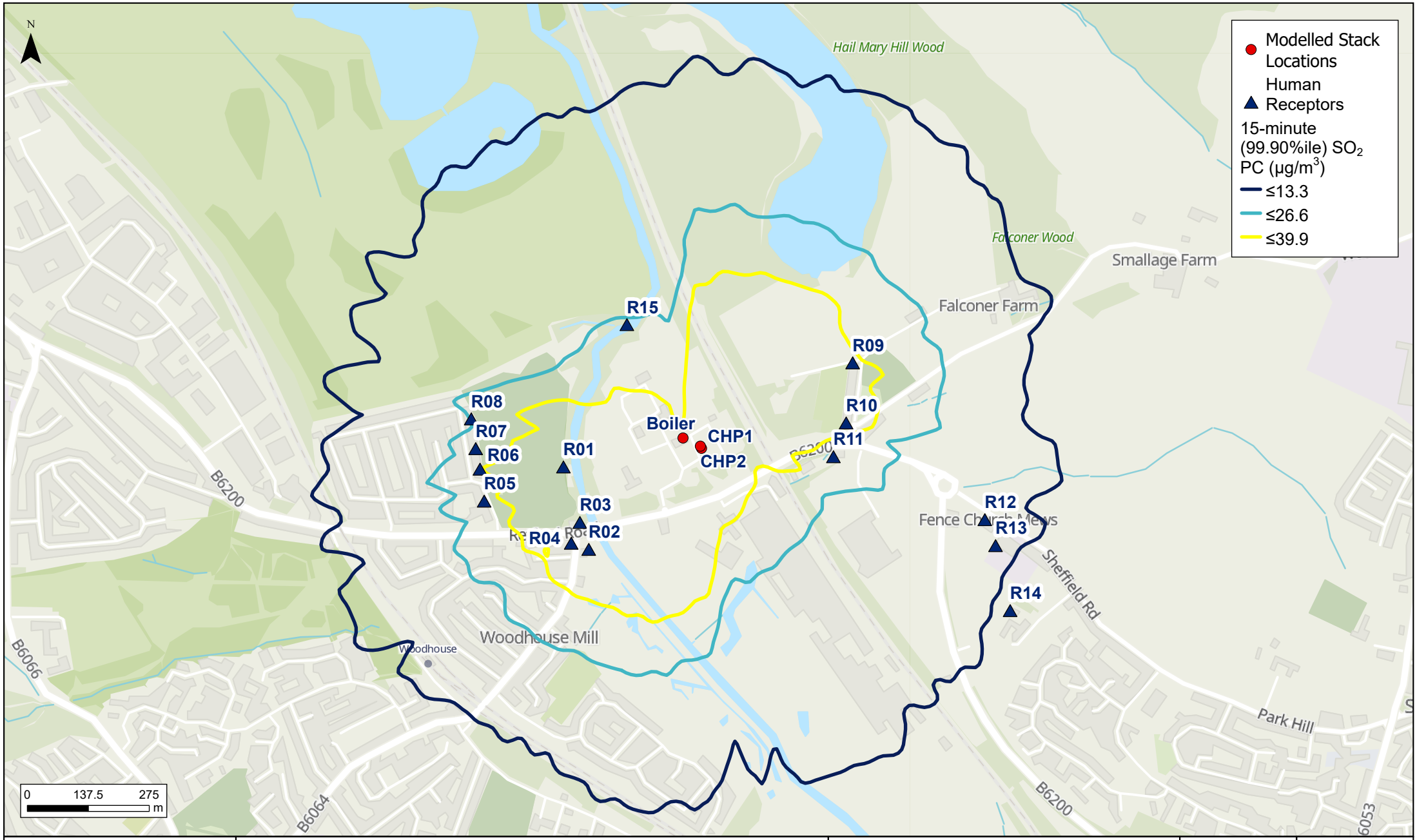

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Woodhouse Mill

2019 Predicted 15-minute Mean (99.90%ile) SO_2 Process Contribution (PC) Contour

1:11,000 @ A4	Date: 24/09/2021
Drawn: LS	Checked: PB
Figure 09	Rev A

Appendix 8 Odour Impact Assessment

Woodhouse Mill STF Qualitative Odour Risk Assessment

Project reference: 331001762

Prepared for:
Yorkshire Water

Prepared by:
Stantec

Report Date

27th September 2021

Revision	Description	Author		Quality Check		Review	
1.0	First Issue	A Martins	08/09/2021	G Baichoo	02/09/21	A Saunders	13/09/21
2.0	Second Issue	A Martins	08/09/2021	G Baichoo	02/09/21	A Saunders	22/09/21
3.0	FINAL	A Martins	08/09/2021	G Baichoo	02/09/21	P. Duncan	27/09/21

Table of Contents

1.0 EXECUTIVE SUMMARY

An Industrial Emissions Directive (IED) permit application is being developed for Yorkshire Water (YW) Woodhouse Mill Sludge Treatment Facility (STF) 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 Yorkshire Water (YW) Woodhouse Mill STF exceeds the 100t/d throughput limit 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 and also Section 5.4 A(1) (a)(i) for a return liquor treatment process (not yet constructed – further details including consideration of odour impacts to be provided as a pre-operational condition).

As part of the IED permit application, an odour assessment is required to assess the risk of odours from Woodhouse Mill STF on the surrounding area. This has been developed in the form of a qualitative odour risk assessment.

The qualitative odour risk assessment for Woodhouse Mill STF has indicated that only one considered sensitive receptor is exposed to a moderate adverse odour effect with the remaining thirteen receptors, including the residential areas to the south-west, east and west, exposed to either a slight adverse or negligible adverse odour effect. The receptor that is potentially exposed to a moderately adverse odour effect is located adjacent to the works south boundary. The moderately adverse odour effect is attributed to the high pathway risk due to the close distance to the site boundary and being in a high wind frequency direction.

Woodhouse Mill WwTW has received odour complaints over the past 5 years. YW site operational staff have indicated that historic odour complaints have been related to the WwTW inlet works and not associated with sludge treatment activities. From the complaints log, these are reported to be from receptors located in the west, south and south-east of the site. The odour complaints are relatively infrequent (27 complaints over the past 5 years) and reported sporadically throughout the year, which suggest that are likely to be attributed to ad-hoc events and are not associated with normal operation.

A site-specific odour survey local to the STF was undertaken which included boundary monitoring and sniff tests around key locations on site. As part of the odour survey, hydrogen sulphide was identified above the recognition concentration threshold of 0.0047 ppm around Centrifuges and Dewater Feed Tanks located in the east and south parts of the site. However, the survey identified that the hydrogen sulphite concentrations are diluted when they reach the site boundary. The odour survey also identified that the majority of samples were assessed as “no odour” or “faint”. Only 2 samples around the Dewater Feed Tanks and cake pad were associated with a “distinct”

which has been attributed to odour from the centrifuge discharges, located in the east and south-east part of the works. However, no odour was subjectively noted at or close to downwind boundaries.

The results of the boundary monitoring and sniff tests indicate that it is unlikely that the STF odours have an adverse effect on surrounding sensitive receptors.

Of the considered BAT Conclusions associated with emissions to air, specifically 14d and 34, a number of sources have been identified as not complying with certain of the stated BAT conclusions. The OCU has been assessed to achieving the stack outlet odour concentration of 1,000 ouE/m^3. However, some of the processes are open to atmosphere, such as the dewater feed tanks and the cake pads. Whilst these processes do not utilise the techniques specifically described in the BAT conclusions; the assessment has not identified a significant risk of odour impact at surrounding receptors from the works. This is supported by the infrequent nature of odour complaints and no significant odour detectable at the boundary during the odour survey sniff testing. It is considered that although these processes do not adopt the specified measures in BAT 14d, they do not have an odour impact on surrounding receptors to the level to warrant odour mitigation; as such alternatives measures in place are adequate.

For the overall site, taking into consideration the findings of the odour survey and the odour risk assessment, it is considered than Woodhouse Mill STF does not have an adverse odour effect on its surrounding receptors. As such, no additional odour mitigation is required above the existing measures already observed on site.

2.0 INTRODUCTION

An IED permit application is being developed for Woodhouse Mill Sludge Treatment Facility (STF) 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 Yorkshire Water (YW) Woodhouse Mill STF exceeds the 100t/d throughput limit 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 and also Section 5.4 A(1) (a)(i) for a return liquor treatment process (not yet constructed – further details including consideration of odour impacts to be provided as a pre-operational condition).

As part of the IED permit application, an odour assessment is required to assess the risk of odours from Woodhouse Mill STF on the surrounding area. This has been developed in the form of a qualitative odour risk assessment.

3.0 SITE BACKGROUND

Woodhouse Mill STF is located within the boundary of the Woodhouse Mill (WwTW). The site is located approximately 5 miles to the south-east of Sheffield city centre, South Yorkshire on the east bank of the River Rother. The site is primarily bordered by Orgreave Colliery works to the north (which has been closed since the 1980s) and residential and commercial areas in all other directions. The works location is highlighted in Figure 1.

Figure 1: Woodhouse Mill STF Site Location.

4.0 PROCESS OVERVIEW

Woodhouse Mill STF treats indigenous sewage sludges arising from sewage treatment processes operated within the co-located Woodhouse Mill WwTW. Indigenous sludge is pumped from the WwTW to the two thickener feed tanks where sludge is blended and mixed; the tanks operate in fill / draw mode with 24-hour changeover. Headspace air from these tanks is extracted to an odour control unit (OCU).

As a contingency, there is the facility to receive imported sewage sludges generated by smaller YW sewage works (with lower capacity or capability for treating sludges on-site) directly to the STF. This material may be delivered to digester feed tank 2, although in practice this facility is very rarely used. A macerator is located within the tank feed lines to break up solid materials or contaminants in the imported sludge.

Sludge from the thickener feed tanks is then transferred to the thickener building via a dedicated pipeline where it is thickened via 3 No. drum filters. Excess liquors are transferred to the top water and return liquors sump located within a building at the northern end of the site. The drum thickeners are connected to the OCU.

The thickened sludge is transferred to the digester feed tanks. These tanks are mixed and covered, with headspace air routed to the OCU. Thickened mixed sludges are then pumped from the digester feed tanks to the anaerobic digesters. The anaerobic digesters operate as a continuous process with sludge being added and treated sludge extracted. The digesters are mixed by gas mixing systems, which utilise biogas from the headspace of each digester; the gas is compressed and then reintroduced using an array of mixing nozzles on the floor of the digester.

Digested treated sludge is gravity fed from the digesters to the adjacent dewater feed tanks. These tanks are mixed to prevent settlement and inhibit generation of methane. Sludge from these tanks are transferred to two centrifuges and mixed with polymer solution.

The final digested and dewatered sludge cake is transferred via conveyers from the centrifuges up over a push-wall and onto the cake pad, prior to be moved by mechanical loaders into storage rows. The whole area under the conveyer and adjacent sludge cake pad is an engineered impermeable surface, with water runoff run off collected in drains running along the centre and perimeter of the pad. There is no lime addition at Woodhouse Mill; instead, cake is stored in piles according to age and is left to mature for a minimum of six weeks in accordance with HACCP (Hazard Analysis Critical Control Points) requirements.

There is a 'top water and return liquors' sump located within a building at the north part of the site that collects liquors from the drum thickeners, centrifuges and sludge cake pad bays prior to be transferred onto the WwTW for full treatment.

There is one odour control unit on site that treats odorous emissions from the STF. The OCU consists of a two stage biofilter and activated carbon unit extracting and treating odorous air from the:

- Thickener feed tanks;
- Drum thickeners;
- Digester feed tanks.

5.0 METHODOLOGY

This qualitative odour risk assessment relies on subjective judgement but uses the generic guidance methodologies provided and referenced in documents such as the Institute of Air Quality Managements (IAQM) Guidance on the Assessment of Odour for Planning, the Scottish Environmental Protection Agency (SEPA) Odour Guidance 2010, the Environment Agency's

Horizontal Guidance Note 1 H1 Environmental Risk Assessments for Permits, and Annex A of H1 – Amenity & accident risk from installations and waste activities.

These guidelines use the Source–Pathway-Receptor concept in which it evaluates the relationship between source(s) of odour, the pathway or transmission route by which exposure may occur at a given receptor(s) who may be affected/impacted.

How well a qualitative odour risk assessment predicts the odour impact for a scenario is dependent on how well the Source-Pathway-Receptor approach can be assessed and scored. This type of assessment is based on subjective judgement and therefore, robust assessment criteria are required. Where subjective judgement for a criterion could be considered broad, sub-criteria have been determined to provide a more detailed judgement.

The below sections outline the assessment criteria for each key area and how it will be applied.

5.1 SOURCE ODOUR POTENTIAL

The odour potential of a source can be broken down into three key considerations:

- How inherently odorous the compounds present are.
- The unpleasantness of the odour.
- The magnitude of the odour release

When trying to determine the offensiveness of an odour source, site-specific odour sampling should be considered in the first instance. In the absence of source odour emission data, the assessment criteria will consider the Environment Agency's Horizontal Guidance Note (H4). H4 looks to categorise how offensive odours are with sources/processes/activities that are considered 'most offensive' odours include septic effluent or sludge and biological landfill odours. All raw sludge treatment processes would be considered to have a high odour offensiveness unless source-specific odour sampling is undertaken demonstrating a low level of odorous compounds. Processes containing the below material are considered to represent a high odour offensiveness:

- Indigenous sludge
- Sludge imports (liquid and solid)
- Sludge liquors

Processes containing the below material are considered to represent a medium odour offensiveness:

- Rags and screenings
- Digested sludge
- Digested sludge liquors
- Digested sludge cake (stored)

No processes on a STF are considered to store material that represents a low odour offensiveness.

The unpleasantness of an odour can be used in defining the source odour offensiveness. This is typically achieved through source material hedonic tone assessments; however, these types of assessments are not typically available for a site. As no source material hedonic tone has been undertaken for Woodhouse Mill STF, it has not been included in the assessment criteria.

The magnitude of the odour release considers the operation of the asset and how likely odours will be released. Whilst the magnitude of odour release is dependent on a number of factors such as source surface area, turbulence of source material, age of source material; the source odour mitigation and control measures have been determined as the defining criteria for magnitude of odour release. For conservatism, all open sources are considered to have a high magnitude of odour release regardless of process operation. Processes with good cover containment that have the headspace odours extracted via a fan are considered to have a low magnitude of odour release. Processes that are covered without fan extraction will have a magnitude of odour release dependant on the source odour offensiveness. This could vary between a low and high odour magnitude of odour release however, for this assessment, would be considered to represent a medium risk.

Table 1 includes the criteria risk scoring for determining the source odour potential.

Table 1: Source Odour Potential Criteria Risk Scoring

Criteria	Risk Ratings		
	High	**Medium**	**Low**
Odour Offensiveness	Very odorous compounds (H2S, Mercaptans) with low odour threshold. Unpleasant odour - "Most Offensive". Unpleasant hedonic tone. Large permitted process / Surface Area.	Compounds involved are moderately odorous. Unpleasantness - process classed in H4 as "Moderately Offensive" or where odours have neutral or slightly unpleasant hedonic tone. Smaller permitted process / Surface Area.	Compounds involved are only mildly offensive. Unpleasantness - process classed in H4 as "Less Offensive". Neutral to positive hedonic tone.
Mitigation / Control	Open air operation with no containment. Reliance solely on good management techniques and best practice.	Some mitigation measures in place but significant residual odour remains.	Effective mitigation measures in place (e.g., BAT, BPM) leading to little or no residual odour.

5.2 PATHWAY EFFECTIVENESS

When considering the effectiveness of the odour pathway as a source transport mechanism through the air to a receptor a number of factors need to be considered. Any factor that increases the source dilution or dispersion into atmosphere from source to receptor will reduce the odour concentration at the receptor, and hence reduce odour exposure. Several factors need to be considered including:

- The distance from source to receptor
- Wind direction and frequency
- Source release effectiveness at dispersion to atmosphere
- The effectiveness of odour mitigation / control

- Topography and terrain between source and receptor

The highest likelihood of impact for a given source will be present when the predominant wind direction is present, the sensitive receptor is close to the emission source, the emissions source is located at ground level with limited dispersion and there are no emission mitigation measures in place.

Table 2 includes the criteria risk scoring for determining the source pathway effectiveness.

Table 2: Source Pathway Effectiveness Criteria Risk Scoring

	Risk Ratings		
	High	Medium	Low
Receptor Distance from Site	< 50m	50 - 300m	> 300 m
Wind Direction Frequency	> 10%	5 - 10%	< 5%
Source Dispersion	Open processes with low level releases	Releases are elevated but compromised by building effects.	Releases are elevated and dispersed via stack/vent and not compromised by surrounding buildings.

When determining the odour risk criteria for a site, consideration should be given to any past studies that identify an odour impact boundary or any sensitive locations of odour complaints. Due to the infrequent nature of odour complaints (27 complaints) in the last 5 years (2017 to 2021) associated with the YW Woodhouse Mill site, generic risk values have been used for the receptors distance from site. It has been considered that any receptor within a 50 m radius from site would be considered in a higher risk location whereby any receptor beyond a 300 m radius would be considered in a lower risk location. Whilst it is recognised that receptors far enough away from site will not be subject to odour impact associated to the works, no maximum distance cap has been included. However, it has been loosely considered that any receptor more than 1 km away from the works will not be considered in the assessment.

When considering pathway effectiveness, consideration is given to whether the receptors are downwind of the source and what the predominant prevailing wind direction is. Whilst the main consideration is typically for the predominant prevailing wind direction, odour impact tends to occur with low wind speeds or stable atmospheric conditions. When conditions are not stable, it will be the downwind receptors that are affected. When considering prevailing wind conditions, annual meteorological data sets from representative meteorological stations local to the site containing wind direction and frequency should be considered.

When considering the source dispersion risk, consideration is given to whether there will be sufficient dilution in reducing the odours as they transverse towards the sensitive receptors. A

source at ground level that is open to atmosphere would likely have poor dispersion of odours and be reliant on other factors such as distance from receptor or low odour offensiveness to manage the risk of likely odour effect at receptors. Sources at height would be considered to have an increased dispersion but could still present a risk. Sources that are either fully contained or fan extracted through an emission stack are considered to have a low dispersion risk.

The topography and terrain surrounding a site can influence the air movement and create an increased risk of odour effect at receptors. The presence of topographical features such as hills and valleys, or urban terrain features such as buildings can affect air flow and therefore increase or inhibit dispersion and dilution. For this assessment, the terrain surrounding the works has not been considered.

5.3 RECEPTOR SENSITIVITY

Within the IAQM guidance document, receptors are placed into one of three categories depending on land use, duration of exposure, and the anticipated level of amenity.

- High Sensitivity – High level of amenity expected, prolonged or continuously present within the area. Examples include residential dwelling, schools, hospitals.

- Medium Sensitivity – Reasonable level of amenity expected, no prolonged or continuously presence within the area. Examples include a place of work, commercial/retail, playing recreational fields.

- Low Sensitivity – No reasonable level of amenity expected or transient exposure. Examples include farms, industrial, footpaths/roads.

5.4 ASSESSMENT OUTPUT

For the above qualitative odour risk assessment, the risk of odour exposure at a receptor can be determined and when assessed against a receptor's sensitivity, a risk of 'likely odour effect' can be determined. The risk of odour exposure is summarised in the below expressions:

- Negligible Effect
- Slight Adverse Effect
- Moderate Adverse Effect
- Substantial Adverse Effect

As referenced by the IAQM when discussing qualitative odour risk assessments, "the EIA regulations require that an assessment reaches a conclusion on the likely significance of the effects. Where the overall effect is greater than "slight adverse" the effect is likely to be considered significant.". Whilst this assessment will consider the risk of odour exposure for each receptor in the assessment,

an overall judgement will be made for the whole site. As such, the result of the assessment will be considered binary on whether the site has significant or no significant risk of odour effect at surrounding receptors. The risk matrix approach outlined by the IAQM and adopted for this assessment is outlined in Table 3 and Table 4.

Table 3: Risk of Odour Exposure at Specified Receptor Locations

		Source Odour Potential		
		Low	Medium	High
Pathway Effectiveness	Highly Effective Pathway	Low Risk	Medium Risk	High Risk
	Moderately Effective Pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

Table 4: Likely Magnitude of Odour Effect at the Specific Receptor Location

Risk of Odour Exposure	Source Odour Potential		
	Low	Medium	High
High Risk of Odour Exposure	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Risk
Medium Risk of Odour Exposure	Negligible Risk	Slight Adverse Effect	Moderate Adverse Effect
Low Risk of Odour Exposure	Negligible Effect	Negligible Effect	Slight Adverse Effect
Negligible Risk of Odour Exposure	Negligible Effect	Negligible Effect	Negligible Effect

6.0 ASSESSMENT

6.1 SOURCE ODOUR POTENTIAL RESULTS

6.1.1 Site Operation

An odour survey has been undertaken providing some indicative information on odorous compounds present on uncovered and channelled emission sources. Where there is no source odour emission data available, the Environment Agency's Horizontal Guidance Note (H4) has been adopted. H4 considers sources/processes/activities that are considered 'most offensive' odours include septic effluent or sludge and biological landfill odours.

As a number of sources are adjacent to each other, it is not realistic to consider the odour effect at a receptor based on individual sources. As all sludge assets are within the same area of site (all assets are located on the east side of the site), the assessment has considered all sources as a combined single area. The pathway effectiveness has been determined based on the receptor being closest in distance to the permitted boundary / nearest source. Figure 2 shows the source boundary on site.

Figure 2: Woodhouse Mill STF Odour Source Area.

There is one OCU on site that extracts odours from the 2 No. Thickener Feed Tanks, 3 No. Drum Thickeners and 2 No. Digester Feed Tanks. As part of the odour survey, negative pressure measurements have been taken below the covers of the Thickener Feed Tanks and the Digester Feed Tanks. The Thickener Feed Tanks achieve a negative pressure between -78 to -100 Pa and would be considered to achieve full odour containment. The Digester Feed Tanks achieve a negative pressure between -7 to -8 Pa and would be considered to achieve a high level of odour containment. The drum thickeners were not assessed as part of the survey but are assumed to achieve a high level of odour containment.

The 3 No. Dewater Feed Tanks and cake pads are all open to atmosphere with no mitigation of odours. There is a Top Water and Return Liquors Sump within a building at the north side of the works

6.1.2 Odour Survey Results

An odour survey of the STF was undertaken considering source and contaminant odour potential. The odour survey consisted of the collection of two air samples from the following sources over a two-day period (4th & 5th August 2021) for laboratory analysis in accordance with BS EN13723.

- Centrifuge discharge (fresh digested cake)
- Cake storage pad (stored digested cake located adjacent to centrifuge discharge)
- STF OCU outlet

The results indicate that the digested sludge cake had low odour emissions rates and was comparable to typical emissions for digested sludge cakes. Sampling has been undertaken on other Yorkshire Water STFs and digested sludge cake has been observed to be between 1 and 10 $ou_E/m^2/s$ (based on data from Blackburn Meadows and Esholt).

A summary of the survey results is included in Table 5.

Table 5: Odour Survey Averaged Results.

Source	Odour Concentration	Odour Emission Rate	Hydrogen Sulphide	Di-methyl Sulphide	Mercaptans	Ammonia	Volatile Organic Compounds
	(ou_E/m^3)	($ou_E/m^2/s$)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
Centrifuge discharge (Fresh	89	0.9	0.002	< 0.1	< 0.1	7.00	< 0.1

Source	Odour Concentration	Odour Emission Rate	Hydrogen Sulphide	Di-methyl Sulphide	Mercaptans	Ammonia	Volatile Organic Compounds
	(ou_E/m^3)	($ou_E/m^2/s$)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
Digested Sludge)							
Cake Storage Pad	50	0.5	0.002	< 0.1	< 0.1	1.50	< 0.1
STF OCU Outlet	56	N/A	< 0.001	< 0.1	< 0.1	< 0.1	< 0.1

Contaminant sampling was undertaken for hydrogen sulphide, mercaptans, di-methyl sulphide, ammonia and volatile organic compounds. Hydrogen sulphide is considered to be the main contaminant in sludge emissions to give rise to high source odour potential. Depending on the source material, the detection threshold for hydrogen sulphide is highly variable. Considering the Environment Agency's "Review of Odour Character and Threshold" to provide a compound detection threshold, for a hydrogen sulphide detection threshold of 0.0005 ppm with a recognition concentration of 0.0047 ppm, the results indicate that, under all operating conditions, the hydrogen sulphide concentrations are within the detection range.

The olfactometric test results show that the OCU is operating well and with a stack outlet concentration below of the BAT conclusions limit of 1,000 ou_E/m^3.

The results indicate ammonia concentrations for the digested sludge cake are far higher than any other contaminant in the survey. Whilst the results indicate a higher ammonia concentration for digested cake when compared to other contaminants, it does not indicate an increased odour risk when compared to other contaminants as the measured ammonia concentrations are below the limit of detection of 17 ppm set in the Environment Agency's "Review of odour character and threshold."

The stored sludge cake exhibits concentrations of odorous compounds low enough not to cause nuisance or adverse effects local to the source and as such, would not be considered to cause adverse effects to local receptors. Whilst this means the sludge cake could potentially be considered as an asset with low odour offensiveness, for the purpose of this assessment, and to add a level of conservatism, the digested sludge and cake storage are considered to have a medium odour offensiveness.

As part of the odour survey, boundary monitoring and sniff tests around key locations on site (see Appendix B – Boundary Survey results for details) have been undertaken local to the STF. The boundary monitoring has identified a couple of areas on site (around the Centrifuges and Dewater Feed Tanks) that hydrogen sulphide (the main compound in sludge odours) was identified above the recognition concentration threshold of 0.0047 ppm. The hydrogen sulphite concentrations are diluted when they reach the site boundary and below the limit of recognition.

Although the odour description for the majority of these samples was identified as "no odour" or "faint", some samples were associated with a "distinct" odour, particularly around the Dewater Feed Tanks and cake pad which has been attributed to odour from the centrifuge discharges, located in the east and south-east part of the works. However, no odour was subjectively noted at or close to downwind boundaries. The odour noted close to the centrifuge discharge bays was subjectively more concentrated than the detectable odour around the digested sludge cake piles but not detectable any distance from the bays.

The results of the boundary monitoring and sniff tests indicate that it is unlikely that the STF odours have an adverse effect on surrounding sensitive receptors.

The boundary survey results are located in Appendix B.

6.1.3 Source Odour Potential Assessment Results

Table 6 includes a summary of the likely magnitude of odour effects with the detailed assessment in Appendix A. This assessment has been based on the approach outlined in section 5.1.

Table 6: Likely Magnitude of Odour Effect at the Specific Receptor Location

Source	Odour Offensiveness	Mitigation/Control Risk	Source Odour Potential
Sludge Treatment Area			
Thickener Feed tanks	High	Low	Low
Drum Thickeners	High	Low	Low
Digester Feed tanks	High	Low	Low
Dewater Feed Tanks	Medium	High	Medium
Dewatering Centrifuges	Medium	Low	Medium
Cake pad	Medium	High	Medium
Top Water and Return Liquors Sump	High	Medium	Medium

Of the seven processes on site, three are considered to have a low source odour potential and four are considered to have a medium source odour potential. No sources are considered to have a high source odour potential.

The OCU is a treated air stream with good dispersion and would not give rise to adverse odour effects at receptors under normal operating conditions. The odour emissions from the OCU are considered to represent BAT for management of these type of odour sources and as such, has not been considered any further in the assessment.

Top Water and Return Liquors PS is within a building with no extraction and therefore, it has been considered as medium risk, to represent containment only.

Of the seven processes within the STF, it is considered that this area is best represented with an odour source potential of a medium risk.

6.1.4 BAT Compliance

As part of the IED permit application there are several BAT conclusions that are specifically associated with emissions to air. Whilst the outcome of this odour risk assessment is not directly influenced by the site's performance against the BAT conclusions, consideration is required if the site is not adopting specific BAT measures and is at risk of adverse odour affects on surrounding receptors.

6.1.4.1 BAT Conclusion 14d

BAT Conclusion 14 is associated with the appropriate combination of techniques to prevent or reduce diffuse emissions to air. BAT Section 14d is associated with the "containment, collection and treatment of diffuse emissions" and includes techniques such as:

- Storing, treating, and handling waste and materials that may generate diffuse emissions in enclosed buildings and/or enclosed equipment (e.g., conveyor belts);
- Maintaining the enclosed equipment or buildings under adequate negative pressure;
- Collecting and directing emissions to an appropriate abatement system via an air extraction system and/or air suction systems close to the emission sources.

In terms of the applicability of this technique it is noted that: "The use of enclosed equipment or buildings may be restricted by safety considerations such as the risk of explosion or oxygen depletion. The use of enclosed equipment or buildings may also be constrained by the volume of waste."

An assessment of STF processes has been undertaken against BAT 14d in Table 7 to review current site measures and compliance.

Table 7: BAT 14d Containment, Collection and Treatment of Diffuse Emissions

Source	Containment, collection and diffuse emissions	BAT Compliant	Compliance Restrictions
Thickener Feed Tanks	Tank covered with foul air mechanically extracted. Odour emissions treated by odour control unit and dispersed to atmosphere.	Yes	N/A

Source	Containment, collection and diffuse emissions	BAT Compliant	Compliance Restrictions
	Thickener Feed Tanks negative differential pressure measured between -78 to -100 Pa, indicating full containment of emissions with no risk of fugitive emissions under current operation.		
Drum Thickeners	Thickeners covered with foul air mechanically extracted. Odour emissions treated by odour control unit and dispersed to atmosphere. No negative pressure measurements on Thickeners. Assumed good containment of emissions with limited risk of fugitive emissions under current operation.	Yes	N/A
Digester Feed Tanks	Tank covered with foul air mechanically extracted. Odour emissions treated by odour control unit and dispersed to atmosphere. Thickener Feed Tanks negative differential pressure measured	Yes	N/A

Source	Containment, collection and diffuse emissions	BAT Compliant	Compliance Restrictions
	between -7 to -8 Pa, indicating good containment of emissions with limited risk of fugitive emissions under current operation.		
Dewater Feed Tanks	Tank open to atmosphere with no containment or treatment of emissions (noting that this is digested material with lower odour generating potential than raw sludge).	Specific BAT measure not in use on process safety grounds	If covered, risk of oxygen depletion leading to methane generation and creation of an explosive atmosphere.
Dewatering Centrifuges	Centrifuges, although of a proprietary enclosed design, do not facilitate creating a negative pressure environment.	Area subject to regular inspection and management, source not considered to contribute to off-site odour nuisance potential. Adequate measures considered to be in operation.	None
Cake Pad	Cake Pad open to atmosphere with no containment or treatment of emissions (noting that this is digested material with lower odour than raw sludge).	Odour management techniques in use rather than specific BAT containment measures. Adequate measures	The use of enclosed equipment or buildings is constrained by the volume of cake stored.

Source	Containment, collection and diffuse emissions	BAT Compliant	Compliance Restrictions
		considered to be in operation, as supported by ORA.	
Top Water and Return Liquors Sump	Sump located within a building, limiting dispersion to atmosphere.	Partial	None

Of the sources on site only the dewater feed tanks and cake pad do not adopt the specific conclusions outlined in BAT 14d. The centrifuges and top water and return liquor sump would be considered to be partially compliant due to being a contained process. Whilst these processes are only partially compliant, they occupy a small source footprint and are not likely to contribute to significant odour emissions or impact on surrounding receptors.

Specific BAT measures within 14d are not in use on the dewater feed tanks due to process safety considerations associated with methane evolving post digestion. However, the odour survey indicates the digested sludge emissions have a low emission rate, more akin to secondary treated wastewater than indigenous sludge emissions. As activated sludge plants and final tanks are typically uncovered on wastewater treatment processes, argument could be made that as the dewater feed tanks are more akin to these process emissions, that these tanks could remain uncovered, presenting a low risk of odour impact on surround receptors, and avoiding the need for complex gas management with associated UKEX compliance provisions.

The cake pad is currently uncovered and does not utilise specific measures outlined in BAT 14d. The cake pad odour emissions are more akin to secondary treated wastewater than indigenous sludge emissions. Covering the cake pad would require a significantly sized building with air extraction / ventilation, odour treatment and dispersion to atmosphere. Given the infrequent nature of odour complaints and no significant odour detectable at the boundary during the odour survey, the risk of odour impact from this area would be limited to does not warrant additional mitigation measures beyond adherence to measures established in the odour management plan and limiting cake double handling. These measures are considered adequate and equivalent to the specified provisions in BAT 14d.

6.1.4.2 BAT Conclusion 34

BAT 34 is associated with the treatment of channelled emissions to air and identifies the accepted techniques and associated emission levels (BAT-AELs). The BAT-AELs for channelled emissions are included in Table 8.

Table 8: BAT 34 BAT Associated Emission Levels for Channelled Emissions

Parameter	Unit	BAT-AEL (Average over the sampling period)	Waste Treatment Process
Ammonia (NH_3)	Mg/Nm^3	0.3 - 20	All biological treatments of waste
Odour Concentration	ou_E/m^3	200 – 1,000 [1]	

[1] To note, whilst the BAT-AEL for odour concentration is reported as a range, clarification has been provided that the upper range of 1,000 ou_E/m^3 is an accepted performance limit.

As part of the odour survey, the odour control unit was assessed to be achieving a high level of performance with a stack outlet odour concentration below the BAT-AEL of 1,000 ou_E/m^3.

6.2 RECEPTOR SENSITIVITY RESULTS

For the assessment, before the pathway effectiveness can be determined, the discrete receptors need to be determined. Discrete receptors should typically consider complaint locations and areas of specific interest. Woodhouse Mill WwTW has received odour complaints mainly from the west, south and south-west nearby neighbourhood.

It is not clear from the complaints log if these complaints are associated with wastewater or sludge operation as they are infrequent (27 complaints in the last 5 years – from 2017 to 2021), from different receptors and at different times of the year. However, YW site operational staff have indicated that historic odour complaints have been related to the WwTW inlet works and not associated with sludge treatment activities. The infrequency of complaints would suggest they are more likely to be attributed to ad-hoc events occurring on site (failure of asset, maintenance work etc) as opposed to continuous complaints associated with normal operation.

However, in order to analyse these complaints and possible other future complaints from different neighbours, a set of discrete receptors have been considered. All of the receptors considered in this assessment are based on receptor distance from the site and then categorised based on sensitivity. Where a number of discrete receptors are in the same location, a single receptor has been selected, considering the likely highest sensitivity receptor, to represent the area. The receptors included in this assessment encompass the complaint locations from the past 5 years along with other areas of specific interest.

Table 9 and Figure 3 highlight the receptor location, type and sensitivity. This assessment has been based on the approach outlined in section 5.3.

Table 9: Receptor Location, Type and Sensitivity

Receptor Name	Receptor Map Reference	Receptor Type	Receptor Sensitivity
Ashtree Stables	D01	Stables	Low
Falconer Lane	D02	Residential	High
Stones Acres	D03	Commercial & Residential	High
The Hollows Kennels and Cattery	D04	Commercial & Residential	High
Mediplan Limited	D05	Commercial	Medium
Aston Fence Junior & Infant School	D06	School	High
Innovation Way Industrial Estate	D07	Industrial	Low
JELD-WEN	D08	Industrial	Low
Princess Royal Hotel	D09	Hotel	High
Top Hand Car Wash	D10	Commercial	Medium
Retford Road	D11	Residential	High
Furnace Road	D12	Commercial & Residential	High
Londis Woodhouse Mill Petrol Filling Station	D13	Commercial	Medium
Residential areas off Retford Road	D14	Residential	High

Figure 3: Location of Sensitive Receptors.

Of the fourteen discrete receptors included, eight are considered to be highly sensitive, attributed mainly to residential or educational receptors. The main residential areas of consideration are to the east, south-west and west. There are no residential receptors directly to the north and north-west of the site boundary.

Three receptors are considered to be medium sensitivity receptors and include places of work and commercial areas. These receptors are located the to the south-west and south-east of the site.

Three receptors are considered to be of low sensitivity and represents industry located to the south, south-east and north-east of the site.

6.3 PATHWAY EFFECTIVENESS RESULTS

6.3.1 Wind Direction

When considering the pathway effectiveness from source odours to an identified receptor, a number of factors have to be determined. Meteorological data from Doncaster Sheffield Airport met. station (met. year 2019) has been used to predict the wind direction frequency for Woodhouse Mill STF. Woodhouse Mill STF is located approximately 25km south-west and therefore is likely experience similar wind directions and frequencies to be considered acceptable for this qualitative assessment. The distance between source and receptor is shown in Appendix A. The breakdown of the wind direction frequency and risk for Doncaster Sheffield Airport met. year 2019 are summarised in Table 10.

Table 10: Meteorological Data Wind Direction Frequency.

Wind Direction	Sample Count	Frequency (%)	Wind Direction Frequency Risk
North to South	889	10.1%	High
North-East to South West	374	4.3%	Low
East to West	510	5.8%	Medium
South-East to North-West	955	10.9%	High
South to North	1979	22.6%	High
South-West to North-East	1500	17.1%	High
West to East	1558	17.8%	High
North-West to South-East	995	11.4%	High

6.3.2 Source Dispersion

When considering source dispersion risk, as the site has been considered in one singular area, a dispersion risk needs to be defined for the area. Table 11 considers the dispersion risk from each individual process.

Table 11: Source Dispersion Risk.

Source	Source Dispersion	Dispersion Risk
Thickener Feed tanks	Covered and extracted process	Low
Drum Thickeners	Covered and extracted process	Low
Digester Feed tanks	Covered and extracted process	Low
Dewater Feed Tanks	Open to atmosphere at high level	Medium
Dewatering Centrifuges	Low Risk - Containerised units	Low
Cake pad	Open to atmosphere at ground level	High
Top Water and Return Liquors Sump	Within a building without extraction.	Medium

It is considered that a medium dispersion risk would be most applicable for the STF.

6.3.3 Pathway Effectiveness Assessment Results

The pathway effectiveness for each defined sensitive receptor is summarised in Table 12 with detailed assessment in Appendix A.

Table 12: Pathway Effectiveness Assessment.

Receptor Name	Distance Risk	Direction From Installation	Wind Direction Frequency	Source Dispersion Risk	Pathway Effectiveness
Ashtree Stables	Low	NE	High	Medium	Ineffective Pathway
Falconer Lane	Medium	E	High	Medium	Moderately Effective Pathway
Stones Acres	Low	E	High	Medium	Moderately Effective Pathway
The Hollows Kennels and Cattery	Medium	SE	High	Medium	Moderately Effective Pathway
Mediplan Limited	Low	SE	High	Medium	Moderately Effective Pathway
Aston Fence Junior & Infant School	Low	SE	High	Medium	Moderately Effective Pathway
Innovation Way Industrial Estate	Medium	SE	High	Medium	Moderately Effective Pathway
JELD-WEN	Medium	S	High	Medium	Moderately Effective Pathway
Princess Royal Hotel	High	S	High	Medium	Highly Effective Pathway
Top Hand Car Wash	Medium	SW	Low	Medium	Moderately Effective Pathway

Receptor Name	Distance Risk	Direction From Installation	Wind Direction Frequency	Source Dispersion Risk	Pathway Effectiveness
Retford Road	Medium	SW	Low	Medium	Moderately Effective Pathway
Furnace Road	Medium	SW	Low	Medium	Moderately Effective Pathway
Londis Woodhouse Mill Petrol Filling Station	Medium	SW	Low	Medium	Moderately Effective Pathway
Residential areas off Retford Road	Low	W	Medium	Medium	Moderately Effective Pathway

7.0 ASSESSMENT RESULTS

The results of the qualitative odour risk assessment are summarised in Table 13 and based on section 5,4.

Table 13: Qualitative Odour Risk Assessment Results.

Receptor	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
Ashtree Stables	Medium	Ineffective Pathway	Negligible Risk	Low	Negligible Effect
Falconer Lane	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
Stones Acres	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
The Hollows Kennels and Cattery	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
Mediplan Limited	Medium	Moderately Effective Pathway	Low Risk	Medium	Negligible Effect
Aston Fence Junior & Infant School	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
Innovation Way Industrial Estate	Medium	Moderately Effective Pathway	Low Risk	Low	Negligible Effect
JELD-WEN	Medium	Moderately Effective Pathway	Low Risk	Low	Negligible Effect

Receptor	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
Princess Royal Hotel	Medium	Highly Effective Pathway	Medium Risk	High	Moderate Adverse Effect
Top Hand Car Wash	Medium	Moderately Effective Pathway	Low Risk	Medium	Negligible Effect
Retford Road	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
Furnace Road	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
Londis Woodhouse Mill Petrol Filling Station	Medium	Moderately Effective Pathway	Low Risk	Medium	Negligible Effect
Residential areas off Retford Road	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect

8.0 SUMMARY

A qualitative odour risk assessment has been undertaken for Woodhouse Mill STF considering seven process activities across the sludge treatment area on site and potential odour effect on fourteen receptors. The assessment has been based on a Source-Pathway-Receptor approach and is primarily based upon professional judgement.

As the sludge assets are within the same area of site (all assets on the east side of the site), the assessment has considered all sources as a combined single area. Consideration has been given to existing site operation for odour mitigation and source dispersion, and combined with receptor location and meteorological conditions, a pathway effectiveness has been determined for each sensitive receptor. This has allowed, with the use of risk matrices, a receptor specific likely odour effect to be determined.

The qualitative odour risk assessment for Woodhouse Mill STF has indicated that only one considered sensitive receptor is exposed to a moderate adverse odour effect with the remaining thirteen receptors, including the residential areas to the south-west, east and west, exposed to either a slight adverse or negligible adverse odour effect. The receptor that is potentially exposed to a moderately adverse odour effect is located adjacent to the works south boundary. The moderately adverse odour effect is attributed to the high pathway risk due to the close distance to the site boundary and being in a high wind frequency direction.

Woodhouse Mill WwTW has received odour complaints over the past 5 years. YW site operational staff have indicated that historic odour complaints have been related to the WwTW inlet works and not associated with sludge treatment activities. From the complaints log, these are reported to be from receptors located in the west, south and south-east of the site. The odour complaints are relatively infrequent (27 complaints over the past 5 years) and reported sporadically throughout the year, which suggest that are likely to be attributed to ad-hoc events and are not associated with normal operation.

A site-specific odour survey local to the STF was undertaken which included boundary monitoring and sniff tests around key locations on site. As part of the odour survey, hydrogen sulphide was identified above the recognition concentration threshold of 0.0047 ppm around Centrifuges and Dewater Feed Tanks located in the east and south parts of the site. However, the survey identified that the hydrogen sulphite concentrations are diluted when they reach the site boundary. The odour survey also identified that the majority of samples were assessed as “no odour” or “faint”. Only 2 samples around the Dewater Feed Tanks and cake pad were associated with a “distinct” which has been attributed to odour from the centrifuge discharges, located in the east and south-east part of the works. However, no odour was subjectively noted at or close to downwind boundaries.

The results of the boundary monitoring and sniff tests indicate that it is unlikely that the STF odours have an adverse effect on surrounding sensitive receptors.

Of the considered BAT Conclusions associated with emissions to air, specifically 14d and 34, a number of sources have been identified as not complying with certain of the stated BAT conclusions. The OCU has been assessed to achieving the stack outlet odour concentration of 1,000 ouE/m^3. However, some of the processes are open to atmosphere, such as the dewater feed tanks and the cake pads. Whilst these processes do not utilise the techniques specifically described in the BAT conclusions; the assessment has not identified a significant risk of odour impact at surrounding receptors from the works. This is supported by the infrequent nature of odour complaints and no significant odour detectable at the boundary during the odour survey sniff testing. It is considered that although these processes do not adopt the specified measures in BAT 14d do not have an odour impact on surrounding receptors to the level to warrant odour mitigation; as such alternatives measures in place are adequate.

For the overall site, taking into consideration the findings of the odour survey and the odour risk assessment, it is considered than Woodhouse Mill STF does not have an adverse odour effect on its surrounding receptors. As such, no additional odour mitigation is required above the existing measures already observed on site.

8.1 APPENDIX A – DETAILED ASSESSMENT

Table 14: Likely Magnitude of Odour Effect at the Specific Receptor Location.

Source	Odour Offensiveness	Mitigation/Control	Source Odour Potential
Sludge Treatment Area			
Thickener Feed tanks	High Risk - indigenous sludge	Low Risk - Covered and extracted process	Low
Drum Thickeners	High Risk - indigenous sludge	Low Risk - Covered and extracted process	Low
Digester Feed tanks	High Risk - indigenous & imported sludge	Low Risk - Covered and extracted process	Low
Dewater Feed Tanks	Medium Risk - Digested sludges	High Risk - Open to atmosphere	Medium
Dewatering Centrifuges	Medium Risk - Digested sludges	Low Risk - Contained Structures	Medium
Cake pad	Medium Risk - Digested sludge cake	High Risk - Open to atmosphere	Medium
Top Water and Return Liquors Sump	High Risk - Sludge liquors	High Risk - Open to atmosphere (within a building)	Medium

Table 13: Pathway Effectiveness Assessment.

Receptor Name	Distance from Site (m)	Distance Risk	Direction From Installation	Wind Direction Frequency (%)	Source Dispersion Risk	Pathway Effectiveness	Notes
Ashtree Stables	495	Low	NE	17.1%	Medium	Ineffective Pathway	Pathway considered ineffective due to the significant distance from source and medium odour potential.
Falconer Lane	245	Medium	E	17.8%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.
Stones Acres	420	Low	E	17.8%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.
The Hollows Kennels and Cattery	220	Medium	SE	11.4%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.

Receptor Name	Distance from Site (m)	Distance Risk	Direction From Installation	Wind Direction Frequency (%)	Source Dispersion Risk	Pathway Effectiveness	Notes
Mediplan Limited	490	Low	SE	11.4%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and source dispersion risk.
Aston Fence Junior & Infant School	625	Low	SE	11.4%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and source dispersion risk.
Innovation Way Industrial Estate	300	Medium	SE	11.4%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.
JELD-WEN	75	Medium	S	10.1%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.
Princess Royal Hotel	50	High	S	10.1%	Medium	Highly Effective Pathway	Pathway considered highly effective due to distance from source and wind frequency risk.

Receptor Name	Distance from Site (m)	Distance Risk	Direction From Installation	Wind Direction Frequency (%)	Source Dispersion Risk	Pathway Effectiveness	Notes
Top Hand Car Wash	120	Medium	SW	4.3%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.
Retford Road	210	Medium	SW	4.3%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.
Furnace Road	185	Medium	SW	4.3%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.
Londis Woodhouse Mill Petrol Filling Station	270	Medium	SW	4.3%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.
Residential areas off Retford Road	420	Low	W	5.8%	Medium	Moderately Effective Pathway	Pathway considered moderately effective due to distance from source and medium source dispersion risk.

8.2 APPENDIX B – BOUNDARY SURVEY RESULTS

2.11 Boundary Survey Results

The ERF boundary surveys were taken at the points shown in Figure 3 below:

Figure 3: Boundary Survey Points

Table 11: Boundary Survey Wednesday 4th August AM 09.00 to 10.00 (South East Breeze)

		H_2S	TVOC	NH_3	Odour	Comments
		ppm	ppm	ppm		
1	NE Corner Cake Pad	0.001	<0.1	ND	No Odour	
2	NW Corner Cake Pad	0.003	<0.1	ND	Faint	Faint cake odour
3	E Edge Cake Pad	0.001	<0.1	ND	No Odour	No odour
4	Base sludge blend tanks	0.002	<0.1	ND	No Odour	No odour
5	By dewatering feed tanks	0.005	<0.1	2	Distinct	Odour from centrifuge discharge
6	E Edge Cake Pad	0.001	<0.1	ND	No Odour	No odour
7	SE Corner Cake Pad	0.002	<0.1	ND	No Odour	No odour
8	W edge Cake Pad	0.003	<0.1	0.5	Distinct	By Fresh formed windrows
9	By digester feed tanks	0.005	<0.1	1	Faint	Odour from adjacent PSTs
10	Front Thickener Building	0.002	<0.1	ND	No Odour	No odour

Table 12: Boundary Survey Wednesday 4th August PM 13.00 to 14.00 (South East Breeze)

		H_2S	TVOC	NH_3	Odour	Comments
		ppm	ppm	ppm		
1	NE Corner Cake Pad	0.001	<0.1	ND	No Odour	
2	NW Corner Cake Pad	0.003	<0.1	ND	Faint	Faint cake odour
3	E Edge Cake Pad	0.001	<0.1	ND	No Odour	No odour
4	Base sludge blend tanks	0.002	<0.1	ND	No Odour	No odour
5	By dewatering feed tanks	0.004	<0.1	1.5	Distinct	Odour from centrifuge discharge
6	E Edge Cake Pad	0.001	<0.1	ND	No Odour	No odour
7	SE Corner Cake Pad	0.002	<0.1	ND	No Odour	No odour
8	W edge Cake Pad	0.003	<0.1	ND	Faint	By Fresh formed windrows
9	By digester feed tanks	0.004	<0.1	1	Faint	Odour from adjacent PSTs
10	Front Thickener Building	0.002	<0.1	ND	No Odour	No odour

Table 13: Boundary Survey Thursday 5th August AM 08.00 to 08.45 (Southerly Wind)

		H_2S	TVOC	NH_3	Odour	Comments
		ppm	ppm	ppm		
1	NE Corner Cake Pad	0.001	<0.1	ND	No Odour	
2	NW Corner Cake Pad	0.003	<0.1	ND	Faint	Faint cake odour
3	E Edge Cake Pad	0.001	<0.1	ND	No Odour	No odour
4	Base sludge blend tanks	0.002	<0.1	ND	Faint	Slight cake odour
5	By dewatering feed tanks	0.004	<0.1	1	Distinct	Odour from centrifuge discharge
6	E Edge Cake Pad	0.001	<0.1	ND	No Odour	No odour
7	SE Corner Cake Pad	0.002	<0.1	ND	No Odour	No odour
8	W edge Cake Pad	0.003	<0.1	ND	Faint	By Fresh formed windrows
9	By digester feed tanks	0.004	<0.1	ND	Faint	Odour from adjacent PSTs
10	Front Thickener Building	0.002	<0.1	ND	No Odour	No odour

Table 14: Boundary Survey Thursday 5th August PM 12.30 to 13.30 (Southerly Wind)

		H_2S	TVOC	NH_3	Odour	Comments
		ppm	ppm	ppm		
1	NE Corner Cake Pad	0.001	<0.1	ND	No Odour	
2	NW Corner Cake Pad	0.003	<0.1	0.5	Faint	Faint cake odour
3	E Edge Cake Pad	0.001	<0.1	ND	No Odour	No odour
4	Base sludge blend tanks	0.002	<0.1	0.5	Faint	Slight cake odour
5	By dewatering feed tanks	0.004	<0.1	1.5	Distinct	Odour from centrifuge discharge
6	E Edge Cake Pad	0.001	<0.1	ND	No Odour	No odour
7	SE Corner Cake Pad	0.002	<0.1	ND	No Odour	No odour
8	W edge Cake Pad	0.002	<0.1	0.5	Faint	By Fresh formed windrows
9	By digester feed tanks	0.004	<0.1	ND	Faint	Odour from adjacent PSTs
10	Front Thickener Building	0.002	<0.1	ND	No Odour	No odour

Appendix 9 Noise Impact Assessment

TECHNICAL NOTE

Job Name: Yorkshire Water Environmental Permitting, Woodhouse Mill

Job No: 331001762 (doc ref - 331001762 100.2301-7)

Note No: 100.2301/ACO01

Date: September 2021

Prepared By: Matthew Barlow

Subject: **Noise and Vibration Risk Assessment**

1. Introduction

1.1. Stantec (UK) has been commissioned by Yorkshire Water (YW) to undertake a noise and vibration risk assessment to support a permit application for Woodhouse Mill Sludge Treatment Facility (STF).

1.2. 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. The Yorkshire Water (YW) Woodhouse Mill Sludge Treatment Facility (STF), part of the wider Woodhouse Mill Wastewater Treatment Works (WwTW), exceeds the 100t/d throughput limit and therefore 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 and Section 5.4 A(1) (a)(i) for related liquor treatment activities.

1.3. This technical note summarises the results of our review of the AD treatment activities with regards to statutory guidance relating to noise and vibration.

2. EA Permitting Requirements - Noise

2.1. The Environment Agency requires that operators (or permit applicants) must consider the potential noise impact of their site. They may need to carry out noise impact assessments:

- at the permit application stage
- when applying to vary a permit
- to comply with specific permit conditions

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Reviewed	Approved
331001762/100.2301/ACO01	1	September 2021	MB	MM	PD

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2.2. The Environment Agency will treat noise in the same way as any other polluting emission. If noise is audible at any of the following types of locations, they will regard it as 'possibly causing an impact':

- residential properties
- schools
- hospitals
- offices
- public recreation areas
- other noise sensitive receptors (NSRs)
- noise sensitive habitats

Where noise is possibly causing an impact, the operator must carry out an assessment to determine:

- the level of impact
- how much work needs to be done to prevent or minimise noise pollution

2.3. Operators must prevent significant pollution and also comply with the requirements to use 'appropriate measures' (Waste Framework Directive 2018/851) or 'best available techniques' (BAT) to prevent or minimise noise pollution.

2.4. Guidance on the noise assessment process for permit applications is detailed in Noise and vibration management: environmental permits.[1]

Guidance on Risk Assessments

2.5. Risk assessments for permitting purposes should be undertaken in accordance with the Guidance on the preparation of risk assessments[2].

Requirements for Quantitative Noise Impact Assessments

2.6. 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)

2.7. 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.

2.8. 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.

2.9. The assessment should be accompanied by a noise and vibration management plan informed by the results of the assessment.

[1] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits
[2] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit
[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)

3. Best Applicable Techniques (BAT)

3.1. 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.

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).*

[5] https://www.legislation.gov.uk/eudn/2018/1147

Technique		Description	Applicability
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 plan of the current STF 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 YW.

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 history 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)

Sensitivity to Noise and Vibration	Description	Example Receptor
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 STF.

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	Approximate Distance/Direction from Site Boundary (m)
A	Dwellings on Falconer Lane	Residential	220 E
B	Dwellings off Retford Road	Residential	120 SE
C	Dwellings at Junction of Retford Road and Furnace Lane	Residential	260 SW
D	Dwellings on St James Walk	Residential	440 W
E	Woodhouse Washlands	Ecological	150 S

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 in a predominantly rural area between Woodhouse and Aughton.

5.8. Strategic noise mapping data provided by Defra[6] does not cover this area, and there are no planning applications in the immediate vicinity which include environmental sound survey data.

5.9. In the absence of detailed environmental sound surveys, the existing environmental sound climate is assumed to be low.

Operational Characteristics

5.10. The sources of noise associated with the permit include:

- The movement of vehicles to and from the cake pad.
- The operation of plant items including the CHP engine, induced draft fans associated with odour extraction, rotating screens, compressors, waste gas burner and air-cooled radiators.

5.11. The main sources of noise would be the operation of the CHP (engine and exhaust), air-cooled radiators and waste gas burner (although this would rarely operate). Other sources of noise include mixing pumps associated with the thickener feed tanks and the digester gas mixing compressors.

[6] https://www.gov.uk/government/publications/strategic-noise-mapping-2019

5.12. 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).

Risk Matrix

5.13. 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 STF operations with regards to noise.

5.14. 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.

5.15. As there have been no recent noise complaints associated with the STF, 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.

5.16. 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 YW'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: CHP	Residential / Ecological	Airborne	The equipment is containerised in a high performance acoustically treated enclosure and designed for external applications. The door is kept closed at all times, except for maintenance. Plant is located a significant distance from receptors. Plant is located such that surrounding structures provide some acoustic screening of noise sources. 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.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: CHP Exhaust	Residential / Ecological	Airborne	Enclosure mounted exhaust silencer. Plant is located a significant distance from receptors. 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.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: Fans on air cooled radiators	Residential / Ecological	Airborne	Fans subject to regular checks and maintenance. Plant is located such that surrounding structures provide some acoustic screening of noise sources. Plant is located a significant distance from receptors. Good maintenance of plant to ensure that excessive noise levels are not generated from equipment breakdown or wear and tear (e.g. fan motor bearing failure), under Operations & Maintenance contract.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: Digesters (Gas Mix Compressors)	Residential	Airborne	Good maintenance of plant to ensure that excessive noise levels are not generated. 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.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: Mixing Pumps	Residential	Airborne	Good maintenance of plant to ensure that excessive noise levels are not generated Plant is located a significant distance from receptors and located such that surrounding structures provide some acoustic screening of noise sources.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low
Noise: Vehicular movements around site	Residential / Ecological	Airborne	Vehicles will be partially screened from receptors by buildings/structures and topography. Deliveries would take place during the daytime hours only when background sound levels are higher.	Unlikely - The risk management actions will prevent significant impact at nearest receptors	Mild – Minor nuisance impacts	Low

Appendix 10 Odour Management Plan

Woodhouse Mill Sludge Treatment Facility Odour Management Plan

December 2023

YorkshireWater

Stantec

Document Control

Document Control Ref:	Version 2
Document Location:	IMS > Level 3 Site Specific Manuals > Energy & recycling Assets > Woodhouse Mill
Document Custodian:	IMS Team
Review Period:	This OMP will be updated following completion of the abatement review as detailed in the proposed improvement programme. It will then be reviewed every year, and in the event of operational changes or persistent odour events or complaints.

Document Revision History

Version	Date	Revised By	Reviewed By	Amendment Details
1	Sept 2021	Antony Saunders (Stantec)	Ed Sutherland	Version 1
2	Dec 2023	Antony Saunders (Stantec)	Hazel Morgan	Version 2

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Client address	Western House Halifax Road Bradford West Yorkshire BD6 2SZ

Document details

Document title	Woodhouse Mill Sludge Treatment Facility Odour Management Plan
Document version	V2
Report author	Antony Saunders
Report reviewed by	
Report approved by	
Report by	Stantec Stantec House Kelburn Court Birchwood Warrington WA3 6UT

Contents

1 Introduction

This Odour Management Plan (OMP) for Woodhouse Mill sludge treatment facility (STF) has been developed by Stantec on behalf of Yorkshire Water Services Ltd (YW). YW have developed this OMP as a live working document that forms part of the operational management system of the site. The OMP demonstrates how odours shall be managed and controlled to prevent odour impacts from activities during normal operation and also during abnormal events.

The OMP has been developed to meet the Environment Agency's (EA) H4 Odour Management Guidance.

The OMP has been prepared in support of permit variation for Woodhouse Mill STF.

These activities fall under Environmental Permit reference DP3092ZJ.

The OMP provides sufficient detail to allow operators and maintenance staff to understand clearly the operational procedures for both normal and abnormal conditions. It is intended to be used as a reference document by operational staff on a day-to-day basis. The OMP includes the following:

A description of the site and catchment, including sources of odour on the site, and location of sensitive receptors;
A brief history of received complaints and measures taken to date;
YW Operation and Management (O and M) procedures for the site, including good housekeeping measures to minimise odour generation and release;
The mitigation procedures which should be implemented when foreseeable situations that may compromise the ability to prevent and minimise odorous releases occur. These can include both breakdowns and external conditions such as extreme weather;
An Action Procedure for complaints;
An odour risk assessment identifying any odorous or potentially odorous areas of the works and immediate and longer-term actions required to eliminate odour complaints; and
The management and operator training requirements and records with respect to odour.

1.1 Yorkshire Water Odour Management

YW acknowledges that high levels of odour arising from wastewater and sludge treatment are not acceptable and that reasonable measures must be taken to minimise any inconvenience to the general public. YW does not operate under a single defined odour exposure standard. Each site is considered individually taking into account the relevant legislation and local authority's conditions. Site specific factors such as site history with regard to odour complaints, potential future encroachment by residential or business developments, and the presence of particularly odour sensitive receptors within the vicinity of the works / facility are also taken into consideration.

2 Site Information

2.1 Site Location

Woodhouse Mill STF is located within the boundary of the Woodhouse Mill Wastewater Treatment Works (WwTW). The site is located approximately 5 miles to the south-east of Sheffield city centre, South Yorkshire on the east bank of the River Rother. The site is primarily bordered by Orgreave Colliery works to the north (which has been closed since the 1980s) and residential and commercial areas in all other directions. The works location is highlighted in Figure 1.

Figure 1 Woodhouse Mill STF Site Location

2.2 Site Receptors

Woodhouse Mill STF is bordered to the north of the works by grassland and a closed quarry. To the east of the site is primarily residential and industrial receptors followed by a boundary of grassland. Towards the south-east and south of the works is a mixed area of commercial, industrial and residential receptors. Towards the south-west and west of the site, beyond an initial grassland boundary, is a larger residential area mixed with smaller commercial receptors.

Woodhouse Mill WwTW has received 27 odour complaints in the last 5 years. YW site operational staff have indicated that historic odour complaints have been related to the WwTW inlet works and not associated with sludge treatment activities.

A summary of the areas of interest and receptors local to the site are highlighted in Figures 2 – 4, complete with receptor description and sensitivity in Table 1.

Figure 2 Location of Sensitive Receptors (Residential)

Figure 3 Location of Sensitive Receptors (Commercial / Industrial)

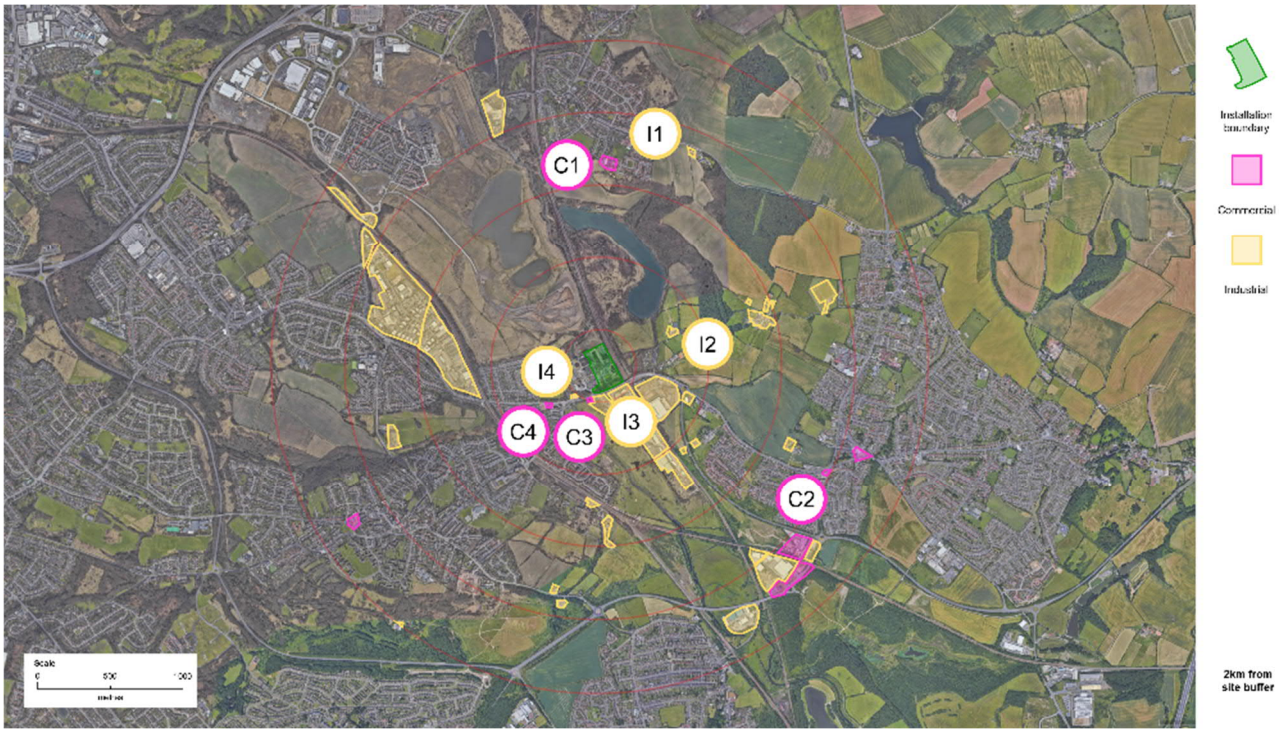


Figure 4 Location of Sensitive Receptors (Education / Healthcare / Leisure)

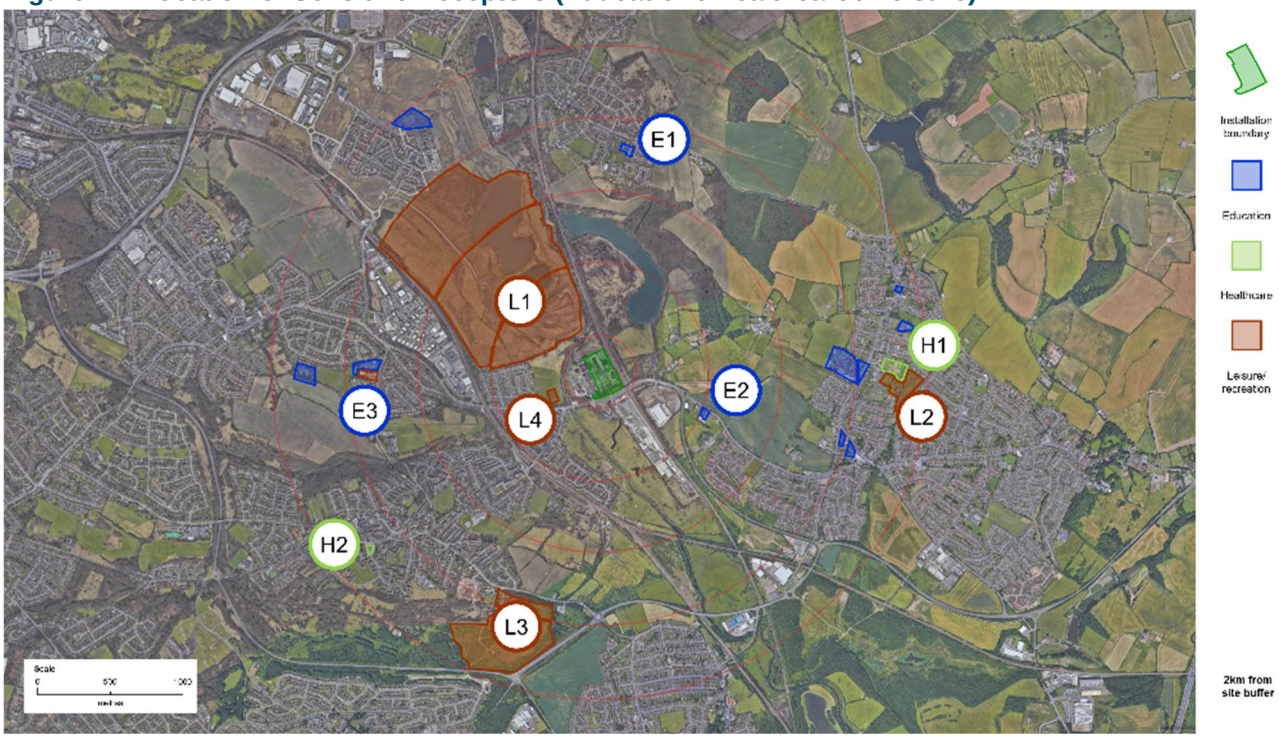


Table 1 Woodhouse Mill Receptor sensitivities

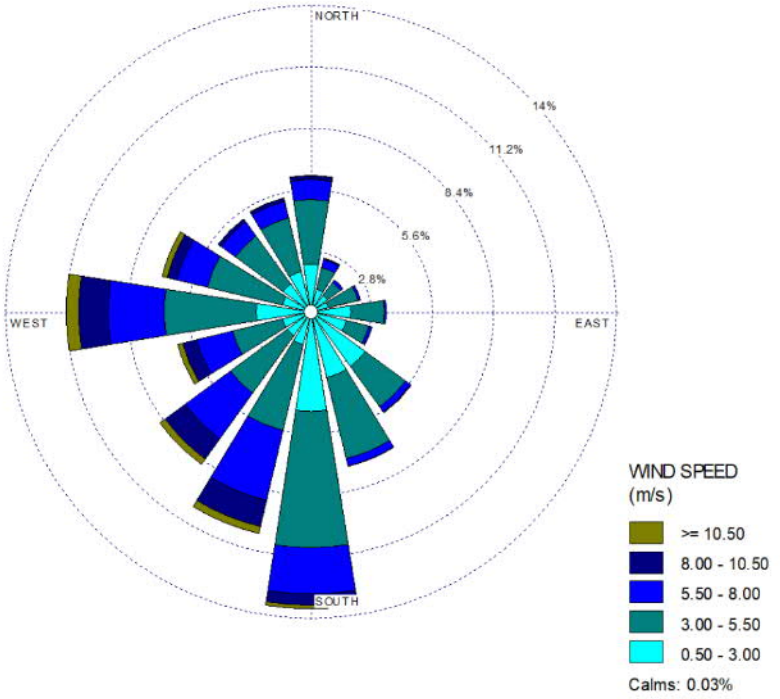
Receptor Name	Receptor Map Reference	Distance from Site (m)	Receptor Type	Receptor Sensitivity
Residential properties to north	R1	1,135	Residential	High
Residential properties to east	R2	115	Residential	High
Residential properties to south	R3	430	Residential	High
Residential properties to west	R4	105	Residential	High
Commercial businesses to north	C1	1,225	Commercial	Medium
Commercial businesses to east	C2	1,545	Commercial	Medium
Commercial businesses to south	C3	30	Commercial	Medium
Commercial businesses to west	C4	185	Commercial	Medium
Industry to north	I1	1,430	Industrial	Low
Industry to east	I2	445	Industrial	Low
Industry to south	I3	30	Industrial	Low
Industry to west	I4	0	Industrial	Low
Schools to the north	E1	1,285	Education	High
Schools to the east	E2	600	Education	High
Schools to the west	E3	1,325	Education	High
Leisure/recreation to the north	L1	200	Leisure/recreation	Medium
Leisure/recreation to the east	L2	1,775	Leisure/recreation	Medium
Leisure/recreation to the south	L3	1,460	Leisure/recreation	Medium
Leisure/recreation to the west	L4	85	Leisure/recreation	Medium
Healthcare to the east	H1	1,780	Healthcare	Medium
Healthcare to the west	H2	1,715	Healthcare	Medium

2.3 Meteorological Conditions

In the UK, the prevailing wind directions are commonly from the west and south-west. The wind direction and speed will impact the dispersion of odour emissions from site. There is currently no wind station on site to measure meteorological conditions.

Doncaster Sheffield airport meteorological station is 25km north-east of the site. There is also a meteorological station in Sheffield city centre, closer to the works. As both meteorological. stations are representative of the local area, Doncaster Sheffield airport has been selected for use due to a complete data set for use in odour assessments being captured at this location. The meteorological data from Doncaster Sheffield airport meteorological station has been incorporated into the site's odour risk assessment whereby wind direction and frequency are used to determine the "pathway effectiveness" from source to receptor. Wind direction and speed is also included as part of the on-site sniff testing (see Section 5.1 Sniff Testing). The wind rose plot for Doncaster Sheffield airport is included in Figure 5.

Figure 5 Doncaster Sheffield Airport Wind Rose Plot



2.4 Process Description

Woodhouse Mill STF treats indigenous sewage sludges arising from sewage treatment processes operated within the co-located Woodhouse Mill WwTW. Indigenous sludge is pumped via sub-surface pipework from the WwTW to the two thickener feed tanks (2 no. 1,427 m^3 steel tanks with GRP roofs) where sludge is blended and mixed; the tanks operate in fill / draw mode with 24 hour changeover. Headspace air from these tanks is routed to an Odour Control Unit (OCU) (see further detail below).

Sewage sludges are also imported from smaller YW sewage works to Woodhouse Mill WwTW where the sludges enter WwTW inlet. This import facility is outside of the scope of this application by virtue of materials passing wholly through the UWWT process.

As a contingency, there is the facility to receive imported sewage sludges generated by smaller YW sewage works (with lower capacity or capability for treating sludges on-site) directly to the STF; this import provision is therefore within the installation boundary. This material may be delivered to digester feed tank 2, although in practice this facility is very rarely used. In the event that this is required, liquid sludge is delivered by tanker with a maximum load of approximately 28 tonnes. Unloading is controlled using 'WaSP' loggers; valves on the discharge pipework will only open when a driver presents appropriate authentication to this system. The WaSP loggers record the source of the sludge, the time and date of delivery, the total volume discharged and average percentage dry solids of the load. Only appropriately authorised vehicles can discharge at the site. A macerator is located within the import delivery line to break up solid materials in the imported sludge.

Sludge from the thickener feed tanks is then transferred to the thickener building via a dedicated pipeline serving each of three thickening streams. Within the thickener building, liquid polymer is first diluted with potable water, then mixed with final treated effluent as a carrier and introduced to the sludge via in-line injection. After injection of polymer, the sludge passes through a shear valve to break up large pieces of sludge before transfer into a flocculation tank. The flocculation tank gives time for the sludge and polymer to mix prior to entry into one of the three drum thickeners. Two drums normally provide sufficient thickening capacity with the third drum providing back up capacity. The polymer encourages separation of water and sludge as the thickened sludge is rotated in the drum to remove excess liquid. These liquors are transferred to the 'top water and return liquors' sump located within a building at the northern end of the site prior to transfer to the WwTW for full treatment.

The drum thickeners are equipped with spray bars which provide continual self-cleaning, and manual cleaning is also undertaken periodically using a power washer; both systems utilise potable water.

The liquid polymer tanker delivery point and liquid polymer IBC delivery point are located in the roadway outside the thickener building; polymer is pumped from here to a 10 m^3 bunded bulk storage tank located within the thickener building. Located above the same concrete sump bund as the bulk storage tank is the 2 m^3 capacity polymer solution storage tank containing the diluted polymer solution.

Odour extracted from each of the three drum thickener units is discharged to atmosphere after treatment in the OCU.

The thickened sludge is transferred to the digester feed tanks, one of which has a capacity of 250 m^3 and the other 554 m^3. These tanks are mixed and covered, with headspace air routed to the OCU. Thickened mixed sludges are then pumped from the digester feed tanks to the anaerobic digesters (2 no. 1,733 m^3 concrete tanks). The anaerobic digesters operate as a continuous process with sludge being added and treated sludge extracted. The digesters have a typical feed rate of around 218 m^3/day per digester; the maximum feed rate is 260m^3/day giving a 12-day retention time as required by Hazard Analysis and Critical Control Points (HACCP) controls. The digesters are mixed by gas mixing systems, which utilise biogas from the headspace of each digester; the gas is compressed and then reintroduced using an array of mixing nozzles on the floor of the digester.

A hot water circuit provides heating to ensure optimum conditions for digester microbial activity. Potable water is heated to around 70°C by the CHP or boiler. This hot water then heats the digester using tube-in-tube, counter-current heat exchangers. Sludge in the digesters is continually recirculated around the heat exchangers using 2 no. (duty/standby) recirculation pumps per digester. A 3-way modulating valve on the water side moderates the amount of hot water that passes into the heat exchanger, depending on the heat demand of the digesters.

Grit build up within digesters is a normal feature of operation; the digesters are cleaned out (including accumulated grit) every 10 years as part of the planned periodic inspection which also includes an internal and external inspection of tank integrity and replacement of instrumentation and gas mixing equipment as required.

An automatic anti-foam dosing system is in place to control digester foaming. This system uses a radar level probe in the digester headspace and compares this to the pressure level sensor at the bottom of the digester to determine the depth of foam. Upon detection of foam, final treated effluent is sprayed into the digester head space through nozzles in the digester roof. If this is not effective in breaking up the foam, a chemical anti-foam is mixed with final treated effluent and dosed into the headspace of the digester via the same spray nozzles. This system includes operator-adjustable dosing setpoints and failsafe systems; if the foam level continues to increase mixing systems are inhibited and if this continues the digester feed will be inhibited. Antifoam is stored in 1m^3 IBCs.

Biogas generated by the digestion process is collected within the digesters (approximately 200 m^3 capacity in the headspace of each digester) and/or piped to the biogas holder (300m^3 capacity). The biogas holder provides gas buffering capability in order to allow for fluctuations in gas production.

Excess liquids within the biogas are removed via three condensate traps on the biogas system. These are located within a condensate chamber adjacent to the biogas holder and treat biogas in each of the pipelines leading to the biogas holder, the flare and the CHP/Boiler. The collected condensate liquid is transferred to Woodhouse Mill WwTW for treatment.

Pressure relief valves are located on the roofs of the digesters (2 no. at each digester), and on the inlet to the biogas holder. These valves are an essential safety mechanism and will release gas to atmosphere in the emergency event of a build of pressure preventing damage to equipment e.g. the gas holder. The valves are also an ‘anti-vacuum’ design to prevent tank damage from negative pressures.

Biogas, via a gas booster, is used as the sole fuel source for the site CHPs. The CHP facility comprises two reciprocating engine generator sets. Each engine has a thermal input of approximately 610kW and generates electricity which is used to power essential site processes. Heat from the combustion process is used to maintain the required temperature in the anaerobic digesters, with any excess being discharged using air cooled radiators. The CHPs typically operate in parallel.

Each CHP set is located within its own dedicated housing with engine combustion products discharged via separate 6m high (approximately) stacks located on the roof of each CHP unit.

A single boiler is available for use as an alternative heat source for the digesters. The boiler can be fired by either biogas or natural gas and has a thermal input of approximately 620 kW. In normal operations boiler use is limited as heat recovery from the CHP engines meets the digester heat demand.

In periods where the CHP engines and boiler are unavailable, biogas is directed to the waste gas burner. This burner, although a purpose built closed flare system installed in 2004, is not capable of achieving a minimum of 1,000°C with 0.3 seconds retention time at this temperature. The flare facility is located at a safe distance from the digesters and other biogas handling and treatment activities. Flare stack operation is automated based on gas level within the biogas holder. If the gas level is high then the flare will operate, however utilisation of the gas is preferred over flaring.

The areas around the digesters and gas storage are classified as a potentially explosive atmosphere, with strict provisions on the control of potential ignition sources in line with requirements of the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).

Digested sludge is gravity fed from the digesters to the adjacent dewater feed tanks (1 steel open topped tank with capacity of 500m^3 and 2 steel open topped tanks with capacity of 606m^3). These tanks are mixed to prevent settlement and to inhibit generation of methane.

Powdered polymer stored in 750kg bags are dispensed via a hopper dosing system which feeds a make-up tank where the powdered polymer is mixed with potable water and transferred to a storage tank. The polymer solution is injected into the sludge stream and taken to one of two centrifuges where the sludge coagulates and supernatant liquor is removed by centrifugal forces. Dewatered liquor is transferred to the top water and return liquors sump located within a building at the northern end of the site prior to transfer to the WwTW for full treatment.

The final digested and dewatered sludge cake is transferred via conveyers from the centrifuges up over a push-wall and onto the cake pad, prior to be moved by mechanical loaders into storage rows. The whole area under the conveyer and adjacent sludge cake pad is an engineered impermeable surface, with water runoff run off collected in drains running along the centre and perimeter of the pad. There is no lime addition at Woodhouse Mill; instead, cake is stored in piles according to age and is left to mature for a minimum of six weeks in accordance with HACCP (Hazard Analysis Critical Control Points) requirements.

Once on the cake pad, sludge cake is moved by mechanical loaders into storage rows. There is no lime addition at Woodhouse Mill STF; instead, cake is stored in piles according to age and is left to mature for a minimum of six weeks in accordance with HACCP requirements. Approximately 2,000 tonnes sludge cake will normally be held on site at any one time. However, the maximum storage capacity of the cake pad is significantly greater than this, up to 25,000 tonnes; greater volumes may be stored on site in emergency/abnormal conditions such as following processing problems at other YW sites or in extreme weather conditions when landspreading operations are temporarily paused. Once maturation is complete, sludge cake is removed from site and landspread in accordance with legislative requirements. Samples of digested, matured cake are taken every 3 months, or whenever a Critical Control Point (CCP) is not within specification, and analysed for metals and pathogens to ensure HACCP standards are being met.

The cake pad also serves certain contingency functions, for both operations at Woodhouse Mill and to wider strategic regional sewage infrastructure operated by YW. The cake pad may, under exceptional circumstances (such as the failure of assets or non-availability of normal disposal routes on a temporary basis) be used for the interim storage of treated or untreated, thickened or dewatered sludge on the cake pad, where that sludge originates from another YW site (or from Woodhouse Mill operations), before that material then undergoes AD treatment in the STF at Woodhouse Mill. It is recognised that such operations are abnormal and would require initiation of site contingency operating procedures, with the intention of minimising any potential short term adverse environmental effects and returning to normal operations as soon as practicable.

There is a ‘top water and return liquors’ sump located within a building at the north part of the site that collects liquors from the drum thickeners, centrifuges and sludge cake pad bays prior to be transferred onto the WwTW for full treatment.

There is one odour control unit on site that treats odorous emissions from the STF. The OCU consists of a two stage biofilter and activated carbon unit extracting and treating odorous air from the:

- Thickener feed tanks;
- Drum thickeners;
- Digester feed tanks.

The process flow diagram for the site is highlighted in Figure 6. The location of site sources are included in Figure 7.

Figure 6 Woodhouse Mill STF Process Flow Diagram

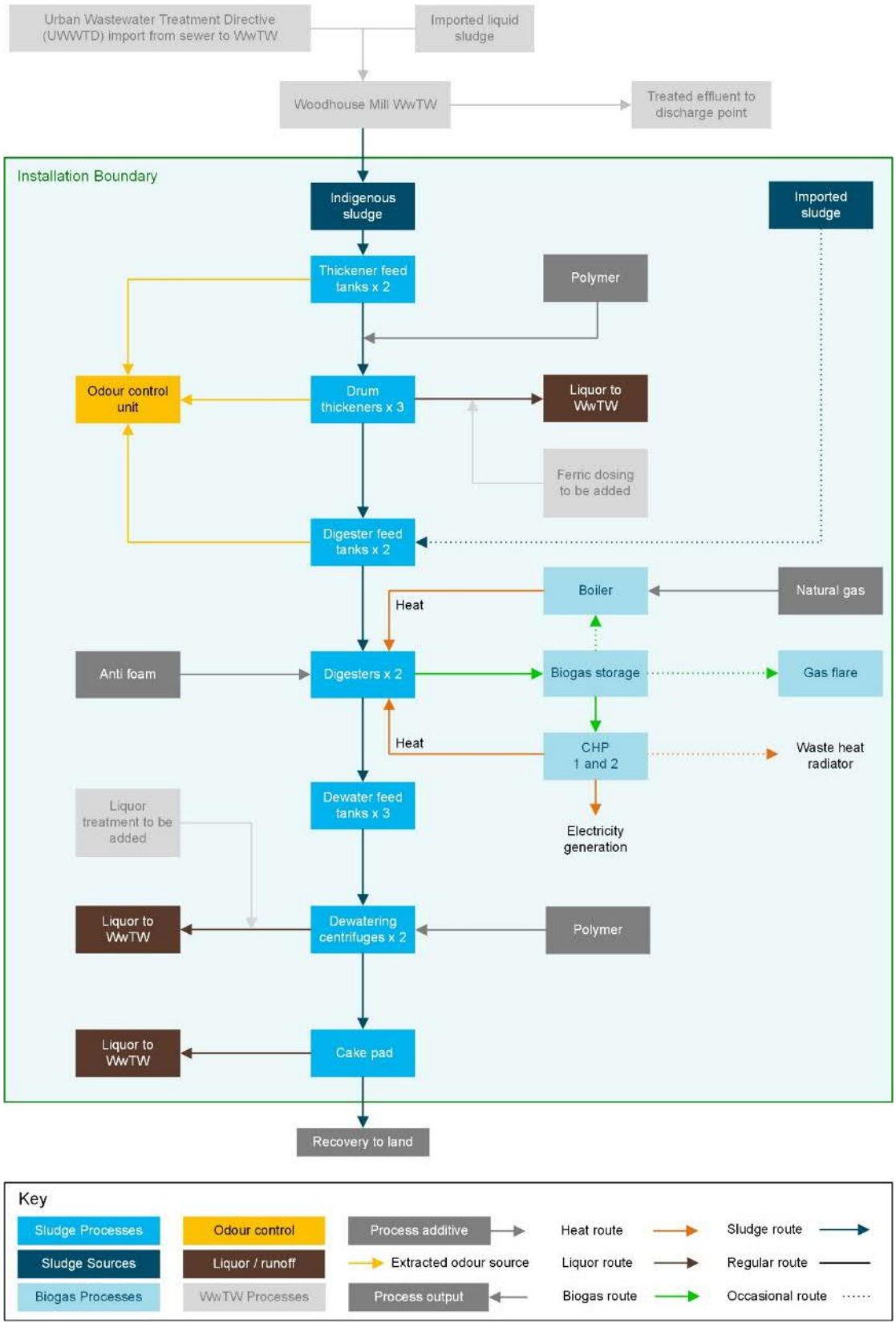


Figure 7 Woodhouse Mill STF Source Location

Type of waste accepted at Woodhouse Mill STF are provided in the environmental permit..

2.5 Process Odour Sources

The odour potential of a source can be broken down into three key considerations:

- How inherently odorous the compounds present are.
- The unpleasantness of the odour.
- The magnitude of the odour release.

When trying to determine the offensiveness of an odour source, site-specific odour sampling should be considered in the first instance. In the absence of source odour emission data, the assessment criteria will consider the Environment Agency's Horizontal Guidance Note (H4). H4 looks to categorise how offensive odours are with sources/processes/activities that are considered 'most offensive' odours include septic effluent or sludge and biological landfill odours. All raw sludge treatment processes would be considered to have a high odour offensiveness unless source-specific odour sampling is undertaken demonstrating a low level of odorous compounds. Processes containing the below material are considered to represent a high odour offensiveness:

- Indigenous sludge
- Sludge imports (liquid and solid)
- Sludge liquors

Processes containing the below material are considered to represent a medium odour offensiveness:

- Rags and screenings
- Digested sludge
- Digested sludge liquors
- Digested sludge cake (stored)

No processes on an STF are considered to store material that represents a low odour offensiveness unless supported by source-specific odour sampling.

The unpleasantness of an odour can be used in defining the source odour offensiveness. This is typically achieved through source material hedonic tone assessments, however; these types of assessments are not typically available for a site without source-specific sampling.

The risk source odour potential critical risk scoring for odour offensiveness and mitigation / control adopted is summarised in Table 4.

Table 2 Source Odour Potential Risk Scoring

Source	Risk Rating		
	High	Medium	Low
Odour Offensiveness	Very odorous compounds (H2S, Mercaptans) with low odour threshold. Unpleasant odour - "Most Offensive". Unpleasant hedonic tone. Large, permitted process / Surface Area.	Compounds involved are moderately odorous. Unpleasantness - process classed in H4 as "Moderately Offensive" or where odours have neutral or slightly unpleasant hedonic tone. Smaller permitted process / Surface Area.	Compounds involved are only mildly offensive. Unpleasantness - process classed in H4 as "Less Offensive". Neutral to positive hedonic tone.
Mitigation / Control	Open air operation with no containment. Reliance solely on good management techniques and best practice.	Some mitigation measures in place but significant residual odour remains.	Effective mitigation measures in place (e.g. BAT, BPM) leading to little or no residual odour.

Table 5 displays the site sludge odour sources, with an inventory of material, quality, and storage capacity, and goes on to explore the odour offensiveness and emission risk. The location of each odour source (asset ID) is shown on Figure 7 above.

Table 3 Woodhouse Mill STF Sludge Inventory of odorous materials

Source	Asset ID	Sludge Type	Storage capacity (m^3)	Average retention time	Frequency of Operation	Odour Description	Hedonic Tone	Odour Offensiveness	Mitigation measures	Emission Release type	Emission Risk
2 No. Thickener Feed Tanks	1	Indigenous, Imports	2 x 1,427 m^3	2 days	Continuous	Septic sludge, sulphide	Unpleasant	High	Covered and extracted to OCU	Abnormal – fugitive only as off-gases ducted to OCU in normal operation	Low
3 No. Drum Thickeners	2	Indigenous, Imports	N/A	N/A	Intermittent Daily	Septic sludge, sulphide	Unpleasant	High	Thickeners covered and extracted to OCU	Abnormal – fugitive only as off-gases ducted to OCU in normal operation	Low
Top Water and Returns Liquors Sump	3	Liquors	N/A	0	Intermittent Daily	Septic sludge, sulphide	Unpleasant	High	Open to atmosphere	Diffuse	High
2 No. Digester Feed Tanks	4	Indigenous, Imports	1x 250m^3 1 x 554m^3	2 days	Continuous	Septic sludge, sulphide	Unpleasant	High	Covered and extracted to OCU	Abnormal – fugitive only as off-gases ducted to OCU in normal operation	Low
2 No. Digesters	5	Indigenous, Imports	2 x 1,733m^3	14 days	Continuous	Biogas, Methane/ sulphide	Unpleasant	High	Covered and extracted to biogas storage Full containment of biogas is a critical safety consideration	Abnormal – fugitive only as biogas is collected for use on site.	Low

Source	Asset ID	Sludge Type	Storage capacity (m^3)	Average retention time	Frequency of Operation	Odour Description	Hedonic Tone	Odour Offensiveness	Mitigation measures	Emission Release type	Emission Risk
Biogas Relief Valves	6	Digested Sludge	N/A	N/A	Emergency Operation	Biogas, Methane/ sulphide	Unpleasant	High	Critical process safety requirement. Operates only as required under abnormal process conditions	Point	Low
OCU stack	7	Treated gases	N/A	N/A	Continuous	Treated off gases	Neutral	Low	Enclosed system with 2-stage treatment	Point	Low
Biogas Holder	8	Biogas	1x 300m^3	2 days	Continuous	Biogas	Unpleasant	High	Enclosed vessel. Full containment of biogas is a critical safety consideration	Abnormal – fugitive only as biogas is collected for use on site.	Low
Flare	9	Combusted biogas	N/A	N/A	Emergency Operation	Combustion	Mildly Unpleasant	Low	Biogas is combusted	Point	Low
3 No. Dewatering Feed Tanks	10	Digested	1 x 500m^3 2 x 606m^3	4 days	Continuous	Digested sludge / Earthy	Neutral	Medium	Open to atmosphere	Diffuse	High
2 No. Centrifuges	11	Digested	N/A	N/A	Intermittent Daily	Digested sludge / Earthy	Neutral	Medium	Covered and within a building	Diffuse	Medium
Cake Pad	12	Digested	25,000 tonnes	up to 45 days	Continuous	Digested sludge / Earthy	Neutral	Medium	Open to atmosphere	Diffuse	High

2.6 Odour Control Units

There is one odour control unit on site that treat odorous emissions from the STF. The odour control system is summarised as:

- Two stage biofilter and activated carbon unit extracting and treating odorous air from the thickener feed tanks, drum thickeners, and digester feed tanks.

The key process performance parameters for the OCU are highlighted in Table 6 below. OCU emissions monitoring is provided in Section 5.1 and OCU performance checklist is provided in Appendix 3:

Table 4 Woodhouse Mill OCU Performance Parameters

Parameter	Biological Filter	Carbon Filter
Media Type	Pumice / Shell	Activated Carbon
Media Volume (m^3)	33 m^3	7 m^3
Media Life (Yrs)	Variable – replace media once saturated	1 year approximately depending on inlet loading
Inlet Parameters*		
Airflow (m^3/hr)	4,296 m^3/hr	
Measured Odour Concentration (ou_E/m^3)	23,567**	
Measured Hydrogen Sulphide (ppm)	1.6***	
Measured Ammonia (ppm)****	<0.1	
Stack Outlet*		
Stack Height	Approx. 4 m	
Stack Efflux Velocity (m/s)	12.0	
Measured Odour Concentration (ou_E/m^3)	56**	
Measured Hydrogen Sulphide (ppm)	0.004***	
Measured Ammonia (ppm)****	<0.1	

* As measured during odour sampling August 2021
**Direct air samples were collected by lung method in accordance with BS EN 13725:2003
*** Sampling methodology using Jerome Hydrogen Sulphide analyser
**** Sampling methodology using gas detection tubes

3 Odour Critical Plant Operation

3.1 Odour Critical Sources

Given the control measures that are in place during operation of the facility, these contributions (if any) are unlikely to increase the odour impact on the receptors outside of the site boundary.

Management of releases includes reducing turbulence, containment and abatement. Where odorous gasses are finally released, design of the extraction system and dispersion stack can influence dilution and dispersion of odours before there is an impact on people. Potential onsite odour releases associated with Woodhouse Mill STF are given in Table 7 below.

Table 5 Woodhouse Mill STF Odour Critical Sources (operational controls)

Asset	Asset ID	Potential Odour Source	Odour Control Measures	Odour Risk	Mitigation Trigger	Mitigation Measures	Timescale	Responsible Person
2 No. Thickener Feed Tanks	1	Indigenous, Imports	Tank covered and odour controlled. Inspection hatches kept closed. Sludge is mixed and regular throughput is maintained	Unlikely given control measures in place	Failure of OCU extraction fans & increase in complaint frequency / odour sniff test identifies sludge odours off-site.	Dose sludge with odour control chemical	Within 5 working days of incident	Product and Process Engineer
3 No. Drum Thickeners	2	Indigenous, Imports	Sludge thickeners are enclosed, and air extracted to OCU. Building doors are kept closed, except when access is required.	Unlikely given the control measures in place	Failure of OCU extraction fans & increase in complaint frequency / odour sniff test identifies sludge odours off-site.	Dose sludge with odour control chemical	Within 5 working days of incident	Product and Process Engineer
Top Water and Returns Liquors Sump	3	Liquors	Risk assessment and odour plan in place before cleaning of any tank.	Unlikely given control measures in place	Increase in complaint frequency / odour sniff test identifies digested sludge odours off-site.	Dose sludge with odour control chemical	Within 5 working days of incident	Product and Process Engineer
2 No. Digester Feed Tanks	4	Indigenous, Imports	Tank covered and odour controlled. Inspection hatches kept closed. Sludge is mixed and regular throughput is maintained	Unlikely given control measures in place	Failure of OCU extraction fans & increase in complaint frequency / odour sniff test identifies sludge odours off-site.	Dose sludge with odour control chemical	Within 5 working days of incident	Product and Process Engineer
2 No. Digesters	5	Liquid sludge / biogas	Tank is covered and biogas extracted. Risk assessment and odour plan in place before cleaning of any tank.	Unlikely given control measures in place	Loss of digester performance (see Table 12 for monitoring parameters)	Investigate digester performance and schedule reactive maintenance.	Same day as incident	Product and Process Engineer
Biogas Relief Valves	6	Biogas	Planned maintenance on equipment.	Unlikely given the control	Prolonged / frequent use of safety valve.	Failures are investigated and reactive	Same day as incident	Product and Process Engineer

Asset	Asset ID	Potential Odour Source	Odour Control Measures	Odour Risk	Mitigation Trigger	Mitigation Measures	Timescale	Responsible Person
			Monitoring of digester pressures. Flare available to burn excess gas.	measures in place. Critical safety system.		maintenance undertaken.		
OCU stack (mechanical extraction)	7	Treated gases	Duty / Standby extraction fan to be available. Prevent increase of fugitive emissions risk from covered processes.	Unlikely given control measures in place	Standby Fan Failure	Standby extraction fan to be in service. Investigate cause of limited extraction.	Support from OCU supplier to be arranged next availability	Product and Process Engineer
OCU stack (treatability)	7	Liquid Sludge	2-stage process to prevent early exhaustion of carbon media. OCU performance is monitored.	Unlikely given control measures in place emissions from OCU outlet	0.5 ppm Hydrogen Sulphide at outlet	Performance monitoring of OCU. Investigate cause of reduced performance	Support from OCU supplier to be arranged next availability	Product and Process Engineer
Biogas Holder	8	Biogas	Planned maintenance on equipment. Monitoring of digester pressures. Flare available to burn excess gas.	Unlikely given the control measures in place. Critical safety system.	Prolonged / frequent use of safety valves.	Failures are investigated and reactive maintenance undertaken.	Same day as incident	Product and Process Engineer
Flare	9	Combusted biogas	Planned maintenance on equipment.	Unlikely given the control measures in place. Critical safety system.	Prolonged / frequent use of flare.	Failures are investigated and reactive	Same day as incident	Product and Process Engineer
3 No. Dewater Feed Tanks	10	Digested	Risk assessment and odour plan in place before cleaning of any tank.	Unlikely given control measures in place	Increase in complaint frequency / odour sniff test identifies digested sludge odours off-site.	Review the digester performance	Immediately	Product and Process Manager /

Asset	Asset ID	Potential Odour Source	Odour Control Measures	Odour Risk	Mitigation Trigger	Mitigation Measures	Timescale	Responsible Person
								Process Engineer
2 No. Centrifuges	11	Sludge cake	Centrifuges are contained asset	Unlikely given control measures in place	Increase in complaint frequency / odour sniff test identifies sludge cake storage odours off-site.	Check digester performance.	Same week as incident	Product and Process Engineer
Sludge Cake Storage Pad	12	Sludge cake	Cake to be handled by the loader only twice (once to move from conveyor to pad, and once to load into the export wagon) to minimise disturbance and odour release.	Unlikely given control measures in place	Increase in complaint frequency / odour sniff test identifies sludge cake storage odours off-site.	Restrict process and reduce storage volumes.	Same week as incident	Centrifuge unit operator
						Ensure cake is removed from site for disposal at the earliest opportunity.	Arrange for compliant cake to be removed from site same week	Centrifuge unit operator
						Root cause analysis and resolution.	Immediately	Product and Process Engineer
Sludge Cake Export	12	Sludge cake	Cover the wagon before leaving site.	Unlikely given control measures in place	Wagon uncovered when leaving site	Ensure wagon is covered before leaving site	Immediately	Centrifuge unit operator

3.2 OCU Performance Investigation

OCUs installed on site shall be monitored and maintained by site operations and the product and process engineer. Whereby there is an issue with an OCU's operability or treatability that cannot be resolved by site operations, a 3rd party specialist shall be engaged as a priority to arrange for support. In the event that the 3rd party specialist cannot directly mobilise to site, the product and process engineer shall manage the OCU's operation to reduce the risk of compromised performance.

The 3rd party specialist shall be commissioned to undertake an asset condition and performance assessment. The assessment shall include as a minimum the tasks outlined in Appendix 3 but shall be extended to any additional tasks to include the highlighted issues by operations.

As part of the assessment, the 3rd party specialist with support from YW operational staff shall work to resolve any issues to ensure the OCU is returned to normal operating conditions. Any issues that cannot be resolved on the day or requires additional parts shall be raised as an action to be manged by the produce and process engineer.

At the end of the asset condition and performance assessment the 3rd party specialist shall provide a summary report that documents findings and associated actions / recommendations to return the OCU to normal operating conditions.

3.3 Protocol for Dosing Odour Control Chemical

In the event that there is failure of process mitigation measures that could lead to increased risk of elevated odours, chemical can be dosed directly into the sludge to mitigate this risk.

4 Odour Impact

4.1 Odour Dispersion Model

An odour dispersion model has not been developed for Woodhouse Mill STF as part of this OMP due to the infrequency of historic odour complaints associated with the WwTW / STF and perceived low risk of potential odour impact.

Odour dispersion modelling including site specific olfactometric surveys shall be undertaken in the event of increased frequency of odour complaints or operational changes with a perceived increase in odour impact risk.

Any odour sampling shall be undertaken in accordance with 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).

4.2 Odour Survey Results

Table 6 An odour survey has been undertaken on selected processes as part of the qualitative odour risk assessment. The odour survey was undertaken during August 2021 to assess the odour emissions from the uncovered and treated emission source. Table 8 includes a summary of the survey results. Woodhouse Mill STF Odour Survey Results

Source	Odour Concentration	Odour Emission Rate	Hydrogen Sulphide	Ammonia
	(ou_E/m^3)	($ou_E/m^2/s$)	(ppm)	(ppm)
Fresh Digested Cake	89	0.9	0.002	7.0
Sorted Digested Cake	50	0.5	0.002	1.5
Dewatering Feed Tanks	86	0.9	0.002	2.25
STF OCU Inlet	23,567	N/A	1.9	< 0.1
STF OCU Mid-Point	488	N/A	0.020	< 0.1
STF OCU Outlet	56	N/A	< 0.001	< 0.1

A site-specific odour survey local to the STF was undertaken which included boundary monitoring and sniff tests around key locations on site. As part of the odour survey, hydrogen sulphide was identified above the recognition concentration threshold of 0.0047 ppm around Centrifuges and Dewatering Feed Tanks located in the east and south parts of the site. However, the survey identified that the hydrogen sulphite concentrations are diluted when they reach the site boundary. The odour survey also identified that the majority of samples was “no odour” or “faint”. Only 2 samples around the Dewatering Feed Tanks and cake pad were associated with a “distinct” which has been attributed to odour from the centrifuge discharges, located in the east and south-east part of the works. However, no odour was subjectively noted at or close to downwind boundaries.

The results of the boundary monitoring and sniff tests indicate that it is unlikely that the STF odours have an adverse effect on surrounding sensitive receptors.

4.3 Qualitative Odour Risk Assessment

A qualitative odour risk assessment of Woodhouse Mill STF has been undertaken by Stantec to determine the odour impact risk at sensitive receptors local to the works. The assessment relies on subjective professional judgement but uses the generic guidance methodologies provided and referenced in documents such as the Institute of Air Quality Managements (IAQM) Guidance on the Assessment of Odour for Planning, the Scottish Environmental Protection Agency (SEPA) Odour Guidance 2010, the Environment Agency's Horizontal Guidance Note H1 Environmental Risk Assessments for Permits, and Annex A of H1 – Amenity & accident risk from installations and waste activities.

These guidelines use the Source-Pathway-Receptor concept in which it evaluates the relationship between source(s) of odour, the pathway or transmission route by which exposure may occur at a given receptor(s) who may be affected/impacted.

How well a qualitative odour risk assessment predicts the odour impact for a scenario is dependent on how well the Source-Pathway-Receptor approach can be assessed and scored. This type of assessment is based on subjective judgement and therefore, robust assessment criteria are required. Where subjective judgement for a criterion could be considered broad, sub-criteria have been determined to provide a more detailed judgement.

The odour offensiveness of the have adopted the risk ratings included in Table 3. The pathway from source to receptor considers the distance, local terrain and meteorological conditions, as highlighted in Section 2.3.

The sensitive receptors considered in the assessment are documented in Figure 8 and Table 9.

Figure 8 Woodhouse Mill STF Odour Risk Assessment Sensitive Receptor Locations

Table 7 Woodhouse Mill STF Odour Risk Assessment Sensitive Receptors

Receptor Name	Receptor ID	Receptor Type	Distance to Site (m)	Receptor Sensitivity
Ashtree Stables	D01	Recreational (Stables)	495	Low
Falconer Lane	D02	Residential	245	High
Stones Acres	D03	Commercial & Residential	420	High
The Hollows Kennels and Cattery	D04	Commercial & Residential	220	High
Mediplan Limited	D05	Commercial	490	Medium
Aston Fence Junior & Infant School	D06	Educational (School)	625	High
Innovation Way Industrial Estate	D07	Industrial	300	Low
JELD-WEN	D08	Industrial	75	Low
Princess Royal Hotel	D09	Hotel	50	High
Top Hand Car Wash	D10	Commercial (Car Wash)	120	Medium
Retford Road	D11	Residential	210	High
Furnace Road	D12	Commercial & Residential	185	High
Londis Woodhouse Mill Petrol Station	D13	Commercial (Petrol Station)	270	Medium
Residential areas off Retford Road	D14	Residential	420	High

4.4 Results

The results of the qualitative odour risk assessment are summarised in Table 8.

Table 8 Woodhouse Mill STF Odour Risk Assessment Results

Receptor ID	Receptor Type	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
D01	Recreational (Stables)	Medium	Ineffective Pathway	Negligible Risk	Low	Negligible Effect
D02	Residential	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
D03	Commercial & Residential	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
D04	Commercial & Residential	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect

Receptor ID	Receptor Type	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
D05	Commercial	Medium	Moderately Effective Pathway	Low Risk	Medium	Negligible Effect
D06	Educational (School)	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
D07	Industrial	Medium	Moderately Effective Pathway	Low Risk	Low	Negligible Effect
D08	Industrial	Medium	Moderately Effective Pathway	Low Risk	Low	Negligible Effect
D09	Hotel	Medium	Highly Effective Pathway	Medium Risk	High	Moderate Adverse Effect
D10	Commercial (Car Wash)	Medium	Moderately Effective Pathway	Low Risk	Medium	Negligible Effect
D11	Residential	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
D12	Commercial & Residential	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect
D13	Commercial (Petrol Station)	Medium	Moderately Effective Pathway	Low Risk	Medium	Negligible Effect
D14	Residential	Medium	Moderately Effective Pathway	Low Risk	High	Slight Adverse Effect

The qualitative odour risk assessment for Woodhouse Mill STF has indicated that only one considered sensitive receptor is exposed to a moderate adverse odour effect with the remaining thirteen receptors, including the residential areas to the south-west, east and west, exposed to either a slight adverse or negligible adverse odour effect. The receptor that is potentially exposed to a moderately adverse odour effect is located adjacent to the works south boundary. The moderately adverse odour effect is attributed to the high pathway risk due to the close distance to the site boundary and being in a high wind frequency direction.

Woodhouse Mill WwTW has received odour complaints over the past 5 years. YW site operational staff have indicated that historic odour complaints have been related to the WwTW inlet works and not associated with sludge treatment activities. From the complaints log, these are reported to be from receptors located in the west, south and south-east of the site. The odour complaints are relatively infrequent (27 complaints over the past 5 years) and reported sporadically throughout the year, which suggest that are likely to be attributed to ad-hoc events and are not associated with normal operation.

For the overall site, taking into consideration the findings of the odour survey and the odour risk assessment, it is considered than Woodhouse Mill STF does not have an adverse odour effect on its surrounding receptors. As such, no additional odour mitigation is required above the existing measures already observed on site.

4.5 BAT Conclusions

BAT Conclusion 14 describes specific measures which may be appropriate for the prevention or reduction of diffuse emissions to air. BAT Section 14d is associated with the "containment, collection and treatment of diffuse emissions" and includes techniques such as:

- Storing, treating, and handling waste and materials that may generate diffuse emissions in enclosed buildings and/or enclosed equipment (e.g., conveyor belts);
- Maintaining the enclosed equipment or buildings under adequate negative pressure;
- Collecting and directing emissions to an appropriate abatement system via an air extraction system and/or air suction systems close to the emission sources.

In terms of the applicability of this technique it is noted that: "The use of enclosed equipment or buildings may be restricted by safety considerations such as the risk of explosion or oxygen depletion. The use of enclosed equipment or buildings may also be constrained by the volume of waste."

An assessment of STF processes carried out at Woodhouse Mill has been undertaken against BAT 14d. Table 9 provides a summary of compliance for site odour sources.

Table 9 BAT Compliance / Alternative Techniques

Source	Source ID	BAT Compliance Review	Alternative Techniques	Compliance Restrictions
Thickener feed tanks	1	Tank is covered and headspace air is extracted and treated in an OCU.	N/A	N/A
Drum thickeners	2	Thickener units are enclosed and located within a building. Air from thickener units is extracted and treated in OCU.	N/A	N/A
Top Water and Return Liquors Sump	3	Sump located within a building.	Small source footprint. Sump is located within a building which is not regularly accessed and doors are kept closed. No sensitive receptors in close proximity. Adequate measures considered to be in operation.	N/A
Digester feed tanks	4	Tank is covered and headspace air is extracted and treated in an OCU.	N/A	N/A
Digesters	5	Tank is covered and biogas captured and utilised. LDAR in place.	N/A	N/A
Biogas relief valve	6	N/A – emergency use only	N/A	N/A

Source	Source ID	BAT Compliance Review	Alternative Techniques	Compliance Restrictions
Odour Control Unit	7	The OCU is working effectively and will be managed and monitored in accordance with this OMP.	N/A	N/A
Biogas holder	8	Biogas is fully contained. LDAR in place.	N/A	N/A
Flare	9	Used only as required. Biogas is combusted.	N/A	N/A
Dewatering Feed Tanks	10	Tank open to atmosphere with no containment or treatment of emissions.	Tank contains digested sludge only which is inherently less odorous. No sensitive receptors in close proximity. YW commits to improvements – refer to proposed improvement programme for further details.	N/A
Dewatering Centrifuges	11	Centrifuges, although of a proprietary enclosed design, do not facilitate creating a negative pressure environment.	Source is enclosed and small footprint. Area subject to regular inspection and management, source not considered to contribute to off-site odour nuisance potential. No sensitive receptors in close proximity. Adequate measures considered to be in operation.	None
Cake Pad	12	Cake Pad open to atmosphere with no containment or treatment of emissions.	Odour management techniques in use rather than specific BAT containment measures. Digested sludge only, which is inherently less odorous, during normal operating conditions. Adequate measures considered to be in operation, as supported by odour measurements and impact assessment.	The use of enclosed equipment or buildings is constrained by the volume of cake stored.

Of the sources on site only the dewatering feed tanks and cake pad and do not adopt the specific conclusions outlined in BAT 14d. Further abatement of emissions from the cake pad is constrained by the volume of waste stored (refer to BAT 14d), however YW commits to improvements to reduce diffuse emissions to air from the dewatering feed tanks.

The centrifuges and the top water and return liquor sump would be considered to be partially compliant due to being contained processes. Whilst these processes are only partially compliant, they occupy a small source footprint and are not likely to contribute to significant odour emissions or impact on surrounding receptors. Therefore, no further mitigation is proposed in respect of these sources.

Given the lack / infrequency of odour complaints, as long as the site adheres to this odour management plan and limits activities such as cake double handling, the risk of odour impact from the STF is limited and does not require any additional mitigation measures. It would be considered that a review of mitigation measures may be warranted if the complaint frequency increases and was attributed to STF emissions, or if there was a process change and significant increase in odour emissions.

As part of the odour survey, the odour control unit was assessed to be achieving a high level of performance with a stack outlet odour concentration below the BAT-AEL of 1,000 ou_E/m^3.

5 Monitoring and Control of Odours

All monitoring should clearly relate to the assessment of odour control and complete records must be kept in an auditable format. The only way to determine whether the processes on site are under control, and to keep them under control, is to do appropriate monitoring.

As far as possible, Woodhouse Mill STF is operated to minimise odour generation and release. As long as the treatment process satisfies the normal design criteria, odour should be minimal. To minimise odour nuisance, it is important to ensure that Woodhouse Mill STF is operating at its optimum. Covers and hatches should always be replaced to maintain the integrity of enclosures provided to collect odorous air.

5.1 Sniff Testing

Sniff testing is recognised by Yorkshire Water as a useful technique to build up a picture of the impact the odour has on the surrounding environment over time. Sniff testing shall be used to support profiling site odour impact, investigate odour complaints and to introduce temporary odour mitigation measures.

Sniff testing shall be undertaken on site on a weekly basis by site operational staff. It is accepted that operational staff may not be ideal for sniff testing of site odours as they have adapted to odours from the site. However, this will provide a baseline for routine observations. The weekly operator sniff tests shall assess the site boundary and focus on the detection of any odours that could potentially be leaving site.

Monthly sniff tests shall be carried out by non-site-based staff (Technically Competent Manager) who are not adapted to site odours. The monthly sniff test shall be carried out at additional test locations local to source to profile the location of any fugitive emission sources. For Woodhouse Mill STF, due to a lack of odour complaints and the majority of assets having odour mitigation, the routine sniff-testing shall be site based only.

In the event of odour complaints being received, site operators shall undertake a sniff test including off-site sniff testing local to the complaint location(s). In the occurrence of a significant odour event or repeated complaints, a third-party shall be engaged for an additional odour investigation including on and off-site sniff testing.

A third-party odour sniff test is scheduled to be undertaken twice a year for comparison with Yorkshire Water (operator and monthly tester) observations. The third-party sniff test shall include both on and off-site locations based on surrounding sensitive receptors and complaint locations. The off-site locations shall be reviewed prior to any third-party testing to ensure any recent changes to sensitive receptors are considered.

The location of weekly and monthly on-site sniff testing locations has been included in Figures 9 and 10, respectively. Routine off-site locations have not been included due to a lack of odour contacts. In the event that odour complaint frequency increase, off-site locations shall be incorporated into the routine sniff testing.

Figure 9 Woodhouse Mill STF Weekly On-Site Sniff Testing Locations

Figure 10 Woodhouse Mill STF Monthly On-Site Sniff Testing Locations

5.2 Channelled Emissions

The odour control unit outlet emissions shall be monitored once every six months for H_2S and NH_3. The sampling shall be undertaken by a third-party Assessor. OCU performance shall be monitored in accordance with the OCU performance checklist provided in Appendix 3.

5.3 Imports/Exports

The Site Operating Procedures include instructions on how sludge must be imported. The YW Safe Loading & Discharging of Sludge Road Tankers is available in Appendix 6. Tankers shall be filled and emptied in a way that minimises odour discharge.

5.4 Sludge Treatment and Disposal

Raw or co-settled sludges always smell objectionable, but the odour becomes stronger during storage, as anaerobic decomposition occurs, leading to high concentrations of malodorous compounds in sludges and sludge liquors. Digested sludges are less odorous, particularly after they have cooled. To minimise the generation of odours, where possible, fresh sludge shall be processed and sent to digestion as quickly as possible before further treatment and removal from site. Raw sludges stored upstream of digestion would never be stored for more than 2 days in normal plant operation.

5.5 Sludge Thickening and Storage

Accumulation of sludge in the system can cause increased odour release in storage tanks, as well as from sludges and liquors when thickening takes place. To minimise odours from the Woodhouse Mill STF, the works should be operated as follows:

- Minimise retention prior to thickening, dewatering or digestion;
- Prevention of sludge accumulation in off-line tanks; and
- Proactive identification of potential problems and tankering of sludges to other sites with odour abatement.

5.6 Anaerobic Digestion

The digestion process breaks down a wide range of odorous compounds, which may be released if care is not taken to avoid turbulence of the sludge after digestion. Odour problems may be caused by:

- Saline intrusion (or industrial wastes) leading to elevated sulphate concentrations of raw sludge, giving a greater sulphide potential;
- Emissions of biogas resulting in significant odour problems; and
- Incomplete digestion leading to odour release from secondary digestion tanks.

Suggested remedial measures include:

- Check seals and valves to prevent the release of biogas;
- Ensure gas handling system is balanced and that pressure relief valves do not operate prematurely;
- Ensure all excess gas is flared and that flare stack ignition is immediate and reliable;
- Addition of iron salts or other chemicals to precipitate or inhibit the formation of sulphide.

There are odour checklists for both YW Operators and Team Leaders in Appendix 2.

5.7 Site Operation and Management Procedures

All operating practices should be compliant with the site O&M manuals. The Integrated Management System (IMS) developed by YW to cover Environmental, Health & Safety and Quality elements of all aspects of YW activities will also apply.

The IMS identifies the environmental aspects and impacts of all YW plants, including the facility at Woodhouse Mill. The facility will operate under the IMS which shall include:

- Quality management procedures for operational aspects, for example: preventative electrical and mechanical maintenance, safe working procedures, accident / incident response and emergencies;
- Specialist contractors shall be employed by YW to undertake any non-routine or specialised maintenance tasks;
- Use of only YW approved contractors. YW maintain an approved contractors list which is used for appointment of all YW contractors. This requires contractors to achieve a high level of environmental competence / performance. YWS Framework Contractors are required to operate an EMS in accordance with ISO 14001;
- Preparation/issue of risk assessments and method statements by all contractors before starting work. These risk assessments and method statements will include consideration of odour and measures in place to control odour releases. These are prepared as part of the 'hand - over' and 'hand – back' certificate or 'permit to work'; and
- Regular environmental and quality audits to be carried out. These shall include a review of potential odour and identify any additional control measures which may be required.

5.7.1 Procedures for Operation Plant

All operating practices should be compliant with the site O&M manuals, YW company practice and the OMP.

5.7.2 Routine Inspection and Recording

Visual inspection of facility processes will be carried out on regular basis as part of staff duties. In addition, regular checks of the OCU performance as described in Appendix 3 shall be carried out. If abnormal odour is witnessed, YW staff shall record details in the Odour Log Spreadsheet of the observation and immediately investigate. During any such recording carried out as part of this OMP, it is important to document any potential contribution from other off-site sources of potential odour nuisance located outside of the facility boundary. An odour monitoring record sheet to be used in the event of site odours is included in Appendix 4.

5.7.3 Maintenance by Engineering Reliability Staff

Engineering Reliability staff (Mechanical Fitters, Electricians and ICA Technicians) carry out routine maintenance of plant and equipment. There is also proactive maintenance of the OCU. This includes odour abatement equipment.

Routine maintenance requirements are included within YW's Work Management System (WMS) task lists for the site and are forwarded to members of this team via their Toughbook. Feedback on planned maintenance carried out is recorded in WMS by the Engineering Reliability staff member via their Toughbook and transferred to SAP for storage.

5.7.4 Reporting Faults and Identifying Maintenance Needs

For faults requiring immediate attention, the Product and Process Engineer raises a SAP notification and calls it through to the Scheduling & Planning Team. If it meets a high priority according to the Risk Assessment Matrix (RAM), it will be attended as a scheduling buster for the relevant YW Engineer to attend site.

For less urgent faults the Product and Process Engineer raises a SAP notification. It will be converted into a SAP job and picked up by the Scheduling & Planning Team and progressed accordingly. If at any time the situation changes, and the job becomes more urgent, the Product and Process Engineer (PPE) would re-prioritise the SAP job in line with the RAM and call through to the Scheduling & Planning Team.

Routine maintenance requirements are fed to YW's maintenance team via SAP.

5.7.5 Replenishing Chemicals / Consumables

The OCU performs an important function for the overall control of odour across the site. When consumables in the OCU need to be replenished they are ordered via YW's ordering system. An order is set up for each chemical and stocks are replenished via a one-off Order. Delivery notes must be kept in a folder on site.

5.7.6 Initiating OCU Media Replacement

Before 12 months of operation carbon samples from the OCUs are manually taken on a given schedule in the Operator's task list and sent for laboratory analysis to determine the lifespan of the media. Once at around 70% spent an order is raised for replacement of the media.

5.8 Changing Dispersion Conditions

Site activities that could lead to increased site emissions will be avoided when there are poor dispersion conditions or during sensitive periods (hot days, when people are more around). If not possible to be avoided, additional monitoring in the form of sniff testing and monitoring of site performance shall be undertaken. In the event that site activities are resulting in increased off-site odours or customer complaints, the activity shall be rescheduled / undertaken during low-risk times / weather conditions.

Table 10 Woodhouse Mill STF Changing Dispersion Risk

Asset	Changing Dispersion Condition	Mitigation Trigger	Mitigation Action	Time scale	Responsible Person
Screening skip	Hot days, school holidays (summer)	Temperature - >26°C and significant odour complaints	Increase frequency of skip export from site	Forecast in advance – 5-day weather forecast	Product and Process Engineer
Sludge cake export	Hot days, school holidays (summer)	Temperature - >26°C and significant odour complaints	Cake export between 8am to 6pm only	Forecast in advance – 5-day weather forecast	Product and Process Engineer

6 Emergency and Incident Response

This section addresses the issue of appropriate response to odour incidents caused by process failure or equipment breakdown. These emergency procedures include the:

- Foreseeable situation that may compromise the ability to prevent and minimise odorous releases from the process;
- Actions to be taken to minimise the impact; and
- Person responsible for initiating the action.

Where abnormally high odour levels are observed – indicating odour pollution a PPE will be required to take appropriate contingency measures. These measures should include:

- Investigating the odour incident and its cause(s);
- Bringing the process back under control; and
- Minimising exposure or annoyance effects.

Table 13 below summarises incident / emergency control measures in place. The YW odour emergency contact details for Woodhouse Mill STF are available in Appendix 1.

Table 11 Woodhouse Mill STF Incident/Emergency Control Measures

Failure/Abnormal Situation	Potential Odour Source	Potential Impact	Mitigation Measures	Actions to be Taken	Timescale for Rectification	Responsible Person
Failure of the odour control unit	Untreated air	High – OCUs provide treatment for odorous air from the Permitted site. Failure of OCU would result in release of abnormal operational fugitive odours direct to atmosphere	Routine maintenance. Regular monitoring of equipment performance. Duty standby functionality. Standby capacity in the media beds.	For plant failure - investigate and repair.	Site operator to investigate on same working day. Support from OCU supplier to be arranged for next availability	Product and Process Engineer
Liquid sludge spillage	Liquid sludge	Medium – low volume spillage likely to go directly to drain which returns to the WwTW for treatment.	Pipework and tanks undergo regular inspections. Planned maintenance on equipment	Stop source of spill and immediately wash down area	Immediate	Tanker Driver
				Arrange repair	Job to be raised and promoted on same working day or next	Product and Process Engineer
				Record spillage and actions taken in site diary	Same day as incident	Product and Process Engineer
High pressure conditions in digesters	Release from Pressure Relief Valve	Medium - Biogas would be vented at high pressure to aid dispersion	Gas pressure is regulated and monitored	Diversion of biogas to Waste Gas Burner	Immediate	Product and Process Engineer
				Investigated likely sources of high pressure in the digester and resolve (i.e. blocked outlet)	Immediate	Product and Process Engineer
Loss of biogas containment	Leaks from gas holder membrane	Medium	Double gas holder membrane system with gas pressure between the membranes	Diversion of biogas to CHP plant or waste gas burner.	Immediate	Product and Process Engineer

Failure/Abnormal Situation	Potential Odour Source	Potential Impact	Mitigation Measures	Actions to be Taken	Timescale for Rectification	Responsible Person
			regulated and monitored. Methane detectors operated with alarms to alert operators of any leakage between membranes.	Inspection maintenance and repairs of gas holder as appropriate		
				Record details and Actions taken in site diary	Immediate	Product and Process Engineer
Staff unavailability	Risk of increase to site odours due to limited operational resources	Low	Staff replacement	Operator replacement from another site Remote monitoring from Control Room / off-site / another site	Same day / For next working day	Product and Process Engineer / Site Manager
Asset Fire	Risk of increase to site odours due to limited access and inability to operate assets	Medium	Regular inspection and planned maintenance	Remote monitoring from Control Room / off-site / another site	Immediate	Product and Process Engineer
Very high rainfall	Flooding	Low	Increased monitoring of media and sludge storage	Check the performance of the OCU when water levels drop and replace media as required (if media has been flooded it may need replacing)	Site operator to investigate on same working day. Support from OCU supplier to be arranged for next availability	Product and Process Engineer

7 Inspection/Monitoring/Maintenance Schedules and Records

7.1 Inspection/Monitoring/Maintenance Schedules for Odour Abatement Equipment

A list of routine monitoring and maintenance tasks for the odour control units is included in Appendix 2. Reference should also be made to the OCU O&M manuals as applicable.

Proactive maintenance tasks are included within SAP task lists for each site and are forwarded to the PPE via their Toughbook for completion.

Monitoring results from the inlet and outlet of the odour control units will be recorded as appropriate. Refer to Appendix 3 monitoring schedule.

Feedback on maintenance of odour abatement equipment and pipework is recorded in SAP by the PPE via their Toughbook. YW maintenance staff also provide feedback on work carried out by them.

A review of the OCU plant effectiveness, including measurement of inlet and outlet process and emissions parameters. Any improvements required will be identified and timescales for implementation proposed. This odour management plan will be updated with details of this planned improvement work.

7.2 Key Process Monitoring

Records of site deliveries for the odour control system are stored on site.

The site is operated under a full PLC SCADA control with data logging and interrogation of key parameters to maintain safe, efficient, and low emissions operation. Table 12 includes the key process monitoring provisions for processes associated with emissions to air.

Table 12 Key Process Monitoring Provisions

Emission point / description	Parameter	Monitoring approach	Monitoring frequency
Occasional sludge intake direct to STF (not currently in normal use)	Intake volume	SCADA	Continuous during unloading operations
	% dry solids	SCADA	Continuous during unloading operations
CHP (A1, A2)	Operating hours	SCADA	Continuous data logging
	Electricity generated	SCADA	Continuous data logging
	Load required / actual (%)	SCADA	Continuous data logging
	Biogas flow / pressure to CHP	SCADA	Continuous data logging
	Heat circuit temperatures (deg. C)	SCADA	Continuous data logging
Boilers (A3)	Load required / actual (%)	SCADA	Continuous data logging
	Biogas / natural gas flow / pressure to boiler	SCADA	Continuous data logging
	Heat circuit temperatures (deg. C)	SCADA	Continuous data logging
	Heat circuit flow	SCADA	Continuous data logging
Flare compound (A4)	Biogas to flare (m^3)	SCADA	Continuous data logging
	Run hours	SCADA	Continuous data logging
Odour control unit stack (A5)	Operational status	SCADA	Indication
Biogas storage	Gas level (%)	SCADA	Continuous data logging
	Gas pressure (mb)	SCADA	Continuous data logging
	Methane %	SCADA	Continuous data logging
Digesters	Volume	SCADA	Continuous data logging
	Volatile Fatty Acids (VFAs)	Manual	Periodic
	Alkalinity	Manual	Periodic
	Process temperature	SCADA	Continuous data logging
	% solids (intake)	SCADA	Continuous data logging
	Retention (hours)	SCADA	Continuous data logging
	Temperature	SCADA	Continuous data logging
	H_2S (ppm)	SCADA	Continuous data logging
	Foam level	SCADA	Continuous data logging
Centrifuges	Dry solids (%)	SCADA	Continuous data logging
	Flow	SCADA	Continuous data logging

8 Customer Communications

8.1 External Complaints

External odour complaints are received by Loop, which is the external company YW uses for all customer contacts. The call handler will work with the caller to understand the source of the issue. They will explore where the caller experienced the odour, whether it is a repeat or a singular issue, when and where it's most noticeable, what site the odour may be coming from, a description of the smell and if it's the first time it's been noticed. Loop record all complaints on the ICE system and contact the appropriate site owner, via the YW Control Room, to manage the complaint. The complaint will be passed to the Site Manager within 30 minutes or next working day if out of hours. The issue will be dealt with as a matter of priority. ICE is a computer program used to record and manage customer contact. The complainant may or may not request feedback of the cause and resolution of the issue. The odour contact form is included in Appendix 8.

When a complaint has been received, Site will undertake an investigation using the Site Checklist and record details of the investigation in the Odour Investigation Form (Appendix 9).

Odour complaints will be investigated at this site on the same working day (where practicable) and ideally within 2 working days of being aware of the issue. The investigation must not be carried out any later than 5 working days after being aware of the issue.

The Technical Optimiser should then put a note in the site diary and odour diary to record the complaint and inform the TCM and Site Manager of their findings.

Any actions will be resolved as a matter of priority. If immediate resolution of the odour issue can't be carried out, and where reasonably practicable, mitigation measures will be undertaken. Actions will be recorded on the investigation form. Feedback of the issue and the actions undertaken will be sent to the Customer Case Manager to communicate to the Complainant (if requested).

In the event of multiple complaints, and / or the potential for multiple complaints to occur, the Duty Manager will be informed and an incident response will be instigated.

8.2 Internal Complaints

If the PPE or any YW staff identify an abnormal odour release, the PPE will undertake an investigation using the Operator Site Checklist and complete any actions the investigation suggests. The PPE should then put a note in the site diary and the odour site dairy and inform the Technical Optimiser and Site Manager of their findings.

The odour complaint process is included in Appendix 7.

8.3 Community Engagement

Customers are at the heart of what we do at Yorkshire Water. In the event of an odour issue affecting multiple customers within the community, Yorkshire Water's communication team will decide the level of response that is required. This could include, but not be restricted to, stakeholder liaison (communication through local councillors, MPs and affected businesses), local media liaison and/or community meetings to discuss the issues and actions that will be undertaken to rectify the issue. Customer engagement events would be held if the odour severity dictated this level of response. Customers may be encouraged to keep an odour diary to record when odour is perceived to be a greater issue.

9 Training

9.1 Training Requirement

All staff receive training to cover operation of the site, assessment of odour and monitoring and maintenance of the OCU on the site. The training requirements for key staff at Woodhouse Mill STF are displayed in Table 15 below.

Table 13 Woodhouse Mill STF Training Requirements

Post	Training Requirement
Product and Process Site Manager	• Awareness of the responsibilities for avoiding odour nuisance. • Monitoring / maintenance of odour abatement equipment. • Odour control procedures during start-up / shut down. • Procedures for abnormal conditions. • Requirements of the OMP and Environmental Permit.
Product and Process Engineer / Operator	• Awareness of the responsibilities for avoiding odour nuisance. • Monitoring / maintenance of odour abatement equipment. • Odour control procedures during start-up / shut down. • Procedures for abnormal conditions. • Requirements of the OMP and Environmental Permit.
Sampler	• Awareness of responsibilities for avoiding odour nuisance and reporting. • Monitoring of odour abatement equipment.

9.2 Training Received

YW maintains processes to ensure that all those working for or on behalf of YW are suitably trained to fulfil their roles efficiently. Assessment of competence and identification of individual training needs is carried out through mutual discussion between the individual and their manager as part of the company performance management process, a fundamental part of which is the competency framework and progression plans which are available for every role in the organisation.

All YW employees receive IMS awareness training, delivered online at induction and periodically thereafter. This includes awareness of the environmental policy and understanding key environmental hazards and risks and the need to comply with IMS requirements.

Staff who work at the Woodhouse Mill STF receive specific training in the plant's operation and the potential environmental impact of the process as well as health and safety. Plant operators have a detailed understanding of the operational procedures for the site for both normal and abnormal operation. As part of the training, operators will receive specific instructions relating to those aspects of plant operation that have the potential for a negative impact on the environment. Toolbox talks are used to provide information and training to site staff, including information about environmental requirements/activities and legislative and compliance requirements. Training records for programmes and courses managed centrally are held on the company Learning Management System. Records for specific training managed locally at the Esholt site is held by individual managers and/or on the Leaning Management System.

Appendix 1 Emergency Contacts

Table 14 Woodhouse Mill STF Contacts

Area	Contact
Sheffield Council	0114 273 4567
Odour Abatement Systems Suppliers	ERG Odour Control
OCU Maintenance Provider	Greenacre Environmental Systems Limited
Woodhouse Mill STF Odour related Yorkshire Water Contacts	Site Manager: Mick Flanagan – 07790 617673 Site Optimiser: Matt Ashford – 07790 617970

Appendix 2 Odour Checklist

CHECKLIST FOR SITE ODOUR INVESTIGATION

AREA OF WORKS	POTENTIAL PROBLEM		FOLLOW UP ACTION REQUIRED
ODOUR MANAGEMENT PLAN (OMP)	· Does the site have an OMP?	YES / NO	
	· Is the site operated according to the OMP?	YES / NO	Inform Treatment Team Leader
SITE - GENERAL	· Are all covers in place?	YES / NO	Replace covers and close hatches as required
	· Are all access hatches closed?	YES / NO	
INLET WORKS	· Is the crude sewage black and / or smelly?	YES / NO	Inform Treatment Team Leader
Screening	· Are there any spilled screenings?	YES / NO	Clean up spills
	· Are the compacted screenings clean?	YES / NO	Inform Treatment Team Leader if screenings are not clean
Grit Removal	· Is there any spilled grit?	YES / NO	Clean up spills
	· Is the grit clean?	YES / NO	Inform Treatment Team Leader if grit is not clean
Screening and Grit Skips	· Do the screenings skips smell?	YES / NO	Inform Treatment Team Leader
	· Do the grit skips smell?	YES / NO	Inform Treatment Team Leader
	· Are the screenings skips too full?	YES / NO	Empty skips as needed
	· Are the grit skips too full?	YES / NO	Empty skips as needed
Storm Tanks	· Have the storm tanks been left full following a storm?	YES / NO	Empty and clean out tanks as needed
	· Is there any sludge left in the bottom of the tanks?	YES / NO	
PRIMARY TANKS	· Are the tanks black and / or smelly?	YES / NO	Inform Treatment Team Leader
	· Are the tanks gassing?	YES / NO	
	· Is there excess scum on the surface?	YES / NO	
BIOLOGICAL FILTRATION	· Are the aeration vents blocked?	YES / NO	Inform Treatment Team Leader
	· Is there any ponding?	YES / NO	
ACTIVATED SLUDGE	· Do the dissolved oxygen levels in the aeration lanes match the setpoint(s)?	YES / NO	Adjust dissolved oxygen levels as required
	· Do the MLSS fall within the tramlines for the site?	YES / NO	Increase / decrease RAS rate as needed
FINAL TANKS	· Are the tanks black and / or smelly?	YES / NO	Inform Treatment Team Leader
	· Are the tanks gassing?	YES / NO	
	· Is there excess scum on the surface	YES / NO	
TERTIARY TREATMENT	· Any there any site specific issues?	YES / NO	Inform Treatment Team Leader
SLUDGE TREATMENT	· Are there any sludge spills?	YES / NO	Clean up spills
Imports and Exports	· Does the tanker filling and emptying process cause significant release of odour?	YES / NO	Inform Treatment Team Leader
Sludge Thickening and Storage	· Are all covers are in place?	YES / NO	Replace covers and close hatches as required
	· Are all access hatches closed?	YES / NO	
	· Are the doors to sludge treatment buildings / sludge cake stores kept closed?	YES / NO	Close doors as required
Anaerobic Digestion	· Is all excess gas flared?	YES / NO	Inform Treatment Team Leader
	· Is flare stack ignition immediate and reliable?	YES / NO	
	· Are the whesso valves / PRVs operating prematurely?	YES / NO	
	· Are the seals on the condensate traps intact?	YES / NO	
ODOUR ABATEMENT	· Is there any detectable odour downwind of the stack?	YES / NO	Inform Treatment Team Leader
	· Is the fan(s) working?	YES / NO	Arrange for fan to be repaired
GENERAL	· Are there any outstanding actions from a previous investigation?	YES / NO	Complete actions

NAME: _____ **DATE:** _____

CHECKLIST FOR SITE ODOUR INVESTIGATION
PRODUCT + PROCESS OPTIMISER / TREATMENT TEAM LEADER

AREA OF WORKS	POTENTIAL PROBLEM		FOLLOW UP ACTION REQUIRED
ODOUR MANAGEMENT PLAN (OMP)	· Does the site have an OMP?	YES / NO	
	· If the site is not operated according to the OMP	YES / NO	Make changes to site operation to minimise odour production and release
SITE - GENERAL	· Are all covers in place?	YES / NO	Replace covers and close hatches as required
	· Are all access hatches closed?	YES / NO	
INLET WORKS	· If the crude sewage black and / or smelly	YES / NO	Check incoming sewage for septicity (in conjunction with Operations Support team) Contact Industrial Waste to check for potential septic discharges
Screening	· Are there any spilled screenings?	YES / NO	Clean up spills
	· If the compacted screenings are not clean	YES / NO	Optimise operation of screenings handling equipment
Grit Removal	· Is there any spilled grit?	YES / NO	Clean up spills
	· If the grit is not clean	YES / NO	Optimise operation of grit handling equipment
Screening and Grit Skips	· If the screenings skips smell	YES / NO	Check that screenings are clean and free from organic material; optimise screenings handling equipment if needed Empty skip(s)
	· If the grit skips smell	YES / NO	Check that grit is clean and free from organic material, optimise grit cleaning system if needed Empty skip(s)
	· Are the screenings skips too full?	YES / NO	Empty skips as needed
	· Are the grit skips too full?	YES / NO	Empty skips as needed
Storm Tanks	· Have the storm tanks been left full following a storm?	YES / NO	Empty and clean out tanks as needed
	· Is there any sludge left in the bottom of the tanks?	YES / NO	
PRIMARY TANKS	· If the tanks are black and / or smelly	YES / NO	Check inlet for septicity: Check levels of sludge in the tank and increase desludge rate if needed
	· OR If the tanks are gassing	YES / NO	
	· If there is excess scum on the surface	YES / NO	Remove excess scum
BIOLOGICAL FILTRATION	· If the aeration vents are blocked	YES / NO	Unblock aeration vents
	· If there is ponding	YES / NO	Consider increasing flushing rate and / or forking media
ACTIVATED SLUDGE	· Do the dissolved oxygen levels in the aeration lanes match the setpoint(s)?	YES / NO	Adjust dissolved oxygen levels as required
	· Do the MLSS fall within the tramlines for the site?	YES / NO	Increase / decrease RAS rate as needed
FINAL TANKS	· If the tanks are black and / or smelly	YES / NO	Check inlet of tanks for septicity: Check levels of sludge in the tank and increase desludge rate if needed
	· OR If the tanks are gassing	YES / NO	
	· If there is excess scum on the surface	YES / NO	Remove excess scum
TERTIARY TREATMENT	· If there are any site specific issues	YES / NO	Investigate and rectify
SLUDGE TREATMENT	· Are there any sludge spills?	YES / NO	Clean up spills
Imports and Exports	· If the tanker filling and emptying process causes significant release of odour	YES / NO	Investigate whether the process can be modified to reduce odour emissions Consider changing timing of tanker operations to reduce nuisance potential
Sludge Thickening and Storage	· Are all covers are in place?	YES / NO	Replace covers and close hatches as required
	· Are all access hatches closed?	YES / NO	
	· Are the doors to sludge treatment buildings / sludge cake stores kept closed?	YES / NO	Close doors as required
Anaerobic Digestion	· If all excess gas is not flared	YES / NO	Contact ER to investigate
	· If flare stack ignitionis not immediate and reliable	YES / NO	Contact ER to investigate
	· If the whesso valves / PRVs operate prematurely	YES / NO	Contact ER to investigate
	· If the seals on the condensate traps leak or are damaged	YES / NO	Contact ER to investigate
ODOUR ABATEMENT	· If there is any detectable odour downwind of the stack	YES / NO	Check OCU using additional checklist
	· Is the fan(s) working?	YES / NO	Arrange for fan to be repaired
GENERAL	· If there are any outstanding actions from a previous investigation	YES / NO	Complete actions

NAME: _____ **DATE:** _____

Appendix 3 OCU Performance Check List

Task	Frequency	Performance Indicators	Method	Actions to be Taken	Responsible Person
Odour Abatement Plant – Biofilter					
Gas flow rate	Continuous	+/- 15% design value (21,260 m^3/hr)	Gas flow meter / EN 16911-1 and MID for EN 16911-1	Odour abatement plant shall be regularly checked and maintained to ensure appropriate performance. Odour abatement plant shall be managed in accordance with permit conditions, the odour management plan and manufacturer's recommendations. Carbon filter(s) to be replaced in accordance with manufacturers recommendations. Equipment shall be regularly calibrated.	Operations
Temperature (inlet)	Daily	For information only	Temperature probe /Traceable to national standards		Operations
Thatching / compacting	Weekly	As per O&M	Back pressure		Operations
Hydrogen sulphide	Continuous	Max 172 ppm	Electrochemical monitor		Operations
pH (biofilter drainage effluent)	Continuous	pH 6 – 8	pH metre		Operations
Differential pressure	Continuous	+/- 15% design value (-224 Pa)	Recognised industry method		Operations
Check irrigation rates of biological OCU	As per O&M	As per O&M	Monitor flow on the unit.	Adjust wetting rate as required.	Operations
Check and clean the irrigation nozzles on the biological OCU	As per O&M	As per O&M	As per O&M	Clean as required	Operations
Efficiency assessment	Every 6 months	Hydrogen Sulphide – 98% removal rate	Media health, air-flow	Third party survey to assess performance of the OCU including	3rd Party Specialist

Task	Frequency	Performance Indicators	Method	Actions to be Taken	Responsible Person
		Ammonia – 90% removal rate Mercaptans – 95% removal rate Dimethyl Sulphide – 20% removal rate VOCs – 50% removal rate	distribution and emission removal efficiency (BS EN 13725 for odour removal)	contaminant removal rates, media health, channelling of media.	
Odour Abatement Plant – Carbon Filters					
Moisture / humidity	Daily	For information only	Moisture meter	Odour abatement plant shall be managed in accordance with permit conditions, the odour management plan and manufacturer's recommendations. Carbon filter(s) to be replaced in accordance with manufacturers recommendations. Equipment shall be regularly calibrated.	Operations
Differential pressure	Continuous	+/- 15% design value (-1,278 Pa)	Recognised industry method		Operations
Efficiency assessment	Annual	99% removal of contaminants	Emission removal efficiency (BS EN 13725 for odour removal)		3rd Party Specialist
Odour Abatement Plant – Outlet Stack					
Temperature	Continuous	For information only	Temperature probe /Traceable to national standards	N/A	Operations
Hydrogen sulphide	Continuous	0.5 ppm	Electrochemical monitor	Investigate OCU performance. Arrange third party specialist support. Replace OCU media	Operations
Hydrogen sulphide	Every 6 months or as agreed in writing by the	As per BAT 8 / BAT 34	CEN TS 13649 for sampling NIOSH 6013 for analysis	Action levels to be achieved in accordance with permit conditions and the odour management plan.	3rd Party Specialist

Task	Frequency	Performance Indicators	Method	Actions to be Taken	Responsible Person
	Environment Agency.				
Ammonia	Every 6 months or as agreed in writing by the Environment Agency.	As per BAT 8 / BAT 34 (0.3 – 20 mg/Nm^3)	EN ISO 21877	Action levels to be achieved in accordance with permit conditions and the odour management plan.	3rd Party Specialist
Containment and Extraction System					
Extraction fan visual inspection	Monthly	No damage / leakage/ signs of corrosion	Visual inspection	If fans are damaged raise a job with ER	Operations
Extraction fan noise	Monthly	Increase noise or vibration from the fan motor	Listen	If fan is in fault or running noisy raise a job with ER	Operations
Check fan drive belt condition and tension	Annually	As per O&M	As per O&M	Check / Repair. Raise a job with ER	Operations
Check fan motors	Annually	As per O&M	As per O&M	Check / Repair. Raise a job with ER	Operations
Check physical integrity of ducting	Monthly	No signs of degradation or other damage and no holes	Visual Inspection	Raise a job with ER	Operations
Check duct supports	Monthly	No damage or corrosion	Visual Inspection	Raise a job with ER	Operations
Process covers visual inspection	Monthly	Good cover integrity. No damage / gaps allowing for fugitive emission leakage.	Visual inspection	If process covers are damaged raise a job with ER	Operations

Appendix 4 Odour Monitoring Record Sheet

Odour Monitoring Record Sheet

Sheet No:

				METEROLOGICAL CONDITIONS							ODOUR[1]		SOURCE		SITE STATUS	CORRECTIVE ACTION	
Date	Location	Time	Staff Name	Weather Temp	General air quality	General air stability	Wind Strength	Wind Direction	Bar Pressure	cloud cover	Intensity 0-6	Offensiveness / Nature	Source within facility	External source	Facility Activities	Action required	Action implemented

[1] *Intensity: 0 No odour, 1 Very faint odour, 2 Faint odour, 3 Distinct odour, 4 Strong odour 5, Very strong odour, 6 Extremely strong odour

Appendix 5 Sniff Testing Record Sheet

Test by		Start Time	
Date		End Time	
Weather Condition		Temperature	
Wind Strength		Wind Direction	

Location No. / Name	Nearest Receptor Sensitivity	Intensity	What does it smell like?	Frequency of odour?	Is the source evident?	Other comments / observations
1. Site Entrance	Low / Medium / High	0 No odour 1 Very faint 2 Faint odour 3 Distinct odour 4 Strong odour 5 Very strong odour 6 Extremely strong odour.		Constant / Intermittent	Yes / No Source area / name to be provide. Might be that maintenance work if occurring and you can detect increased odours due to that activity, or call smell cake import wagon etc	Are there odours detected from other sources? Farm / Landfill / other industry etc
2. South-East Corner – Site Boundary						
3. North-East Corner – Site Boundary						

4. North-West Corner – Site Boundary						
5. Thickener Building						
6. Cake pad – East Boundary						
7. Dewatering Feed Tanks						

Appendix 6 Safe Loading and Discharge of Sludge Road Tankers

Occupational Health & Safety Management System

Safe Working Procedure SWP 007

Safe Loading & Discharging of Sludge Road Tankers

Document Control Ref:	SWP 007
Document Location:	OH&S Database / Safe Working Procedures
Document Custodian:	OH&S Department
Review Period:	5 Years

Revision History

Issue	Date	Reviewed By	Amendment Details
1	31/12/2013	D. Ross	New document
2	13/02/2015	D. Ross	Clauses 2.10, 2.21, 2.25, 3.3, 3.4, 3.5, 3.15
3	12/10/2016	S. Ross, C. Birkenshaw, M. Blanchard, J. Pell	Updated to reflect current practice
4	30/10/2018	J. Pell, M Blanchard	Updated gas monitor requirements & reviewed document

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Safe Loading & Discharging of Sludge Road Tankers

The following notes are for your guidance. For further information, or if in doubt, contact your line manager / Safety Advisor who will give further help or advice.

Minimum Number of Persons Required: 1	**Major Hazards:**
Essential Safety Equipment Required: • Personal gas monitor • Safety footwear • Hand protection • Hi-Vis jacket/vest • Eye protection • Head protection (hard hat) • Hearing protection • First aid kit (Include. Eyewash) • Task lighting	• Hydrogen sulphide • Slips, trips and falls • Manual Handling • Stored energy • Pressure systems • Noise • Falls from height
Training and/or Documentation required: • Please see Section 6 – Further Guidance.	

1. Introduction

1.1 Sludge tanker 'barrels' are classed as pressure vessels and are subject to annual examination by a competent person. Only fully trained YW personnel, or authorised persons who understand how all the controls pressure relief valves etc. function, may operate this equipment.

Note: Do not use pressure vessels that you are not familiar with or have not been trained on and seek advice and support.

1.2 Pressurised vessels are potentially hazardous under working conditions, and daily checks should be made of the satisfactory operation of safety critical devices such as the Pressure Relief Valve. Follow the detailed supplier's instructions regarding operator's daily checks.

1.3 Sewage and sewage sludge are substances that are potentially hazardous to health. Avoid skin contact, ingestion and inhalation of aerosols. Always wear your personal protective equipment and follow good hygiene practices.

1.4 Experience has shown that during the operation of a vacuum tanker, hydrogen sulphide can be vented from the tanker barrel. The use of suitable portable gas monitors is therefore a mandatory requirement at all times whilst on-site.

1.5 Avoid leaving pressure vessels containing sludge parked overnight. (Where this cannot be avoided ensure that the vessels are adequately vented by the means of leaving the vent valve open).

1.6 Follow designated traffic routes, one way systems etc. and comply with site speed restrictions.

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Safe Loading & Discharging of Sludge Road Tankers

Task

2. Loading the Tanker (Vacuum Transfer)

2.1 On arrival on site, check that your personal gas monitor is turned on – has been calibrated (in a clean air environment) - and is worn on your person at all times whilst on-site (near your breathing zone).

2.2 Complete a 360° check of the tanker/loading area. Consider the environment around you – hazard identification, wind direction, vehicle movements, people in close proximity to the vehicle e.g. operators/contractors etc. Ensure all inlet and outlet valves are closed and then open the vent breaker valve before removing the end-cap.

2.3 Where practicable attach sufficient 'vent bagging' to the compressor exhaust extension pipe to vent any hydrogen sulphide away from the work area to ensure a safe working area is provided. Also consider the positioning or repositioning of your vehicle to reduce the potential of H2S in the working zone.

Note: Ensure that any gases being vented away from the tanker are not creating additional hazards to other people or processes and are not likely to enter a confined space.

2.4 If loading from a hose already connected to sludge holding tank, check hose for weight kick and gently lift (hose may possibly still have liquid left in it). Never assume any hose is sound - check for splits and excessive wear. Also check that couplings are in good condition and the correct sealing ring is in place before using the tanker hose. If the tanker hose is found to have faults, the tanker hose must never be used and be disposed of correctly.

2.5 Connect the hose between the tanker inlet valve and the loading point. Check that all connections are correctly fitted and all air taps are closed.

Note: The use of gloves in couplings is an unacceptable practice – do not use to create a seal in the bauer coupling.

2.6 Ensure that the changeover valves are in the vacuum/suck position.

2.7 Open the travel valve (if not automatic where fitted).

2.8 Once connections to vehicle and sludge tanks are made and vehicle power take off (PTO) is engaged if applicable, the driver should carefully monitor the loading operation. This may be achieved by standing in a safe location outside of the vehicle, observing the loading procedure.

Note: Keep clear of the exhaust area when loading and venting the barrel.

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2.9 Yorkshire Water vehicles predominantly use a hydraulic pack. If using a donkey engine, do not engage the PTO as this will damage the hydraulic pack.

2.10 Start the vacuum pump and check that vacuum starts to develop.

2.11 Monitor the dial gauge to ensure the vacuum develops.

2.12 Open inlet valve on tanker.

2.13 If loading from sludge tank open outlet valve on loading point slowly.

2.14 Look and listen for air or product leaks.

2.15 On tankers fitted with sight glass, check isolation valves are open.

2.16 Feel the hose for sludge going through it and check the sight glass when loading for sludge rising in the barrel.

2.17 You may not always get a full load on the first attempt.

2.18 If this happens, vent the barrel and ensure the dump tank is empty and then re-start vacuum pump and check that vacuum starts to develop.

2.19 Monitor the dial gauge to ensure the vacuum develops.

2.20 When tanker is nearly full (sight glass and dial gauge) close the valve on sludge tank and then open the air release valve to enable the tanker hose to be emptied safely on completion of loading.
Note: Sight glasses should be clearly marked to the correct level for vehicle weight.

2.21 Close inlet valve on tanker.

2.22 Turn off vacuum pump and vent tank.

2.23 Disconnect tanker hose and put away in a safe place ensuring site is left in a clean and safe state.

2.24 Connect end cap and ensure relevant valves, such as vent valves, are closed before moving vehicle.

2.25 In addition to the vacuum loading of tankers, barrels may also be loaded by external pumping. Please refer to the pump loading safe working procedure.

2.26 Complete a 360° walk-around check of the vehicle, equipment and immediate work area.

Note: At sites where there are no fixed tanker points, sludge (or sewage), may have to be drawn directly from an asset which is not a sludge holding tank. Ensure that steps are taken to minimise risk by using the correct tools, considerations are made for working at height, avoid confined spaces and other hazards. If in any doubt about the safety of the operation, consult your line manager.

3 Discharging the Tanker (Pressure)

3.1 Yorkshire Water vehicles predominantly use a hydraulic pack. If using a donkey engine, do not engage the PTO as this will damage the hydraulic pack.

3.2 On arrival on site, check that your personal gas monitor is turned on – has been calibrated (in a clean air environment) - and is worn on your person at all times whilst on-site (near your breathing zone).

3.3 Complete a 360° check of the tanker/loading area. Consider the environment around you – hazard identification, wind direction, vehicle movements, people in close proximity to the vehicle e.g. operators/contractors etc. Ensure all inlet and outlet valves are closed and then open the vent breaker valve before removing the end-cap.

3.4 Open air tap on barrel before removing end cap.

3.5 If discharging from a tanker hose already connected to sludge holding tank, check hose for weight, kick and gently lift (it is possible that the hose may still have liquid left in it). Never assume any tanker hose is sound - check for splits and excessive wear. Also check that couplings are in good condition and the correct sealing ring is in place before using the hose.

3.6 Connect hose between the tanker outlet valve and the off-loading point. Check that all connections are correctly fitted and all air taps are closed.

Note 1: Ensure that tanker hoses are securely connected before operating the V5, rotork valves or manual valves at the off-loading point.

Note 2: The use of gloves in couplings is an unacceptable practice – do not use to create a seal in the bauer coupling.

3.7 Ensure that the discharge point rotork or manual operating valve is fully open before opening the tanker rear outlet valve.

3.8 Open the outlet valve on tanker.

3.9 Ensure that the changeover valves are in the pressure/blow position.

3.10 Open travel valve (if fitted and not automatic).

3.11 Start pump.

3.12 Monitor the Dial Gauge for pressure.

3.13 Feel the hose for sludge going through and where possible visually check the V5 machine or sight glass to make certain liquid is discharging (no blockages).

3.14 Where ever possible it's always better to turn the pump off before the last of the sludge is discharged as this helps to reduce odour, prevent the bagging from bouncing and H2S.

3.15 Be aware that when discharging under pressure the load can be "discharged" with significant force and sludge can spray over a wide area, especially in windy conditions.

3.16 If discharging to a level below the barrel outlet, the preferred method is by gravity as it is a safer but possibly slower operation. Ensure that you have left the pipe work clear of the product.

3.17 Close tanker outlet valve (and ensure any manual/rotork valves at the discharge point are left closed).

3.18 Turn off pump and vent tank in a suitable location to prevent H2S exposure to all parties.

3.19 Open air tap and release remaining air pressure within the tanker hose slowly.

3.20 Disconnect tanker hose and replace end cap.

3.21 Store the tanker hose in a safe place.

3.22 Clean out dump tank and clean up any spillages.

3.23 Ensure all valves are in the correct position. Connect end cap and ensure relevant valves, such as vent valves, are closed before moving vehicle.

3.24 Complete a 360° walk-around check of the vehicle, equipment and immediate work area.

4 Action in the Event of a Gas Monitor Alarm

4.1 The gas monitor is designed to alarm at any reading above 10 parts per million of hydrogen sulphide with a pre warning at 5ppm.

4.2 If an alarm is activated, the driver must immediately shut down the load/discharge operation and walk away from the vehicle. This will remove you from the immediate gas hazard as detected by the monitor.

4.4 Advise any person in the local area that there is hydrogen sulphide present and ask them to leave the area until you give the all clear.

4.5 Check your gas monitor – the reading will start to decrease as you move out of the gaseous atmosphere.

4.6 Periodically check the reading of the monitor, when the reading has dropped to a safe level and press the reset button on the monitor. Walk back towards the working area, checking gas levels.

4.7 If the alarm sounds again, repeat the above process.

4.8 Once the alarm indicates it is safe at the vehicle controls – re-start the load/unload process.

4.9 All gas monitor alarms over 10ppm must be reported as 'Near Misses'.

4.10 The alarm will indicate the presence of hydrogen sulphide and you must follow the SWP if the alarm sounds.

4.11 Multiple alarm activations may occur at a site during a load/unload. If this occurs for a prolonged period stop work at this site and seek immediate advice from your line manager.

4.12 Time Weighted Average alarm means that you should inform your line manager and stop working with sludge for the day when using a gas monitor.

5 Incident and Hazard Reporting

5.1 Report all Accidents to your line manager immediately and complete an accident report on Safeguard.

5.2 Report all Near Misses using the YW incident reporting system on Safeguard.

5.3 Report all Hazards using the YW Hazard Reporting System on Safeguard.

5.4 Report any vehicle defects promptly in accordance with the YW Fleet defect reporting procedures.

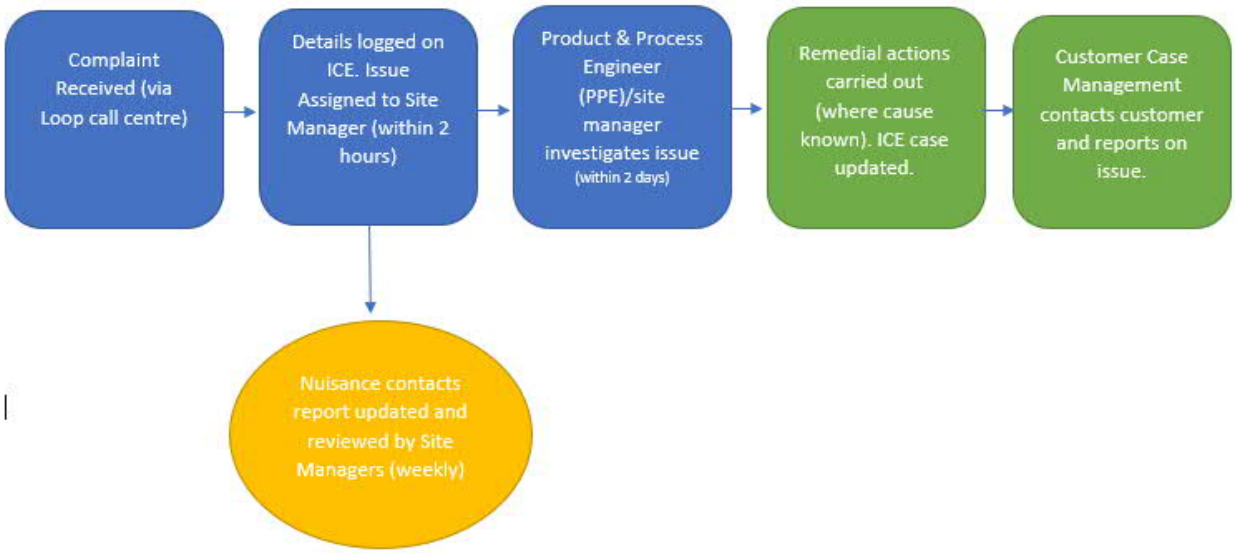
6 Further Guidance

Management Procedures / Safe Working Procedures / Technical Specifications (held on Safeguard) that are also relevant include:

- SWP 053 – Personal Safety & Security
- SWP 078 – Safe Use of Mobile Phones
- MP 05 – Lone Work
- MP 34 – Manual Handling

REMEMBER: IF IN DOUBT - ASK YOUR LINE MANAGER / SAFETY ADVISOR

Appendix 7 Odour Complaint Process



Appendix 8 STF Odour Complaint Form

Loop handle customer complaints being reported to Yorkshire Water. The call Handler will work with the complainant to try and locate the odour. Loop uses a software system called ICE to record the issue. If the issue is believed to be arising from a sewage works, the call handler will work through the following forms to pinpoint the issue.

Customer's details (name and address, if provided)	
When did the odour occur	
Time when the odour occurred	
Where was the location of the odour	
Is the odour happening now or was it in the past	
Does the customer know what is causing the smell	
What is a description of the odour (sewage / drains / eggy / sweet composting)	
Is this the first time the odour has been noticed	
Where is the odour at its worst (inside/outside house/boundary)	
Any other comment	

Appendix 9 Odour Investigation Form

The following investigation form will be used by Operational staff in the event of an odour complaint being received.

Date of odour complaint	
Time of odour (if known)	
Name of YW colleague investigating issue	
Postcode where the issue was identified (if known)	
Weather at the time of odour complaint (including temperature)	
Wind Direction (from onsite wind monitor) and strength (no wind, light, gusty, heavy)	
Description of smell from Complainant (if known)	
Is this linked with other complaints	
Do you know what asset is causing the issue	
Can the asset be identified through sniff testing (follow sniff testing monitoring programme in the odour management plan)	
Can the issue be resolved immediately	
If no, what actions are needed to resolve the issue	
If the issue is going to take >2 days to resolve, can the issue be mitigated to reduce the odour effect	
Does the odour management plan need updating to discuss the cause/action/mitigation	
Date when resolved	

Appendix 11 Secondary Containment Risk Assessment

Woodhouse Mill Secondary Containment Assessment

December 2023

YorkshireWater

Stantec

Sign-Off Sheet

Project details	
Project number	331001762 100.2301
Project name	Environmental permitting for IED sites
Date	December 2023
Client details	
Client name	Yorkshire Water Service Ltd
Client address	Western House Halifax Road Bradford West Yorkshire BD6 2SZ
Document details	
Document title	Woodhouse Mill Secondary Containment Assessment
Document version	Final v2
Report author	Kiran Parmar
Report reviewed by	Sam Walmsley
Report approved by	
Report by	Stantec Stantec House Kelburn Court Birchwood Warrington WA3 6UT

Disclaimer

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1 Introduction

As part of the Industrial Emissions Directive (IED) permit application for Woodhouse Mill Sludge Treatment Facility (STF), Yorkshire Water (YW) has undertaken an assessment of the significance and potential environmental risks associated with a loss of containment of process vessels. YW has also reviewed existing provisions and potential improvement options against Best Available Techniques (BAT) principles, in alignment with CIRIA C736[1].

Woodhouse Mill STF falls under the IED as a Part A(1) installation by virtue of exceeding the 100t/d throughput limit for anaerobic digestion (AD). The permit will cover raw sludge storage, handling and thickening, digested sludge storage, handling and dewatering, sludge cake secondary treatment and storage, biogas storage, utilisation and flaring. This document focuses on the secondary containment aspects of the permit requirements, in particular the application of BAT, and should be viewed in parallel with the main permit application document, in particular Section II: Technical Description, Section III: Accident Risk Assessment and Section V: Site Condition Report.

1.1 Site details

Figure 1 shows an aerial view of Woodhouse Mill STF. Woodhouse Mill treats indigenous sludge from the co-located wastewater treatment works which serves a population equivalent of 185,556 in the south-east area of Sheffield. Figure 2 indicates the key activities at Woodhouse Mill STF via a process flow diagram. The key activities are the sludge thickening, anaerobic digestion, biogas handling and combustion, sludge dewatering, and associated routes of gaseous, liquid solid materials and energy vectors. These processes are further discussed in Section 3.2.1.

Figure 1. Woodhouse Mill STF aerial view. Permit boundary in green. *© Google, 2021*

[1] CIRIA (2014) Containment systems for the prevention of pollution: Secondary, tertiary, and other measures for industrial and commercial premises (C736; 2014)

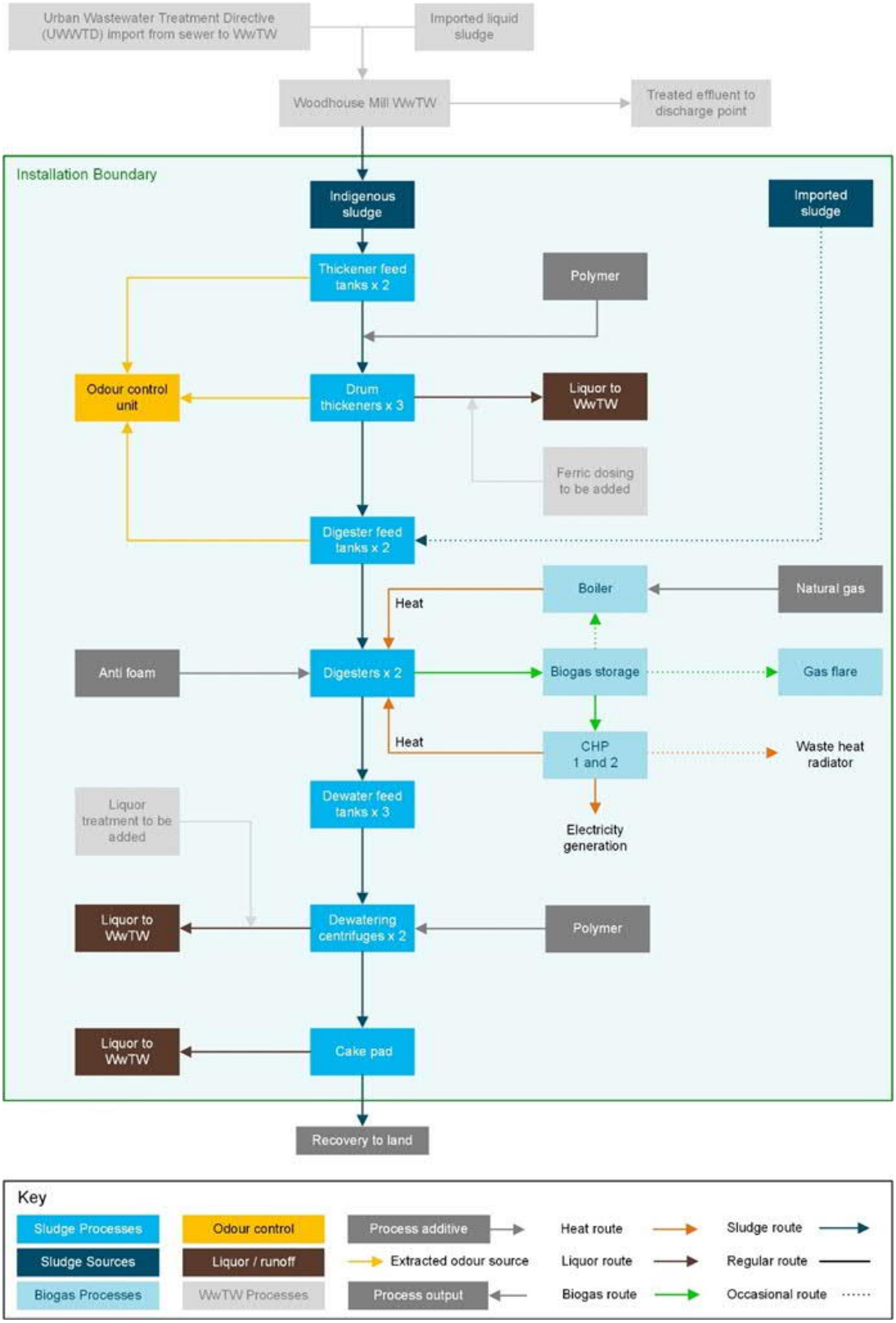


Figure 2. Process flow diagram Woodhouse Mill STF.

1.2 Overview

YW commissioned Stantec to assess existing provisions and, where necessary, improvement options for secondary containment at the site. Stantec have provided risk-based supporting evidence to accompany the permit application, which demonstrates the most appropriate solution(s) for IED BAT compliance using CIRIA C736 standards. To fully understand the requirement for secondary containment and to provide environmental protection at Woodhouse Mill, two different industry standard tools have been used, these are shown within the flow chart in Figure 3.

Firstly, the Anaerobic Digestion and Biogas Association (ADBA) secondary containment risk assessment tool has been applied to assets at Woodhouse Mill. The ADBA assessment tool uses a risk-based methodology to determine the class of secondary containment systems required at a site, based on an assessment of sources, pathways and receptors, and the control measures which already provide protection.

As an existing installation in continuous operation, retrospectively applying a standard secondary containment bund to all sludge tanks and containers may present significant technical, operational, safety and logistical challenges. It is also noted that the location of Woodhouse Mill STF within a wider wastewater treatment works (WwTW) presents opportunities in terms of utilising existing YW assets as part of the pollution containment and prevention solution. Recognising this limitation, a bespoke source, pathway, receptor approach has been developed by Stantec and applied to identify and risk assess bunding solutions in line with the ADBA approach. These findings have then been used to develop as well site-specific options for secondary containment.

Whilst these tools are discrete pieces of work, they come together to provide a detailed evidence base for intervention at Woodhouse Mill.

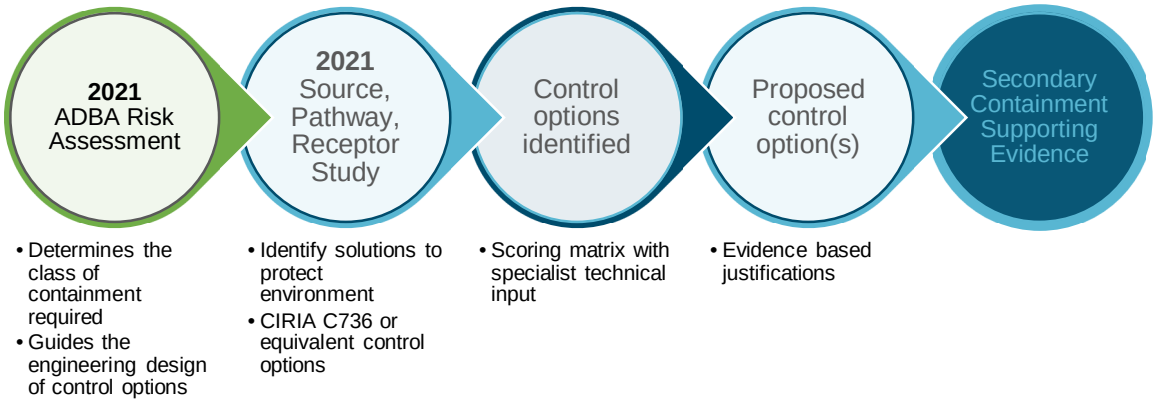


Figure 3. Flow chart showing the approach taken to provide secondary containment supporting evidence.

2 ADBA risk assessment tool findings

The ADBA Risk Assessment Tool is based on CIRIA C736 requirements for the prevention of pollution: including secondary and tertiary containment, and other measures for industrial and commercial premises. An assessment is presented in Appendix 1 and the findings are summarised in this chapter.

2.1 Class of required secondary containment for Woodhouse Mill

To identify the class of containment deemed to provide sufficient environmental protection in the ADBA Risk Assessment, the tool uses a source, pathway, receptor model. This identifies hazards posed to the environment and assigns a class of containment based on the site hazard rating and likelihood of loss of primary containment. The approach is summarised in Figure 4 below.

Figure 4. ADBA risk assessment classification flowchart.

The ADBA Risk Assessment Tool scored the source element as 'High risk', pathway elements as 'High risk' and the receptor element as 'High risk' at Woodhouse Mill owing to the significant volumes of sewage sludge stored onsite and site drainage pathways to the sensitive receptor, the River Rother. In summary, this assessment approach indicates that Woodhouse Mill STF has an overall site hazard rating of 'High Risk'. The likelihood of failure was 'Low Risk' due to the type of infrastructure involved and the mitigations at the site e.g., regular tank inspections and level sensors.

According to Table 4 within the ADBA tool (box 2.2 CIRIA C736), reproduced in Figure 5 below, the combination of a high site hazard rating and a low likelihood rating, gives the overall site risk as medium. The indicated class of secondary containment for **Woodhouse Mill STF was therefore deemed as being Class 2.**

Table 4: Overall site risk rating as defined by combining ratings of site hazard and probability of containment failure *(Box 2.2 CIRIA 736)*

Possible combination	Overall Risk Rating	Indicated class of secondary containment
HH, HM, OR MH	HIGH	Class 3
MM, HL, OR LH	MEDIUM	Class 2
LL, ML, OR LM	LOW	Class 1

Figure 5. ADBA classification matrix.

The 'Woodhouse Mill STF ADBA Secondary Containment Risk Assessment' outlines the information and data utilised in greater detail, as well as the assumptions applied to undertake a secondary containment risk assessment. The requirement for 'Class 2' type secondary containment within Woodhouse Mill STF has been used to inform the next stage of the risk assessment, spill modelling and the site-specific options appraisal carried out by Stantec in 2021 to support the permit application process (See Chapter 3).

3 Solution appraisal

3.1 Objectives

The purpose of this stage of the assessment is to determine the significance and potential environmental risks associated with a loss of containment from sludge vessels within the Woodhouse Mill STF, and to review existing provisions and potential improvement options against BAT principles, including CIRIA C736. As described previously, this stage of the process is informed by the outputs of the ADBA tool, but also considers options which are outside the scope of the ADBA scoring system utilising a bespoke methodology which adopts source-pathway-receptor principles in a qualitative risk-based framework.

3.2 Sources at Woodhouse Mill STF

The sources of risk which have been identified at Woodhouse Mill as shown in Figure 6. These STF operational assets mainly occupy the northern and eastern areas of the site and comprise sludge thickening, digestion, dewatering and cake storage areas.

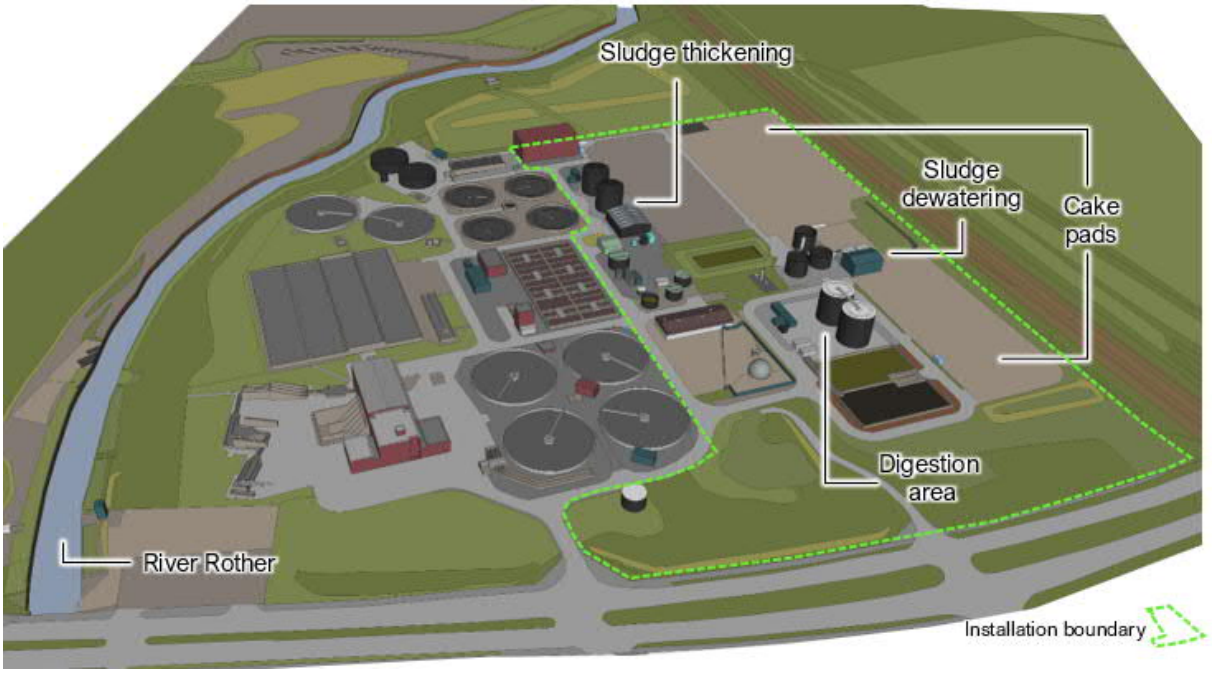


Figure 6. Woodhouse Mill sources of risk and site areas.

3.2.1 Bulk storage vessels

The bulk storage vessel locations are shown and labelled in Figure 7 and Figure 8. Further description of how these vessels are utilised, the sources of risk, existing controls and mitigations associated with the STF is provided in the discussion.

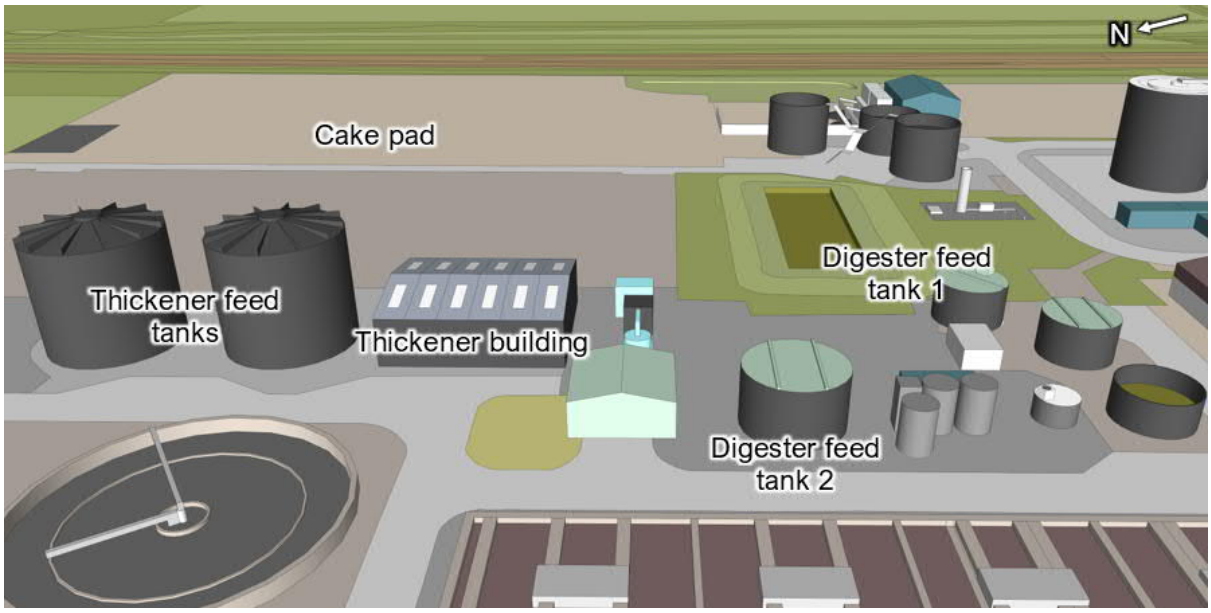


Figure 7. Sludge vessels located in the northern and central section of the site.

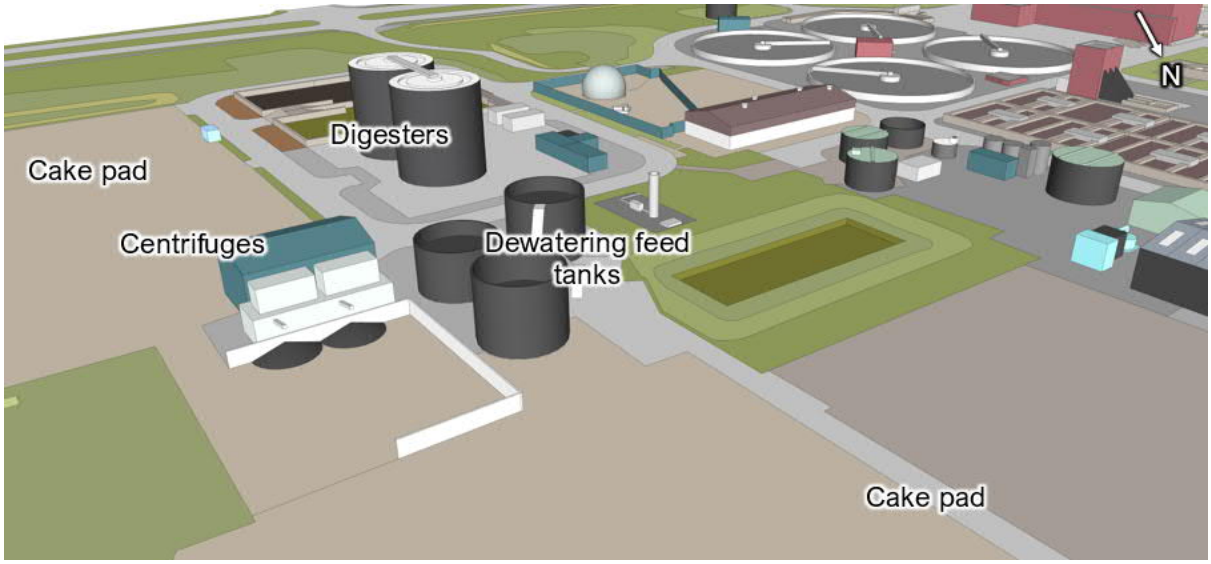


Figure 8. Sludge vessels located in the eastern section of the site.

3.2.1.1 Sludge reception, treatment, and handling

Woodhouse Mill STF treats indigenous sewage sludges arising from sewage treatment processes operated within the co-located Woodhouse Mill WwTW. Indigenous sludge is pumped via sub-surface pipework from the WwTW to the two thickener feed tanks (Figure 9, 2 no. 1,427 m^3 steel tanks with GRP roofs) where sludge is blended and mixed. Sludge from the thickener feed tanks is then transferred to the thickener building via a dedicated pipeline serving each of three thickening streams.

Figure 9. Thickener feed tanks (2 no.).

As a contingency, there is the facility to receive imported sewage sludges generated by smaller YW sewage works (with lower capacity or capability for treating sludges on-site) directly to the STF. This material may be delivered to digester feed tank 2 (Figure 11), although in practice this facility is very rarely used. In the event that this is required, liquid sludge is delivered by tanker with a maximum load of approximately 28 tonnes. Unloading is controlled using 'WaSP' loggers; valves on the discharge pipework will only open when a driver presents appropriate authentication to this system. The WaSP loggers record the source of the sludge, the time and date of delivery, the total volume discharged and average percentage dry solids of the load. Only appropriately authorised vehicles can discharge at the site.

The sludge reception and storage processes are largely automated and controlled via PLC. PLC includes level sensors to reduce risk of tank overtopping, resulting in contamination and potential odour generation. Additionally, tank mixing is performed using air injection to avoid settlement, blockage or gas production. Furthermore, piping is trace heated to reduce the risk of loss of containment from pipe fracture on freezing.

3.2.1.2 Sludge digestion

The thickened sludge is transferred to the digester feed tanks, one of which has a capacity of 250 m^3 (Figure 10) and the other 554 m^3 (Figure 11). These tanks are mixed and covered, with headspace air routed to the odour control unit (OCU). Thickened mixed sludges are then pumped from the digester feed tanks to the anaerobic digesters (Figure 12, 2 no. 1,733 m^3 concrete tanks). The anaerobic digesters operate as a continuous process with sludge being added and treated sludge extracted. The digesters have a typical feed rate of around 218 m^3/day per digester; the maximum feed rate is 270m^3/day giving a 12-day retention time as required by Hazard Analysis and Critical Control Points (HACCP) controls. The digesters are mixed by gas mixing systems, which utilise biogas from the headspace of each digester; the gas is compressed and then reintroduced using an array of mixing nozzles on the floor of the digester. Foam levels are actively monitored, and an anti-foam system is used as required.

The digestion plant is largely automated under PLC operation. Monitoring instrumentation, including high level probes and pressure sensors are linked to automatic PLC controlled pumps and other equipment to avoid potential loss of containment. Additionally, digested sludge transfer pumps are fitted with vent lines to prevent build-up of potentially explosive biogas. An inspection and testing programme for above and below ground vessels, pipes and valves is in place. This incorporates a combination of visual examinations and non-destructive testing (e.g., ultrasonic thickness measurements).

Figure 10. Digester feed tank 1.

Figure 11. Digester feed tank 2.

Figure 12. Digesters (2 no.).

3.2.1.3 Digested sludge treatment, handling and disposal

Digested sludge is gravity fed from the digesters to the adjacent dewater feed tanks (Figure 13, 1 no. steel open topped tank with capacity of 500m³ and Figure 14, 2 no. steel open topped tanks with capacity of 606m³). These tanks are mixed both to prevent settlement and inhibit generation of methane. Powdered polymer stored in 750kg bags are suspended over a hopper dosing system which feeds a make-up tank where the powdered polymer is mixed with potable water and transferred to a storage tank. The polymer solution is injected into the sludge stream and taken to one of two centrifuges where the sludge coagulates and supernatant liquor is removed by centrifugal forces. Dewatered liquor is transferred to the top water and return liquors sump located within a building at the northern end of the site prior to transfer to the WwTW for full treatment prior to discharge.

Figure 13. Dewatering tank 1.

Figure 14. Dewatering tanks 2 and 3 (tanks in the foreground).

The final digested and dewatered sludge cake is transferred via conveyers from the centrifuges up over a push-wall and onto the cake pad (Figure 15). The whole area under the conveyer and adjacent sludge cake pad is an engineered impermeable surface, with water runoff run off collected in drains running along the centre and perimeter of the pad. These liquids are pumped back to the WwTW for full treatment prior to discharge.

Figure 15. Sludge cake conveyors and pad.

Once on the cake pad, sludge cake is moved by mechanical loaders into storage rows (Figure 16). The cake pad is engineered to collect leachate and washwater which is routed for treatment and the co-located WwTW.

There is no lime addition at Woodhouse Mill; instead, cake is stored in piles according to age and is left to mature for a minimum of six weeks in accordance with HACCP (Hazard Analysis Critical Control Points) requirements. Approximately 2,000 tonnes sludge cake will normally be held on site at any one time. However, the maximum storage capacity of the cake pad is significantly greater than this, up to 25,000 tonnes; greater volumes may be stored on site in emergency/abnormal conditions such as following processing problems at other YW sites or in extreme weather conditions when landspreading operations are temporarily paused. Once maturation is complete, sludge cake is removed from site and landspread in accordance with legislative requirements.

Figure 16. Sludge cake storage pad.

3.2.2 Tank volumes

The storage volumes, date constructed and construction materials of the sludge and non-sludge tanks within the STF are summarised in Table 1.

Table 1. Woodhouse Mill STF tanks, capacities, age, and construction materials.

Tank	Size m^3 (each tank)	Year constructed	Construction material
2 no. thickener feed tanks	1,427	2013	Steel
2 no. digester feed tanks	250; 554	1990; 2000	Steel
2 no. digesters	1,733	2013	Concrete
3 no. dewatering feed tanks	1x 500, 2x 606	1x 1996, 2x 2013	Steel
1 no. polymer bulk storage tank (thickening)	10	2013	GRP
1 no. polymer solution storage tank (thickening)	2	2013	GRP
1 no. service water tank (thickening)	2	2013	GRP
1 no. polymer mixing tank (dewatering)	4.7	2013	GRP
1 no. polymer storage tank (dewatering)	4.7	2013	GRP
1 no. service water tank (dewatering)	2	2013	GRP
1 no. service water break tank (ferric dosing)	1.12	2013	GRP
1 no. anti-foam stock tank (digester anti-foam)	0.128	2013	Plastic

3.2.3 Engineering and maintenance standards

YW technical standards define the types of assets that meet the requirements of the business, including how they should be built and then maintained. In relation to Woodhouse Mill, this covers:

- Design and construction of all assets, including selection of appropriately qualified design and build contractors.
- Procedures for inspection and testing of storage vessels, including internal and external inspections, thickness assessment and non-destructive testing.
- Regular inspections of above ground assets and associated pipework at defined intervals.
- Documented log of any actions arising because of these inspections.

YW's asset standards have been developed over many years and where relevant comply with Civil Engineering Specification for the Water Industry (CESWI) Seventh Edition March 2011 and the Water Industry Mechanical and Electrical Specifications (WIMES 9.02).

Contractors involved in the design/build of the Woodhouse Mill scheme were YW framework contractors, appointed following a rigorous EU tender process; this process involved an assessment of experience, technical competency, design capability and quality procedures.

The combination of all these measures significantly reduces the risk of a catastrophic tank failure, thus reducing the likelihood of secondary containment being required. Nonetheless, it is recognised that the risk of a catastrophic tank failure cannot be eliminated, and external factors could always arise leading to very low likelihood, high consequence events (such as missile generation arising from other plant failure, domino effects or *force majeure*, for example an aircraft impact or terrorist attack).

3.3 Existing site surfacing

Most of the active process areas within the installation are covered by buildings and hardstanding, with some peripheral areas of soft landscaping (grass and gravel cover). Surfacing was generally observed to be in good condition across the site with no significant evidence of cracks or erosion. Site surfacing for Woodhouse Mill is illustrated in Figure 17.

Figure 17. Woodhouse Mill existing site surfaces.

3.4 Pathways

Pathways are the routes by which pollutants could travel from a source to the point where they could cause damage, the receptor. The potential pathways in this assessment were determined using computation flow modelling based on defined source spillage volumes. The modelling approach, limitations and spill volumes are outlined in the following sections, allowing the principal pathways to be identified.

3.4.1 Spill modelling

To model the potential impact of spills to the environment from the various sludge treatment assets at Woodhouse Mill STF and defined credible pathways, YW has used PondSIM, a computational overland flow modelling tool. PondSIM can represent the flow of a liquid spill across an area of ground, taking account of local topography and flow restrictions (such as barriers). Applying this to the Woodhouse Mill site has allowed visualisation of the likely effects of a spill occurring within each of the key areas of the permitted installation.

3.4.1.1 Modelling limitations and uncertainties

As with any computational modelling tool, there are several assumptions required and associated modelling limitations and uncertainties:

- PondSIM is designed to model the overland flow of water; as such it is not able to account for the typically higher viscosities associated with sludge, which results in a larger modelled inundation extent than would be expected.
- The model cannot allow for flow to drains and other subsurface features.
- Surge is not accounted for within the model. Instead, this will be allowed for by ensuring final designs consider CIRIA C736 recommendations, while recognising the loss of kinetic energy as viscous sludge travels over flat ground.
- The model assumes that no mitigation measures are put in place following an incident to curtail flow.
- The model assumes that the full modelled volume spills from a single point.
- Assets are treated as simple flow barriers in the model, which may result in deflections being observed where flow would spread out.

Therefore, the modelled outputs are a worst-case inundation scenario resulting from sludge spills at Woodhouse Mill. Notwithstanding these limitations, the use of PondSIM is considered appropriate for the purpose intended in this study and allows for the rapid screening and assessment of asset risks to support prioritisation of risk mitigation.

To counter these limitations, several worst-case assumptions were selected relating to the potential failure events, including spill volumes.

3.4.2 Spill volumes

YW has followed CIRIA C736 guidance on spill volumes to be modelled i.e., values equivalent to the containment provided by bunded tanks have been used. For a single tank the volume should be calculated based on 110 per cent of the capacity of that tank. For multi-tank installations, the containment volume should be calculated based on 25 per cent of the total capacity of all the tanks in a common area (which assumes that it is unlikely that more than 25 per cent of tanks will fail simultaneously), or 110 per cent of the largest tank, whichever is greatest. Tanks which are hydraulically linked should be treated as if they were a single tank.

The Woodhouse Mill sludge treatment processes are installed in common areas of the site as either multi-tank or single tank installations. The spill modelling scenarios for each scenario and associated containment volumes are listed in Table 2. Storage tanks at Woodhouse Mill are spread across the sludge treatment area. Assessment of spill scenarios showed that modelling a spill of 110% of the volume of each tank individually (total volume of 9,720) would produce the most representative 'worst case' scenario.

Table 2. Volume of material used in spill modelling scenarios.

Scenario	Capacity calculation	Modelled containment volume (m^3)	Modelling reference
'Worst case'	110% capacity of individual sludge containing vessels	9,720 (worst case). See Table 1. Woodhouse Mill STF tanks, capacities, age, and construction materials.	Figure 18

3.5 PondSIM modelling of unmitigated pathways

This section presents the modelling outputs showing unmitigated flow routes from the identified source, via surface pathways as calculated by PondSIM to the identified receptors.

This first stage of the modelling assessment considered the effect of a simultaneous loss of containment from all the sludge tanks at the STF. Therefore, the model presented in Figure 18 represents the worst-case scenario, recognising limitations discussed in 3.4.1 Spill modelling. The location and direction of the modelled spills and adjacent treatment assets are discussed in section 3.6 Spill pathways.

Figure 18. Model showing unmitigated result of spills from existing tanks at Woodhouse Mill

3.6 Spill pathways

The unmitigated modelled spills show the potential pooling of sludge on hardstanding surfaces around the digester tanks and on the northern cake pad, as illustrated in Figure 19. Contained surface water drainage is present along the kerb of the access roads, this returns to the WwTW for treatment.

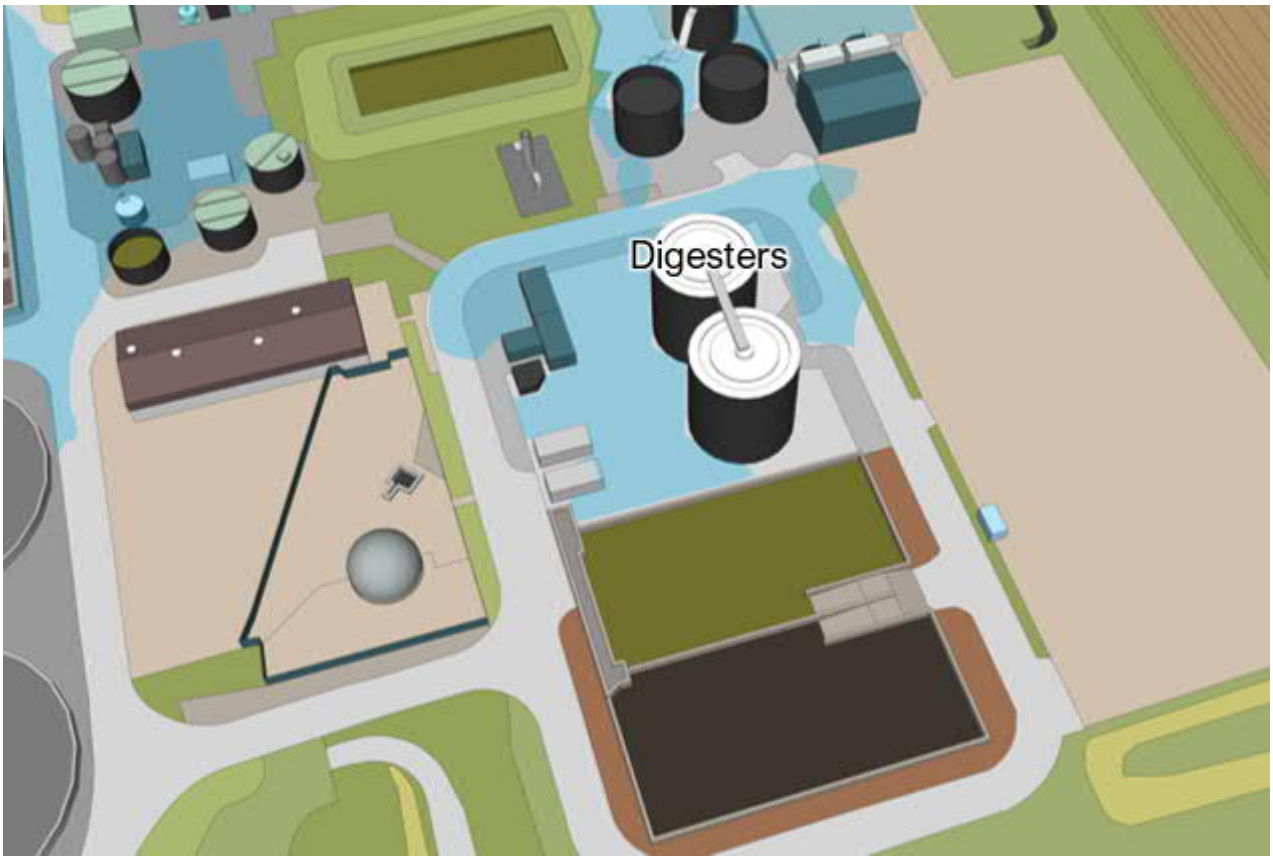


Figure 19. Pooling potential around the access section of the digestion tanks.

Figure 27 shows significant depth of pooling being contained within the northern cake pad area and around the three dewatering feed tanks, as shown in Figure 20. The ground is hardstanding and surface water drainage in this area is again returned to the WwTW for treatment.

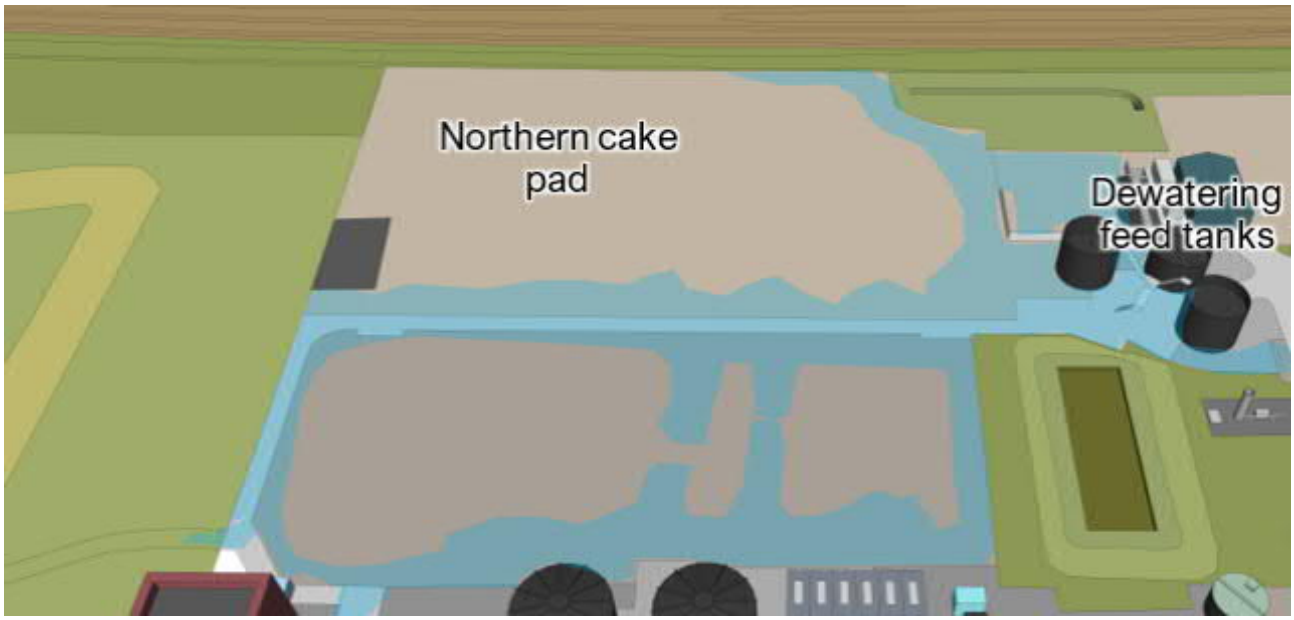


Figure 20. Pooling potential within the northern cake pad and around the dewatering tanks.

Figure 21 shows pooling in the areas between the thickener feed tanks and FST's which are on both hardstanding and grassy sections of ground. A direct pathway to the River Rother exists due to the non-contained surface drainage around the FST's flowing directly to the outfall outlet.

A sludge surge from the thickener feed tanks has the potential to enter the FST's and therefore creates a direct pathway to the River Rother. The probability of a catastrophic tank failure occurring is low given the condition and age of the tanks and recognising mitigation measures already in place and the low likelihood of vehicular impact due to existing kerbs and little to no traffic on site. Despite all of these measures, it is recognised that additional mitigation against surge should be considered, this is discussed within 3.7 Mitigation control options.

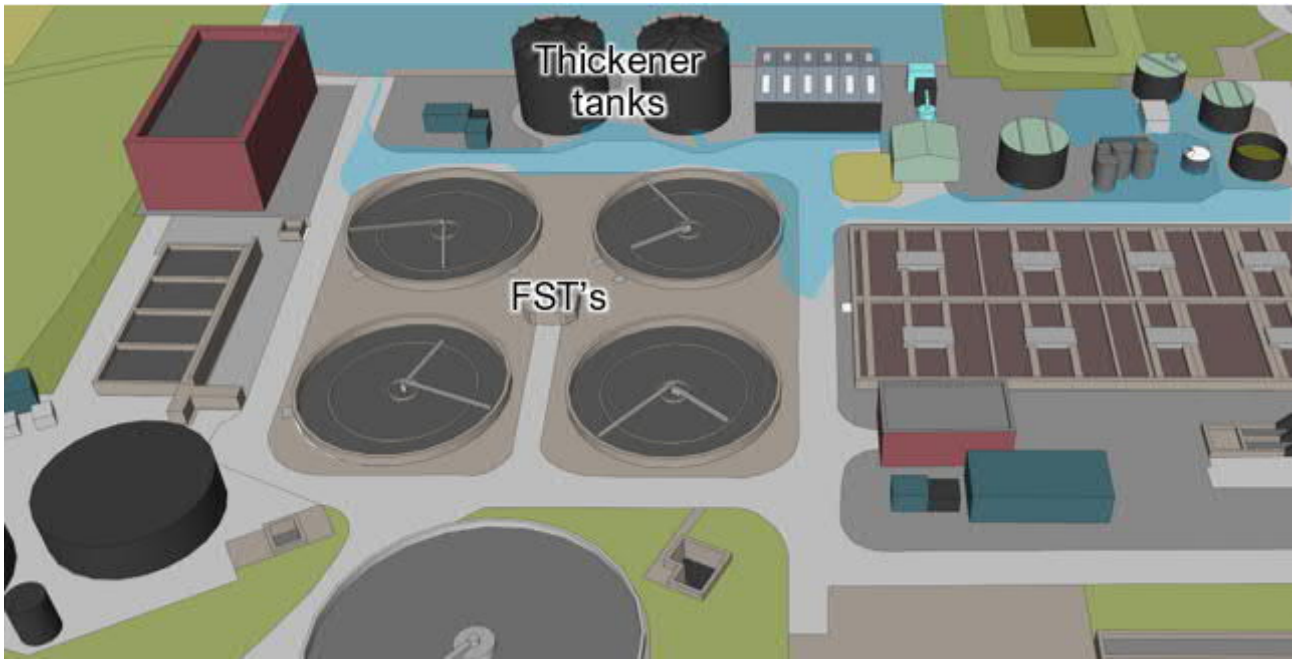


Figure 21. Potential pooling around the thicker tanks and FST's.

Figure 22 shows the potential for sludge pooling around the ASP's and in between the PSTs, although no risk of tank inundation has been identified. Key areas of sludge pooling are on existing access roads and other hardstanding areas. A direct pathway to the River Rother exists due to the non-contained surface drainage around the PSTs. The height of the existing ASP walls will provide protection against surge in this area and eliminate the chance of sludge spills entering the ASP tanks.

Figure 22. Potential pooling around ASP's and PSTs, plus surge potential from digester feed tank no 2.

3.6.1 Surface drainage

Woodhouse Mill WwTW underwent a surface drainage survey in March 2020. The survey mapped the location of gullies and manholes, separating them into contained and non-contained drainage routes, as illustrated in Figure 23. The survey shows that the site has areas of surface water drainage that discharge to the River Rother without additional treatment i.e., non-contained, these are shown in blue. Surface water drainage routes shown in red are routed to the inlet of the site i.e., contained.

These present a spill pathway that cannot be directly modelled by PondSIM. Instead, the potential for transmission of spills to receptors through uncontained drains has been identified by comparing surface spill locations with drainage plans. This confirms that there is a pollution risk which must be mitigated.

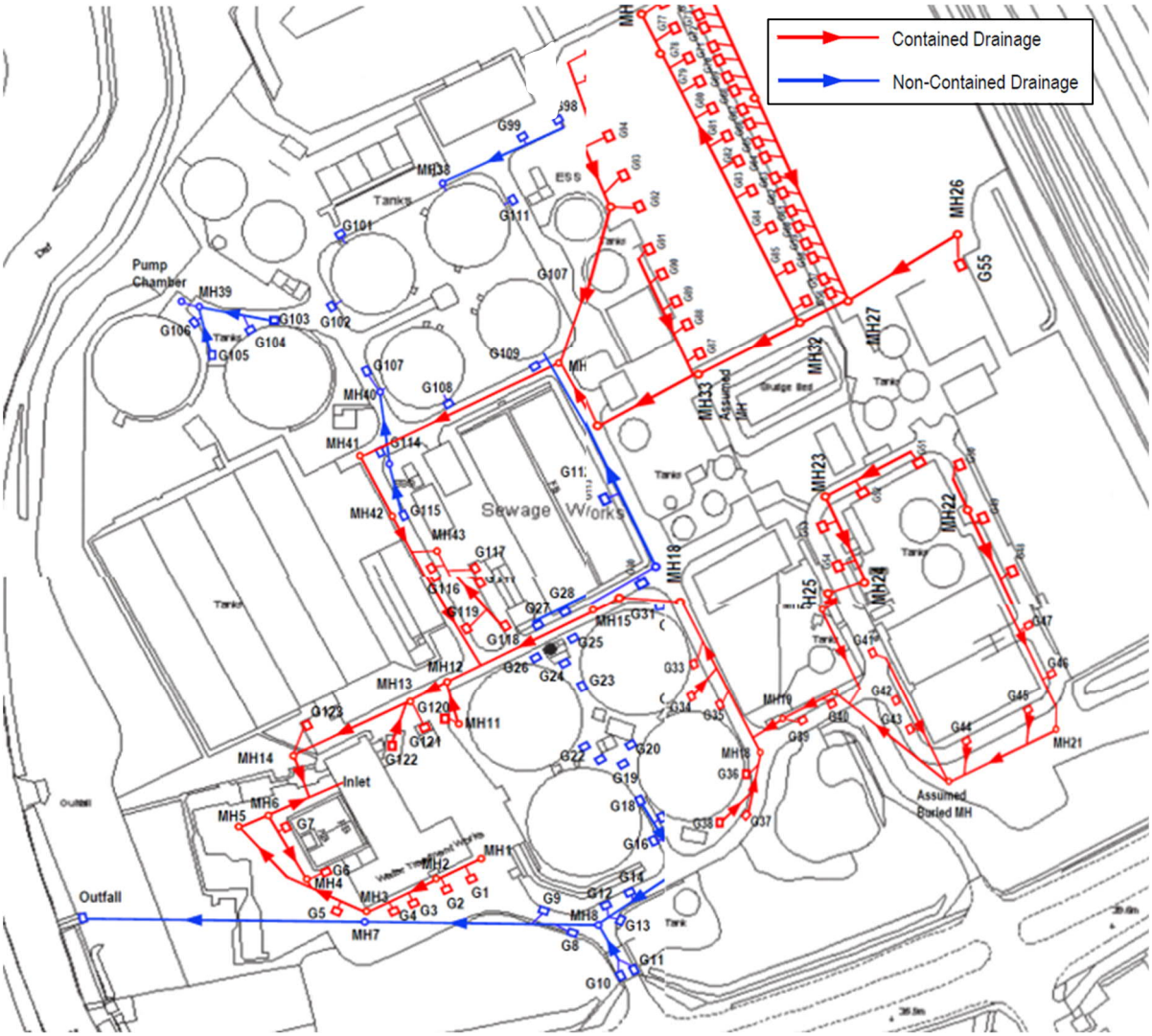


Figure 23. Woodhouse Mill WwTW contained and non-contained site drainage.

3.6.2 Spill pathway summary

The table below lists the resulting pathways associated with tank failure at Woodhouse Mill determined using the PondSIM model. Full model results are presented in Section 3.5.

Table 3. Surface pathways from the key assets at Woodhouse Mill.

Tank / Common Area	Surface Pathways	Comments
2 no. thickener feed tanks	Overland run-off over sealed surfaces to: • North of the site on the FST and thickener tank access road. • Centre of the site surrounding ASP unit.	Principal spill volume captured on existing site hardstanding areas and access roads. Surface water drainage in this area is non-contained and connected to the outfall chamber which flows directly to the River Rother.
2 no. digester feed tanks	Overland run-off over sealed surfaces to: • Centre of the site towards the northern cake pad. • Centre of the site surrounding the ASP unit.	Spill flows across and is captured on hardstanding and road surfaces. Surface water drainage in the centre and east of the site is non-contained and is therefore a pathway to the River Rother
2 no. digesters	Overland run-off over sealed surfaces to: • East of the site surround the digestion plant. • East of the site pooling around the dewatering tanks.	Spill flows across and is captured on hardstanding and road surfaces. Surface water drainage in this area is contained, and returned to the main WwTW for treatment prior to discharge.
3 no. dewatering feed tanks	Overland run-off over sealed surfaces to: • North of the site within the cake pad. • East of the site surrounding the digestion plant.	Principal spill volume captured on existing site hardstanding areas within the northern cake pad. Surface water drainage in this area is contained and returned to the main WwTW for treatment prior to discharge.

3.7 Receptors

To complete the source pathway receptor model, a review of sensitive receptors was conducted. These were identified based on judgement, modelling results and potential flow paths which may take any cardinal direction in lower lying areas. Figure 24 shows the receptors identified which could theoretically be impacted by a loss of containment from sludge vessels at Woodhouse Mill.

Table 4 lists the type of pathway potentially leading to each receptor e.g., indirect, such as via FST's, permeable surfaces or direct to the environment, e.g., a flow path into the River Rother.

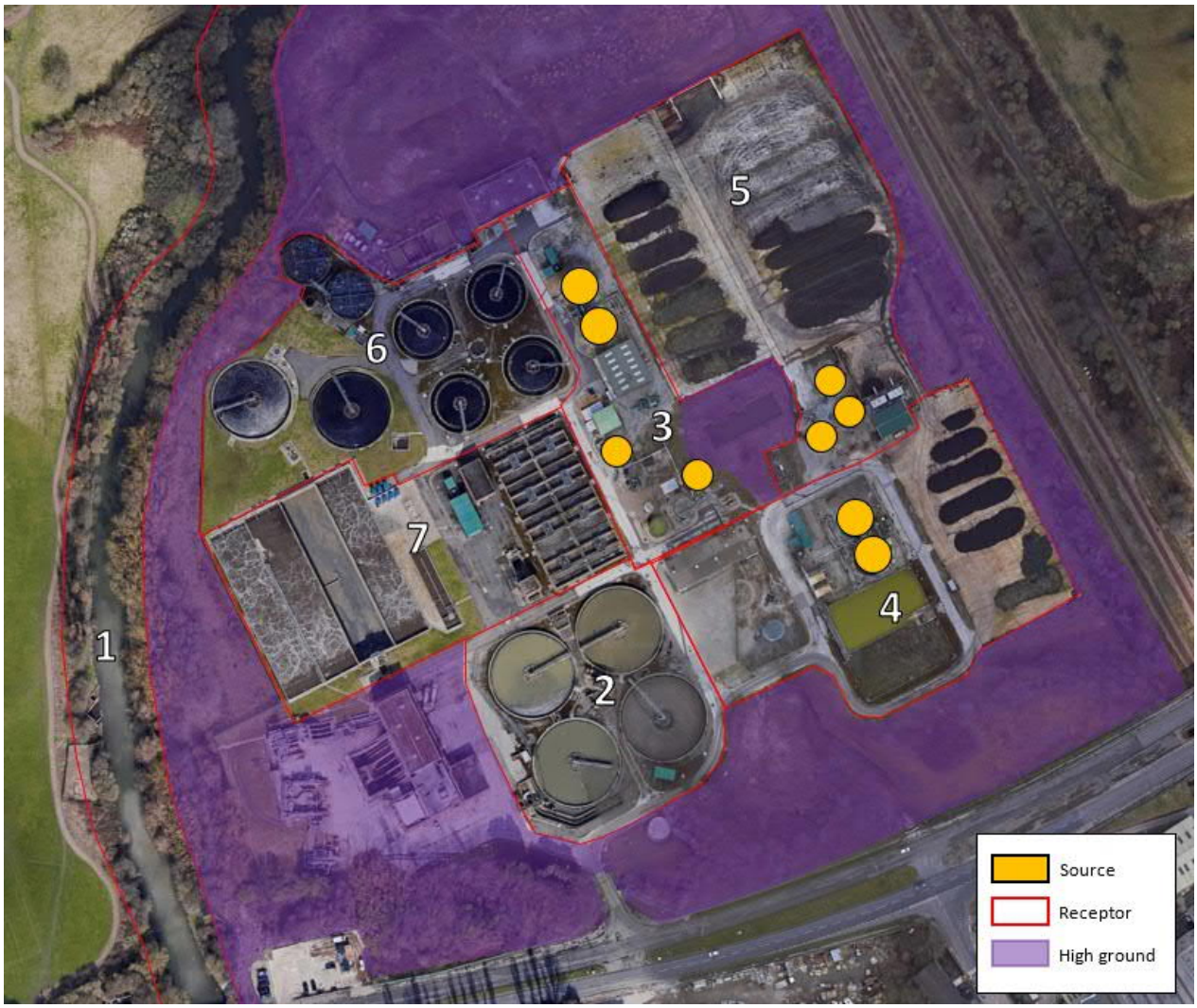


Figure 24. Map of numbered receptors at Woodhouse Mill. © Google, 2021

Table 4. Receptors

Receptor no.	Receptor
1	River Rother (including adjacent habitats).
2	Ground / groundwater – areas around inlet works and PST's.
3	Ground / groundwater - area around thickener feed and digester feed tanks.
4	Ground / groundwater - areas within the digester site and south easterly cake pad.
5	Ground / groundwater - areas within the dewatering tanks and northerly cake pad.
6	Ground / groundwater - areas including and surrounding the FST's.
7	Ground /groundwater – area including and surrounding the ASP's.

3.8 Source-pathway-receptor summary

A summary of the receptors at risk following the modelling of spill pathways from identified sources at Woodhouse Mill STF is listed in Table 5.

Table 5. Source-pathway-receptor summary

Tank / Common Area	Surface Pathways	Receptors at risk
2 no. thickener feed tanks	Overland run-off over sealed surfaces to: • North of the site on the FST and thickener tank access road. • Centre of the site surrounding ASP unit.	• Receptor 3 - Ground / groundwater - area around thickener feed and digester feed tanks. • Receptor 6 - Ground / groundwater - areas including and surrounding the FST's. • Receptor 7 - Ground /groundwater – area including and surrounding the ASP's. • Receptor 1 - River Rother (including adjacent habitats).
2 no. digester feed tanks	Overland run-off over sealed surfaces to: • Centre of the site towards the northern cake pad. • Centre of the site surrounding the ASP unit.	• Receptor 3 - Ground / groundwater - area around thickener feed and digester feed tanks. • Receptor 7 - Ground /groundwater – area including and surrounding the ASP's. • Receptor 2 - Ground / groundwater – areas around inlet works and PST's. • Receptor 1 - River Rother (including adjacent habitats).
2 no. digesters	Overland run-off over sealed surfaces to: • East of the site surround the digestion plant. • East of the site pooling around the dewatering tanks.	• Receptor 4 - Ground / groundwater - areas within the digester site and south easterly cake pad. • Receptor 5 - Ground / groundwater - areas within the dewatering tanks and northerly cake pad.
3 no. dewatering feed tanks	Overland run-off over sealed surfaces to: • North of the site within the cake pad. • East of the site surrounding the digestion plant.	• Receptor 5 - Ground / groundwater - areas within the dewatering tanks and northerly cake pad. • Receptor 4 - Ground / groundwater - areas within the digester site and south easterly cake pad.

3.9 Mitigation solution

An iterative process was completed to develop options that provide environmental protection in accordance with CIRIA C736, including different methods for achieving impermeable surfaces. Determination of the preferred solution considered financial viability, sustainability to reduce impacts from embodied carbon and availability of materials to allow timely implementation given the timeframes of meeting compliance.

The solution identified is illustrated in Figure 25, with further specification and dimensions given in Appendix 2. This solution achieves CIRIA C736 compliance, including approaches for improving the sustainability of construction in the following ways:

- **Surge allowance:** CIRIA C736 table 6.3 specifies the freeboard required to protect against surge. Recognising these recommendations, an allowance of 0.25m for walling and 0.75m for earth works has been added to the bund heights to protect against surge.
- **Drainage**: The condition of all surface drainage infrastructure will be assessed to prevent infiltration to surrounding areas. This will include assessment of drain capacity e.g., can the drains deal with sludge spills volumes including rainwater falling into the area. All drains that could be affected by a sludge spill will be part of a contained system i.e., any liquid entering them will be captured and treated prior to discharge.
- **Permeable areas:** all permeable areas of land that could receive a spill will be made impermeable or protected by a bund.
- **Hardstanding areas:** existing areas of hardstanding that will form part of the containment solution (in-situ concrete, access roads) will be assessed to ensure that they provide a level of containment consistent with the requirements of CIRIA C736.
- **Sleeping policeman:** materials used will be either tarmac or concrete at sufficient heights to contain and deflect a sludge spill, including 0.25m freeboard allowance for surge as per CIRIA C736.

YW have committed to install a containment solution that complies with CIRIA C736. The current preferred options are listed below but may be subject to modification during the detailed design phase.

3.9.1 Impermeable surfaces

Spill modelling at Woodhouse Mill shows that in the event of a tank collapse, a large proportion of the spill would be captured on existing impermeable surfaces, particularly site roads and the cake pad. Modelling has also shown that some of the spill has potential to settle on surfaces which are currently permeable. YW commit to installing impermeable surfaces in these areas. Figure 25 shows initial understanding of the areas that will require additional surfacing, this will be confirmed during detailed design.

Figure 25 New impermeable surfaces at Woodhouse Mill

3.9.2 Surface drainage

Spill modelling has identified a risk that a major sludge release could reach nearby watercourses through existing surface drains. YW commit to modifying drains that currently connect discharge directly to a watercourse, and could be affected by spills so that they return for full treatment, i.e. they will be converted to contained drainage. See Figure 26 for detail. This maximises environmental protection from both major and minor spills and is seen as appropriate for IED compliance.

Figure 26 Drains that will be converted from non-contained to contained (highlighted orange).

3.9.3 Surge

The catastrophic collapse of a tank would lead to a rapid release of sludge which will then flow across the surrounding area. This is particularly true on steep gradients, which will encourage flow to travel further. As flow travels across flat ground, it will lose speed and the risk from surge will rapidly decrease.

Sludge released in this way will tend to flow over obstacles, but physics limits the height of barrier which it can pass. It is possible, but complex to calculate the extent of flow over obstacles using specialist software, but it would be prohibitively expensive to do this for every site where containment is being considered. In the absence of detailed modelling, CIRIA C736 provides guidance on the additional height of bund wall (Figure 27), above settled spill level, that is required to ensure surge flow does not pass containment walls.

Table 4.7 Surge allowance (in the absence of detailed analysis)

Type of structure (see Part 3)	Allowance
In situ reinforced concrete and blockwork bunds	250 mm
Secondary containment tanks	250 mm
Earthwork bunds	750 mm

Figure 27 Surge protection requirements. Taken from CIRIA C736, pg 54

Woodhouse Mill is a large site, with significant distances between assets and in general the velocity of flow is expected to diminish rapidly because of its rheology. In most areas of the site, the height of existing tank walls significantly exceeds CIRIA C736 requirements on wall heights to protect against surge. The exception is the two FSTs close to the large thickener feed tanks, where a need for dedicated surge protection has been confirmed.

YW have considered a range of possible solutions for protecting the tanks and have found that the installation of a barrier to protect the tanks from surge effects will give the best level of protection. A number of potential construction types have been identified, including the use of legato blocks, trief kerbing or metal/plastic sheets. YW are currently carrying out detailed analysis to confirm the most appropriate construction type, but commit to installing a solution that complies with the requirements of CIRIA C736.

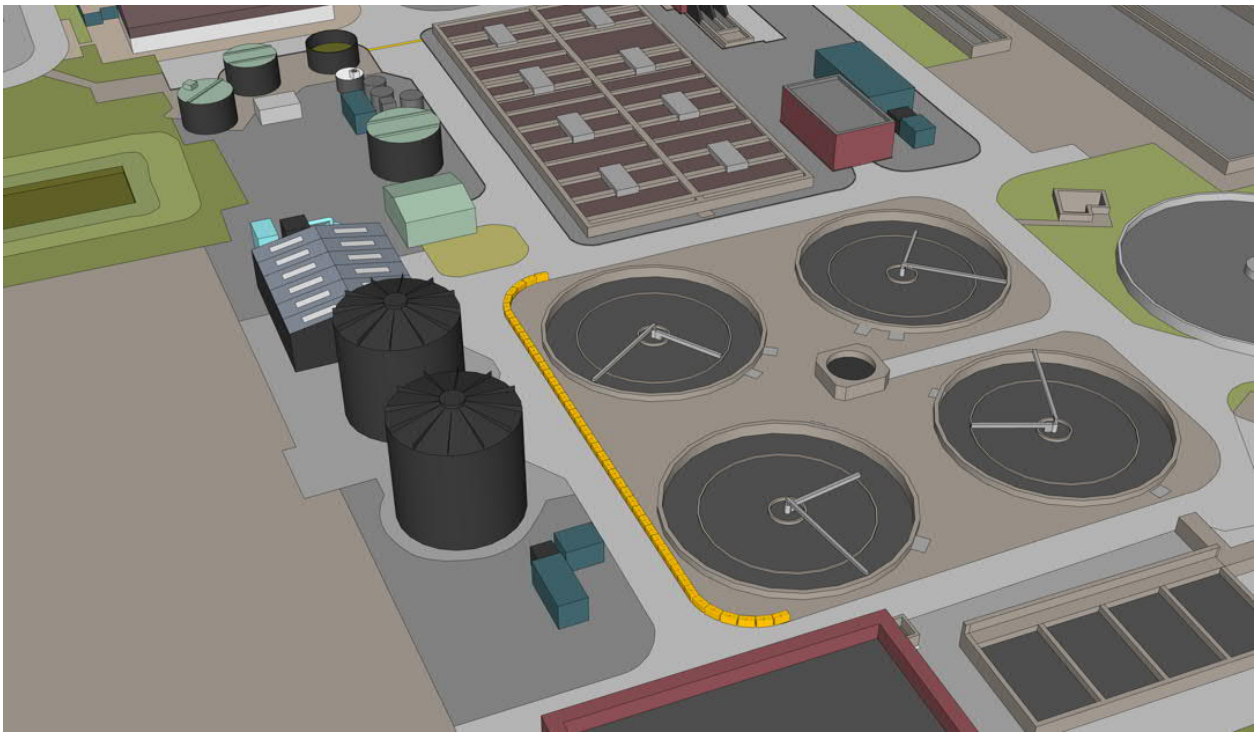


Figure 28. Example of potential surge protection solution using legato blocks

3.9.4 Additional mitigation

Although not required to achieve IED compliance, this exercise has identified operational benefits from the installation of a sleeping policeman in the location shown in Figure 29. From an IED perspective, this will reduce the extent of a potential spill, making clean up both easier and less expensive.

Figure 29. Proposal solution 1.3 - sleeping policemen across access road adjacent to the ASP unit.

3.9.5 Jetting

The recently issued EA guidance on spills to permeable surfaces means YW has reconsidered its approach to jetting and recognises that surfaces which could receive a sludge spill because of tank failure will require an impermeable surface. This means tank leaks, including jetting, within the tank locations at Woodhouse Mill will be contained, as the immediate and surrounding surfaces will be impermeable.

The risk of environmental harm as a result of jetting from these tanks has been assessed as low for the following reasons:

- YW design, construction and monitoring controls ensure tanks are constructed to a high standard and would identify any critical weaknesses at an early stage, and well before catastrophic failure occurred.
- For tanks constructed of concrete, formation of a hole large enough to allow jetting, but small enough to avoid total tank collapse is unlikely. If failure were to occur, it is much more likely to initially show as cracking, giving time to respond before significant sludge escaped.
    - A technical note has been provided in Appendix 3 that validates the failure mechanism of a tank constructed from concrete.
- The sludge in the concrete digesters is relatively viscous and this is likely to reduce the extent of jetting as viscous materials will travel relatively slowly through an orifice.
- The most likely cause, albeit it still very unlikely, of a tank wall puncture that would allow jetting is a direct impact, the most likely cause of which would be an out-of-control vehicle. If this were to happen, it would almost certainly be at ground level. In most cases existing site structures will protect tanks from direct impact.

Yorkshire Water understand that while risk is low, consideration of jetting remains a requirement of CIRIA C736. The blue circles in Figures 30 to 33 show areas which could be affected by jetting. These have been calculated according to CIRIA C736 guidelines, Appendix 4.

3.9.5.1 Thickener feed tanks

The two steel thickener feed tanks are tall and sit relatively close to the final settlement tanks (FSTs) of the adjacent WwTW. The FSTs flow directly to a watercourse and if sludge were to enter them, it is very likely that pollution would result. As discussed in section 3.9.3, surge protection is required at the FSTs. Jetting protection will be considered during the design process, and if possible, a combined solution implemented. If a combined solution is not feasible, YW commit to installing a CIRIA C736 compliant jetting solution in this area. Note that where existing surfaces in this area are permeable, they will be replaced with an impermeable surface.

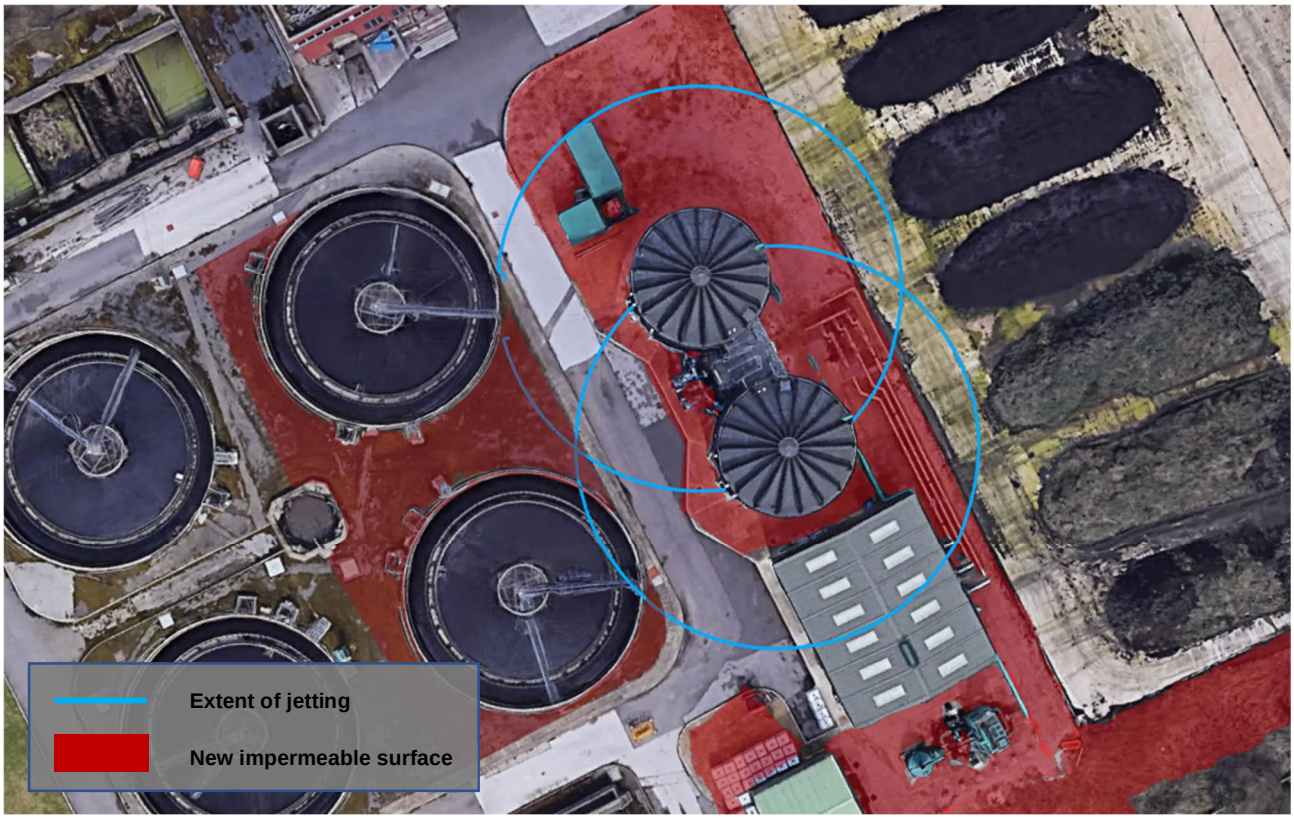


Figure 30 Jetting from thickener feed tanks

3.9.6 Digester Feed Area

Jetting from the dewatering feed tanks at Woodhouse Mill would primarily land on surfaces which are currently permeable, but where YW have committed to installing an impermeable liner. If the spill were to spread beyond these areas, it would be captured by the wider site secondary containment system. No need for specific jetting protection identified.

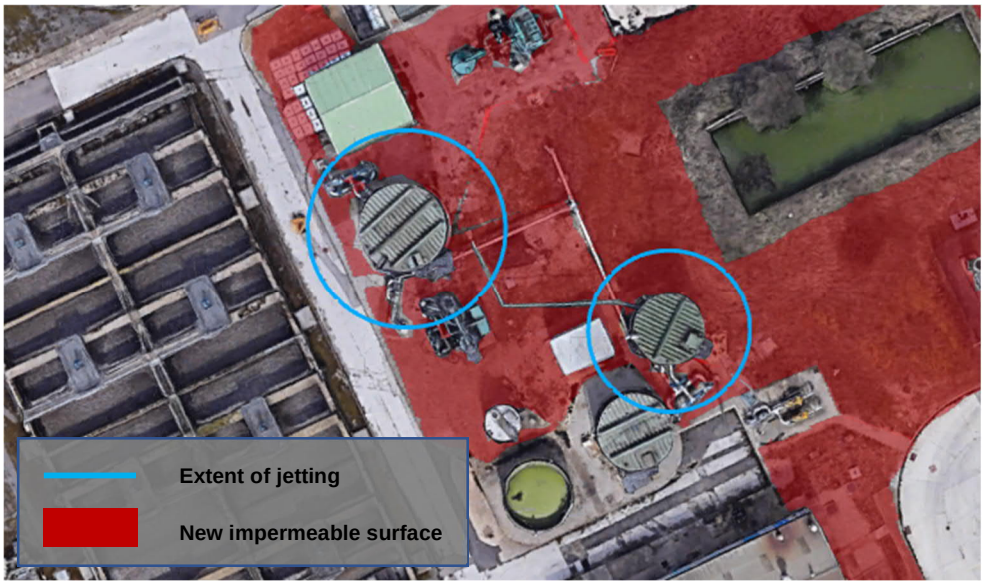


Figure 31 Jetting from digester feed tanks

3.9.6.1 Digester Area

The digestion tanks at Woodhouse Mill are approximately 14 metres tall, which means they have the potential to jet a significant distance. Initial modelling in line with CIRIA C736 shows that in the event of a tank puncturing, it is likely that tank content would be captured on existing impermeable surfaces (Figure 32). There is an old lagoon to the SE of the digesters which could be affected by jetting, visible as a large green rectangle in the satellite image. This is not an active process tank and valves controlling flow from the tank are normally kept closed. Recognising these controls, the risk of pollution as a result of sludge entering this tank is negligible. No need for specific jetting protection identified.

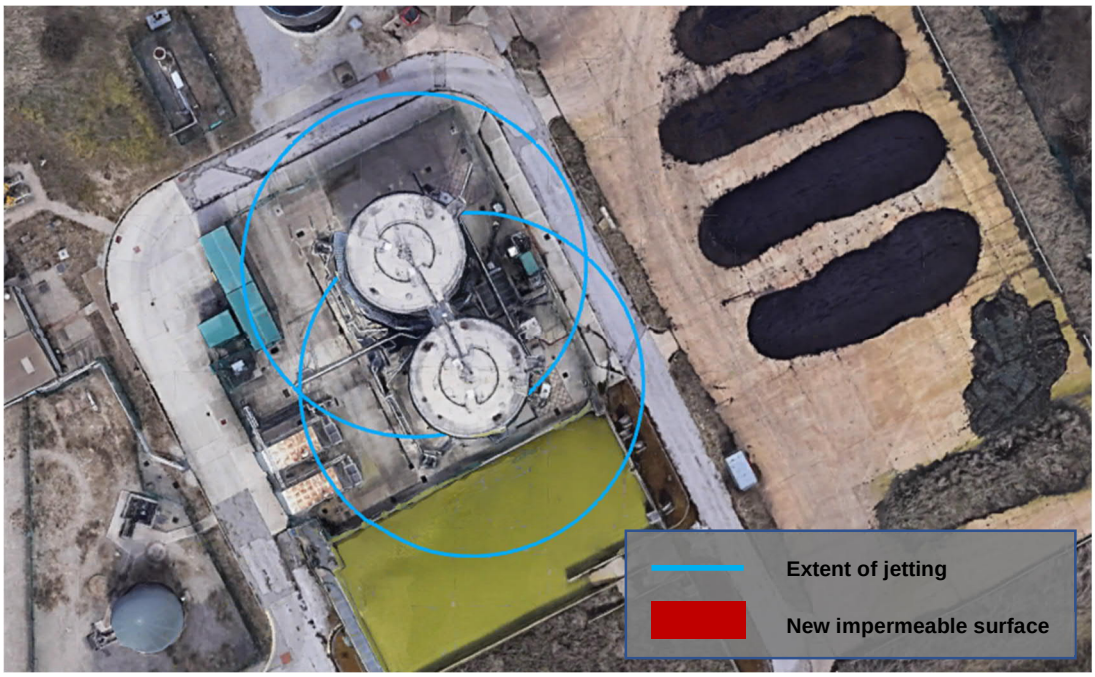


Figure 32 Digester area jetting

3.9.6.2 Dewatering feed area jetting

Jetting from the dewatering feed tanks at Woodhouse Mill would primarily land on surfaces which are currently permeable, but where YW have committed to installing an impermeable liner. If the spill were to spread beyond these areas, it would be captured by the wider site secondary containment system. No need for specific jetting protection identified.

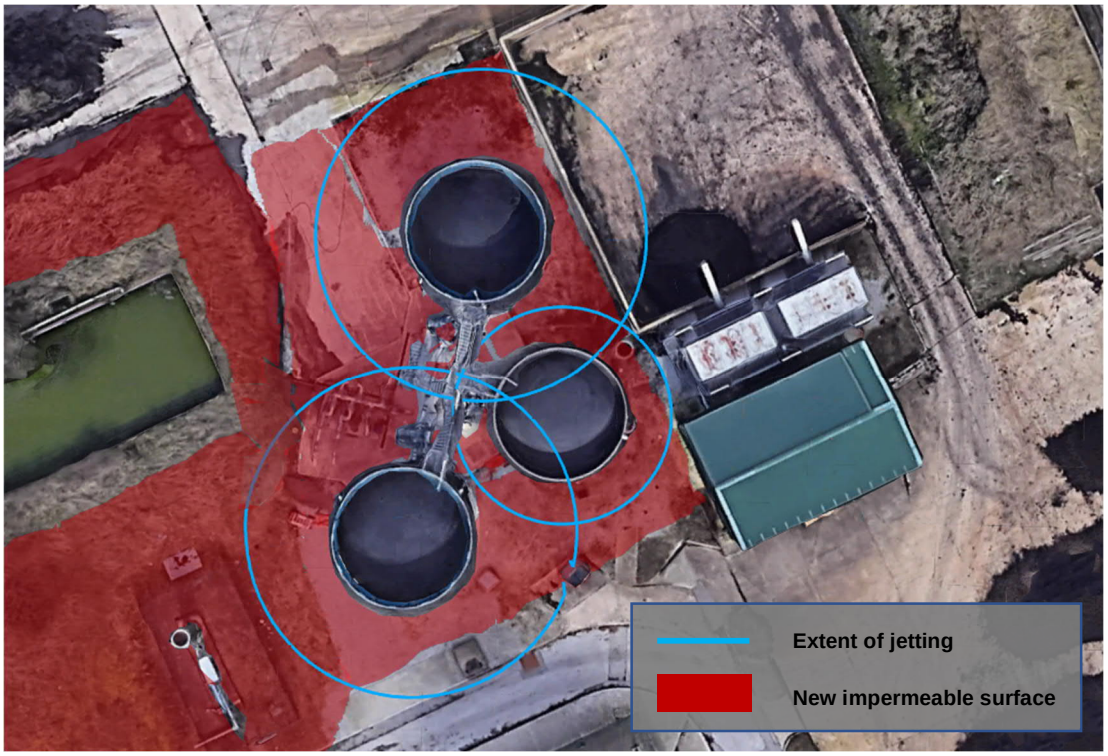


Figure 33 Jetting from tanks in dewatering feed area

3.10 CIRIA C736 compliance and construction

The secondary containment solution at Woodhouse Mill will be implemented by contractors chosen via YW's procurement process. This process is designed to ensure contractors have the knowledge and experience to build a secondary containment solution that complies with CIRIA C736.

The effectiveness of the containment and jetting solution will be confirmed by the appointed construction company, who will use the bunding design described in this document as a starting point for development of detailed design. YW will confirm that the final bunding solution is acceptable to the EA prior to commencement of the build.

4 Preventative maintenance and inspection regime

4.1 Above ground tanks

All tanks are tested and inspected as part of initial construction quality assurance checks; an example of a tank check is shown in Appendix 5.

The tanks at Woodhouse Mill are regularly inspected by a qualified engineer. As part of these inspections, the reinspection period of each tank will be determined by the inspection engineer (anywhere from 6-months to 3 years depending on the condition of the tank). Any defects identified during inspections will be actioned and remedial works carried out as soon as possible.

Visual checks on tanks also form part of daily/weekly operational checks. These ensure that any damage or major degradation of tanks is identified as a risk and is reported before a hazard can develop.

4.2 Below ground level tanks/chambers

- Yorkshire Water understand the environmental risk associated with underground structures and are committed to identifying and rectifying any leaks from them. To support this aim, YW commit to the following:
- Daily visual inspection (Mon-Fri on certain sites) of subsurface tanks, wells, and surrounding ground by site operational team. These checks will identify major structural issues visible above liquid/ground level and any changes in ground conditions.
- Monthly external visual inspection of subsurface tanks, wells, and surrounding ground by a technically competent manager.
- Risk assessed additional monitoring.
- Three monitoring techniques have been identified as potentially appropriate for subsurface tanks/chambers identified as high risk.
    - Drop testing - the chamber/tank will be filled to normal maximum operating level, covered to prevent loss by evaporation, and left for 24 hours. For each tank an acceptable drop in level will be specified, if this is passed during the test, a repair will be completed.
    - Empty and inspect – tanks will be emptied, cleaned and a visual inspection completed.
    - Borehole monitoring – sampling of up- and down-hydraulic gradient boreholes located around a tank perimeter will allow leaks from the tank to be detected and investigated as required. Following an initial period of monitoring to establish a baseline, trigger levels will be set and agreed with the EA.
- Repair timescales.
    - Where a leak is detected using any of the above techniques, YW will isolate the source of the leak e.g., empty or bypass the tank as soon as practicable. The tank will not be returned to service until a repair has been completed.
- The use of inlet/outlet flowmeters to detect leaks has been considered, but the large volumes of flow passing through pipes combined with accuracy limitations of the instrument mean that leaks are likely to have already had an environmental impact, visible at ground level, by the time they are large enough to be detected. On this basis YW do not consider flow comparison to be a useful tool for leak detection.

4.3 Underground pipes

To mitigate the risk of failure of underground pipework, e.g., cracks and splits, surveys are completed using in-pipe crack detection technology every 5 years if mechanical joints are present, and 10 years if they are not. For future pipe installations, underground pipework will be avoided. Where this is not possible, pipes will be installed with secondary containment and leak detection.

In the event of an incident/ accident a team will be deployed immediately to isolate the damaged pipe and a spill management procedure will be followed. Thereafter, repairs to the damaged pipework will be arranged. Additionally, the incident will be logged, and hazard assessed to reduce or eliminate the risk of occurrence.

4.4 Impermeable surfaces

Appropriate containment of potential spills in large part relies on capturing them on impermeable surfaces that protect underlying ground. At Woodhouse Mill these surfaces are typically made of concrete and YW are committed to keeping these in good condition to ensure that any potentially polluting liquids cannot pass the impermeable layer. The most likely path for liquids is through cracks and other damaged areas.

Responsibility for monitoring the condition of impermeable surfaces sits with two roles within YW.

- Site operators will carry out daily visual inspection of impermeable surfaces as part of their normal duties.
- The Technically Competent Manager (TCM) with responsibility for the site will carry out a monthly inspection of impermeable surfaces.

Where damage is identified a high priority job will be raised for repairs to be completed through the YW reactive maintenance system. In cases of severe damage, temporary protection will be installed around the damaged area to ensure that effective liquid capture is maintained.

5 Implementation and timescales

5.1 Construction

A plan outlining the implementation of containment solutions identified is shown in Table 7. The timescales and estimated dates are indicative, and subject to timely external contract appointment, including acceptance of the procedures and ideal weather conditions for construction. Furthermore, bottlenecks, such as resource availability due to ongoing number of installations has not been factored in. These will be revisited once contractors are appointed, and capacities understood.

Table 6. Secondary containment implementation stages and schedule.

Stage	**Estimated date complete**
Completed detailed final design	1st March 2024
Commence construction	30th April 2024
Complete construction	December 2024

6 Conclusions and recommendations

This study has considered the risks associated with CIRIA C736 defined loss of containment scenarios at Woodhouse Mill STF installation. This assessment was completed using a source-pathway-receptor model. A computational modelling study has been undertaken, which adopted conservative assumptions to understand a worst-case scenario for the spread of spills. A computational modelling study has been undertaken, which adopted conservative assumptions to understand a worst-case scenario for the spread of spills. This enabled the potential effects of a substantial, unmitigated loss of containment to be considered; this has shown that further mitigation is required to protect sensitive receptors (the metric of compliance being an equivalence to a traditional 25 / 110 per cent capacity secondary containment bund in line with CIRIA C736 via the ADBA study).

The need for additional secondary containment infrastructure has been confirmed and YW commit to installing this. YW also understand the following factors and existing mitigation measures should be maintained to ensure an appropriate level of environmental protection:

Current controls

- Continuation of the measures already in place to minimise the likelihood of catastrophic failure of sludge vessels, through the use of stringent technical standards, SCADA technologies and regular visual inspections.

Existing infrastructure

- Site drains are able to return liquid to the inlet works for treatment, providing containment and flow mitigation.
- The sludge cake storage and loading pad has been engineered to drain liquid contents which returns to the inlet works of the WwTW, acting as remote containment.
- In most areas the site surfacing and drainage would capture spills, leaks and catastrophic pipe failures, transferring the liquid to the WwTW for safe treatment. This will minimise the potential effects of loss of containment.

Reducing Likelihood

- Whilst the potential for catastrophic tank failure can never be wholly mitigated when sites are operated with large tank inventories, the likelihood of substantial failure is very low, as evidenced by YW's own track record of operating sludge storage/treatment vessels across its asset base.
- In support of likelihood of failure YW has reviewed actual failure data. YW has over 40 years of experience in operating AD plants and STF's. YW has 14 AD sites, 5 of these sites have Environmental Permits. Within this time YW has not experienced the catastrophic collapse of a storage vessel.
- YW has found from experience that 'failures' of concrete tanks are generally associated with ancillaries such as joints, waterstops, seals, etc, rather than any inherent defect with the actual civil structure. YW has experienced one incident of note, and this was at Hull STF digester number 5. This example is a case in point; the release of sludge that occurred was caused by the failure of a 'link seal' mechanical coupling that should have provided a watertight seal around the outside of a mixer pipe intrusion. In comparison with a catastrophic collapse scenario, this resulted in relatively controlled spill of small volume.

Environmental impact

- Receptors in the area must be protected from the effects of major sludge spills to reduce pollution and impacts to biodiversity.

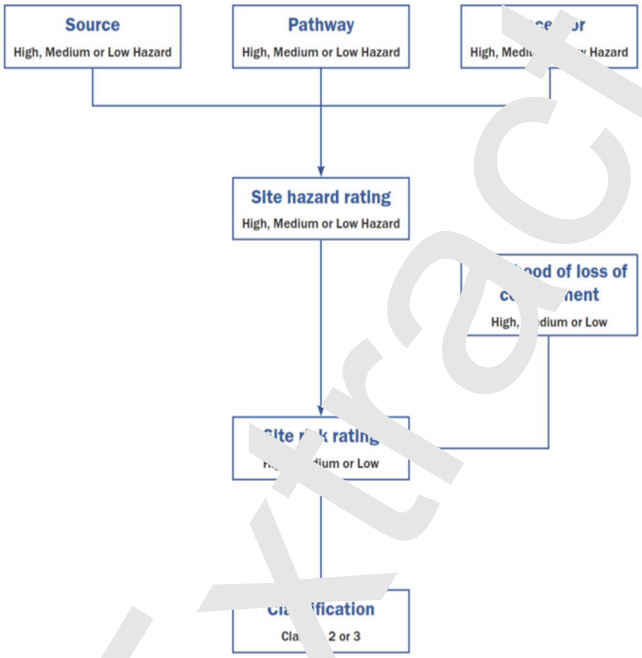
7 Appendices

Appendix 1 – ADBA assessment tool

Although this tool works as a standalone tool, we recommend you read this first: ADBA CIRIA736 Bund Classification Assessment

There are 5 steps to follow:

1) Identify the hazard posed to the environment by the inventory of materials held on the site and the location of the site
   a. Categorise the source
   b. Identify the pathways
   c. Identify the receptor
2) The Site Hazard Rating is derived by this tool from the combination of the hazards assessed above
3) Calculate the likelihood of a loss of primary containment event occurring
4) The combination of the Site Hazard Rating and the likelihood of a loss of containment occuring gives the site risk rating and required secondary containment classification
5) From the class of containment needed, identify suitable designs from the 'Standard Containment Designs' sheet



Additional Guidance

As detailed in section … of CIRIA C736, determining an overall hazard rating for the site is largely subjective, and assessing the combined effects is a judgement based on knowledge, experience and the degree of confidence in the information available.

Section 2.4 of CIRIA C736 states: "*where there is uncertainty about the correct categorisation of any of the individual source, pathway or receptor hazard ratings, it may be appropriate to move the overall site hazard category to the next higher rating*".

The worksheets in this spreadsheet are protected to prevent inadvertant damage to the tool. To remove the protection, the password is CIRIA736

Screenshot from spreadsheet containing full assessment. Full document included as part of permit submission.

Appendix 2 – Bunding solution – key features

Category	Criteria	Unit	Value
Site wide			
Design specification	CIRIA C736 spill volume [25/110%]	m^3	9,720 (110% of all tanks)
	Bund perimeter length	m	N/A
	Total containment surface area	m^2	N/A
	Maximum Final Spill depth	m	N/A
Build required	Required concrete walling length	m	N/A
	Required earth works length	m	N/A
	Impermeable surfacing area	m^2	8995
	Trief kerb length	m	N/A

Appendix 3 – Structural integrity note for concrete tanks

Technical Note

aquaconsultants
water · environment · energy

Project: Yorkshire Water – IED

Title – Leakage of water through concrete sections.

Author – Imran Nawaz MEng CEng MICE

Date 08/06/2022

1. Introduction

This Technical Note discusses the possibility of concrete tank walls developing an aperture through which fluids could be ejected at speeds resembling a jet. In fluid terms a jet develops when laminar flow is achieved at significant velocity at 90 degrees from the plane of the aperture.

2. Concrete section construction

Concrete is formed from angular aggregate suspended in a matrix of cement paste and sand. Upon pouring and vibrating fresh concrete the aggregates settle at the bottom of the mixture while being fully surrounded and immersed in the cement and sand paste. During this process the excess water and cement paste rises to the top and careful mix design and match management is needed to ensure this paste is not too much or too little; in both cases the result would be poor surface finish and weaker concrete.

The final product is well compacted angular aggregate with a good degree of interlock bound by the hardened cement paste.

3. Concrete in service.

Concrete in service is subject to many effects that cause expansion and contraction. These include drying shrinkage as the water which is not chemically bound by hydration evaporates; autogenous shrinkage as the product of the chemical reaction takes up a smaller volume than the constituents; thermal strain; and differential settlement. In addition to these, the structural stresses in the concrete cause tension and bending, both of which cause a tension force in the concrete. All the effects described here contribute to cracks developing on the face and within the interior of the concrete. In all reinforced concrete section including those that are structurally sound, the concrete will crack and redistribute the tension force to the steel reinforcement by a combination of chemical bonding (between steel and cement paste) and aggregate interlock with the ribbed bars. Cracks are generally designed to be 0.3mm, although acceptable crack width will be less than 0.2m for water retaining concrete, which will allow water retention while keeping water egress through the cracks to a small an acceptable level.

4. Concrete deterioration.

Concrete hardens and strengthens over time as the hydration reaction continues along an asymptotic curve. However, processes such as chlorine attach, carbonation and freeze-thaw can cause weakening and deterioration of the concrete. In addition to this, acidity, ground conditions and the nature of the retained material within a tank can accelerate deterioration.

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1

In extreme cases the effects of this can be:

- Severe weakening of the concrete leading to crushing failure.
- Severe delamination of surface layers over a great length exposing the steel reinforcement, causing it to corrode so the section fails in tension.
- Severe steel and/or concrete deterioration at junctions i.e., slab/wall/beam/column interfaces leading to shear failure and adjacent sections becoming detached.

Although exceedingly rare, the cases above describe total failure conditions. In these cases, leakage of fluids is not so much of a problem as structural collapse. Less extreme cases allowing water or fluid egress a tank are described below.

- Significant damage or corrosion to reinforcement leading to excessive crack width and significant leakage. In this situation the crack can be significant and even penetrate the full section of concrete wall. The water flowing through follows a tortuous path around the aggregate before it leaks out of the surface.
- Significant spalling and loss of material from a zone on the inside and outside of the concrete wall. In this situation the remaining thickness can retain the water. If this location also coincides with a crack, water will flow through a tortuous path as described above.

This type of damage allows water leakage, water jetting would not occur as long as a small intact section of concrete is present to impede laminar flow.

Considering the possibility of an aperture opening in the wall, this could in theory occur if spalling, and loss of cement and aggregate became so severe that it penetrated the section. Although it is not rare for severe material loss to occur, for conditions to be this aggressive they would affect a large area or the majority of the structure, causing significant loss of section leading to structural failure in stages preceding development of a full thickness aperture.

5. Conclusions

When the concrete is in service or subject to significant concrete deterioration, spalling and loss of section, the condition of laminar flow through an aperture will not develop.

Under severe concrete deterioration, any conditions approaching aperture formation will lead to structural failure before an aperture can form therefore the likelihood of this happening are considered to be negligible.

- End -

Appendix 4 – CIRIA C736 jetting calculation

For a small diameter sharp edged discharge orifice, it can be demonstrated that:

$l^2 = 4\,C_v^2\,(z-h)\,(H-z)$

where C_v = coefficient of velocity

In practice, $C_v \cong 0.99$. Assuming $C_v = 1$ leads to the conservative solution:

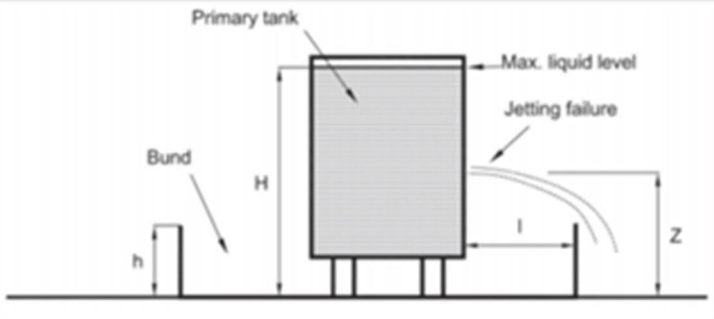
$l^2 = [4(z-h)(H-z)]^{0.5}$

For a given value of h, it may be shown the l is a maximum when:

$z = 0.5H + 0.5h$

which leads to the solution:

$l_{max} = H-h$



Appendix Figure 1. CIRIA C736 jetting calculation to determine jetting solution.

Appendix 5 – Example tank inspection report

Form No: YW-INSP-FRM-1, Rev 4a, 2020 11 04

YorkshireWater

EQUIPMENT INSPECTION REPORT

Calder Vale STW/STF. Digested sludge holding tank No: 2.

Report Number:	**CALDE-INSP-016**	**Inspection Procedure**	**YW-InsProc-24**
Equipment Number:	**PLI00386066**	**Category:**	**External visual**
Service:	**Sludge storage.**	**Equipment Used:**	**Camera**
P&ID Number:	**N/A**	**Site Operator:**	**Daniel Jones.**
Associated IAN's	**N/A**	**Site Manager:**	**Joe Kelly.**
Associated MAL's	**CALDE-MAL-009**	**PoWRA Completed**	**Yes**

Inspection to be as defined in the INSPECTION MANUAL

Type of Inspection:	Date of Inspection (Mth-YYYY):	Scheduled Interval (months):	Next Inspection Date (Mth-YYYY):	Maximum Interval (months):
Thorough External Inspection:	**APRIL-2021**	**36**	**APRIL-2024**	**60**
Thorough Internal Inspection:	**N/A**	**N/A**	**N/A**	**120**
On-Stream Thickness Survey:	**N/A**	**N/A**	**N/A**	**N/A**

Site address. Calder Vale STW/STF. Calder Vale Road. Wakefield. WF1 5PJ.
Inspection date: 22/04/21. Repeat inspection.
Previous reports. CALD-INSP-007. MAY-2019.

Equipment list.

- **Digested sludge holding tank No: 2. PLI00386066.**

Inspection details. Digested sludge holding tank No: 2.
Manufacturer: Galglass. Installed: Aug 2004. Capacity: 314.2m3. Material: Shell. GFS. Open topped.

External. Since the last inspection in May 2019, there has not been any notable change to the tank's external condition. All shell panels are free from corrosion and the glass bonded coating is intact. Photo ref: 1.

Panel bolting is in an acceptable condition. Panel joint sealant is generally embrittled with cracking noted. No leaks, where seen, from the panel joints. Photo ref: 2.3.4.

Manufacturer's nameplate is secure and legible. Photo ref: 5. No earth strip is installed.

The tank has had a new tank I/D sign secured to the shell as per CALD-MAL-002. Photo ref: 6.

The galvanised steel manway unit is free from corrosion. The davit arm for the manway lid is secure and free from corrosion. Photo ref: 7.8.

The concrete base surround is intact with no significant cracking/damage. Photo ref: 9.

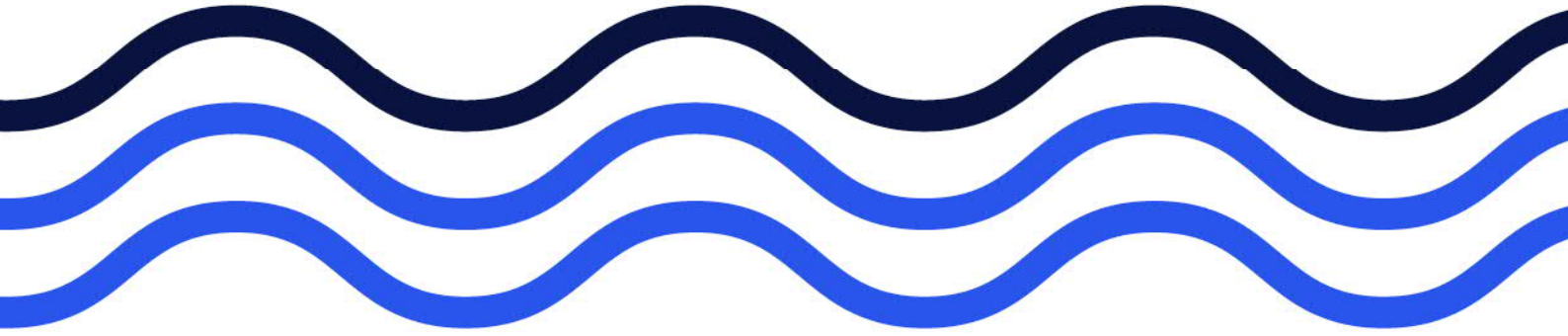
Pipework. The ductile iron grade inlet pipe is insulated. The outer metal cladding is secure and free from corrosion. Where the pipe is exposed at soil level, the paint coating is intact. Bolted flange joints are in an acceptable condition where seen. Photo ref: 10.11.12.

Page 1 of 16

Appendix Figure 2. Example equipment inspection report

Appendix 12 Waste Pre-acceptance and Acceptance Procedure

Waste pre-acceptance, acceptance and rejection Procedure for Anaerobic Digestion



YorkshireWater

Document Control

Document Control Ref:	V001
Document Location:	YW IMS (Environment and Waste > Waste and Installations > IED)
Document Custodian:	David Shaw
Review Period:	Every 12 months or sooner if: - the waste changes - the process giving rise to the waste changes - if waste is found to be non-compliant.

Document Approval

Name	**Name**
David Shaw Policy and Assurance	
Document Owner (Author)	**Document Approval Manager (Tier 3)**

Document Revision History

Version	Date	Revised By	Reviewed By	Amendment Details
1	20/12/2023	David Shaw	Hazel Morgan	New document
2				
3				

Business areas affected by this document
This applies to colleagues that are operating an IED STF or colleagues moving sludge on behalf of Yorkshire Water (YW) into a YW Anaerobic Digestion (AD) Site. It may also be applicable to any YW colleague that wants to export an abnormal sludge load into an IED AD facility.

1. Introduction

This document details the waste pre-acceptance, acceptance and rejection procedures for wastes received for anaerobic digestion (AD) at the Sludge Treatment Facility (STF) located at Yorkshire Water (YW).

This details how YW has established procedures that align with the guidance in the Best Available Techniques Reference (BREF) Document for Waste Treatment, for operational techniques to improve environmental performance.

This procedure is written using guidance produced by the Environment Agency on 'Biological waste treatment: Appropriate measures for permitted facilities' (September 2022).

1.1. Waste steams treated by AD

The YW AD facility treats only sewage sludges arising from YW waste water treatment works (WwTW). These non-hazardous waste water sludges arrive at the AD facility via two routes:

- ***Indigenous sludges***. Originating from the adjacent wastewater treatment works (WwTW) on the wider YW site and transferred to the AD facility via above or below ground pipes as liquid sludge.
- ***Imported sludges***. Arriving via sludge tanker from smaller WwTWs that have limited or no capacity for AD treatment. Imported sludges arrive as either liquid (typically 2-6%dry solids) or as cake (typically >16% dry solids).

No commercial waste will be treated at the facility.

The only wastes that will be accepted for AD will be the EWC code wastes listed in the environmental permit in schedule 2, table 2.2, reproduced in table 1 below.

19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)
19 08	
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 05	sludges from treatment of urban waste water

Table 1 –Permitted wastes

Table 2 provides a summary of the wastes accepted at the AD facility by waste stream, EWC code and origin.

Waste Stream	EWC code	Origin
Indigenous sludges	19 08 05 sludges from treatment of urban waste water	Sewage sludges arising from adjacent WwTW.
Imported sludges	19 08 05 sludges from treatment of urban waste water	Sewage sludge originating from other WwTW sites, delivered directly to the AD facility by tanker, comprising raw sludge.
	19 02 06 sludges from physico/chemical treatment other than those mentioned in 19 02 05	Thickened sludge arising from dewatering activities originating from other WwTW sites, delivered directly to the AD facility by tanker.
	19 02 06 sludges from physico/chemical treatment other than those mentioned in 19 02 05	Sludge cake that may originate from other WwTW sites and is stored on the STF cake pad as a contingency measure (Note 1). This sludge cake will require treatment at the AD facility.

Note 1: Sludge cake may need to be relocated for environmental protection reasons (e.g. flood risk to site) or if an unforeseen breakdown with the cake import facility has occurred.

Table 2 – Description of wastes

1.2. Key site personnel and responsibilities

This document details the characteristics of the sludge to be treated and confirms the conditions in which the sludge would be rejected. It is a requirement of the site permit that this document is in place and adhered to.

It is the responsibility of the Site Manager, the site Technically Competent Manager (TCM) and the Site Operators to ensure this procedure is adhered to.

1.3. Tracking system

This waste pre-acceptance and acceptance procedure is part of the YW Management System. The company's Sludge Delivery Scheduling system together with its WaSP software (for logging the delivery of sludges by individual tankers) ensures that a system is in place to track waste from the point of sludge pre-acceptance enquiry through to delivery at the AD facility.

2. Waste Pre-acceptance procedure

Waste pre-acceptance activities will be undertaken to determine if the waste is suitable for treatment at the AD facility. A risk-based approach will be undertaken to characterise the waste, assess the risks to process safety/occupational safety/the wider environment and to assess the impact of the waste stream on the AD process and outputs. These activities will take place prior to waste acceptance at the facility.

2.1. Legal suitability checks

An initial legal check will be undertaken on the waste. The waste type must be listed in the environmental permit for it to be suitable for AD. Information on the source, nature and point of origin of the waste will be obtained and verified against the permit EWC codes and the information presented in Table 2.

Only waste arising from WwTW sites will be treated by AD. Any enquiry from a commercial customer to deliver waste for treatment by AD will be rejected.

The proposed method for delivering the wastes to the STF will be assessed to determine if it complies with the YW safety procedures. Imported waste must be delivered in an appropriate tanker that can discharge safely into the sludge import tank.

If the waste is legally suitable, then further information will be requested on the potential quantities and characteristics of the waste, as described in this procedure.

2.2. Sampling procedures

YW commits to pre-acceptance testing of indigenous and imported sludge in order to determine its suitability for AD. This testing will also provide a bank of information that will enable YW to monitor the consistency and variability of waste from different origins.

Indigenous sludges are generally fresher in age than imported sludges. The age of indigenous sludge ranges from a few hours old up to 10 days in normal operation. Imported sludges are generally anywhere from 1 day – 6 months for the smallest WwTW sites. The sludge age is important as it can lower the sludge calorific value and affect digester health and in turn the amount of biogas that is generated. It is worth noting that smaller sites, which have a relatively older sludge age, will produce a much smaller quantity of sludge than larger WwTWs and have a lesser impact on digester health.

A representative sample of sludge will be collected for testing. The following information will be recorded for each sludge sample:

- Origin of waste – indigenous or imported, including the name of the originating WwTW
- EWC code/method of production – filter works, activated sludge, thickened sludge
- Size of sample
- Age of the sludge sampled
- Date of sample

An STF typically accepts sludge from ~100 smaller WwTW. The sludge is deemed to be consistent and therefore samples for waste characterisation will be carried out on a risk-based approach.

Sludge samples will be taken from a minimum of 10 of the 100 exporting sites. These will be selected on a risk basis and shall include sites that:

- Are the largest contributors of sludge (by volume)
- Have industrial customers within their catchment whose effluent could contain compounds with potential to disrupt/impact AD biology.

These sites would have the greatest potential to negatively impact on AD operations and therefore it is important to understand their waste characteristics.

The sampling will be undertaken by the TCM or appropriately trained Site Operator and tested at a third-party laboratory with a documented management system accredited to EN ISO 17025.

2.3. Waste Characterisation

Information on the characteristics of the waste will be obtained prior to acceptance of the waste at the STF. These characteristics fall into four groupings:

- Visual – colour, cake or liquid
- Physical – thickness (pumpability), total solids
- Level of acidity/alkalinity - measurement of pH
- Chemical – e.g. lab test results for contamination with heavy metals

Table 3 lists the test parameters for sludge samples taken during pre-acceptance. These parameters will provide information on the consistency of the sludge, the biodegradability and alert YW to any contamination/toxicity that may cause it to be unsuitable or inhibit biological activity.

These parameters have been selected as the most relevant to sewage sludge because they have the greatest potential to impact on the digestion process and on the quality of the digestate, the end product. The selection of the testing approach and acceptable ranges/trigger points is informed by operational experience, guidance on input material testing in PAS110:2014[1] and the Inhibition Values for anaerobic processes in section 13 of the EA guidance 'Biological waste treatment: Appropriate measures for permitted facilities'.

[1] PAS 110:2014 – Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials.

Parameter	Testing Standard /Approach	Acceptable Range
Colour	Qualitative testing	Within typical colour range
Particle Size distribution and physical contaminants	Qualitative testing	Evidence of rags and large contaminants will be rejected unless sludge passes through a screening system
pH value	BS EN 13037	Sewage sludge is usually slightly acidic pH hydrolysis and fermentation acido and aceto genesis – optimal pH 5-7 Methanogenesis – optimal pH7-8; operational 6.5-8.5 Typical pH range of sewage sludge 6.5-8
Total solids	BS EN 14346	WaSP system records total solids. Sludges greater than 20% dry solids have a reduced capacity for being pumped through the system.
Potentially toxic elements (PTEs) Heavy metals • chromium • zinc • copper • nickel • cadmium • lead	Various EN standards available (e.g. EN ISO 11885, EN ISO 17294-2, EN ISO 15586)	Heavy metals, if above acceptable levels, may cause a toxic effect on the digester biology.
Ammonia and total nitrogen content	EN 12260, EN ISO 11905-1	Ammonium build up may inhibit the anaerobic process No threshold data provided

Note: It is Recognised that the inhibitory values are under review and may be added, removed or amended. This table will be updated when data is available or otherwise in agreement with the Environment Agency.

Table 3 – Test parameters

This information will assist YW in understanding how each waste type would be processed, the effect of the different waste streams/sources on the AD process, in order to manage the facility more efficiently, predicting gas generation and digested sludge properties.

The likely weekly volumes, delivery frequencies and estimated annual quantities of each waste identified for AD treatment will also be recorded.

2.4. Record keeping

The pre-acceptance waste characteristics information will be obtained in writing or electronic form. All information will be stored electronically on a central database system called ROD.

The pre-acceptance records will be retained for at least 3 years using the YW computerised waste tracking systems following receipt of the waste. If an enquiry does not lead to receipt of the waste, a record does not need to be kept.

2.5. Reassessment of waste

Wastes will be reassessed should the following occur:

- There are significant changes in the waste e.g. the physical description is different to previous samples taken from the site source
- There are process changes at the WwTW that results in changes to the waste changes e.g. a different type of sludge thickening agent is used
- There are significant changes to industrial waste water sources
- The waste received does not conform to the pre-acceptance information

Irrespective of the above, an annual pre-acceptance review will be undertaken to ensure the waste sources remain suitable for AD.

2.6. Confirmation of suitability

The Site Operator, under the instruction of the TCM, will determine if the pre-acceptance information received meets the legal and technical requirements of the AD facility.

3. Acceptance

The AD facility treats only sludges arising from WwTW sites. These are known sources and the waste will be consistent in its characteristics. It's anticipated that only on rare occasions will waste need to be rejected.

In accordance with Section 6.8 of guidance produced by the Environment Agency on 'Biological waste treatment: Appropriate measures for permitted facilities' (September 2022), acceptance sampling requirements do not apply to sewage sludge and septic tank sludge. Instead, visual checks and periodic audits against pre-acceptance characteristics will be undertaken.

The following sections of this procedure detail how visual acceptance checks will be undertaken, the waste rejection process, record keeping and periodic testing.

3.1. Characteristic checks prior to tanker/tipper loading

Tankers are used to collect liquid sludges from smaller YW WwTW sites to a STF for AD. This should be consistent in colour and odour. The tanker driver will undertake a visual and / or odour check on the waste prior to loading. If the waste has a typical appearance and odour it will be loaded and delivered to the AD site.

Tipper vehicles are used to transport sludge cake from smaller YW WwTW sites to a STF for AD. Prior to loading, the tipper driver will inspect the cake to ensure it is not too wet/has high dry solids and therefore will not seep out of the vehicle onto the road. The waste will be rejected if the water content is too high or if it has weeds growing on it.

The waste will be rejected for collection if it:

- Has a darker colour than usual
- Appears to be contaminated with oil
- Has a different/unusual odour suggesting the waste is septic or has other contamination

These visual and odour checks take place prior to collection of the waste from the WwTW.

3.2. Visual and physical characteristic inspection at the STF

Waste is only received and accepted under the supervision of a suitably qualified operational team member. A visual inspection of solid feedstocks is carried out before any waste is unloaded. This will check for any unusual malodours and visual appearance differences, to confirm the waste is consistent with agreed pre-acceptance parameters.

Under normal operation, every liquid sludge waste load received on site will enter the AD import facility via a WaSP logger, a software data management system. This records the total quantity of waste and the % dry solids (total solids) in addition to the time and date on when the waste was unloaded. The system will only permit the waste to be unloaded if there is sufficient storage capacity in the holding tank. Insufficient storage capacity will cause the valve to close, which will automatically turn off the tanker pumps and unloading will cease as a result.

3.3. Storage of sludge cake

Any sludge that has failed acceptance testing and needs to be quarantined must not be stored on site for longer than 5 working days.

In exceptional operating circumstances, for example where cake import facility is unavailable due to mechanical downtime, sludge cake may be imported onto the cake pad awaiting further processing through the AD. Any imported cake must be stored appropriately so as not to cause a contamination risk to any digested sludge piles or an amenity impact.

3.4. Rejection of waste in import tank

Sludge that does not meet the agreed quality criteria must not enter AD treatment. Through the visual inspection process, early identification of issues should eliminate problems. However, imported liquid and sludge cake are soon fed into the process. Any problem not identified at visual inspection stage may have entered the process by the time a problem has been identified. If this occurs the following steps will be undertaken:

1- Waste will be isolated in the tank
2- A tanker will couple up to the appropriate tank and empty it of its contents
3- No further imports will be accepted whilst this emptying is occurring

4- The tank will not be put back in service until all contents are removed. Only at this point will the site be open to imports

3.5. Treatment of septic sludges

Treating a high load of septic sludges can cause increased foaming, reduce biogas yield and produce more carbon dioxide and hydrogen sulphide. In addition, sludges may be higher in metal concentration due to evaporation of sludges, which can be toxic to the digester bacteria causing rapid bacterial poisoning and a reduction in biogas yield. Sludges may be outside of a normal pH range, a shock impact of which could affect digester health and impact biogas yield.

Sludges that are septic in nature, and where the load is deemed significant, will be subject to testing prior to acceptance at the AD import facility. A sample of the waste must be taken before it has left the exporting site and the results submitted to the TCM for review*. The results will be used in a digester toxicity calculator to determine the correct course of action. The possible outcome of this toxicity analysis are as follows:

- Acceptance of the sludge at the requested site
- Acceptance of the sludge at another YW AD site (where the toxicity calculator demonstrates there will be no issue to digester health)
- Reduced load acceptance at the requested site (i.e. part load acceptance to enable blending with normal sludges)
- Acceptance of load over a longer period of time
- Combination of the above
- Rejection of the sludge in its entirety and another outlet (i.e. landfill) to be found**

* At minimum, Sludges will be tested for the following… pH, volatile solids concentration, ammonia, potential toxic elements (PTEs).

**Sludge will be rejected if a reduction in the sludge load and / or increase of import time makes no difference to the waste's toxicity and it continues to fail toxicity limits.

Rejected loads will be sent to a suitable facility for processing and any records of the decision to reject abnormal loads and the associated digester toxicity calculation will be kept for no less than 3 years.

3.6. Waste tracking

All Imported sludge loads are tracked through the WaSP import facility. In the event of an issue arising with digester health, the WaSP system can be interrogated to identify the sludge origin. The outcome of any investigation will be to minimise the reoccurrence of an issue arising in the future.

3.7. Periodic sampling

Testing will be carried out on the parameters listed in table 3 when a problem with a waste source has been identified at the STF or if the waste may have changed in characteristic as detailed in section 2.5. Sampling and inspection may only be carried out by operators with appropriate technical knowledge to identify and deal with non-conforming feedstocks.

This test results will be used to ensure the waste characterisation in section 2 remains accurate.

4. Definitions

Definitions of Terms Used:	
Yorkshire Water	Yorkshire Water is used in this document to refer to Yorkshire Water Services Limited and all other subsidiary companies within Kelda Holdings.
Anaerobic Digestion	AD is used to refer to anaerobic digestion. The process which imported waste is subject to at this sewage treatment facility.

5. Compliance with this document

Colleagues shall comply with the requirements of this document, in line with the company Conduct Policy.

6. Assurance

Regular monitoring of compliance with these requirements shall be undertaken by the assurance providers documented as part of the Assurance Framework.

Any sampling that is undertaken will be taken in accordance with sampling procedures as documented in the internal guidance document Operator Self-Monitoring, which can be found on the Integrated Management System. Samples must be tested at a UKAS accredited laboratory.

7. Related Documents

Appendix 13 LDAR Plan

Management Procedure

Woodhouse Mill Leak Detection and Repair (LDAR) Plan

Document Control

Document Control Ref:	Version 1
Document Location:	IMS
Document Custodian:	IMS Team
Review Period:	2 Years or as defined using a risk-based approach by the document owner.

Document Approval

Ed Sutherland Project Sponsor Bioresource Asset Management **Document Owner (Author)**	**Alex Cook** Site Manager Energy and Recycling South **Document Approval Manager (Tier 3)**

Document Revision History

Version	Date	Revised By	Reviewed By	Amendment Details
1	19/09/2023	Ed Sutherland	Hazel Morgan	
2				
3				
4				

Contents

1. Introduction to LDAR

1.1 Purpose

As operators of Sludge Treatment Facilities (STFs), Yorkshire Water (YW) shall comply, as applicable, with the Environment Agency's document 'Appropriate Measures for the Biological Treatment of Waste' which provides guidance on how to comply with legislation governing anaerobic digestion of sewage sludge. One specific requirement in the appropriate measures document is the provision of an LDAR (Leak Detection and Repair) Plan to control emissions of organic compounds, including biogas, to air from the STF and associated infrastructure (for example, pipework, conveyors, lagoons or tanks).

"Leak detection and repair (LDAR) programme'' means a structured approach to reduce fugitive emissions of organic compounds by detection and subsequent repair or replacement of leaking components. Currently, sniffing (described by EN 15446) and optical gas imaging methods are available for the identification of leaks as set out in BAT 14 and section 6.6.2 of the Waste Treatment BAT Conclusions.

This management procedure outlines the overarching requirements of Yorkshire Water's LDAR programme and specifically how these shall be applied at the Woodhouse Mill STF.

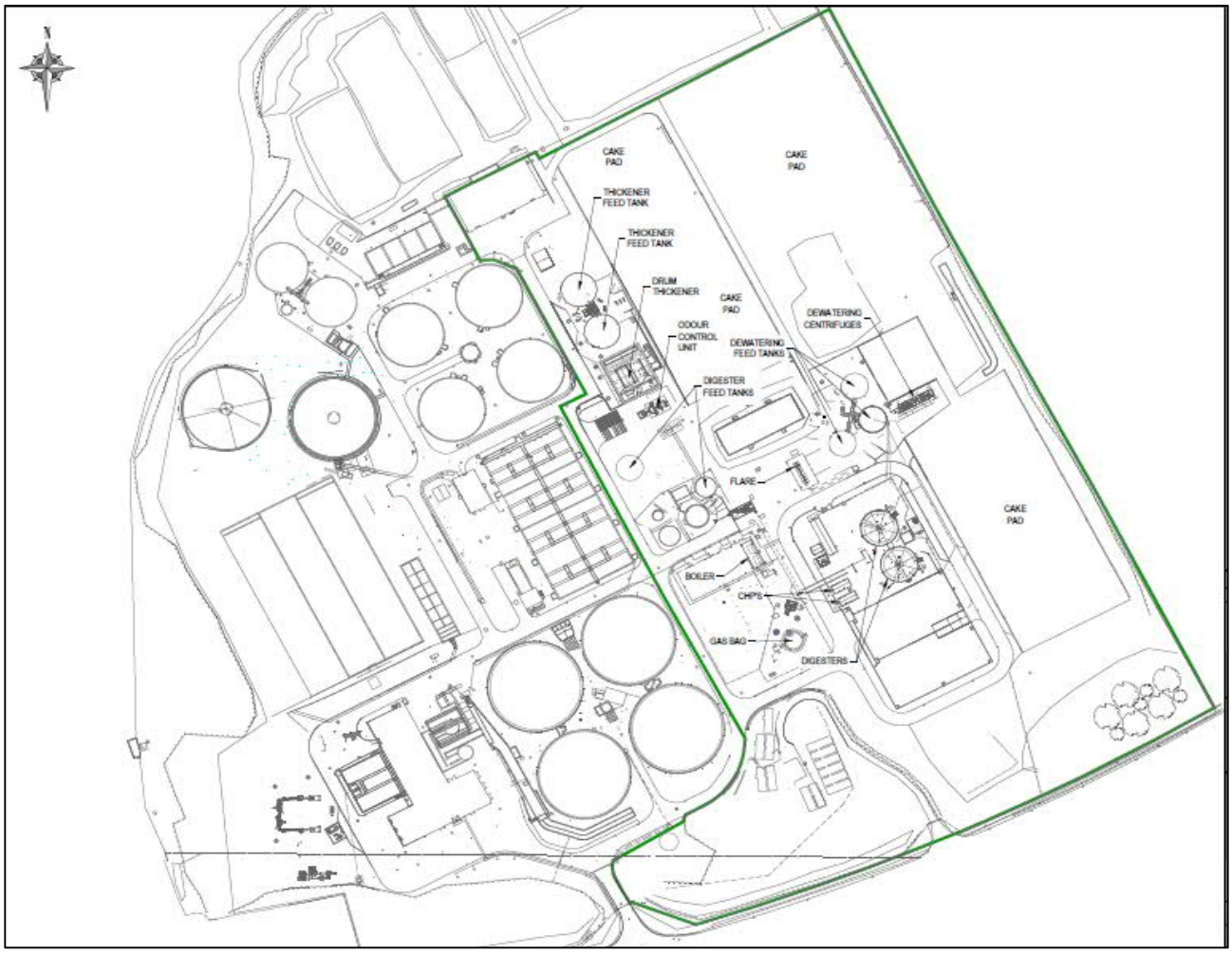


Figure 1 – Site layout IED permit boundary

1.2 Scope

This Management Procedure shall apply to all plant and equipment within the boundary of the STF which has the potential in normal (or abnormal) operating conditions to result in the release of potentially polluting or nuisance causing substances arising from the unintentional releases. This plant and equipment, includes, but is not limited to the following:

- Anaerobic Digester Tanks
- Pressure Relief Valves
- Biogas pipework from AD to biogas treatment and storage
- Natural gas pipework
- Biogas storage
- Pipework from biogas treatment to flare stack and engines
- CHPs
- Boilers
- Flare Stack

And all such related connections, pipework, valves, pumps and other connections

1.3 Responsibilities

It is the responsibility of the Site Operations Manager to ensure the implementation of the LDAR plan.

1.4 Assurance

Regular monitoring of procedure compliance shall be undertaken by the assurance providers documented as part of the Assurance Framework.

2 LDAR Considerations

The LDAR programme provides a structured approach to identifying and controlling releases of volatile organic compounds to air from equipment within the IED permit boundary. Typical causes of these releases would be damage to or degradation of items such as pipework, joints and other equipment linked to the transport, storage or processing of biogas or natural gas.

2.1 Biogas

Biogas is produced by bacteria within the anaerobic digester. Its composition is variable but will typically be within the following range.

Compound	Formula	%
Methane	CH_4	50–75
Carbon dioxide	CO_2	25–50
Nitrogen	N_2	0–10
Hydrogen	H_2	0–1
Hydrogen sulphide	H_2S	0–3
Oxygen	O_2	0–0.5

From an environmental and H&S perspective the key concern associated with uncontrolled releases of biogas are levels of methane (an explosive gas that is also environmentally damaging) and H_2S (typically found in low concentrations, but extremely toxic).

2.2 Natural Gas

Natural (mains) gas is used as a backup fuel on anaerobic digestion sites when insufficient biogas is available due to process limitations or disruption. It is most commonly used as a supplemental fuel source for boilers.

2.3 Leak Detection Equipment

Scheduled inspections under the LDAR programme shall be carried out using optical imaging devices with appropriate filters to detect methane and/or 'sniffer' style devices that detect methane directly.

The standard YW equipment for detecting release of gases is an FLIR GF77 camera fitted with an appropriate lens for detecting biogas and/or natural gas.

The scheduled inspection shall be supported by regular inspections by the site operational team. Although the focus is on prevention of leaks, in the event that one does develop, site staff are likely to identify this by its distinctive smell. As an additional detection measure, standard operational H&S requirements include the wearing of personal gas monitors at all times within the STF, these will alarm in the event of a large-scale release of gas.

2.4 Leak Volume Measurement

Should a leak be identified, an estimation of the measurement of fugitive emissions of volatile organic compounds (VOCs) shall be undertaken by Yorkshire Water with assistance of technical experts as required. The estimation shall be based on the known gas composition and the concentration of VOC's (ppm) at the interface of the leak. It will then be converted to a mass emission rate to quantify the estimated release of VOCs in kilograms per hour (kg/h). This calculation will be undertaken using the correlation values detailed within the European Standard EN 15446:2008.

The estimation may be determined utilising the following information:

- Calculation based on flow rate, pressure and size of leak area.
- Leak definitions adopted e.g. mass emission rates detailed within EN 15446:2008.

If point source monitoring is undertaken using portable detection equipment, the average value of the total mass emission over the reporting period shall be taken as the average between the total emission rate at the beginning of the reporting period and the total emission rate at the end of the reporting period, multiplied by the duration of the reporting period.

The site operations team are responsible for ensuring that the estimated size of the fugitive emission is recorded on a Schedule 5 notification and sent to the EA, as well as arranging repair of the leak.

As part of normal operations, the gas composition from the digesters (in the case of biogas leaks) will be obtained and can be used in conjunction with the results of the methane leak detection rate to calculate the leak of all biogas constituents based on a percentage basis.

2.5 Maintenance Schedule

YW follow a risk-based maintenance schedule to ensure that their assets are functional and safe.

2.6 DSEAR

AD sites operate under the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR). This legislation defines duties related to the control of dangerous substances, including biogas. There is significant overlap between DSEAR requirements and LDAR, all activities described in this document shall comply with DSEAR requirements.

3 Site

This management procedure details the process for LDAR at the Woodhouse Mill site.

3.1 Site Plan- Emission Sources

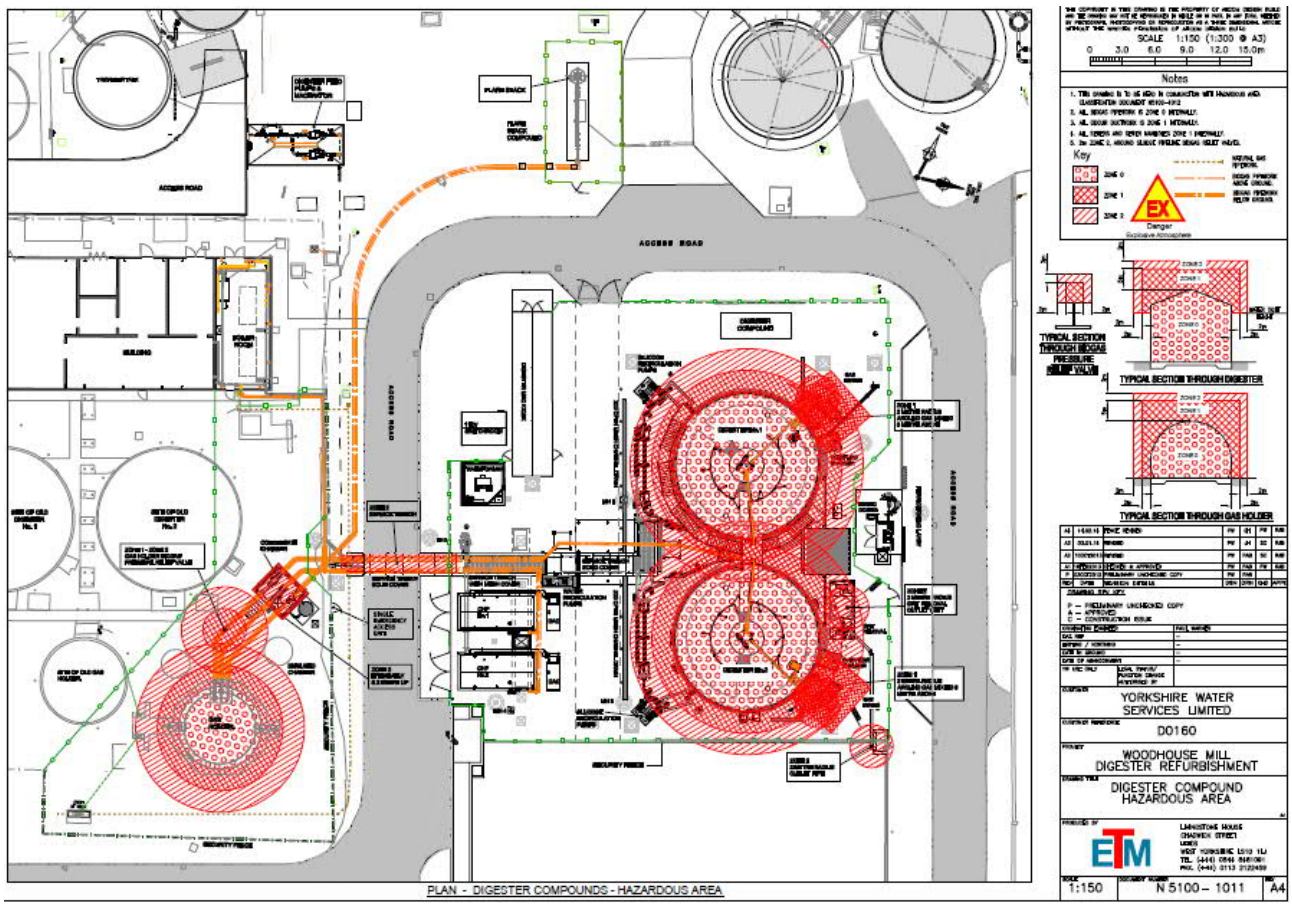


Figure 2: Digester plant emission sources

3.2 Key site information

e.g. typical daily methane production, gas consumers, normal operating pressure(s) of gas lines, over/under pressure setting on PRVs

Typical daily biogas production	4,000 m3/day @ 65% methane
Gas consumers	CHP x 2 Boilers x2 Flare Stack
Normal biogas operating pressure (unboosted)	25mbar
Digester PRV over-pressure release (mb)	28.5mbar
Biogas holder PRV over-pressure release (mb)	-2.5mbar

3.3 Site Specific LDAR Plan

The following actions shall be completed as part of LDAR work:

3.4 Routine operational checks

Visual checks of biogas systems are a daily task for site operational staff. These are recorded on the operational daily spreadsheet.

The purpose of these checks is to identify large scale leaks from the biogas system. They are unlikely to detect minor leaks. To ensure these are addressed, pro-active checks are carried out according to the maintenance schedule.

Staff wear personal gas monitors, although these are primarily a H&S tool, they will provide an audible alert if significant levels of biogas are detected.

3.5 STF Tanks (Anaerobic Digesters)

The only tanks in which biogas would routinely be found are the anaerobic digesters. These tanks are fully cleaned and inspected by competent engineers from the YW Asset Integrity team as per the frequency determined. Currently this means a full internal and external inspection every 10 years.

Any defects that are picked up by the 10-year inspection are addressed immediately via remedial works before the digester is approved to be put back into service for another 10 years.

3.6 Pressure Relief Valves

Pressure relief valves ensure a fail-safe route for gas escape that prevents catastrophic failure of other components within the gas system as a result of excessive pressure build up. They typically also provide under-pressure protection i.e. they prevent a vacuum forming within the gas system. Gas passing through the valves in a genuine high-pressure situation should not be considered a fault, and it is important that PRVs are never isolated from the rest of the system.

PRV's are serviced and calibrated every 12 months via removal from the digester roof and bench-testing to ensure they will relieve at the correct pressure setpoints. There are duty/standby valves on each digester to allow this service/calibration to take place while the digester is still in operation.

3.7 Biogas pipework

All inspections are scheduled as per the YW Asset Integrity inspection data base. The assets are all inspected using a FLIR GF77 camera with filters specifically designed for detecting methane gas releases. Each AD site is inspected annually. After inspection, any leaks or defects detected will be rectified as a matter of urgency.

3.7.1 Biogas storage

Site equipment includes a biogas holder installed at ground level. This is a double membrane design, with an outer layer that is constantly inflated using fans and an inner membrane that rises and falls depending on the amount of gas held within it. The positive pressure within the outer membrane ensures that under normal operation no biogas will pass from the inner membrane to the pressurised void.

The space between the inner and outer membranes is fitted with a methane detector which generates an alarm if the inner membrane becomes damaged, allowing biogas to escape.

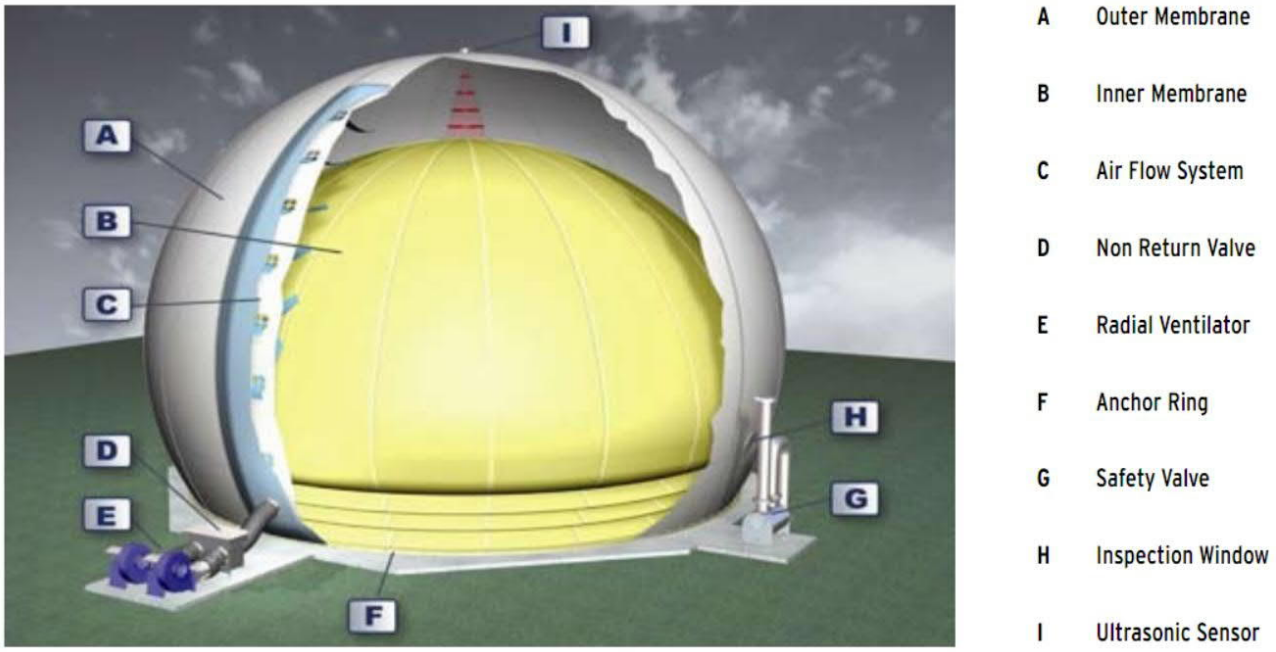


Figure 3: Gas holder construction. Copyright Utile https://www.utileengineering.co.uk/gas-holders/

The first inspection of a gas holder is completed 5 years after installation. After this point, inspections take place every 2 years, with frequency increasing further if recommended by the inspecting company. The interval will be recommended by the specialist contractors completing work and agreed with the Yorkshire Water asset integrity team.

Inspection of the gas holder is a specialist task with significant H&S risks, as a result YW use a third-party to complete these inspections.

3.7.2 Pipework from biogas treatment to flare stack and engine

All inspections are scheduled as per the YW Asset Integrity inspection data base. The assets are all inspected using a FLIR GF77 camera with filters specifically designed for detecting methane gas releases. Each AD site is inspected annually. After inspection, any leaks or defects detected will be rectified as a matter of urgency.

3.7.3 Biogas Engine

Routine servicing and inspection of the biogas CHP engine is carried out by specialist contractors as per the recommended servicing schedule and include emergency responses to alarms and breakdowns. The internal compartment housing the engine contains gas leak detection which generates an alarm, isolates the fuel supply, and shuts down the engine on detection. The system also electrically isolates the engine, with the exception of the ventilation fans which will keep running to clear any hazardous gases.

The biogas CHP engine is also included in the annual inspection carried out by the YW Asset Integrity team using the FLIR GF77 camera with filters specifically designed for detecting methane gas releases.

It is the responsibility of the Site Operations Manager in collaboration with the Bioresource Asset Management team to deal with any recommendations or actions from the biogas CHP engine contractors.

Exhaust emissions

A poorly calibrated or maintained engine can lead to methane passing through the engine unburnt and being released to atmosphere as part of exhaust emissions. Annual emissions monitoring at site includes measurement of methane within exhaust gases to ensure that it remains within specified limits and as required by environmental permits.

3.7.4 Boilers (including boiler house)

Routine servicing and inspection of the boilers is carried out by specialist boiler contractors as per the recommended servicing schedule and include emergency responses to alarms and breakdowns. The boiler house contains gas leak detection which generates an alarm and shuts down electrical systems and isolates fuel supplies to the boiler on detection.

The boilers are also included in the annual inspection carried out by the YW Asset Integrity team using the FLIR GF77 camera with filters specifically designed for detecting methane and/or natural gas releases.

It is the responsibility of the Site Operations Manager in collaboration with the Bioresource Asset Management team to deal with any recommendations or actions from the biogas CHP engine contractors.

3.7.5 Flare Stack

Routine servicing and inspection of the flare stack is carried out by specialist flare stack contractors as per the recommended servicing schedule and includes safety interlocks as part of a valve proving sequence to prevent leakage of biogas.

The flare stack is also included in the annual inspection carried out by the YW Asset Integrity team using the FLIR GF77 camera with filters specifically designed for detecting methane and/or natural gas releases.

It is the responsibility of the Site Operations Manager in collaboration with the Bioresource Asset Management team to deal with any recommendations or actions from the biogas CHP engine contractors.

3.8 Natural gas pipework from mains network to gas consumers.

All inspections are scheduled as per the YW Asset Integrity team asset inspection data base. The assets are all inspected using a FLIR GF77 camera with filters specifically designed for detecting natural gas releases. Each AD site is inspected annually.

Appendix 14 STF processing capacity calculations

Site: Woodhouse Mill STF

Overall Summary:
The figures provided below represent Woodhouse Mill STF's peak throughput capacity. Under normal circumstances the plant runs at a lower throughput than this, which is moderated by the amount of liquid imports that are brought into the site.

1) Digesters Commentary:
The 2no digesters at Woodhouse Mill are the heart of the process. Therefore, their size and throughput capacity dictates the sizing of all upstream and downstream tanks and assets. At peak throughput, they are able to process up

Digesters		
Individual Digester Volume	1,800	m3
Total Digester Volume (@90% active)	3,240	m3
Peak feed rate @ 12 days HRT (day)	270	m3/d
Peak feed rate @ 12 days HRT (year)	98,550	m3/yr
Peak Digester Throughput at 6% ds (day	16.2	tDS/d
Peak Digester Throughput at 6% ds (yea	5,913	tDS/Yr

2) Thickeners Commentary:
The thickeners thicken the site indigenous primary and SAS sludges.
At peak throughput, the thickeners process a sludge feed flow of up to 1,749m3/day and thicken this up to a target output of 6% dry solids at a volume of 233m3/day, which

Thickeners Outlet Sludge		
Peak sludge output at 6% ds	233	m3/day
Peak sludge output at 6% ds	85,000	m3/Yr

Thickeners: Duty/Assist/Assist sized to process 28m3/hr each. So able to process up to 2,016m3/day.

Drum Thickener Feed Sludge		
Total Volume Feed to Drums	1,749	m3/day
Maximum Feed Volume Primary	349	m3/day
Maximum Feed Volume SAS	1,400	m3/day

3) Imports and Sludge Screening:
Sludge is discharged from liquid import tankers via the onboard offload pump able to offload a 28m3 artic tanker in just 15 minutes.

The sludge is passed directly to the digester feed tanks (via macerator) for feed to the

Primary Transfer Pumps: Duty/Standby pumps at a peak of 29m3/hr each. So able to pump forward up to 696m3/day. (Feed Directly to the digester feed tanks)

Onboard Tanker offload pump: Duty sized to discharge

SAS Transfer Pumps: Duty/Standby at 120m3/hr each. So

Site Indigenous Primary Sludge		
Peak amount produced by site	2,800	tDS/Yr
Minimum sludge thickness	2.2	%
Maxium sludge volume (per day)	349	m3/day
Maxium sludge volume (per year)	127,273	m3/year
Maximum sludge thickness	5.1	%
Minimum sludge volume (per day)	150	m3/day
Minimum sludge volume (per year)	54,902	m3/year

Liquid Sludge Imports from other treatment works		
Peak amount produced by site	813	tDS/Yr
Minimum sludge thickness	2	%
Maxium sludge volume (per day)	111	m3/day
Maxium sludge volume (per year)	40,650	m3/year
Maximum sludge thickness	6	%
Minimum sludge volume (per day)	37	m3/day
Minimum sludge volume (per year)	13,550	m3/year

Site Indigenous SAS Sludge		
Peak amount produced by site	2,300	tDS/Yr
Minimum sludge thickness	0.45	%
Maxium sludge volume (per day)	1,400	m3/day
Maxium sludge volume (per year)	511,111	m3/year
Maximum sludge thickness	1	%
Minimum sludge volume (per day)	630	m3/day
Minimum sludge volume (per year)	230,000	m3/year

4) Indigenous Primary Sludge Commentary:
The indigenous primary sludge coming off Old Whittington wastewater treatment works and being passed forward for thickening peaks at 2,800tDS/year.
The thickness and therefore the volume of the sludge being passed forward for thickening varies between 127,273m3/year when the dry solids are at their minimum 2.2%. Down to 54,902m3/year

5) Liquid Sludge Imports Commentary:
The liquid sludge imports coming from other wastewater treatment works and being passed forward for thickening peaks at 813tDS/year.
The thickness and therefore the volume of the sludge being passed forward for thickening varies between 40,650m3/year when the dry solids are at their minimum 2%. Down to 13,550m3/year when the dry solids are at their maximum 6%.

6) Indigenous SAS Sludge Commentary:
The indigenous SAS sludge coming off Old Whittington wastewater treatment works and being passed forward for thickening peaks at 2,300tDS/year.
The thickness and therefore the volume of the sludge being passed forward for thickening varies between 511,111m3/year when the dry solids are at their minimum 0.45%. Down to 230,000m3/year when the dry solids are at their maximum 1%.

Appendix 15 Materials Safety Data Sheets

Form 34 - COSHH Assessment Form

	Substance Name:	**Gas Oil**			
	REACH Registration Number:	Not supplied		Last Review:	09/09/2020
	Assessed By:	Richard Jelfs		Review Due:	08/09/2025
	Name of Site:	Waste Water		Reference No:	CW-WW-023 v1
1	Physical Description	Straw to amber fluid; may be dyed red			
2	Usage - General	Depending on the process application & used for cleaning – estimated 1 x weekly			
	a. Risk from Chemical	Medium			
	b. Specific Use	Fuel for plant and equipment e.g. generators			
	c. Process Description	When fuel is required for on-site use, it is pumped from the bunded tank, into a vehicle or Gerry can. If this fuel is used on site, it is then carried to the required location and distributed from the Gerry can. The mandatory 5 points of PPE are worn during this process.			
	d. Exposure Times	Less than 30 minutes, approximately 1000 litres per week			
	e. Substitution	Due to the nature of the product and its use - no substitution possible.			
3	Staff / Persons at Risk	Operators	Maintenance	Office Based	Contractors	Visitors
	Staff Numbers Exposed	**16**				
	Final Risk Ratings	**M**				
4	Hazards Identification a. Pictograms					
	b. Hazard Statements As per EC 1272/2008	These oils, particularly when catalytically and thermally cracked hydrocarbons are present, may contain polycyclic aromatic hydrocarbons (PCAs); some PCAs have been shown to have a potential to cause skin cancer (category 3 carcinogen). There are small concentrations of cetane no. improvers, flow improvers, anti-foam and detergent additives and marker/dye that are not considered to represent a health risk. Injection of fuel under the skin may have serious medical effects. Classified as dangerous for the environment				
5	Tasks	**A) Delivery:**			
	a. Controls	The chemical (fuel), is ordered via the SRM by the Product & Process Engineer (PPE). It is delivered by contractor direct to site, where they fill up the existing tank. This is witnessed by the Yorkshire Water PPE.			
	b. PPE	• Eye protection BS EN 166 • Hand and skin protection - Hand and skin protection recommended at all times. Where • exposure is likely protective clothing must be worn, including nitrile gloves approved to BS EN 374 with a breakthrough time of >360 minutes.			
	c. Documents	• Material Safety Data Sheet. • Task Specific Risk Assessment • Specific site procedures			
		B) Fuel for internal combustion engines:			
	a. Controls	• Stored in line with MSDS in well ventilated area • Wash hands well after use • Use mechanical lifting aid where possible			
	b. PPE	• Eye protection BS EN 166 • Hand and skin protection - Hand and skin protection recommended at all times. Where • exposure is likely protective clothing must be worn, including nitrile gloves approved to BS EN 374 with a breakthrough time of >360 minutes.			
	c. Documents	• Material Safety Data Sheet. • Task Specific Risk Assessment			
6	Exposure Limits	Long term exposure limit - (8 hour TWA reference period) 5 milligrams per cubic metre. Short term exposure limit - (15 minute reference period) - 10 milligrams per cubic metre.			
	a. Estimation of Risk	Low			
7	Health Surveillance Required	No			
	Health Surveillance Details	Not applicable			

Form 34 - COSHH Assessment Form

	Substance Name:	Gas Oil
8	First Aid	
	a. Skin Contact	• Wash skin as soon as possible with soap and water. • Change contaminated clothing and launder before reuse. Get medical advice if irritation persists.
	b. Eye Contact	• Wash out thoroughly with large amounts of water. If redness and/or irritation continues get medical advice.
	c. Inhalation	• If inhalation of vapour causes irritation or drowsiness remove to fresh air. Get medical advice if the symptoms continue.
	d. Ingestion	• Wash mouth out with water and give water to drink. • If a large amount has been swallowed get medical advice. • DO NOT INDUCE VOMITING BECAUSE OF THEDANGER OF ASPIRATION.
9	a. Storage General	• The design, construction and maintenance of bulk storage and handling facilities are covered by codes of practice published by the Institute of Petroleum, British Standards • Institution and the Health and Safety Executive. • Drums should be stored on their sides on racks preferably under cover, out of direct sunlight, in well ventilated conditions. • Other types of containers should be stored under cover out of direct sunlight, in well ventilated conditions. Care should be taken to avoid over-stacking.
	b. Storage Specific	The chemical (fuel) is stored in a bunded tank, which is locked off with the key stored in a key safe - PPE's are the only personnel whom have access. The tank is fitted a gauge on it and a spill kit is stored near to the area
10	Spillage	• Treat any spillage as a fire hazard. Spray, vapour or mist can be a potential fire or explosion hazard. • Contain spillage - do not wash spillage down drain. Absorb using absorbent clay, diatomaceous clay or other suitable absorbent.
11	Disposal	• Container to be segregated on site and disposed on as hazardous waste Must not be disposed together with household garbage. Do not allow product to reach sewage system • Should a spillage occur on site, this should be cleaned by using a spill kit, this should then be classed as hazardous waste and disposed of on-site at the recycling hub. • Disposal must be made according to official regulations.
12	Additional Site Specific Information	• The design, construction and maintenance of bulk storage and handling facilities are covered by codes of practice published by the Institute of Petroleum, British Standards • Institution and the Health and Safety Executive. • Drums should be stored on their sides on racks preferably under cover, out of direct • sunlight, in well ventilated conditions. • Other types of containers should be stored under cover out of direct sunlight, in well ventilated conditions. • Care should be taken to avoid over-stacking.

Form 34 - COSHH Assessment Form

	Substance Name:	**Diesel**												
	REACH Registration Number:	Not supplied								Last Review:			23/08/2017	
	Assessed By:	Lisa Cuthbert								Review Due:			22/08/2022	
	Name of Site:	Waste Water								Reference No:			CA-WW-030 v1	
1	Physical Description	Liquid												
2	Usage - General	Fuel for on-road diesel-powered engines. Fuel for use in offroad diesel engines, boilers, gas turbines and other combustion equipment.												
	a. Risk from Chemical	Low												
	b. Specific Use	Fuel for pumps and machines												
	c. Process Description	When the fuel is needed, it is funnelled from the fuel can into the pumps or machines where it is required												
	d. Exposure Times	30 minutes												
	e. Substitution	No substitution												
3	Staff / Persons at Risk	Product & Process Engineers			Maintenance			Office Based			Contractors			Visitors		
	Staff Numbers Exposed	**1-5**			**1-5**			**0**			**0**			**0**		
	Final Risk Ratings	**L**			**L**											
4	Hazards Identification a. Pictograms													
	b. Hazard Statements As per EC 1272/2008	H226 Flammable liquid and vapour. H227 Combustible liquid. H304 May be fatal if swallowed and enters airways. H315 Causes skin irritation. H332 Harmful if inhaled. H351 Suspected of causing cancer. H373 May cause damage to organs or organ systems through prolonged or repeated exposure. H401 Toxic to aquatic life. H411 Toxic to aquatic life with long lasting effects.													
5	Tasks	**A) Delivery, Storage & Use:**												
	a. Controls	• Avoid inhaling vapour and/or mists. • Avoid prolonged or repeated contact with skin. • When using do not eat or drink. • Extinguish any naked flames. Do not smoke. Remove ignition sources. • Avoid sparks. Earth all equipment. • Properly dispose of any contaminated rags or cleaning materials in order to • prevent fires. • Use local exhaust ventilation if there is risk ofinhalation of vapours, mists or aerosols. The vapour is heavier than air, spreads along the ground and distant ignition is • possible.													
	b. PPE	• Chemical resistant gloves/gauntlets, • boots, and • apron (where risk of splashing).												
	c. Documents	• Task Specific Risk Assessment. • Material Safety Data Sheet.												
6	Exposure Limits	Not applicable												
	a. Estimation of Risk	Low risk – exposure at point of transferring fuel												
7	Health Surveillance Required	No												
	Health Surveillance Details	No												
8	First Aid	**GENERAL:** In all cases of doubt, seek medical attention.												

Form 34 - COSHH Assessment Form

	Substance Name:	Diesel
	a. Skin Contact	• Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment. • When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent • immediately to a hospital. Do not wait for symptoms to develop.
	b. Eye Contact	• Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention
	c. Inhalation	• Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
	d. Ingestion	• If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. • If vomiting occurs spontaneously, keep head below hips to prevent aspiration. • If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing. Give nothing by mouth.
9	a. Storage General	Store in well ventilated area
	b. Storage Specific	• Drum and small container storage: Drums should be stacked to a maximum of 3 high. Ensure adequate bunds in the event of damage • Store away from sunlight • Use properly labelled and closeable containers. • Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be bunded • Locate away from heat and other sources of ignition.
10	Spillage	• Evacuate the area of all nonessential personnel. Ventilate contaminated area thoroughly. Take precautionary measures against static discharges. • Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. • Do not flush away residues with water. Retain as contaminated waste. • Allow residues to evaporate or soak up with an appropriate
11	Disposal	• Treat as hazardous waste • Use licensed waste contractors
12	Additional Site Specific Information	N/A

Form 34 - COSHH Assessment Form

	Substance Name:	**Renolin B 10 VG 32 Oil**			
	REACH Registration Number:	01-2119490822-33		Last Review:	13/01/2017
	Assessed By:	Colin Barton		Review Due:	12/01/2022
	Name of Site:	Waste Water		Reference No:	CA-WW-032 v1
1	Physical Description	Pale yellow liquid			
2	Usage - General	Used to lubricated the hydraulic pumps on site			
	a. Risk from Chemical	Medium			
	b. Specific Use	The substance is used to lubricated the hydraulic pumps on site			
	c. Process Description	The chemical is added to the pumps by adding litres (qty does vary) into hyro-pack, in order to allow for the pumps to run in their normal application			
	d. Exposure Times	<30 minutes			
	e. Substitution	None			
3	Staff / Persons at Risk	Operators	Maintenance	Office Based	Contractors	Visitors
	Staff Numbers Exposed	**1-5**				
	Final Risk Ratings	**M**				
4	Hazards Identification a. Pictograms					
	b. Hazard Statements As per EC 1272/2008	H35 Causes skin irritation H400 Very toxic to aquatic life. H410 Very toxic to aquatic life with long lasting effects.				
5	Tasks	**A) Adding to pumps:**				
	a. Controls	• Area is restricted to persons performing the task. • Task is performed under SWP • Item to be stored in line with MSDS • Deliveries made in bunded area. • Wear PPE as listed. Remove contaminated clothes immediately and wash before further use				
	b. PPE	• Hard hat (in date) • Safety Goggles/face shield are recommended. • Hi vis jacket or vest. • Standard issue safety footwear (steel toe capped) • Chemical resistant safety gloves - Nitri Foam Grip or equivalent • Lightweight chemical resistant coveralls • If handling large quantities, full chemical body suit & boots • Other Protection - Chemical resistant apron				
	c. Documents	Material Safety Data Sheet Task Specific Risk Assessment.				
6	Exposure Limits	None of the components have assigned exposure limits.				
	a. Estimation of Risk	Although the substance is contained, and PPE provides protection for residual risk, it has nonetheless been decided that residual risk should be rated as **Medium** due to the severity of potential consequences.				
7	Health Surveillance Required	No				
	Health Surveillance Details	No applicable				
8	First Aid	If first aid applied or ill health experienced, inform line manager and ensure incident reported in accordance with YW Accident Reporting Procedure. Where medical intervention is required, ensure this document and the Safety Data Sheet (SDS) is shown.				
	a. Skin Contact	Wash off immediately with soap and plenty of water. The product is not skin irritating.				
	b. Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.				
	c. Inhalation	None Hazardous. .				
	d. Ingestion	Clean mouth with water and drink afterwards plenty of water.				

Form 34 - COSHH Assessment Form

	Substance Name:	Renolin B 10 VG 32 Oil
9	a. Storage General	The substance is stored within PTP building or Gallery, and sat on a bunded area. The substance is stored alone with no contact / contamination with other chemicals, with the lids on the bottles tightly closed.
	b. Storage Specific	The chemical should be used in a well-ventilated area.
10	Spillage	Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders sawdust). Keep in suitable, closed containers for disposal.
11	Disposal	Container to be segregated on site and disposed on as hazardous waste
12	Additional Site Specific Information	The product may not be released into the environment without control.

COSHH Assessment Form

	Substance Name:	**Sodium Bicarbonate Powder**		
	REACH Registration Number:	01-2119457606-32-xxxx	Last Review:	26/07/22
	Assessed By:	Helen Darby	Review Due:	26/07/23
	Name of Site:	Various	Reference No:	CA-WW-074 (Version 1)
1	Physical Description	White crystalline powder.		
2	Usage - General	pH control.		
	a. Risk from Chemical	Low.		
	b. Specific Use	Control of pH, alkalinity and the purification process in water treatment facilities.		
	c. Process Description	Substance is delivered and offloaded by the supplier and stored on delivery pallets in 25 kg bags.		
	d. Exposure Times	< 15 minutes.		
	e. Substitution	Not possible.		
3	Staff / Persons at Risk	Operators	Driver	
	Staff Numbers Exposed	**1 - 2**	**1**	
	Final Risk Ratings	**L**	**L**	
4	Hazards Identification a. Pictograms	Product is not classified as dangerous according to Regulation (EC) No. 1272/2008.		
	b. Hazard Statements As per EC 1272/2008	None.		
5	Tasks	**A) Delivery:**		
	a. Controls	• Delivered by the supplier directly adjacent to the dosing point. • Suitable signage in place. • Driver checks delivery prior to offloading. • Delivery driver controls offloading. • Supplier delivery is undertaken in accordance with their own delivery procedures. • Spill kit, emergency shower and eye wash facilities are available on site.		
	b. PPE	Yorkshire Water 5 points of PPE.		
	c. Documents	Safety data sheet.		
		B) Dosing of powder		
	a. Controls	• Do not dose in high winds or at exposed locations (to avoid dust exposure). • Product can become slippery when wet – Any dosing area spillages must be cleaned up. • Spill kit, emergency shower and eye wash facilities are available on site.		
	b. PPE	5 points of PPE including: • Safety goggles (EN 166). • Nitrile gloves (EN 374). • FFP3 dust mask (EN 149).		
	c. Documents	• Safety data sheet. • Point of work risk assessment (PoWRA).		
6	Exposure Limits	Contains no substances with occupational exposure limit values.		
	a. Estimation of Risk	Low.		
7	Health Surveillance Required	None.		
	Health Surveillance Details	N/A.		
8	First Aid	General – No specific precautions required.		
	a. Skin Contact	Wash off with soap and water. If skin irritation persists, seek medical attention.		
	b. Eye Contact	Rinse thoroughly with plenty of water, also under the eyelids. If eye irritation persists, seek medical attention		
	c. Inhalation	Remove to fresh air. If symptoms persist, seek medical attention.		
	d. Ingestion	Rinse mouth with water. Never give anything by mouth to an unconscious person. Do not induce vomiting. If symptoms persist, seek medical attention.		

COSHH Assessment Form

	Substance Name:	Sodium Bicarbonate Powder
9	a. Storage General	Store in original packaging away from other chemicals. Avoid moisture contamination.
	b. Storage Specific	Place on hardstanding protected by contained site drainage.
10	Spillage	• Do not flush into surface water or sanitary sewer system. • Avoid subsoil penetration. • Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders) or use spill kit booms and mats. • Keep spillage waste suitable, closed containers for disposal through a YW approved waste contractor.
11	Disposal	Dispose of any waste from through a YW approved waste contractor.
12	Additional Site Specific Information	Sites may have ferric sulphate dosing facilities and sodium bicarbonate is incompatible with ferric sulphate as reaction between the two chemicals is exothermic and produces carbon dioxide. The chemicals must be segregated and simultaneous deliveries of both chemicals prohibited. Clear signage must be in place. Avoid exposing sodium bicarbonate to > 50°C as decomposition may occur, also producing carbon dioxide.

SAFETY DATA SHEET

According to Regulations (EC) No 2015/830 and (EC) No 1907/2006

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: FLOPAM™ EM 640 TBD

Type of product: Mixture.

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Processing aid for industrial applications.

Uses advised against: None.

1.3. Details of the supplier of the safety data sheet

Company: SNF (UK) Limited
Solutions House, Ripley Close
Normanton WF6 1TB
United Kingdom

Telephone: 01924-311000

Telefax: 01924-311099

E-mail address: sds@snf.fr

1.4. Emergency telephone number

24-hour emergency number: +33 477 36 87 25

National Poison Information Service: NHS Direct: 0845 4647 or 111 (24/24, 7/7); Scotland: NHS 24 - 08454 24 24 24 (24/24, 7/7)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) 1272/2008:

Not classified.

2.2. Label elements

Labelling according to Regulation (EC) 1272/2008:

Hazard pictogram(s): None.

Signal word: None.

Hazard statement(s):	None.
Precautionary statement(s):	None.
Additional elements:	EUH210 - Safety data sheet available on request

2.3. Other hazards

Spills produce extremely slippery surfaces.

PBT and vPvB assessment:
Does not fulfill the criteria according to Annex XIII of REACH.

For explanation of abbreviations see Section 16.

SECTION 3: Composition/information on ingredients

3.1. Substances
Not applicable, this product is not a substance.

3.2 Mixtures

Hazardous components

Hydrocarbons, C12-C15, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Concentration/ -range:	20 - 30%
ECHA List Number: *(Assigned to substances without a CAS N° or other numerical identifier.)*	920-107-4
REACH Registration Number:	01-2119453414-43-XXXX
Classification according to Regulation (EC) No.1272/2008:	Asp. Tox. 1;H304

Notes
Does not result in classification of the mixture if the kinematic viscosity is greater than 20.5 mm²/s measured at 40°C.

Isotridecanol, ethoxylated

Concentration/ -range:	< 5%
EC-No.:	Polymer
REACH Registration Number:	Not applicable (polymer).
Classification according to Regulation (EC) No.1272/2008:	Acute Tox. 4;H302, Eye Dam. 1;H318

For explanation of abbreviations see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Move to fresh air. No hazards which require special first aid measures.

Skin contact:
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. In case of persistent skin irritation, consult a physician.

Eye contact:
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention immediately.

Ingestion:
Rinse mouth with water. Do NOT induce vomiting. Call a physician or poison control centre immediately.

4.2. Most important symptoms and effects, both acute and delayed

None under normal use.

4.3. Indication of any immediate medical attention and special treatment needed.

None reasonably foreseeable.

Other information:
None.

SECTION 5: Fire-fighting measures

5.1. Extinguishing media

Suitable extinguishing media:
Water. Water spray. Foam. Carbon dioxide (CO2). Dry powder.

Unsuitable extinguishing media:
None.

5.2. Special hazards arising from the substance or mixture

Hazardous decomposition products:
Ammonia. Carbon oxides (COx). Nitrogen oxides (NOx). Hydrogen chloride. Hydrogen cyanide (hydrocyanic acid) may be produced in the event of combustion in an oxygen deficient atmosphere.

5.3. Advice for fire-fighters

Protective measures:
Wear self-contained breathing apparatus and protective suit.

Other information:
Spills produce extremely slippery surfaces.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions:
Do not touch or walk through spilled material. Spills produce extremely slippery surfaces.

Protective equipment:
Wear adequate personal protective equipment (see Section 8 Exposure Controls/Personal Protection).

Emergency procedures:
Keep people away from spill/leak.

6.2. Environmental precautions

Do not contaminate water.

6.3. Methods and material for containment and cleaning up

Small spills:
Do not flush with water. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

Large spills:
Do not flush with water. Dam up. Clean up promptly by scoop or vacuum.

Residues:
Soak up with inert absorbent material. After cleaning, flush away traces with water.

6.4. Reference to other sections

SECTION 7: Handling and storage; SECTION 8: Exposure controls/personal protection; SECTION 13: Disposal considerations;

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid contact with skin and eyes. Renders surfaces extremely slippery when spilled. When using, do not eat, drink or smoke.

7.2. Conditions for safe storage, including any incompatibilities.

Keep away from heat and sources of ignition. Freezing will affect the physical condition and may damage the material. Incompatible with oxidizing agents.

7.3. Specific end use(s)

None.

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

National occupational exposure limits:
None.

Derived No and Minimum Effect Levels (DNELs/DMELs)
None known.

Hydrocarbons, C12-C15, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Isotridecanol, ethoxylated

Predicted no-effect concentrations (PNECs)
None known.

8.2. Exposure controls

Appropriate engineering controls:

Ensure adequate ventilation, especially in confined areas. Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.

Individual protection measures, such as personal protective equipment:

a) Eye/face protection:
Safety glasses with side-shields.

b) Skin protection:
Wear coveralls and/or chemical apron and rubber footwear where physical contact can occur.

i) Hand protection:
PVC or other plastic material gloves.

c) Respiratory protection:
No personal respiratory protective equipment normally required.

d) Additional advice:
Wash hands and face before breaks and immediately after handling the product. Wash hands before breaks and at the end of workday.

Environmental exposure controls:

Do not allow uncontrolled discharge of product into the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

a) Appearance:	Viscous liquid, Milky.
b) Odour:	Aliphatic.
c) Odour Threshold:	No data available.
d) pH:	4 - 6 @ 5 g/L
e) Melting point/freezing point:	< 5°C
f) Initial boiling point and boiling range:	> 100°C
g) Flash point:	Does not flash.
h) Evaporation rate:	No data available.
i) Flammability (solid, gas):	Not applicable.
j) Upper/lower flammability or explosive limits:	Not expected to create explosive atmospheres.
k) Vapour pressure:	2.3 kPa @ 20°C

l) Vapour density:	0.804 g/litre @ 20°C
m) Relative density:	1.0 - 1.1
n) Solubility(ies):	Completely miscible.
o) Partition coefficient:	Not applicable.
p) Autoignition temperature:	Not applicable.
q) Decomposition temperature:	> 150°C
r) Viscosity:	> 20.5 mm²/s @ 40°C
s) Explosive properties:	Not expected to be explosive based on the chemical structure.
t) Oxidizing properties:	Not expected to be oxidising based on the chemical structure.

9.2. Other information

None.

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under recommended storage conditions.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Oxidizing agents may cause exothermic reactions.

10.4. Conditions to avoid

Protect from frost, heat and sunlight.

10.5. Incompatible materials

Oxidizing agents.

10.6. Hazardous decomposition products

Thermal decomposition may produce: hydrogen chloride gas, nitrogen oxides (NOx), carbon oxides (COx). Ammonia. Hydrogen cyanide (hydrocyanic acid).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on the product as supplied:

Acute oral toxicity: LD50/oral/rat > 5000 mg/kg.

Acute dermal toxicity:	LD50/dermal/rat > 5000 mg/kg
Acute inhalation toxicity:	The product is not expected to be toxic by inhalation.
Skin corrosion/irritation:	Non-irritating to skin.
Serious eye damage/eye irritation:	Not irritating. (OECD 437)
Respiratory/skin sensitisation:	Not sensitizing.
Mutagenicity:	Not mutagenic.
Carcinogenicity:	Not carcinogenic.
Reproductive toxicity:	Not toxic for reproduction.
STOT - single exposure:	No known effects.
STOT - repeated exposure:	No known effects.
Aspiration hazard:	Due to the viscosity, this product does not present an aspiration hazard.

Relevant information on the hazardous components:

Hydrocarbons, C12-C15, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Acute oral toxicity:	LD50/oral/rat > 5000 mg/kg. (OECD 401)
Acute dermal toxicity:	LD50/dermal/rabbit > 5000 mg/kg (OECD 402)
Acute inhalation toxicity:	LC50/inhalation/4 h/rat = 4951 mg/m^3. (OECD 403)
Skin corrosion/irritation:	Not irritating. (OECD 404) Repeated exposure may cause skin dryness or cracking.
Serious eye damage/eye irritation:	Not irritating. (OECD 405)
Respiratory/skin sensitisation:	By analogy with similar products, this product is not expected to be sensitizing. (OECD 406)
Mutagenicity:	Not mutagenic. (OECD 471, 473, 474, 476, 478, 479)
Carcinogenicity:	Carcinogenicity study in rats (OECD 451): Negative.
Reproductive toxicity:	By analogy with similar substances, this substance is not expected to be toxic for reproduction. NOAEL/rat = 300 ppm. (OECD 421)
STOT - single exposure:	No known effects.
STOT - repeated exposure:	NOAEL/oral/rat/90 days >= 3000 mg/kg/day (OECD 408) (Based on results obtained from tests on analogous products).
Aspiration hazard:	May be fatal if swallowed and enters airways.

Isotridecanol, ethoxylated

Acute oral toxicity:	LD50/oral/rat = 500 - 2000 mg/kg.

Acute dermal toxicity:	LD50/dermal/rabbit > 2000 mg/kg
Acute inhalation toxicity:	No data available.
Skin corrosion/irritation:	Not irritating. (OECD 404)
Serious eye damage/eye irritation:	Causes serious eye irritation. (OECD 405)
Respiratory/skin sensitisation:	The results of testing on guinea pigs showed this material to be non-sensitizing.
Mutagenicity:	Not mutagenic.
Carcinogenicity:	Not carcinogenic.
Reproductive toxicity:	Two-Generation Reproduction Toxicity (OECD 416) NOAEL/rat > 250 mg/kg/day Prenatal Development Toxicity Study (OECD 414) NOAEL/Maternal toxicity/rat > 50 mg/kg/day NOAEL/Developmental toxicity/rat > 50 mg/kg/day
STOT - single exposure:	No known effects.
STOT - repeated exposure:	NOAEL/oral/rat/600 days = 50 mg/kg/day
Aspiration hazard:	No known effects.

SECTION 12: Ecological information

12.1. Toxicity

Information on the product as supplied:

Acute toxicity to fish:	LC50/Fish/96 hours = 10 - 100 mg/L (Estimated)
Acute toxicity to invertebrates:	EC50/Daphnia/48 hours = 10 - 100 mg/L (Estimated)
Acute toxicity to algae:	Algal inhibition tests are not appropriate. The flocculation characteristics of the product interfere directly in the test medium preventing homogenous distribution which invalidates the test.
Chronic toxicity to fish:	No data available.
Chronic toxicity to invertebrates:	No data available.
Toxicity to microorganisms:	No data available.
Effects on terrestrial organisms:	No data available. Readily biodegradable, exposure to soil is unlikely.
Sediment toxicity:	No data available. Readily biodegradable, exposure to sediment is unlikely.

Relevant information on the hazardous components:

Hydrocarbons, C12-C15, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Acute toxicity to fish:	LC0/Oncorhynchus mykiss/96 hours > 1000 mg/L. (OECD 203)
Acute toxicity to invertebrates:	EC0/Daphnia magna/48 hours > 1000 mg/L. (OECD 202)

Acute toxicity to algae:	IC0/Pseudokirchneriella subcapitata/72 hours > 1000 mg/L. (OECD 201)
Chronic toxicity to fish:	NOEC/Oncorhynchus mykiss/28 days > 1000 mg/L.
Chronic toxicity to invertebrates:	NOEC/Daphnia magna/21 days > 1000 mg/L.
Toxicity to microorganisms:	EC50/Tetrahymena pyriformis/ 48h > 1000 mg/L.
Effects on terrestrial organisms:	No data available.
Sediment toxicity:	No data available. Readily biodegradable, exposure to sediment is unlikely.

Isotridecanol, ethoxylated

Acute toxicity to fish:	LC50/Cyprinus carpio/96 hours = 1 - 10 mg/L (OECD 203)
Acute toxicity to invertebrates:	EC50/Daphnia/48 hours = 1 - 10 mg/L (OECD 202)
Acute toxicity to algae:	IC50/Desmodesmus subspicatus/72 hours = 1 - 10 mg/L (OECD 201)
Chronic toxicity to fish:	No data available.
Chronic toxicity to invertebrates:	No data available.
Toxicity to microorganisms:	EC10/activated sludge/17 hours > 10000 mg/L (DIN 38412-8)
Effects on terrestrial organisms:	No data available.
Sediment toxicity:	No data available.

12.2. Persistence and degradability

Information on the product as supplied:

Degradation:	Readily biodegradable.
Hydrolysis:	At natural pHs (>6) the polymer degrades due to hydrolysis to more than 70% in 28 days. The hydrolysis products are not harmful to aquatic organisms.
Photolysis:	No data available.

Relevant information on the hazardous components:

Hydrocarbons, C12-C15, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Degradation:	Readily biodegradable.
Hydrolysis:	Does not hydrolyse.
Photolysis:	No data available.

Isotridecanol, ethoxylated

Degradation:	Readily biodegradable. > 60% / 28 days (OECD 301 B)
Hydrolysis:	Does not hydrolyse.

Photolysis: No data available.

12.3. Bioaccumulative potential

Information on the product as supplied:

The product is not expected to bioaccumulate.

Partition co-efficient (Log Pow): Not applicable.

Bioconcentration factor (BCF): No data available.

Relevant information on the hazardous components:

Hydrocarbons, C12-C15, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Partition co-efficient (Log Pow): 3 - 6

Bioconcentration factor (BCF): No data available.

Isotridecanol, ethoxylated

Partition co-efficient (Log Pow): > 3

Bioconcentration factor (BCF): No data available.

12.4. Mobility in soil

Information on the product as supplied:

No data available.

Relevant information on the hazardous components:

Hydrocarbons, C12-C15, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Koc: No data available.

Isotridecanol, ethoxylated

Koc: > 5000

12.5. Results of PBT and vPvB assessment

PBT assessment:
Does not fulfill the criteria according to Annex XIII of REACH.

vPvB assessment:
Does not fulfill the criteria according to Annex XIII of REACH.

12.6. Other adverse effects

None.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste from residues/unused products:

Dispose in accordance with local and national regulations.

Contaminated packaging:

Rinse empty containers with water and use the rinse-water to prepare the working solution. If recycling is not practicable, dispose of in compliance with local regulations.

Recycling:

Store containers and offer for recycling of material when in accordance with the local regulations.

SECTION 14: Transport information

Land transport (ADR/RID)

Not classified.

Sea transport (IMDG)

Not classified.

Air transport (IATA)

Not classified.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

All components of this product have been registered or pre-registered with the European Chemicals Agency or are exempt from registration.

15.2. Chemical safety assessment

A Chemical Safety Assessment for this product has been carried out by the person responsible for producing this Safety Data Sheet. All relevant information used to conduct this assessment are included in this Safety Data Sheet as well any as any resulting Risk Reduction Measures.

SECTION 16: Other information

This data sheet contains changes from the previous version in section(s):

SECTION 3. Composition/information on ingredients, SECTION 16. Other Information.

Key or legend to abbreviations and acronyms used in the safety data sheet:

Abbreviations
Asp. Tox. 1 = Aspiration hazard Category Code 1
Acute Tox. 4 = Acute toxicity Category Code 4
Eye Dam 1 = Serious eye damage/eye irritation Category Code 1

H-Phrases
H302 - Harmful if swallowed
H304 - May be fatal if swallowed and enters airways
H318 - Causes serious eye damage

This SDS was prepared in accordance with the following:

Regulation (EU) No. 2015/830
Regulation (EC) No. 1272/2008
Regulation (EC) No. 1907/2006

Version: 16.01.b

ENCC046

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

ANNEX(ES)

This product is not hazardous as supplied and does not contain:

• hazardous components which require REACH registration; or,
• demonstrate relevant effects which would require a chemical safety assessment; or,
• are present at concentrations above their cut-off value.

Therefore, according to Regulation (EC) No 1907/2006, Article 31, paragraph 7, an Exposure Scenario is not required as an annex to the Safety Data Sheet.

SAFETY DATA SHEET

According to Regulation (EC) No 1907/2006 and its amendments

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: FLOPAM™ FO 4490

Type of product: Mixture.

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Processing aid for industrial applications.

Uses advised against: None.

1.3. Details of the supplier of the safety data sheet

Company: SNF (UK) Limited
Solutions House, Ripley Close
Normanton WF6 1TB
United Kingdom

Telephone: 01924-311000

Telefax: 01924-311099

E-mail address: sds@snf.fr

1.4. Emergency telephone number

24-hour emergency number: +33 477 36 87 25

National Poison Information Service: NHS Direct: 0845 4647 or 111 (24/24, 7/7); Scotland: NHS 24 - 08454 24 24 24 (24/24, 7/7)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No.1272/2008:

Not classified.

2.2. Label elements

Labelling according to Regulation (EC) 1272/2008:

Hazard pictogram(s): None.

Signal word: None.

Hazard statement(s):	None.
Precautionary statement(s):	None.
Additional elements:	EUH210 - Safety data sheet available on request

2.3. Other hazards

Aqueous solutions or powders that become wet render surfaces extremely slippery.

PBT and vPvB assessment:
Does not fulfill the criteria according to Annex XIII of REACH.

For explanation of abbreviations see Section 16.

SECTION 3: Composition/information on ingredients

3.1. Substances
Not applicable, this product is a mixture.

3.2. Mixtures

Hazardous components

Adipic acid

Concentration/ -range:	<= 2.5%
EC-No.:	204-673-3
REACH Registration Number:	01-2119457561-38-XXXX
Classification according to Regulation (EC) No.1272/2008:	Eye Irrit. 2;H319

Sulphamidic acid

Concentration/ -range:	<= 2.5%
EC-No.:	226-218-8
REACH Registration Number:	01-2119982121-44-0000 / 01-2119488633-28-XXXX
Classification according to Regulation (EC) No.1272/2008:	Skin Irrit. 2;H315, Eye Irrit. 2;H319, Aquatic Chronic 3;H412

For explanation of abbreviations see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Move to fresh air. Get medical attention if symptoms occur.

Skin contact:
Wash off with soap and plenty of water. Get medical attention if irritation develops and persists.

Eye contact:
Rinse immediately with plenty of water, also under the eyelids. Get medical attention.

Ingestion:
Rinse mouth. If conscious, give the victim plenty of water to drink. Induce vomiting, but only if victim is fully conscious.

4.2. Most important symptoms and effects, both acute and delayed

Powder can cause localised skin irritation in folds of the skin or under tight clothing. Contact with dust can cause mechanical irritation or drying of the skin.

4.3. Indication of any immediate medical attention and special treatment needed.

None.

Other information:
No information available.

SECTION 5: Fire-fighting measures

5.1. Extinguishing media

Suitable extinguishing media:
Water. Water spray. Foam. Carbon dioxide (CO2). Dry powder.
Warning! Aqueous solutions or powders that become wet render surfaces extremely slippery.

Unsuitable extinguishing media:
none.

5.2. Special hazards arising from the substance or mixture

Hazardous decomposition products:
Thermal decomposition may produce: hydrogen chloride gas, nitrogen oxides (NOx), carbon oxides (COx). Hydrogen cyanide (hydrocyanic acid) may be produced in the event of combustion in an oxygen deficient atmosphere.

5.3. Advice for fire-fighters

Protective measures:
Wear self contained breathing apparatus for fire fighting if necessary.

Other information:
Aqueous solutions or powders that become wet render surfaces extremely slippery.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions:
Aqueous solutions or powders that become wet render surfaces extremely slippery.

Protective equipment:
Wear adequate personal protective equipment (see Section 8 Exposure Controls/Personal Protection).

Emergency procedures:
Keep people away from spill/leak. Prevent further leakage or spillage if safe to do so.

6.2. Environmental precautions

As with all chemical products, do not flush into surface water.

6.3. Methods and material for containment and cleaning up

Small spills:
Do not flush with water. Clean up promptly by sweeping or vacuum.

Large spills:
Do not flush with water. Prevent unauthorized access. Sweep up and shovel into suitable containers for disposal.

Residues:
Sweep up to prevent slip hazard. After cleaning, flush away traces with water.

6.4. Reference to other sections

SECTION 7: Handling and storage; SECTION 8: Exposure controls/personal protection; SECTION 13: Disposal considerations;

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid contact with skin and eyes. Avoid dust formation. Avoid breathing dust. Wash hands before breaks and at the end of workday.

7.2. Conditions for safe storage, including any incompatibilities

Keep in a dry place. Incompatible with oxidizing agents.

7.3. Specific end use(s)

Processing aid for industrial applications.

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

National occupational exposure limits:
None.

Derived No and Minimum Effect Levels (DNELs/DMELs)

Adipic acid

Workers

Acute systemic effects:

Skin contact	38 mg/kg/day
Inhalation	264 mg/m³

Acute local effects:

Inhalation	5 mg/m³

Long-term systemic effects:

Skin contact	38 mg/kg/day
Inhalation	264 mg/m³

Long-term local effects:

Inhalation	5 mg/m³

Consumer:

Acute systemic effects:

Ingestion	19 mg/kg/day
Skin contact	19 mg/kg/day
Inhalation	65 mg/m³

Long-term systemic effects:

Ingestion	19 mg/kg/day
Skin contact	19 mg/kg/day
Inhalation	65 mg/m³

Sulphamidic acid

Workers

Long-term systemic effects:

Skin contact	10 mg/kg/day

Consumer:

Long-term systemic effects:

Ingestion	5 mg/kg/day
Skin contact	5 mg/kg/day

Predicted no-effect concentrations (PNECs)

Adipic acid

Freshwater:	0.126 mg/L
Marine water:	0.0126 mg/L
Intermittent release:	0.46 mg/L
Sewage treatment plant:	59.1 mg/L
Sediment (freshwater):	0.484 mg/kg
Sediment (marine water):	0.0484 mg/kg
Soil:	0.0228 mg/kg

Sulphamidic acid

Freshwater:	0.048 mg/L
Marine water:	0.0048 mg/L
Intermittent release:	0.48 mg/L
Sewage treatment plant:	2 mg/L
Sediment (freshwater):	0.173 mg/kg
Sediment (marine water):	0.0173 mg/kg
Soil:	0.00638 mg/kg
Oral (secondary poisoning):	The product is not expected to bioaccumulate.

8.2. Exposure controls

Appropriate engineering controls:

Use local exhaust if dusting occurs. Natural ventilation is adequate in absence of dusts.

Individual protection measures, such as personal protective equipment:

a) Eye/face protection:
Safety glasses with side-shields. Do not wear contact lenses where this product is used.

b) Skin protection:
Chemical resistant apron or protective suit if splashing or repeated contact with solution is likely.

i) Hand protection:
PVC or other plastic material gloves.

c) Respiratory protection:
Dust safety masks recommended where working powder concentration is more than 10 mg/m^3.

d) Additional advice:
Wash hands before breaks and at the end of workday. Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls:

Do not allow uncontrolled discharge of product into the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

a) Appearance:	Granular solid, white.
b) Odour:	None.
c) Odour Threshold:	Not applicable.
d) pH:	2.5 - 4.5 @ 5g/L
e) Melting point/freezing point:	> 100°C
f) Initial boiling point and boiling range:	Not applicable.
g) Flash point:	Not applicable.
h) Evaporation rate:	Not applicable.
i) Flammability (solid, gas):	Not combustible.
j) Upper/lower flammability or explosive limits:	Not expected to create explosive atmospheres.
k) Vapour pressure:	Not applicable.
l) Vapour density:	Not applicable.
m) Relative density:	0.6 - 0.9
n) Solubility(ies):	Soluble in water.

o) Partition coefficient:	< 0
p) Autoignition temperature:	Not applicable.
q) Decomposition temperature:	> 200°C
r) Viscosity:	See Technical Bulletin.
s) Explosive properties:	Not expected to be explosive based on the chemical structure.
t) Oxidizing properties:	Not expected to be oxidising based on the chemical structure.

9.2. Other information

None.

SECTION 10: Stability and reactivity

10.1. Reactivity

Hazardous polymerisation does not occur.

10.2. Chemical stability

Stable.

10.3. Possibility of hazardous reactions

Oxidizing agents may cause exothermic reactions.

10.4. Conditions to avoid

None known.

10.5. Incompatible materials

Oxidizing agents.

10.6. Hazardous decomposition products

Thermal decomposition may produce: hydrogen chloride gas, nitrogen oxides (NOx), carbon oxides (COx). Hydrogen cyanide (hydrocyanic acid) may be produced in the event of combustion in an oxygen deficient atmosphere.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on the product as supplied:

Acute oral toxicity:	LD50/oral/rat > 5000 mg/kg.
Acute dermal toxicity:	LD50/dermal/rat > 5000 mg/kg
Acute inhalation toxicity:	The product is not expected to be toxic by inhalation.
Skin corrosion/irritation:	Not irritating.

Serious eye damage/eye irritation:	Testing conducted according to the Draize technique showed the material produces no corneal or iridial effects and only slight transitory conjuctival effects similar to those which all granular materials have on conjuctivae.
Respiratory/skin sensitisation:	The results of testing on guinea pigs showed this material to be non-sensitizing.
Mutagenicity:	Not mutagenic.
Carcinogenicity:	Not carcinogenic.
Reproductive toxicity:	Not toxic for reproduction.
STOT - single exposure:	No known effects.
STOT - repeated exposure:	No known effect.
Aspiration hazard:	No hazards resulting from the material as supplied.

Relevant information on the hazardous components:

Adipic acid

Acute oral toxicity:	LD50/oral/rat > 2000 mg/kg.
Acute dermal toxicity:	LD50/dermal/rabbit > 2000 mg/kg
Acute inhalation toxicity:	LC0/inhalation/4 hours/rat > 7.7 mg/L
Skin corrosion/irritation:	Slightly irritating.
Serious eye damage/eye irritation:	Not irritating. (OECD 405) (SNF)
Respiratory/skin sensitisation:	Not sensitizing.
Mutagenicity:	Negative in the In vitro Mammalian Cell Gene Mutation Test (OECD 476).
Carcinogenicity:	Not carcinogenic.
Reproductive toxicity:	Not toxic for reproduction.
STOT - single exposure:	No known effects.
STOT - repeated exposure:	No known effect.
Aspiration hazard:	No known effects.

Sulphamidic acid

Acute oral toxicity:	LD50/oral/rat > 2000 mg/kg.

Acute dermal toxicity:	NOAEL/dermal/rat = 2000 mg/kg (OECD 402)
Acute inhalation toxicity:	The product is not expected to be toxic by inhalation.
Skin corrosion/irritation:	Not irritating. (OECD 404) (SNF)
Serious eye damage/eye irritation:	Moderately irritating to the eyes. (EPA OPPTS 870.2400)
Respiratory/skin sensitisation:	The product is not expected to be sensitizing.
Mutagenicity:	Negative in the Ames Test (OECD 471) Negative in the In vitro Mammalian Cell Gene Mutation Test (OECD 476). Not mutagenic. (OECD 472, 487)
Carcinogenicity:	Based on the absence of mutagenicity, it is unlikely that the substance is carcinogenic.
Reproductive toxicity:	No data available.
STOT - single exposure:	No known effects.
STOT - repeated exposure:	No known effect.
Aspiration hazard:	No known effects.

SECTION 12: Ecological information

12.1. Toxicity

Information on the product as supplied:

Acute toxicity to fish:	LC50/Danio rerio/96 hours = 5 - 10 mg/L (OECD 203)
Acute toxicity to invertebrates:	EC50/Daphnia magna/48 hours = 20 - 50 mg/L. (OECD 202)
Acute toxicity to algae:	Algal inhibition tests are not appropriate. The flocculation characteristics of the product interfere directly in the test medium preventing homogenous distribution which invalidates the test.
Chronic toxicity to fish:	No data available.
Chronic toxicity to invertebrates:	No data available.
Toxicity to microorganisms:	No data available.
Effects on terrestrial organisms:	No data available. Readily biodegradable, exposure to soil is unlikely.
Sediment toxicity:	No data available. Readily biodegradable, exposure to sediment is unlikely.

Relevant information on the hazardous components:

Adipic acid

Acute toxicity to fish:	LC0/Danio rerio/96 hours >= 1000 mg/L
Acute toxicity to invertebrates:	EC50/Daphnia magna/48 hours = 46 mg/L. (OECD 202)
Acute toxicity to algae:	IC50/Selenastrum capricornutum/72 hours = 59 mg/L (OECD 201)
Chronic toxicity to fish:	No data available.
Chronic toxicity to invertebrates:	NOEC/Daphnia magna/21 days = 6.3 mg/L (OECD 211)
Toxicity to microorganisms:	EC50/activated sludge/3 hours = 4747 mg/L (OECD 209)
Effects on terrestrial organisms:	No data available.
Sediment toxicity:	No data available.

Sulphamidic acid

Acute toxicity to fish:	LC50/Pimephales promelas/96 hours = 70.3 mg/L (OECD 203)
Acute toxicity to invertebrates:	EC50/Daphnia magna/48 hours = 71.6 mg/L. (OECD 202)
Acute toxicity to algae:	IC50/Scenedesmus subspicatus/72 hours = 48 mg/L (OECD 201)
Chronic toxicity to fish:	No data available.
Chronic toxicity to invertebrates:	No data available.
Toxicity to microorganisms:	EC50/activated sludge/3 hours > 200 mg/L (OECD 209)
Effects on terrestrial organisms:	No data available.
Sediment toxicity:	No data available.

12.2. Persistence and degradability

Information on the product as supplied:

Degradation:	Readily biodegradable.
Hydrolysis:	At natural pHs (>6) the polymer degrades due to hydrolysis to more than 70% in 28 days. The hydrolysis products are not harmful to aquatic organisms.
Photolysis:	No data available.

Relevant information on the hazardous components:

Adipic acid

Degradation: Readily biodegradable. > 70% / 28 days (OECD 301 D)

Hydrolysis: Does not hydrolyse.

Photolysis: Half-life (indirect photolysis): = 2.9 days

Sulphamidic acid

Degradation: Not relevant (inorganic).

Hydrolysis: Does not hydrolyse.

Photolysis: No data available.

12.3. Bioaccumulative potential

Information on the product as supplied:

The product is not expected to bioaccumulate.

Partition co-efficient (Log Pow): < 0

Bioconcentration factor (BCF): No data available.

Relevant information on the hazardous components:

Adipic acid

Partition co-efficient (Log Pow): 0.093 @ 25°C, pH 3.3

Bioconcentration factor (BCF): No data available.

Sulphamidic acid

Partition co-efficient (Log Pow): -4.34 @ 20°C

Bioconcentration factor (BCF): No data available.

12.4. Mobility in soil

Information on the product as supplied:

No data available.

Relevant information on the hazardous components:

Adipic acid

Koc: No data available.

Sulphamidic acid

Koc: No data available.

12.5. Results of PBT and vPvB assessment

PBT assessment:
Does not fulfill the criteria according to Annex XIII of REACH.

vPvB assessment:
Does not fulfill the criteria according to Annex XIII of REACH.

12.6. Other adverse effects

None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste from residues/unused products:

Dispose in accordance with local and national regulations. Can be landfilled or incinerated, when in compliance with local regulations.

Contaminated packaging:

Rinse empty containers with water and use the rinse-water to prepare the working solution. If recycling is not practicable, dispose of in compliance with local regulations. Can be landfilled or incinerated, when in compliance with local regulations.

Recycling:

In accordance with local and national regulations.

SECTION 14: Transport information

Land transport (ADR/RID)

Not classified.

Sea transport (IMDG)

Not classified.

Air transport (IATA)

Not classified.

SECTION 15: Regulatory information

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

All components of this product have been registered or pre-registered with the European Chemicals Agency or are exempt from registration.

15.2. Chemical safety assessment

A Chemical Safety Assessment for this product has been carried out by the person responsible for producing this Safety Data Sheet. All relevant information used to conduct this assessment are included in this Safety Data Sheet as well any as any resulting Risk Reduction Measures.

SECTION 16: Other information

This data sheet contains changes from the previous version in section(s):

SECTION 13. Disposal considerations, SECTION 16. Other Information.

Key or legend to abbreviations and acronyms used in the safety data sheet:

Abbreviations
Eye Irrit. 2 = Serious eye damage/eye irritation Category Code 2
Skin Irrit. 2 = Skin corrosion/irritation Category Code 2
Aquatic Chronic 3 = Hazardous to the aquatic environment Chronic Category Code 3

H-Phrases
H319 - Causes serious eye irritation
H315 - Causes skin irritation
H412 - Harmful to aquatic life with long lasting effects

This SDS was prepared in accordance with the following:

Regulation (EC) N°1907/2006, as amended
Regulation (EC) N°1272/2008, as amended

Version: 17.01.a

PRCC003

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

ANNEX(ES)

This product is not hazardous as supplied and/or does not contain hazardous components:

- which require REACH registration; or,
- which demonstrate relevant effects which would require a chemical safety assessment; or,
- which are present at concentrations above their cut-off value.

Therefore, according to Regulation (EC) No 1907/2006, Article 31, paragraph 7, an Exposure Scenario is not required as an annex to the Safety Data Sheet.

MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: **FLOFOAM 139F**

Supplier: **SNF (UK) LIMITED**
Solutions House, Ripley Close,
Normanton Industrial Estate
Normanton, WF6 1TB.

Telephone Number: +44 (0) 1924 311000 **Fax:** +44 (0) 1924 311099

Product Use: Process aid for industrial applications.

2. HAZARDS IDENTIFICATION

This product is not hazardous to health according to EC criteria.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components presenting hazards : Blend of hydrocarbons, fatty acid esters and surfactants.

Hazardous	CAS No	Concentration	R Phrase	Classification
Component				
Kerosene	064742-81-0	<55%	R65	Xn

4. FIRST AID MEASURES

Product in eyes : Wash thoroughly with water. If irritation persists, seek medical advice.

Product on skin : Remove all contaminated clothing and footwear. Wash with soap and water. In case of persistent skin irritation, consult a physician.

Product inhaled : No hazard anticipated.

Product ingested : Do not induce vomiting. Give milk to drink. Seek medical advice.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : WATER SPRAY, FOAM, CARBON DIOXIDE (CO2), POWDERS, AQUEOUS FILM FORMING FOAM (AFFF).

Unsuitable extinguishing media : Strong water jet.

Specific hazards : NOT classified as flammable according to EC criteria, but may present a risk in the event of a fire.
Combustible liquid. However, it does not catch fire easily.

6. ACCIDENTAL RELEASE MEASURES

Wash small spillages away with cold water. Absorb large spillages with sand or earth.
Dispose in accordance with national and local regulations.

7. HANDLING AND STORAGE

Store between 5^{o}C and 30^{o}C. Extremes of temperature may adversely affect viscosity and stability.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering measures : No specific measures are required provided the product is handled in accordance with the general rules of occupational hygiene and safety.

Personal protective equipment :
Hand protection : Protective gloves.

Eye Protection : Goggles or visor.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Clear amber liquid.
S.G.: Approx 0.88.

10. STABILITY AND REACTIVITY

No known hazardous reactions.

11. TOXICOLOGICAL INFORMATION

Product in eyes : This product is mildly irritating to the eyes.

Product on skin : Moderately irritant to the skin, prolonged contact may cause dermatitis.

Product inhaled : No hazard anticipated.

Product ingested : This product has low systemic toxicity. If aspiration occurs (e.g. during vomiting) this can lead to intense irritation of the lung tissue, and chemically induced pneumonia.

12. ECOLOGICAL INFORMATION

OECD 301D Biodegradability test. 14 days >80% Biodegradation.

13. DISPOSAL CONSIDERATIONS

Incineration under approved conditions.

14. TRANSPORT INFORMATION

This product is not classified as dangerous.

15. REGULATORY INFORMATION

EC Labelling

- Symbol (s)	None.
- R Phrase (s)	None.
- S Phrase (s)	None.

16. OTHER INFORMATION

Further information:

This MSDS was prepared in accordance with the following:

Council Directive 92/32/EEC of 30 April 1992 amending for the seventh time Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances and all subsequent adaptations to technical progress.

Directive 1999/45/EC of the European Parliament and of the Council of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations.

Commission Directive 2001/58/EC of 27 July 2001 amending for the second time Directive 91/155/EEC defining and laying down the detailed arrangements for the system of specific information relating to dangerous preparations in implementation of Article 14 of European Parliament and Council Directive 1999/45/EC and relating to dangerous substances in implementation of Article 27 of Council Directive 67/548/EEC (safety data sheets).

ISO 110140-1 : Material Safety Data Sheet for Chemical Product.

Contact: SNF (UK) Ltd.
Tele: 01924 311000

SAFETY DATA SHEET

SECTION 1 Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

- Product Name: OXYGEN SCAVENGER PLUS
- Product Part Number: 698712 (25 liter)

1.2 Relevant identified uses of the substance or mixture and uses advised against

- Use of the substance/mixture: Water treatment

1.3 Details of the supplier of the safety data sheet

- Name of Supplier: Wilhelmsen Ships Service AS
- Address of Supplier: Willem Barentszstraat 50, 3165AB Rotterdam, The Netherlands
- Telephone: Telephone: +31 4877 777 Fax: +31 4877 888
-
- Head office: Wilhelmsen Ships Service AS
- Strandveien 20, N1324 Lysaker
- Norway, Tel: (47) 6349 440 35
-
-
- Other suppliers SEE SECTION 16!!!
- For quotations contact your local Customer Services
-
- Responsible Person: Product HSE Manager
- Telephone: +31 10 4877775
- Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com
- Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com

1.4 Emergency telephone number

- ****ONLY TO BE USED IN CASE OF AN INCIDENT****
-
- International 24hrs Emergency NCEC:+ 44 1865 407333
- American 24hrs Emergency CHEMTREC (800) 424 9300
- American Chemistry Council 24hrs +1 703 527 3887
- Greece: Poisoning emergency center, +30 210 7793777
- Norway: Poison information centre, +47 22591300
- Sweden: Poison information centre, +46 08 33 12 31
- China NRCC 24hrs emergency telephone number: +86-0532-8388 9090
- Wilhelmsen Ships Service, Melbourne, AUSTRALIA Emergency 24hrs: +61 3 9630 0998

SECTION 2 Hazards identification

2.1 Classification of the substance or mixture

- Counsil Directive 1999/45/EEC Classification, packing and labelling of dangerous preparations.
- Refer to current The Dangerous Substances Directive (67/548/EEC)
- Symbols: Xn
- Harmful by inhalation and in contact with skin (R20/21)
- Irritating to eyes, respiratory system and skin (R36/37/38)
-
- Regulations 1272/2008/EEC. Classification, labeling and packing of dangerous substances and preparations

SECTION 2 Hazards identification (....)

- Symbols: GHS07
- Signal Word: Warning
- Acute Tox. 4
- Eye Irrit. 2
- Skin Irrit. 2
- Harmful if swallowed (H302).
- Causes serious eye irritation (H319).
- Causes skin irritation (H315).

2.2 Label elements

- Signal Word: Warning
-
- Contains:
- Diethylhydroxylamine
-
- Hazard phrases
  Harmful if swallowed (H302).
  Causes serious eye irritation (H319).
  Causes skin irritation (H315).
-
- Precautionary Phrases
  Wear protective gloves/protective clothing/eye protection/face protection (P280).
  IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing (P305+P351+P338).
  If eye irritation persists: Get medical advice/attention (P337+P313).
  IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician (P301+P310).

2.3 Other hazards

- Not applicable
- Not a PBT according to REACH Annex XIII
- Odour: Amine odour
- Appearance: Liquid, pale yellow, soluble in water

SECTION 3 Composition/information on ingredients

3.1 Mixtures

- Diethylhydroxylamine
  Concentration: 10-30%
  CAS Number: 3710-84-7
  EC Number: 223-055-4
  Symbols: Xn, GHS07, GHS02
  R/H Phrases: R10, R20/21, R36/37/38 - H226, H302, H319, H315
  Categories: Flam. Liq. 3, Acute Tox. 4, Eye Irrit. 2, Skin Irrit. 2

SECTION 4 First aid measures

4.1 Description of first aid measures

SECTION 4 First aid measures (....)

- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower (P303+P361+P353).
- IF ON SKIN: Wash with plenty of soap and water (P302+P352).
- Contaminated clothing should be laundered before reuse
-
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing (P305+P351+P338).
- If eye irritation persists: Get medical advice/attention (P337+P313).
-
- IF SWALLOWED: rinse mouth. Do NOT induce vomiting (P301+P330+P331).
- Give 200-300mls (half pint) water to drink
- Obtain immediate medical attention
-
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing (P304+P340).
- When in doubt or symptoms persist, seek medical attention

4.2 Most important symptoms and effects, both acute and delayed

- Causes irritation
- May cause gastro-intestinal disturbances

4.3 Indication of any immediate medical attention and special treatment needed

- No information available

SECTION 5 Fire-fighting measures

5.1 Extinguishing media

- Not flammable. In case of fire use extinguishing media appropriate to surrounding conditions

5.2 Special hazards arising from the substance or mixture

- Smoke from fires is irritating

5.3 Advice for firefighters

- Wear chemical protection suit and positive-pressure breathing apparatus

SECTION 6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- Wear protective clothing as per section 8

6.2 Environmental Precautions

- Do not allow to enter public sewers and watercourses
- Do not flush spilt material into any public water system

6.3 Methods and material for containment and cleaning up

- Absorb spillage in inert material and shovel up
- Ventilate the area and wash spill site after material pick-up is complete

6.4 Reference to other sections

- See Section 13

SECTION 7 Handling and storage

7.1 Precautions for safe handling

- Wear protective clothing as per section 8
- Do not get in eyes, on skin, or on clothing (P262).
- Eyewash bottles should be available

7.2 Conditions for safe storage, including any incompatibilities

SECTION 7 Handling and storage (....)

- Store in a dry place. Store in a closed container (P402+P404).
- Store in a well-ventilated place (P403).

7.3 Specific end use(s)

- Proper chemicals handling procedures should be adopted

SECTION 8 Exposure controls/personal protection

8.1 Control parameters

- Diethylhydroxylamine
  No exposure limits have been set for this substance

8.2 Exposure controls

- No special precautions are required for this product

8.3 Occupational exposure controls

- Wear suitable protective clothing, including eye/face protection and gloves (plastic or rubber are recommended)
- Penetration time of glove material:
  The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
- Respiratory protection may be required under exceptional circumstances when excessive air contamination exists
- Wear suitable respiratory protection. Gas cartridge (organic substances).

SECTION 9 Physical and chemical properties

9.1 Information on basic physical and chemical properties

- Odour: Amine odour
- Appearance: Liquid, pale yellow, soluble in water
- pH 10 - 11 at 100 % concentration
- Density 0,995 - 1,005 g/cm3 at 20 deg C
- Flash point > 62 deg C (CC)
- Partition Coefficient (n-Octanol/Water): Log Pow -1,5
- Non combustible

9.2 Other information

- No information available

SECTION 10 Stability and reactivity

10.1 Reactivity

- No information available

10.2 Possibility of hazardous reactions

- No hazardous reactions known if used for its intended purpose

10.3 Incompatible materials

- Incompatible with amines
- Incompatible with oxidizing substances
- Incompatible with reducing agents
- Incompatible with acid

10.4 Conditions to avoid

SECTION 10 Stability and reactivity (....)

- Avoid contact with water
- No special precautions are required for this product

10.5 Hazardous Decomposition Products

- Decomposition products may include toxic gas
- Decomposition products may include Nitrous gases (NOX)
- Decomposition products may include amines
- Decomposition products may include ammonia
- Decomposition products may include hydrogen

SECTION 11 Toxicological information

11.1 Information on toxicological effects

- LD50 (oral,rat) >2190 mg/kg
- LD50 (skin,rabbit) 1300 mg/kg
- LC50 (inhalation, rat) 3140 ppm /4h

11.2 Contact with eyes

- Causes irritation

11.3 Contact with skin

- Causes irritation

11.4 Ingestion

- May cause gastro-intestinal disturbances

11.5 Inhalation

- Vapours or aerosols may cause irritation of eyes, nose and respiratory tract

SECTION 12 Ecological information

12.1 Toxicity

- LC50 (fish) Diethylhydroxylamine 150 mg/l (96 hr)
- EC50 (daphnia) Diethylhydroxylamine 130.1 mg/l (48 hr)
- Biodegradability. OECD-test. 28 days 20 % (Diethylhydroxylamine)
-
- This product does not contain ingredients which are classified in the EU as dangerous for the environment.

12.2 Persistence and degradability

- Degrades rapidly on exposure to air

12.3 Bioaccumulation Potential

- Bioaccumulation of the components in this product is insignificant.

12.4 Mobility in soil

- Completely soluble in water

12.5 Results of PBT and vPvB assessment

- Not a PBT according to REACH Annex XIII

12.6 Other Adverse Effects

- No environmental problems are expected when the product is used / handled correctly.

SECTION 13 Disposal considerations

13.1 Waste treatment methods

- Do not discharge into drains or the environment, dispose to an authorised waste collection point
- Disposal should be in accordance with local, state or national legislation

SECTION 13 Disposal considerations (....)

13.2 Classification

- EU Waste class: 07.01.99

SECTION 14 Transport information

14.1 UN

- UN No.: Not applicable
- Proper Shipping Name: Not applicable
- Hazard Class: Not applicable
- Packing Group: Not applicable

Not classified as hazardous for transport

14.2 Environmental hazards

- Not Classified
- Presents little or no hazard to the environment

14.3 Special precautions for user

- Not classified as hazardous for transport

14.4 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code

- Not applicable

14.5 Road/Rail (ADR/RID)

- ADR UN No.: Not applicable
- Proper Shipping Name: Not applicable
- ADR Hazard Class: Not applicable
- ADR subrisk: Not applicable
- ADR Packing Group: Not applicable
- ADR Flashpoint: Not applicable

14.6 Sea (IMDG)

- IMDG UN No.: Not applicable
- Proper Shipping Name: Not applicable
- IMDG Hazard Class: Not applicable
- IMDG subrisk: Not applicable
- IMDG Pack Group.: Not applicable
- IMDG EmS: Not applicable
- IMDG Flashpoint: Not applicable

14.7 Air (ICAO/IATA)

- ICAO UN No.: Not applicable
- Proper Shipping Name: Not applicable
- ICAO Packing Group: Not applicable
- ICAO Hazard Class: Not applicable
- ICAO subrisk: Not applicable
- ICAO Flashpoint: Not applicable

14.8 DOT / CFR (US Department of Transportation)

- Identification Number: Not applicable
- DOT Proper Shipping Name: Not applicable
- DOT Labels: Not applicable
- Product RQ (lbs): Not applicable
- Hazardous Material: Not applicable

SECTION 14 Transport information (....)

- Hazard Class: Not applicable
- DOT subrisk: Not applicable
- DOT Flashpoint: Not applicable

SECTION 15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

- Counsil Directive 1999/45/EEC Classification, packing and labelling of dangerous preparations.
- This Safety Data Sheet is provided in compliance with The Dangerous Substances Directive (67/548/EEC)
- Regulations 1272/2008/EEC. Classification, labeling and packing of dangerous substances and preparations
-
- Norwegian Productregistration no: 52696
- This Safety Data Sheet has been prepared in accordance with article 31 and annex II in REACH and Directive 453/2010/EU.

15.2 Chemical Safety Assessment

- None

SECTION 16 Other information

Text not given with phrase codes where they are used elsewhere in this safety data sheet:- H226: Flammable liquid and vapour. H302: Harmful if swallowed. H315: Causes skin irritation. H319: Causes serious eye irritation. R10: Flammable. R20/21: Harmful by inhalation and in contact with skin. R36/37/38: Irritating to eyes, respiratory system and skin.

The data given here is based on current knowledge and experience. This Safety Data Sheet describes the product in terms of safety requirements and does not signify any warranty with regard to the product's properties

The data given here only applies when product used for proper application(s). The product is not sold as suitable for other applications - usage in such may cause risks not mentioned in this sheet. Do not use for other application(s) without seeking advice from manufacturer

The information provided about the product on this Safety Data Sheet has been compiled from knowledge of the individual constituents

The most up-to-date version of this MSDS can be found on www.wilhelmsen.com/shipsservice

OTHER CONTACT INFORMATION MAJOR CHEMICAL OFFICES

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SECTION 16 Other information (....)

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SAFETY DATA SHEET
sodium hydroxide

According to Regulation (EC) No 1907/2006, Annex II, as amended. Commission Regulation (EU) No 2015/830 of 28 May 2015.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name	sodium hydroxide
Product number	ACF-00219
Synonyms; trade names	caustic soda, sodium hydroxide
REACH registration number	01-2119457892-27-XXXX
CAS number	1310-73-2
EU index number	011-002-00-6
EC number	215-185-5

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Industry Professional Consumer

1.3. Details of the supplier of the safety data sheet

Supplier	Airedale Chemical Company Limited Airedale Mills Skipton Road Cross Hills Keighley West Yorkshire BD20 7BX +44 (0) 1535 637876 (Mon - Fri, 08:00 - 17:00 UK time only) +44 (0) 1535 630740 sds@airedalechemical.co.uk

1.4. Emergency telephone number

Emergency telephone	+44 (0) 1535 637876 (Mon - Fri, 08:00 - 17:00 UK time only)
National emergency telephone number	National Poisons Information Service For medical advice or information you should contact your GP or NHS 111 (or NHS 24 in Scotland) on 111 (for 24 hour health advice) If you are a healthcare professional with an enquiry please visit www.TOXBASE.org

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards	Met. Corr. 1 - H290
Health hazards	Skin Corr. 1A - H314 Eye Dam. 1 - H318
Environmental hazards	Not Classified

sodium hydroxide

2.2. Label elements

EC number 215-185-5

Pictogram

Signal word Danger

Hazard statements
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary statements
P264 Wash contaminated skin thoroughly after handling.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplementary precautionary statements
P234 Keep only in original packaging.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P310 Immediately call a POISON CENTER/ doctor.
P321 Specific treatment (see medical advice on this label).
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
P405 Store locked up.
P406 Store in a corrosion-resistant/… container with a resistant inner liner.
P501 Dispose of contents/ container in accordance with national regulations.

2.3. Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

SECTION 3: Composition/information on ingredients

3.1. Substances

Product name sodium hydroxide

REACH registration number 01-2119457892-27-XXXX

EU index number 011-002-00-6

CAS number 1310-73-2

EC number 215-185-5

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation Remove affected person from source of contamination. Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight clothing such as collar, tie or belt. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Place unconscious person on their side in the recovery position and ensure breathing can take place. Get medical attention immediately.

sodium hydroxide

Ingestion Rinse mouth thoroughly with water. Do not induce vomiting unless under the direction of medical personnel. Get medical attention immediately.

Skin contact It is important to remove the substance from the skin immediately. Take off immediately all contaminated clothing. Rinse immediately with plenty of water. Continue to rinse for at least 15 minutes and get medical attention. Chemical burns must be treated by a physician.

Eye contact Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 10 minutes. Get medical attention immediately.

Protection of first aiders First aid personnel should wear appropriate protective equipment during any rescue. Wash contaminated clothing thoroughly with water before removing it from the affected person, or wear gloves. It may be dangerous for first aid personnel to carry out mouth-to-mouth resuscitation.

4.2. Most important symptoms and effects, both acute and delayed

Inhalation Corrosive to the respiratory tract. Symptoms following overexposure may include the following: Severe irritation of nose and throat. Chemical burns.

Ingestion May cause chemical burns in mouth, oesophagus and stomach. Symptoms following overexposure may include the following: Severe stomach pain. Nausea, vomiting.

Skin contact Causes severe burns. Symptoms following overexposure may include the following: Pain or irritation. Redness. Blistering may occur.

Eye contact Causes serious eye damage. Symptoms following overexposure may include the following: Pain. Profuse watering of the eyes. Redness. May cause chemical eye burns. Corneal damage. Blindness.

4.3. Indication of any immediate medical attention and special treatment needed

Notes for the doctor Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media The product is non-combustible. Use fire-extinguishing media suitable for the surrounding fire.

Unsuitable extinguishing media Water.

5.2. Special hazards arising from the substance or mixture

Specific hazards In contact with some metals can generate hydrogen gas, which can form explosive mixtures with air. Severe corrosive hazard. Water used for fire extinguishing, which has been in contact with the product, may be corrosive. Control run-off water by containing and keeping it out of sewers and watercourses.

5.3. Advice for firefighters

Protective actions during firefighting Avoid breathing fire gases or vapours. Evacuate area. Keep upwind to avoid inhalation of gases, vapours, fumes and smoke. Avoid discharge to the aquatic environment. Control run-off water by containing and keeping it out of sewers and watercourses. If risk of water pollution occurs, notify appropriate authorities.

Special protective equipment for firefighters Regular protection may not be safe. Wear chemical protective suit. Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing. Firefighter's clothing conforming to European standard EN469 (including helmets, protective boots and gloves) will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

sodium hydroxide

Personal precautions No action shall be taken without appropriate training or involving any personal risk. Keep unnecessary and unprotected personnel away from the spillage. Wear protective clothing as described in Section 8 of this safety data sheet. Follow precautions for safe handling described in this safety data sheet. Wash thoroughly after dealing with a spillage. Ensure procedures and training for emergency decontamination and disposal are in place. Do not touch or walk into spilled material. Avoid inhalation of dust and vapours. Use suitable respiratory protection if ventilation is inadequate. Avoid contact with skin and eyes. Avoid contact with contaminated tools and objects.

6.2. Environmental precautions

Environmental precautions The product may affect the acidity (pH) of water which may have hazardous effects on aquatic organisms. Avoid discharge into drains and the aquatic environment. Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Wear protective clothing as described in Section 8 of this safety data sheet. Clear up spills immediately and dispose of waste safely. This product is corrosive. Approach the spillage from upwind. Avoid generation and spreading of dust. Collect spillage with a shovel and broom, or similar and reuse, if possible. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water. Wash thoroughly after dealing with a spillage. Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

6.4. Reference to other sections

Reference to other sections For personal protection, see Section 8. See Section 11 for additional information on health hazards. See Section 12 for additional information on ecological hazards. For waste disposal, see Section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions Wear protective clothing as described in Section 8 of this safety data sheet. Provide adequate ventilation. Keep away from food, drink and animal feeding stuffs. Keep container tightly sealed when not in use. This product is corrosive. Avoid generation and spreading of dust. Immediate first aid is imperative. Do not handle until all safety precautions have been read and understood. Do not handle broken packages without protective equipment. Do not reuse empty containers. Always dilute by carefully pouring the product into water.

Advice on general occupational hygiene Wash promptly if skin becomes contaminated. Take off contaminated clothing. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Wash at the end of each work shift and before eating, smoking and using the toilet. Change work clothing daily before leaving workplace.

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Store in accordance with local regulations. Store away from incompatible materials (see Section 10). Keep only in the original container. Keep container tightly closed, in a cool, well ventilated place. Protect containers from damage. The substance is hygroscopic and will absorb water by contact with the moisture in the air.

Storage class Corrosive storage.

7.3. Specific end use(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure controls/Personal protection

sodium hydroxide

8.1. Control parameters

Occupational exposure limits

Short-term exposure limit (15-minute): WEL 2 mg/m³

WEL = Workplace Exposure Limit

DNEL

Industry - Inhalation; Long term local effects: 1 mg/m³
Consumer - Inhalation; Long term local effects: 1 mg/m³

8.2. Exposure controls

Protective equipment

Appropriate engineering controls

Observe any occupational exposure limits for the product or ingredients. Provide adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls as the primary means to minimise worker exposure. Personal protective equipment should only be used if worker exposure cannot be controlled adequately by the engineering control measures. Ensure control measures are regularly inspected and maintained. Ensure operatives are trained to minimise exposure.

Eye/face protection

Wear tight-fitting, dust-resistant, chemical splash goggles if airborne dust is generated. Personal protective equipment for eye and face protection should comply with European Standard EN166. If inhalation hazards exist, a full-face respirator may be required instead.

Hand protection

Wear protective gloves. The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. To protect hands from chemicals, gloves should comply with European Standard EN374. Considering the data specified by the glove manufacturer, check during use that the gloves are retaining their protective properties and change them as soon as any deterioration is detected. Frequent changes are recommended.

Other skin and body protection

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.

Hygiene measures

Provide eyewash station and safety shower. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Clean equipment and the work area every day. Good personal hygiene procedures should be implemented. Wash at the end of each work shift and before eating, smoking and using the toilet. When using do not eat, drink or smoke. Warn cleaning personnel of any hazardous properties of the product.

Respiratory protection

If ventilation is inadequate, suitable respiratory protection must be worn. Wear a respirator fitted with the following cartridge: Particulate filter, type P2. Particulate filters should comply with European Standard EN143.

Environmental exposure controls

Keep container tightly sealed when not in use. Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels. Store in a demarcated bunded area to prevent release to drains and/or watercourses.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Solid.

Colour

White.

sodium hydroxide

Odour	Odourless.
pH	pH (diluted solution): > 14 at 100g/l
Melting point	323°C @ 1013 hPa
Initial boiling point and range	1388°C @ 1013 hPa
Flash point	Not applicable.
Vapour pressure	1 Pa @ 513°C
Relative density	2.13 @ 20°C
Solubility(ies)	Soluble in water. 520 g/l water @ 25°C
Partition coefficient	Not applicable. Substance is inorganic.
Explosive properties	There are no chemical groups present in the product that are associated with explosive properties.
Oxidising properties	Does not meet the criteria for classification as oxidising.

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity See Section 10.3 (Possibility of hazardous reactions) for further information.

10.2. Chemical stability

Stability Stable at normal ambient temperatures and when used as recommended.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions The following materials may react with the product: Acids. Alcohols. Hydrocarbons - halogenated. In contact with some metals can generate hydrogen gas, which can form explosive mixtures with air. Reactions with the following materials may generate heat: Water

10.4. Conditions to avoid

Conditions to avoid The substance is hygroscopic and will absorb water by contact with the moisture in the air. Avoid exposure to high temperatures or direct sunlight. Avoid freezing.

10.5. Incompatible materials

Materials to avoid Acids. Alcohols. Aluminium. Copper. Magnesium. Phenols, cresols. Zinc. Tin. Lead. Leather. Ammonia. Chlorohydrocarbons. Oxidising materials. Organic compounds.

10.6. Hazardous decomposition products

Hazardous decomposition products Does not decompose when used and stored as recommended. Thermal decomposition or combustion products may include the following substances: Hydrogen.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity - oral

Notes (oral LD_{50}) Endpoint waived according to REACH Annex VII, IX or XI. Corrosive Small amounts may cause serious damage.

Skin corrosion/irritation

Skin corrosion/irritation Skin Corr. 1A - H314 Causes severe burns.

Serious eye damage/irritation

sodium hydroxide

Serious eye damage/irritation	Eye Dam. 1 - H318 Corrosive to skin. Corrosivity to eyes is assumed.

Respiratory sensitisation

Respiratory sensitisation	Not applicable. Corrosive

Skin sensitisation

Skin sensitisation	Not sensitising.

Germ cell mutagenicity

Genotoxicity - in vitro	Based on available data the classification criteria are not met.
Genotoxicity - in vivo	Based on available data the classification criteria are not met.

Carcinogenicity

Carcinogenicity	Scientifically unjustified.

Reproductive toxicity

Reproductive toxicity - fertility	Scientifically unjustified.
Reproductive toxicity - development	Scientifically unjustified.

Specific target organ toxicity - single exposure

STOT - single exposure	Not classified as a specific target organ toxicant after a single exposure.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure	Not classified as a specific target organ toxicant after repeated exposure.

Aspiration hazard

Aspiration hazard	Not relevant. Solid.

General information	The severity of the symptoms described will vary dependent on the concentration and the length of exposure.
Inhalation	Corrosive to the respiratory tract. Symptoms following overexposure may include the following: Severe irritation of nose and throat. Chemical burns.
Ingestion	May cause chemical burns in mouth, oesophagus and stomach. Symptoms following overexposure may include the following: Severe stomach pain. Nausea, vomiting.
Skin contact	Causes severe burns. Symptoms following overexposure may include the following: Pain or irritation. Redness. Blistering may occur.
Eye contact	Causes serious eye damage. Symptoms following overexposure may include the following: Pain. Profuse watering of the eyes. Redness. May cause chemical eye burns. Corneal damage. Blindness.
Acute and chronic health hazards	This product is corrosive. Causes severe burns.
Route of exposure	Ingestion Inhalation Skin and/or eye contact
Target organs	No specific target organs known.

SECTION 12: Ecological information

Ecotoxicity	The product may affect the acidity (pH) of water which may have hazardous effects on aquatic organisms.

12.1. Toxicity

sodium hydroxide

Toxicity Based on available data the classification criteria are not met.

Acute aquatic toxicity

Acute toxicity - aquatic invertebrates EC_{50}, 48 hour: 40.4 mg/l, Daphnia magna

12.2. Persistence and degradability

Persistence and degradability The product contains only inorganic substances which are not biodegradable.

Stability (hydrolysis) Substance is inorganic.

12.3. Bioaccumulative potential

Bioaccumulative potential The product is not bioaccumulating.

Partition coefficient Not applicable. Substance is inorganic.

12.4. Mobility in soil

Mobility The product is water-soluble and may spread in water systems.

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment This substance is not classified as PBT or vPvB according to current EU criteria.

12.6. Other adverse effects

SECTION 13: Disposal considerations

13.1. Waste treatment methods

General information The generation of waste should be minimised or avoided wherever possible. Reuse or recycle products wherever possible. This material and its container must be disposed of in a safe way. Disposal of this product, process solutions, residues and by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any local authority requirements. When handling waste, the safety precautions applying to handling of the product should be considered. Care should be taken when handling emptied containers that have not been thoroughly cleaned or rinsed out. Empty containers or liners may retain some product residues and hence be potentially hazardous.

Disposal methods Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

SECTION 14: Transport information

14.1. UN number

UN No. (ADR/RID) 1823

UN No. (IMDG) 1823

UN No. (ICAO) 1823

UN No. (ADN) 1823

14.2. UN proper shipping name

Proper shipping name (ADR/RID) SODIUM HYDROXIDE, SOLID

Proper shipping name (IMDG) SODIUM HYDROXIDE, SOLID

Proper shipping name (ICAO) SODIUM HYDROXIDE, SOLID

Proper shipping name (ADN) SODIUM HYDROXIDE, SOLID

sodium hydroxide

14.3. Transport hazard class(es)

ADR/RID class	8
ADR/RID classification code	C6
ADR/RID label	8
IMDG class	8
ICAO class/division	8
ADN class	8

Transport labels

14.4. Packing group

ADR/RID packing group	II
IMDG packing group	II
ICAO packing group	II
ADN packing group	II

14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant
No.

14.6. Special precautions for user

EmS	F-A, S-B
ADR transport category	2
Emergency Action Code	2W
Hazard Identification Number (ADR/RID)	80
Tunnel restriction code	(E)

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations	Health and Safety at Work etc. Act 1974 (as amended). The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (SI 2009 No. 716). The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009 No. 1348) (as amended) ["CDG 2009"]. EH40/2005 Workplace exposure limits.

sodium hydroxide

EU legislation

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended).
Commission Regulation (EU) No 453/2010 of 20 May 2010.
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).
Commission Regulation (EU) No 2015/830 of 28 May 2015.

15.2. Chemical safety assessment

No chemical safety assessment has been carried out.

SECTION 16: Other information

Abbreviations and acronyms used in the safety data sheet

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.
RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail.
IATA: International Air Transport Association.
ICAO: Technical Instructions for the Safe Transport of Dangerous Goods by Air.
IMDG: International Maritime Dangerous Goods.
CAS: Chemical Abstracts Service.
ATE: Acute Toxicity Estimate.
LD_{50}: Lethal Dose to 50% of a test population (Median Lethal Dose).
EC_{50}: 50% of maximal Effective Concentration.
PBT: Persistent, Bioaccumulative and Toxic substance.
vPvB: Very Persistent and Very Bioaccumulative.
DNEL: Derived No Effect Level.
PNEC: Predicted No Effect Concentration.
REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.
UN: United Nations.
IBC: International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code).

Classification abbreviations and acronyms

Met. Corr. = Corrosive to metals
Eye Dam. = Serious eye damage
Skin Corr. = Skin corrosion

Key literature references and sources for data

Source: European Chemicals Agency, http://echa.europa.eu/

Classification procedures according to Regulation (EC) 1272/2008

Eye Dam. 1 - H318: Skin Corr. 1A - H314: : Expert judgement. Met. Corr. 1 - H290: : Expert judgement.

Training advice

Read and follow manufacturer's recommendations. Only trained personnel should use this material.

Revision date

04/05/2017

Revision

2

Supersedes date

25/11/2015

sodium hydroxide

Hazard statements in full

H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.

Exposure scenario
Manufacturing of liquid NaOH

Identification

Product name	Caustic Soda
REACH registration number	01-2119457892-27-XXXX
CAS number	1310-73-2
EC number	215-185-5
EU index number	011-022-00-6
Revision date	04/05/2017
Version number	1
Es reference	ES1
Supplier	Airedale Chemical Company Limited Airedale Mills Skipton Road Cross Hills Keighley West Yorkshire BD20 7BX +44 (0) 1535 637876 (Mon - Fri, 08:00 - 17:00 UK time only) +44 (0) 1535 630740 sds@airedalechemical.co.uk

1. Title of exposure scenario

Main title	Manufacturing of liquid NaOH
Sector of use	SU3 Industrial uses SU8 Manufacture of bulk, large-scale chemicals (including petroleum products)

Environment

Environmental release category	ERC1 Manufacture of the substance

Worker

Manufacturing of liquid NaOH

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

2. Conditions of use affecting exposure (Industrial - Environment 1)

Control of environmental exposure

Environmental release category

ERC1 Manufacture of the substance

Product characteristics

Physical state

Liquid

Concentration details

Covers concentrations up to 50 %.

Frequency and duration of use

Continuous.

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

Conditions and measures related to external treatment of waste for disposal

Liquid waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2. Conditions of use affecting exposure (Workers - Health 1)

Control of workers exposure

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product characteristics

Physical state

Liquid

Manufacturing of liquid NaOH

Concentration details Covers concentrations up to 50 %.

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use closed systems or covering of open containers. Replace where appropriate, manual processes by automated/and or closed processes. Use long-handled tools where possible. Avoid splashing. Local exhaust ventilation and/or general ventilation is good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Replace where appropriate, manual processes by automated/and or closed processes. Avoid formation of irritating mists, spraying and subsequent potential splashes. Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.5 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

2. Conditions of use affecting exposure (Workers - Health 2)

Control of workers exposure

Process category PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product characteristics

Physical state Liquid

Concentration details Covers concentrations up to 50 %.

Frequency and duration of use

Manufacturing of liquid NaOH

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use closed systems or covering of open containers. Replace where appropriate, manual processes by automated/and or closed processes. Use long-handled tools where possible. Avoid splashing. Local exhaust ventilation and/or general ventilation is good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Replace where appropriate, manual processes by automated/and or closed processes. Corrosive to skin and eyes. Avoid formation of irritating mists, spraying and subsequent potential splashes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.5 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

3. Exposure estimation (Environment 1)

Environmental release category ERC1 Manufacture of the substance

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a STP and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water based aerosol, the substance will rapidly neutralised as a result of its reaction with CO2 (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH-will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

3. Exposure estimation (Health 1)

Manufacturing of liquid NaOH

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
Assessment method	Used ECETOC TRA model.
Specific conditions	Modelled exposure data, very low vapour pressure, without local exhaust ventilation, without respiratory protection.
Exposure	Inhalation worker exposure.: Exposure 0.17 mg/m³, DNEL , RCR 0.17 This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 1)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. As this product contains ingredients with exposure limits, process enclosures, local exhaust ventilation or other engineering controls should be used to keep worker exposure below any statutory or recommended limits, if use generates dust, fumes, gas, vapour or mist.

3. Exposure estimation (Health 2)

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
Assessment method	Used ECETOC TRA model.
Specific conditions	Measured exposure data, worst case.
Exposure	Worker - inhalation, short-term - local: Exposure 0.33 mg/m³, DNEL , RCR 0.33 Worker - inhalation, long-term - local: Exposure 0.14 mg/m³, DNEL , RCR 0.14

Manufacturing of liquid NaOH

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 2)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. As this product contains ingredients with exposure limits, process enclosures, local exhaust ventilation or other engineering controls should be used to keep worker exposure below any statutory or recommended limits, if use generates dust, fumes, gas, vapour or mist.

Exposure scenario
Manufacturing of Solid NaOH

Identification

Product name	Caustic Soda
REACH registration number	01-2119457892-27-XXXX
CAS number	1310-73-2
EC number	215-185-5
EU index number	011-022-00-6
Revision date	04/05/2017
Version number	1
Es reference	ES2
Supplier	Airedale Chemical Company Limited Airedale Mills Skipton Road Cross Hills Keighley West Yorkshire BD20 7BX +44 (0) 1535 637876 (Mon - Fri, 08:00 - 17:00 UK time only) +44 (0) 1535 630740 sds@airedalechemical.co.uk

1. Title of exposure scenario

Main title	Manufacturing of Solid NaOH
Sector of use	SU3 Industrial uses SU8 Manufacture of bulk, large-scale chemicals (including petroleum products)

Environment

Environmental release category	ERC1 Manufacture of the substance

Worker

Manufacturing of Solid NaOH

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

2. Conditions of use affecting exposure (Industrial - Environment 1)

Control of environmental exposure

Environmental release category

ERC1 Manufacture of the substance

Product characteristics

Physical state

Solid

Concentration details

Covers concentrations up to 100 %.

Frequency and duration of use

Continuous.

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

Conditions and measures related to external treatment of waste for disposal

Disposal method

Liquid waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2. Conditions of use affecting exposure (Workers - Health 1)

Control of workers exposure

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product characteristics

Physical state

Solid

Manufacturing of Solid NaOH

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use closed systems or covering of open containers. Replace where appropriate, manual processes by automated/and or closed processes. Avoid formation of irritating mists, spraying and subsequent potential splashes. Use long-handled tools where possible. Local exhaust ventilation and/or general ventilation is good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.5 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

2. Conditions of use affecting exposure (Workers - Health 2)

Control of workers exposure

Process category PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product characteristics

Physical state Solid

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use closed systems or covering of open containers. Replace where appropriate, manual processes by automated/and or closed processes. Avoid formation of irritating mists, spraying and subsequent potential splashes. Use long-handled brushes and rollers where possible. Local exhaust ventilation and/or general ventilation is good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Manufacturing of Solid NaOH

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.5 mm
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should comply with the requirements of EN 374.
Gloves should have a breakthrough time of >480 minutes.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

3. Exposure estimation (Environment 1)

Environmental release category

ERC1 Manufacture of the substance

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a STP and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water based aerosol, the substance will rapidly neutralised as a result of its reaction with CO2 (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH-will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

3. Exposure estimation (Health 1)

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Assessment method

Used ECETOC TRA model.

Specific conditions

Modelled exposure data, very low vapour pressure, without local exhaust ventilation, without respiratory protection.

Manufacturing of Solid NaOH

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Inhalation worker exposure.: Exposure 0.01 mg/m³, DNEL , RCR 0.01

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
Inhalation worker exposure.: Exposure 0.1 mg/m³, DNEL , RCR 0.1

PROC4 Chemical production where opportunity for exposure arises
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
Inhalation worker exposure.: Exposure 0.5 mg/m³, DNEL , RCR 0.5

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 1)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

3. Exposure estimation (Health 2)

Process category

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Assessment method

Used ECETOC TRA model.

Specific conditions

Measured exposure data, worst case.

Exposure

PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
Worker - inhalation, short-term - local: Exposure 0.26 mg/m³, DNEL , RCR 0.26

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 2)

Manufacturing of Solid NaOH

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Exposure scenario
Industrial use

Identification

Product name	Caustic Soda
REACH registration number	01-2119457892-27-XXXX
CAS number	1310-73-2
EC number	215-185-5
EU index number	011-022-00-6
Revision date	04/05/2017
Version number	1
Es reference	ES3
Supplier	Airedale Chemical Company Limited Airedale Mills Skipton Road Cross Hills Keighley West Yorkshire BD20 7BX +44 (0) 1535 637876 (Mon - Fri, 08:00 - 17:00 UK time only) +44 (0) 1535 630740 sds@airedalechemical.co.uk

1. Title of exposure scenario

Main title	Industrial use
Sector of use	SU3 Industrial uses

Environment

Environmental release category	ERC2 Formulation into mixture ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC6a Use of intermediate ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article) ERC7 Use of functional fluid at industrial site

Worker

Industrial use

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC7 Industrial spraying
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring.
PROC15 Use as laboratory reagent.
PROC19 Manual activities involving hand contact
PROC23 Open processing and transfer operations at substantially elevated temperature
PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles

2. Conditions of use affecting exposure (Industrial - Environment 1)

Control of environmental exposure

Environmental release category

ERC2 Formulation into mixture
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC6a Use of intermediate
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC7 Use of functional fluid at industrial site

Product characteristics

Concentration details

Covers concentrations up to 100 %.

Frequency and duration of use

Continuous.

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

Conditions and measures related to external treatment of waste for disposal

Liquid waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2. Conditions of use affecting exposure (Workers - Health 1)

Control of workers exposure

Industrial use

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC7 Industrial spraying
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring.
PROC15 Use as laboratory reagent.

Product characteristics

Physical state Liquid Solid, low dustiness

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use closed systems or covering of open containers. Replace where appropriate, manual processes by automated/and or closed processes. Avoid formation of irritating mists, spraying and subsequent potential splashes. Use long-handled tools where possible. Local exhaust ventilation and/or general ventilation is good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.5 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

2. Conditions of use affecting exposure (Workers - Health 2)

Control of workers exposure

Industrial use

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring.
PROC15 Use as laboratory reagent.
PROC19 Manual activities involving hand contact

Product characteristics

Physical state Liquid Solid, low dustiness

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use closed systems or covering of open containers. Replace where appropriate, manual processes by automated/and or closed processes. Avoid formation of irritating mists, spraying and subsequent potential splashes. Use long-handled tools where possible. Local exhaust ventilation and/or general ventilation is good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.50 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

2. Conditions of use affecting exposure (Workers - Health 3)

Control of workers exposure

Industrial use

Process category

PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC14 Tabletting, compression, extrusion, pelletisation, granulation

Product characteristics

Physical state

Liquid Solid, low dustiness

Concentration details

Covers concentrations up to 100 %.

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures

Use closed systems or covering of open containers. Replace where appropriate, manual processes by automated/and or closed processes. Avoid formation of irritating mists, spraying and subsequent potential splashes. Use long-handled tools where possible. Local exhaust ventilation and/or general ventilation is good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures

Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.5 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

2. Conditions of use affecting exposure (Workers - Health 4)

Control of workers exposure

Process category

PROC23 Open processing and transfer operations at substantially elevated temperature
PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles

Product characteristics

Physical state

Liquid Solid, low dustiness

Concentration details

Covers concentrations up to 100% .

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Industrial use

Technical protective measures Use closed systems or covering of open containers. Replace where appropriate, manual processes by automated/and or closed processes. Avoid formation of irritating mists, spraying and subsequent potential splashes. Use long-handled tools where possible. Local exhaust ventilation and/or general ventilation is good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.50 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

3. Exposure estimation (Environment 1)

Environmental release category

ERC2 Formulation into mixture
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC6a Use of intermediate
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC7 Use of functional fluid at industrial site

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a STP and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water based aerosol, the substance will rapidly neutralised as a result of its reaction with CO2 (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH-will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

3. Exposure estimation (Health 1)

Industrial use

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC7 Industrial spraying PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring. PROC14 Tabletting, compression, extrusion, pelletisation, granulation PROC15 Use as laboratory reagent. PROC19 Manual activities involving hand contact PROC23 Open processing and transfer operations at substantially elevated temperature PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles
Assessment method	Used ECETOC TRA model.
Specific conditions	Liquid, no LEV, no respiratory protection (RPE).
Exposure	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC7 Industrial spraying PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring. PROC14 Tabletting, compression, extrusion, pelletisation, granulation PROC15 Use as laboratory reagent. PROC19 Manual activities involving hand contact PROC23 Open processing and transfer operations at substantially elevated temperature PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles Inhalation worker exposure., Worker - inhalation, short-term - local: Exposure 0.17 mg/m³, DNEL , RCR

Industrial use

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 1)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

3. Exposure estimation (Health 2)

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring.
PROC15 Use as laboratory reagent.
PROC19 Manual activities involving hand contact

Assessment method

Used ECETOC TRA model.

Specific conditions

Solid, no LEV, no respiratory protection (RPE).

Industrial use

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Worker - inhalation, short-term - local: Exposure 0.01 mg/m³, DNEL , RCR

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC15 Use as laboratory reagent.
Worker - inhalation, short-term - local: Exposure 0.1 mg/m³, DNEL , RCR

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring.
PROC19 Manual activities involving hand contact
Worker - inhalation, short-term - local: Exposure 0.5 mg/m³, DNEL , RCR

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 2)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

3. Exposure estimation (Health 3)

Process category

PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC14 Tabletting, compression, extrusion, pelletisation, granulation

Assessment method

Used ECETOC TRA model.

Specific conditions

Solid, no respiratory protection (RPE).

Exposure

PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC14 Tabletting, compression, extrusion, pelletisation, granulation
Worker - inhalation, short-term - local: Exposure 0.2 mg/m³, DNEL , RCR

Industrial use

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 3)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

3. Exposure estimation (Health 4)

Process category

PROC23 Open processing and transfer operations at substantially elevated temperature
PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles

Assessment method

Used ECETOC TRA model.

Specific conditions

Solid, with PRE (90%)

Exposure

PROC23 Open processing and transfer operations at substantially elevated temperature
Worker - inhalation, short-term - local: Exposure 0.4 mg/m³, DNEL , RCR

PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles
Worker - inhalation, short-term - local: Exposure 0.5 mg/m³, DNEL , RCR

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 4)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Exposure scenario
Professional use

Identification

Product name	Caustic Soda
REACH registration number	01-2119457892-27-XXXX
CAS number	1310-73-2
EC number	215-185-5
EU index number	011-022-00-6
Revision date	04/05/2017
Version number	1
Es reference	ES4
Supplier	Airedale Chemical Company Limited Airedale Mills Skipton Road Cross Hills Keighley West Yorkshire BD20 7BX +44 (0) 1535 637876 (Mon - Fri, 08:00 - 17:00 UK time only) +44 (0) 1535 630740 sds@airedalechemical.co.uk

1. Title of exposure scenario

Main title	Professional use
Sector of use	SU22 Professional uses

Environment

Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) ERC9a Widespread use of functional fluid (indoor)

Worker

Professional use

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC11 Non industrial spraying
PROC13 Treatment of articles by dipping and pouring.
PROC14 Tabletting, compression, extrusion, pelletisation, granulation
PROC15 Use as laboratory reagent.
PROC19 Manual activities involving hand contact
PROC22 Manufacturing and processing of minerals and/or metals at substantially elevated temperature
PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles

2. Conditions of use affecting exposure (Industrial - Environment 1)

Control of environmental exposure

Environmental release category

ERC2 Formulation into mixture
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC6a Use of intermediate
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC7 Use of functional fluid at industrial site

Product characteristics

Concentration details

Covers concentrations up to 100 %.

Frequency and duration of use

Continuous.

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

Conditions and measures related to external treatment of waste for disposal

Liquid waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

Conditions and measures related to external recovery of waste

Liquid waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2. Conditions of use affecting exposure (Workers - Health 1)

Professional use

Control of workers exposure

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC7 Industrial spraying
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring.
PROC15 Use as laboratory reagent.

Product characteristics

Physical state Liquid Solid, low dustiness

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use long-handled tools where possible. Avoid splashing.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.5 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

2. Conditions of use affecting exposure (Workers - Health 2)

Control of workers exposure

Professional use

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring.
PROC15 Use as laboratory reagent.
PROC19 Manual activities involving hand contact

Product characteristics

Physical state Liquid Solid, low dustiness

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use long-handled tools where possible. Avoid splashing.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Rubber (natural, latex).
Polyvinyl chloride (PVC).
Thickness: 0.5 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

2. Conditions of use affecting exposure (Workers - Health 3)

Control of workers exposure

Process category

PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC14 Tabletting, compression, extrusion, pelletisation, granulation

Product characteristics

Professional use

Physical state Liquid Solid, low dustiness

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use long-handled tools where possible. Avoid splashing.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.5 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

2. Conditions of use affecting exposure (Workers - Health 4)

Control of workers exposure

Process category PROC23 Open processing and transfer operations at substantially elevated temperature
PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles

Product characteristics

Physical state Liquid Solid, low dustiness

Concentration details Covers concentrations up to 100% .

Frequency and duration of use

Covers frequency up to 8 hours/day, 200 days/year, .

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Use long-handled tools where possible. Avoid splashing.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Corrosive to skin and eyes. Ensure operatives are trained to minimise exposures.

Risk management measures

Professional use

Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate.
It is recommended that chemical-resistant, impervious gloves are worn.
It is recommended that gloves are made of the following material:
Butyl rubber.
Polyvinyl chloride (PVC).
Rubber (natural, latex).
Thickness: 0.5 mm
Gloves should have a breakthrough time of >480 minutes.
Nitrile rubber.
Viton rubber (fluoro rubber).
Thickness: 0.35-0.40 mm
Gloves should have a breakthrough time of >480 minutes.
Wear tight-fitting, chemical splash goggles or face shield.
In case of dust or aerosol formation use suitable respiratory protection with approved filter.
P2

3. Exposure estimation (Environment 1)

Environmental release category

ERC2 Formulation into mixture
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC6a Use of intermediate
ERC6b Use of reactive processing aid at industrial site (no inclusion into or onto article)
ERC7 Use of functional fluid at industrial site

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a STP and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water based aerosol, the substance will rapidly neutralised as a result of its reaction with CO2 (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH-will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

3. Exposure estimation (Health 1)

Professional use

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC7 Industrial spraying PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring. PROC14 Tabletting, compression, extrusion, pelletisation, granulation PROC15 Use as laboratory reagent. PROC19 Manual activities involving hand contact PROC23 Open processing and transfer operations at substantially elevated temperature PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles
Assessment method	Used ECETOC TRA model.
Specific conditions	Liquid, no LEV, no respiratory protection (RPE).
Exposure	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC7 Industrial spraying PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring. PROC14 Tabletting, compression, extrusion, pelletisation, granulation PROC15 Use as laboratory reagent. PROC23 Open processing and transfer operations at substantially elevated temperature PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles Inhalation worker exposure., Worker - inhalation, short-term - local: Exposure 0.17 mg/m³, DNEL , RCR

Professional use

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 1)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

3. Exposure estimation (Health 2)

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring.
PROC15 Use as laboratory reagent.
PROC19 Manual activities involving hand contact

Assessment method

Used ECETOC TRA model.

Specific conditions

Solid, no LEV, no respiratory protection (RPE).

Professional use

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Worker - inhalation, short-term - local: Exposure 0.01 mg/m³, DNEL , RCR

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC15 Use as laboratory reagent.
Worker - inhalation, short-term - local: Exposure 0.1 mg/m³, DNEL , RCR

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring.
PROC19 Manual activities involving hand contact
Worker - inhalation, short-term - local: Exposure 0.5 mg/m³, DNEL , RCR

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 2)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

3. Exposure estimation (Health 3)

Process category

PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC14 Tabletting, compression, extrusion, pelletisation, granulation

Assessment method

Used ECETOC TRA model.

Specific conditions

Solid, no respiratory protection (RPE).

Exposure

PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC14 Tabletting, compression, extrusion, pelletisation, granulation
Worker - inhalation, short-term - local: Exposure 0.2 mg/m³, DNEL , RCR

Professional use

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 3)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

3. Exposure estimation (Health 4)

Process category

PROC23 Open processing and transfer operations at substantially elevated temperature
PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles

Assessment method

Used ECETOC TRA model.

Specific conditions

Solid, with PRE (90%)

Exposure

PROC23 Open processing and transfer operations at substantially elevated temperature
Worker - inhalation, short-term - local: Exposure 0.4 mg/m³, DNEL , RCR

PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles
Worker - inhalation, short-term - local: Exposure 0.5 mg/m³, DNEL , RCR

This substance is corrosive. For handling of corrosive substances and formulations, immediate dermal contact occur only occasionally and it is assumed that the repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systematically available in the body under normal handling and use conditions. Systemic effects of NaOH dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to check compliance with the exposure scenario (Health 4)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Exposure scenario
Consumer use

Identification

Product name	Caustic Soda
REACH registration number	01-2119457892-27-XXXX
CAS number	1310-73-2
EC number	215-185-5
EU index number	011-022-00-6
Revision date	04/05/2017
Version number	1
Es reference	ES5
Supplier	Airedale Chemical Company Limited Airedale Mills Skipton Road Cross Hills Keighley West Yorkshire BD20 7BX +44 (0) 1535 637876 (Mon - Fri, 08:00 - 17:00 UK time only) +44 (0) 1535 630740 sds@airedalechemical.co.uk

1. Title of exposure scenario

Main title	Consumer use
Product category	PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents PC35 Washing and cleaning products PC39 Cosmetics, personal care.
Sector of use	SU21 Consumer uses
Environment	
Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) ERC9a Widespread use of functional fluid (indoor)

2. Conditions of use affecting exposure (Non-industrial - Environment 1)

Control of environmental exposure (Non-industrial)

Consumer use

Environmental release category

ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC9a Widespread use of functional fluid (indoor)

Product characteristics

Concentration details

Covers concentrations up to 100 %.

Risk management measures

There are no specific risk management measures relating to environment.

Conditions and measures related to external treatment of waste for disposal

This material and its container must be disposed of in a safe way. If container is empty trash as regular municipal waste. Batteries should be recycled as much as possible.

2. Conditions of use affecting exposure (Non-industrial - Health 1)

Control of Non-industrial exposure

PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents PC35 Washing and cleaning products PC39 Cosmetics, personal care.

Product characteristics

Physical state

Liquid , or: Solid, low dustiness

Concentration details

Covers concentrations up to 100 %.

Other given operational conditions affecting Non-industrial exposure

Keep out of the reach of children. Avoid contact with skin and eyes. To avoid risks to human health and the environment, comply with the instructions for use. It is recommended that chemical-resistant, impervious gloves are worn. Wear chemical splash goggles. In case of dust or aerosol formation use suitable respiratory protection with approved filter. P2

3. Exposure estimation (Environment 1)

Environmental release category

ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ERC9a Widespread use of functional fluid (indoor)

Consumer uses relate to already diluted products which will further be neutralized quickly in the sewer, well before reaching WWTP or surface water.

3. Exposure estimation (Health 1)

Process category

PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
PC35 Washing and cleaning products
PC39 Cosmetics, personal care.

Assessment method

ConsExpo. SrayExpo.

Specific conditions

Assessed only for the most critical use.

Exposure

Consumer - inhalation, short-term - local: Exposure 0.3 - 1.6 mg/m³, DNEL , RCR <1

Consumer use

4. Guidance to check compliance with the exposure scenario (Health 1)

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.