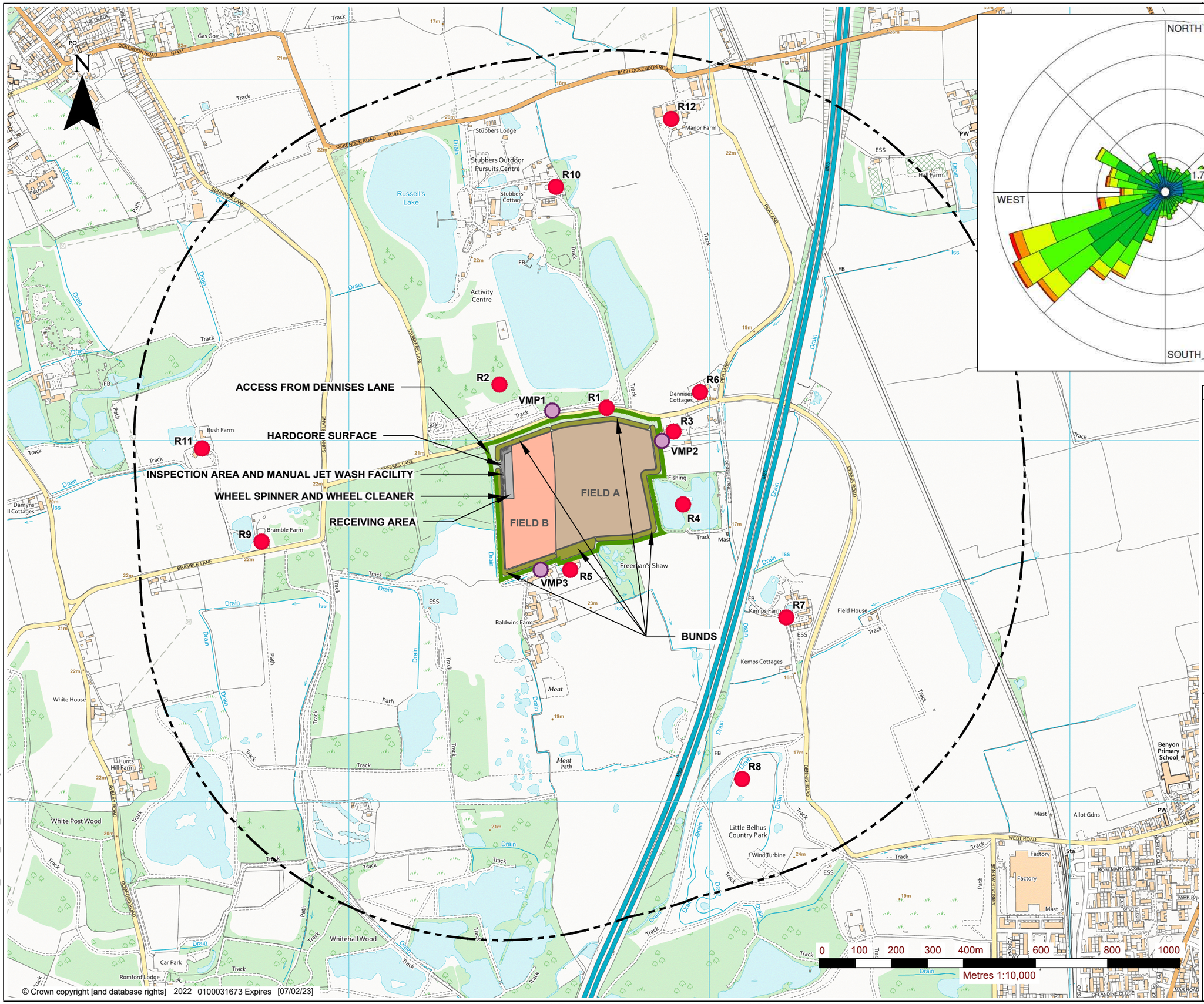
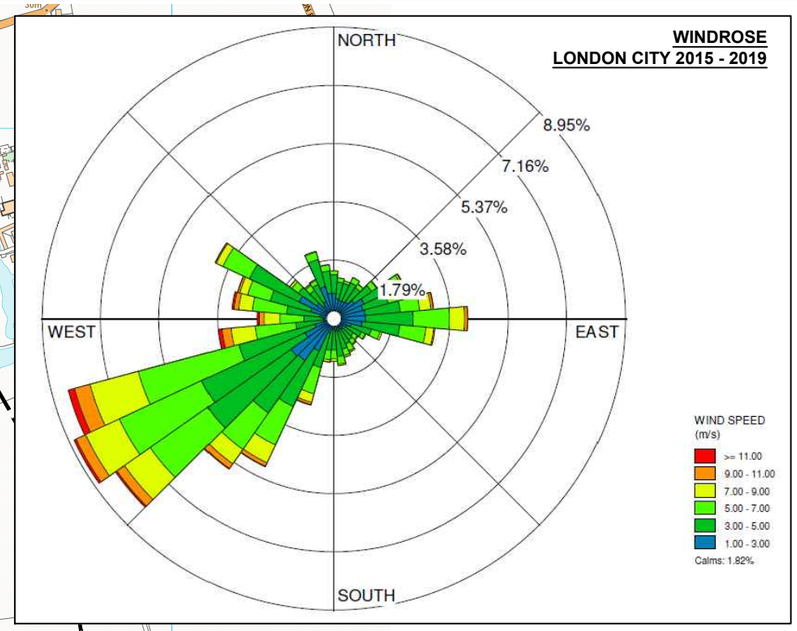




LEGEND

- ENVIRONMENTAL PERMIT BOUNDARY
- 1km BOUNDARY OFFSET
- DUST SENSITIVE RECEPTOR

INGREBOURNE VALLEY LTD

SLR
3RD FLOOR
THE BREW HOUSE
JACOB STREET
BRISTOL, BS2 0EQ
T: 01179 064280
www.slrconsulting.com

MEDINA FARM

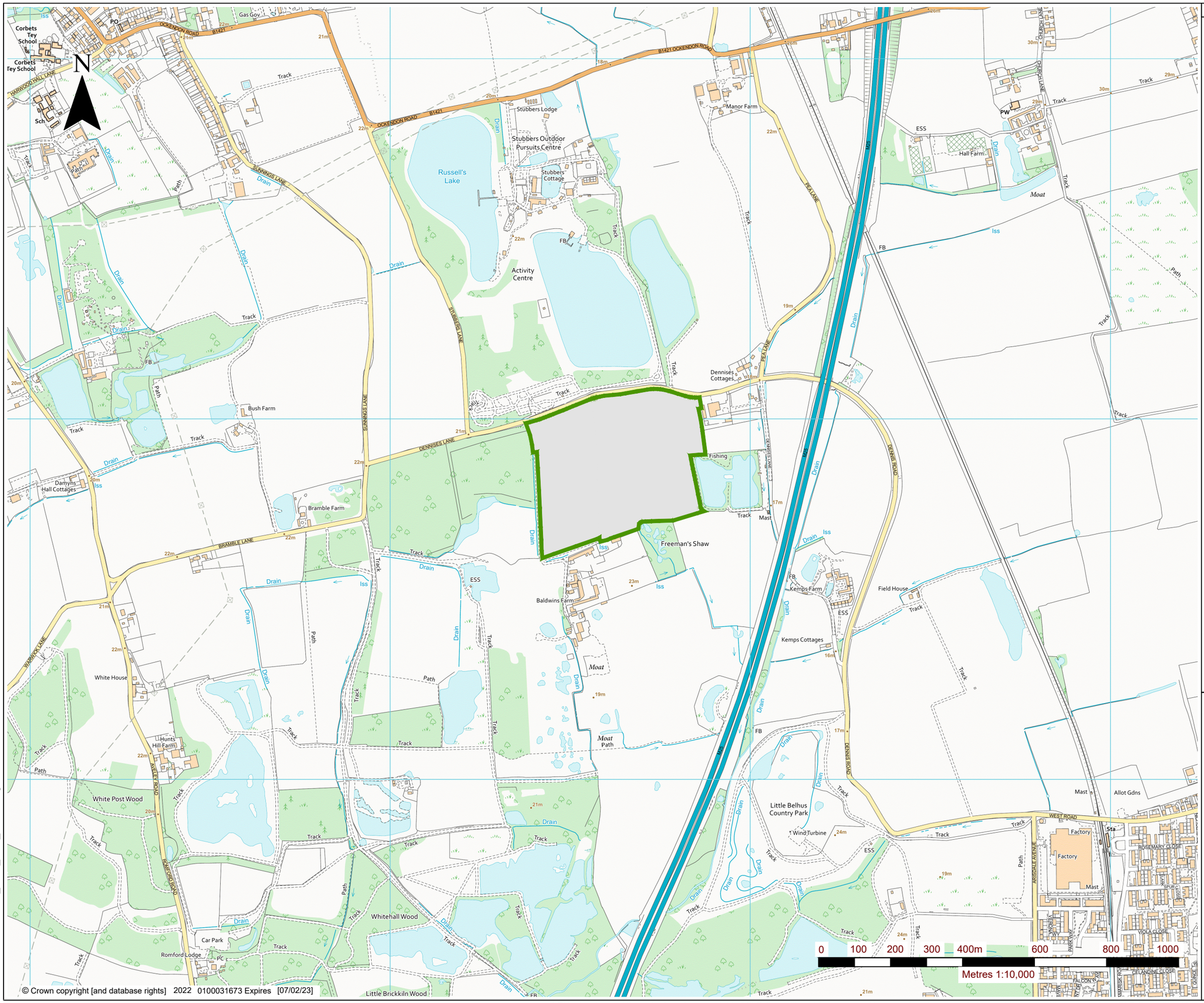
ENVIRONMENTAL PERMIT APPLICATION

DUST MANAGEMENT PLAN

DMP1

Scale	Date
1:10,000 @ A3	MAY 2022

01526.00087.13.DMP1.0_DUST_MAN_PLAN.dwg



LEGEND

ENVIRONMENTAL PERMIT BOUNDARY

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ENVIRONMENTAL PERMIT APPLICATION

SITE LOCATION PLAN

EP1

Scale 1:10,000 @ A3

Date MAY 2022

01526.00087.13.EP1.0_SITE_LOC_PLAN.dwg

N

DENNISES LANE

DENNISES LANE

MS

19.2m

GAS

GAS

Soil Stockpile

Container Cabins

Madina Farm

Mast (telecommunication)

Gate

Fence (P/W)

TP

Und

Access Road

Ditch

Drain

Drain

Fence (P/W)

Path (um)

Lake

Fence (P/W)

IL17.73

IL17.43

Ditch

Issues

Woods

Pond

Ponds

Freeman's Shaw

Track

Silos

Gate

Access Road (Baldwins Farm)

Baldwins Farm

0 20 40 60 80m 120 160 200

Metres 1:2000

LEGEND

ENVIRONMENTAL PERMIT BOUNDARY

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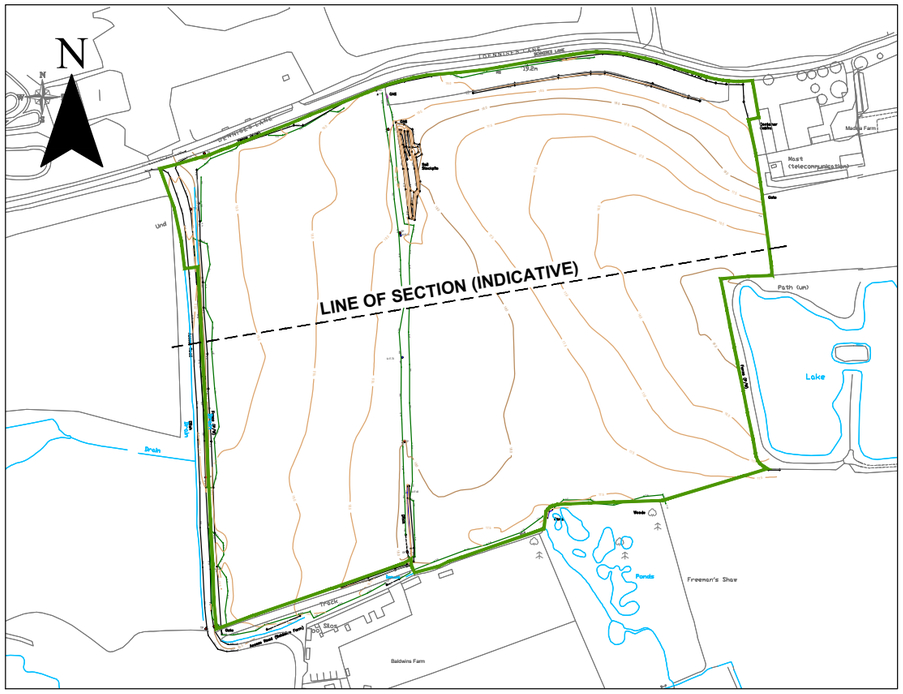
ENVIRONMENTAL PERMIT APPLICATION

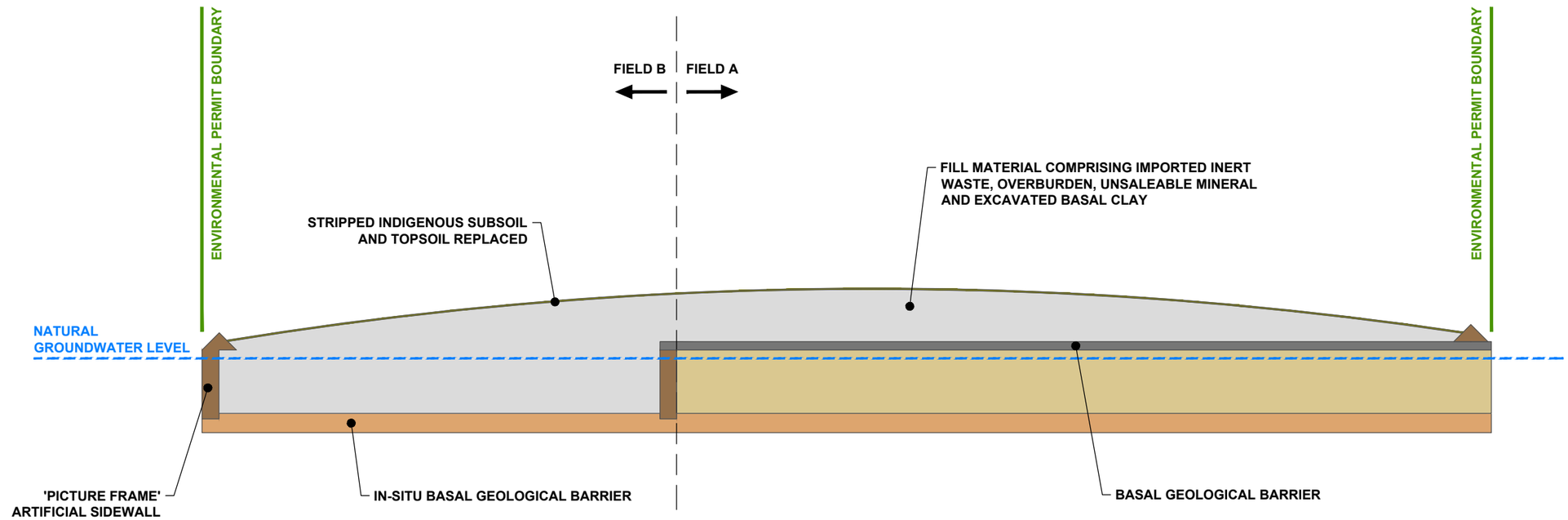
ENVIRONMENTAL PERMIT BOUNDARY

EP2

Scale	Date
1:2000 @ A3	MAY 2022

01526.00087.13.EP2.0_ENV_PERM_BDY.dwg





LEGEND

ENVIRONMENTAL PERMIT BOUNDARY

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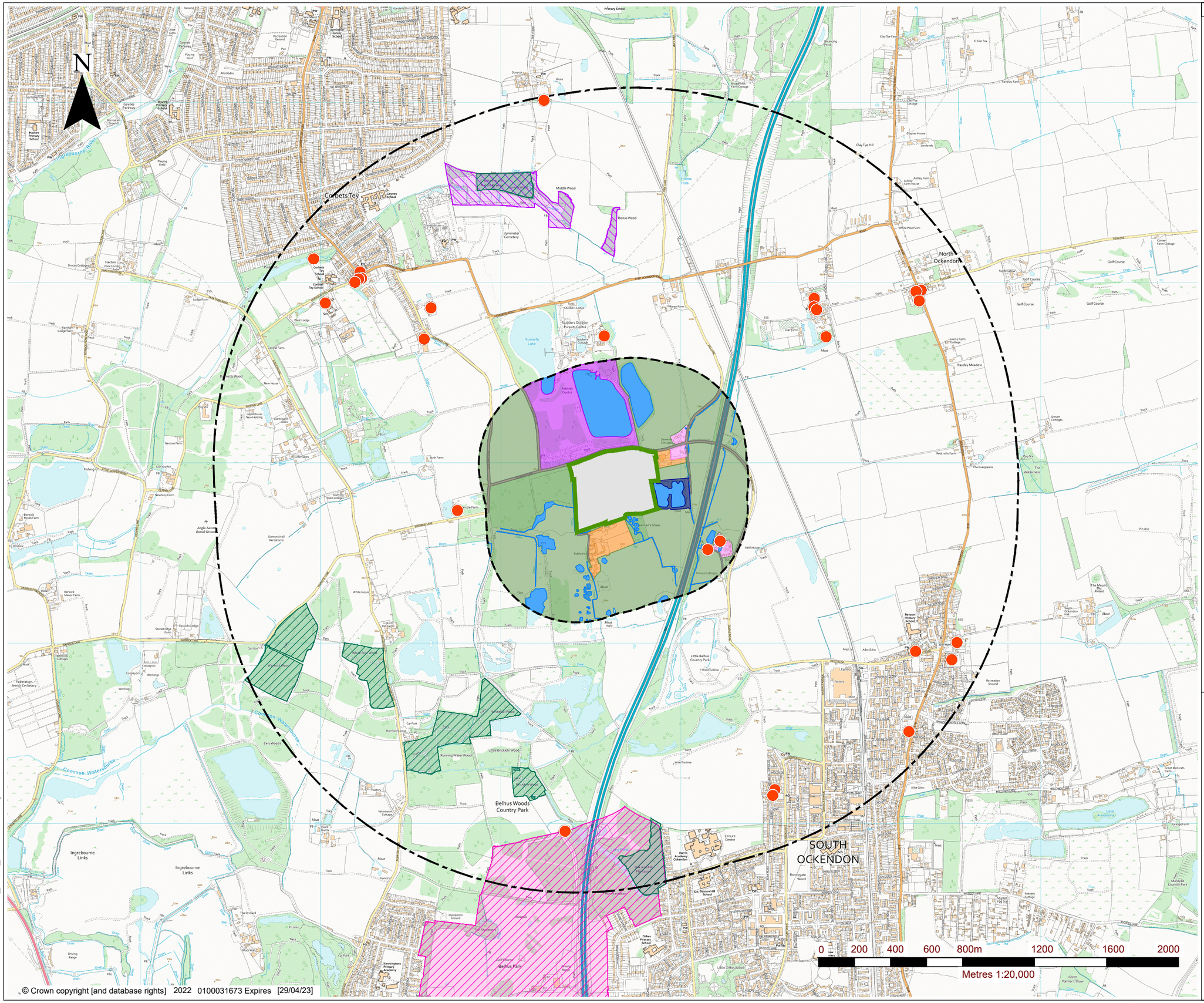
ENVIRONMENTAL PERMIT APPLICATION

ENGINEERING SCHEMATIC

EP3

Scale	Date
NTS (A3)	MAY 2022

01526.00087.13.EP3.1_ENGINEERING.dwg



LEGEND

- ENVIRONMENTAL PERMIT BOUNDARY
- 500m BOUNDARY OFFSET
- 2km BOUNDARY OFFSET
- LOCAL ROAD NETWORK
- RESIDENTIAL
- COMMERCIAL / INDUSTRIAL
- OPEN WATER / DITCHES
- OPEN GROUND
- RECREATIONAL (FISHING LAKE)
- RECREATIONAL (STUBBERS OUTDOOR PURSUIT CENTRE)
- LISTED BUILDING
- ANCIENT WOODLAND
- LOCAL NATURE RESERVE (LNR)
- REGISTERED PARK / GARDEN

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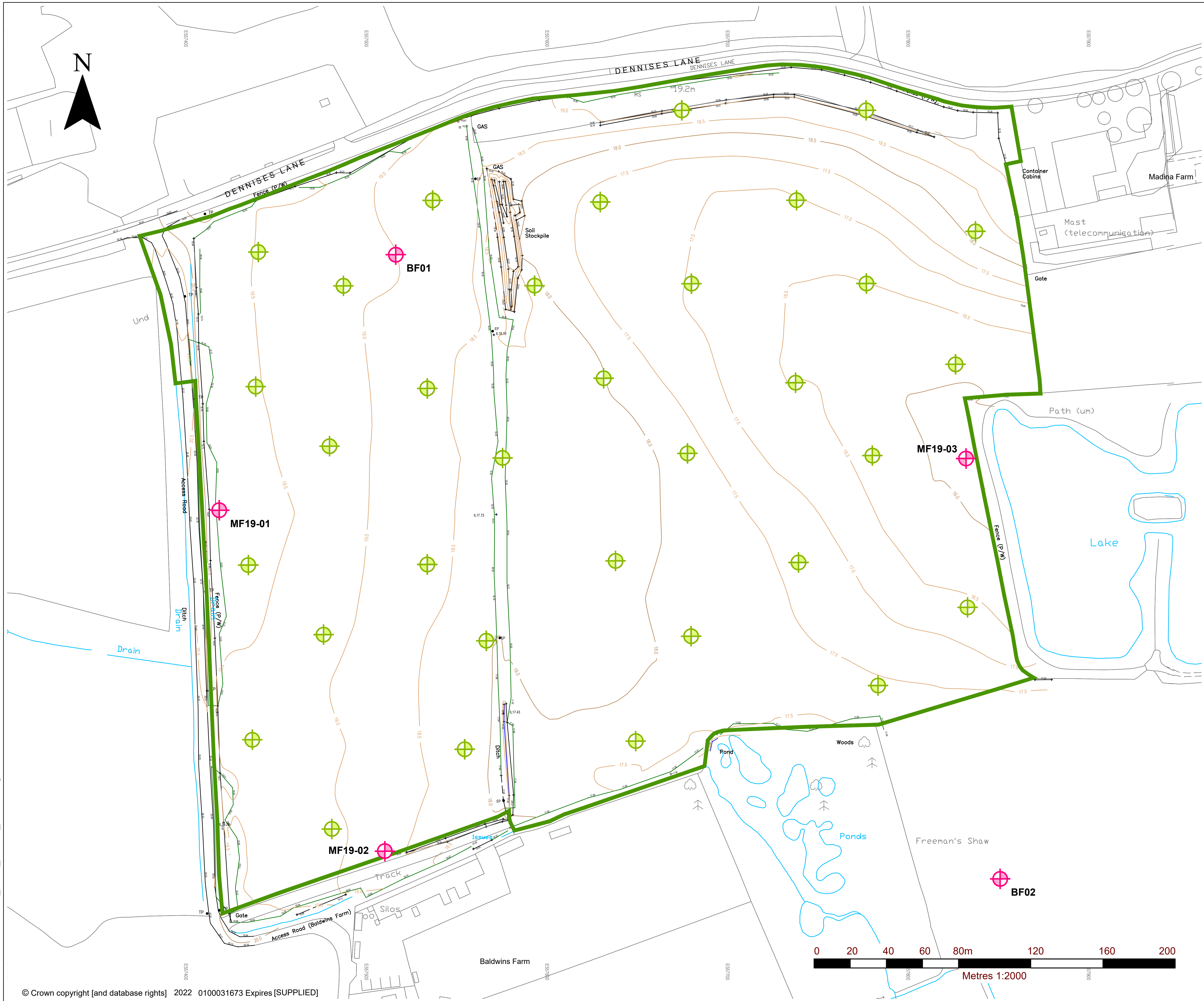
ENVIRONMENTAL PERMIT APPLICATION

ENVIRONMENTAL SITE SETTING

EP4

Scale	Date
1:20,000 @ A3	MAY 2022

01526.00087.13.EP4.0_SITE_SETTING.dwg



LEGEND

- ENVIRONMENTAL PERMIT BOUNDARY
- PERIMETER GROUNDWATER AND GAS MONITORING BOREHOLE
- INDICATIVE LOCATION OF IN-WASTE GAS MONITORING BOREHOLE

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THE BREW HOUSE
JACOB STREET
BRISTOL, BS2 0EQ
T: 01179 064280
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MEDINA FARM

ENVIRONMENTAL PERMIT APPLICATION

MONITORING POINT PLAN

EP5

Scale	Date
1:2000 @ A3	MAY 2022

01526.00087.13.EP5.0_MON_POINT_PLAN.dwg

DENNISES LANE

Route of underground gas pipelines

Local authority boundary

Hedgerow reinstated

General direction of surface drainage

General direction of surface drainage

Gradient of restored landform c.1:40 - 1:80 approx.

Drainage ditch

Attenuation pond

Drainage ditch

Public Footpath (Thurrock FP1)

MEDINA

Route of underground gas pipelines

DENNIS ROAD

M25

FREEMAN'S SHAW

BALDWINS FARM

KEMPS FARM

Attenuation pond

Public Footpath (Thurrock FP1)

DRAFT

N

0m 50m 100m

Version / amendment: **1616/R/1 v3**

D.K. Symes Associates

Proposed Restoration

Scale - **1:2,500** (at A3)

Date - **09-03-2018**

Plan No. **1616/R/1**

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

Ingrebourne Valley Limited

5b Company registration number

02848746

Date of registration (DD/MM/YYYY)

27/08/1993

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: Appendix A - Director Details

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: Ingrebourne Valley Limited
Cecil House, Foster Street
Harlow Common
Essex

Postcode: CM17 9HY

Contact numbers, including the area code

Phone: 01279 422 436

Fax

Mobile

Email

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

Document reference

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

Contact name

Title (Mr, Mrs, Miss and so on)

First name

Last name

Address

Postcode

6 Your address, continued

Contact numbers, including the area code

Phone

Fax

Mobile

Email

Now go to section 7

7 Contact details

7a Who can we contact about your application?

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

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

Document reference of this separate sheet

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

Contact name

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

First name Greg

Last name Altria

Address 3rd Floor, Brew House
Jacob Street
Bristol

Postcode BS2 0EQ

Contact numbers, including the area code

Phone 0117 906 4280

Fax

Mobile 07787 269604

Email galtria@slrconsulting.com

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

Contact name

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

First name Andy

Last name Clark

Address Ingrebourne Valley Limited
Cecil House
Harlow Common
Essex

Postcode CM17 9HY

Contact numbers, including the area code

Phone 01279 422 436

Fax

Mobile

Email AndyClark@ingrebournevalley.co.uk

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)

First name: Company Accountant

Last name: Ingrebourne Valley Limited

Address: Cecil House
Harlow Common
Essex

Postcode: CM17 9HY

Contact numbers, including the area code

Phone: 01279 422 436

Fax

Mobile

Email

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 Refer to Appendix A - Director Details

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

Date of birth (DD/MM/YY)

Name

Date of birth (DD/MM/YY)

Name

Date of birth (DD/MM/YY)

Document reference

MEDINA FARM RESTORATION

Stability Risk Assessment

Prepared for: Ingrebourne Valley Limited

SLR Ref: 416.01526.00087
Version No: 1
November 2022

BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Ingrebourne Valley Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

CONTENTS

DOCUMENT REFERENCES

TABLES

APPENDICES

Appendix 01: Engineering Schematic
Appendix 02: Stability Analysis Outputs

1.0 Introduction

Ingrebourne Valley Limited (IV) has instructed SLR Consulting Limited (SLR) to prepare a bespoke Environmental Permit (EP) application to authorise an inert waste landfill for the restoration of Medina Farm, Dennises Lane, South Ockendon, Essex RM14 2XB, hereafter referred to as 'the Site'.

As part of the permit application, SLR has undertaken a geotechnical Stability Risk Assessment (SRA). This document describes the manner in which the assessment has been carried out and presents the overall finding of the work.

Relevant background information describing the site setting (including geological, hydrological, site monitoring data and development proposals) is detailed within the Site's Conceptual Site Model.

The methodology adopted for this Stability Risk Assessment generally follows the principles outlined in the Environment Agency R&D Technical Report P-385, volumes TR1 and TR22[1] (from here on referred to as the guidance). Where additional analytical techniques have been used, these are described within the text.

1.1 Conceptual Stability Site Model

The conceptual stability site model has been developed from information gathered from relevant publicly available sources, site-specific data obtained from planning documents and information provided by the client.

Medina Farm is located 2.7km to the north north-east of South Ockendon in Essex at grid reference TQ 57636 83872. It is approximately 17ha in size.

The Site currently comprises two agricultural fields: Field A is a former gravel pit that has been infilled with inert waste and poorly restored; Field B has not been previously exploited and is the subject of the proposed mineral extraction.

The Site's topography is generally flat, falling gently from a maximum elevation of 20m above Ordnance Datum (AOD) in the northwest corner, to a minimum of 15m AOD on the eastern boundary.

A review of the British Geological Survey (BGS)[2] mapping reveals that the Site is underlain by superficial deposits of the Lynch Hill Gravel Member, comprising brown sand and subangular to sub rounded fine to coarse gravel, to a depth of 3.2m bgl. The underlying bedrock geology comprises the London Clay Formation to a depth of approx. 150m bgl.

The superficial sand and gravel are classified as a Secondary A Aquifer with the underlying London Clay classified as Unproductive Strata.

Groundwater is recorded at a maximum of 15.6m aOD to 21.2m aOD during winter periods. Groundwater flow through the Site is predominantly in a south or southeast direction, following the regional topography. The typical unsaturated zone thickness ranges from 1-2.5m[3]

Due to high groundwater levels beneath the Site, Field B will be worked using the process of "picture framing" ensuring the Site is dewatered without affecting nearby water interests.

---

[1] Environment Agency R&D Technical Report P1-385/ TR1 and TR2, 'Stability of Landfill Liner Systems', March 2003.

[2] British Geological Survey – Available: mapapps.bgs.ac.uk/geologyofbritain/home.html, accessed June 2022

[3] SLR Consulting Ltd (2022). Medina Farm Restoration - 2022 Hydrogeological Risk Assessment.

Field B will be stripped to a maximum depth of approx. 0.87m below ground level (bgl) where the expected water table will be reached. Perimeter trenches will then be dug to the base of the mineral at approx. 3.2m bgl and then backfilled with cohesive material with a maximum permeability of 1x10-7m/s.

The base of the landfill will be located on low permeability in-situ London Clay deposits (>150m thick). Therefore, there is no requirement for an engineered basal geological barrier.

Once the perimeter trenches are complete the Site will be dewatered progressively via a sump in the base of the excavation.

Due to the small size of the Site, landfilling of the void in Field B, will be undertaken in a single phase, and will therefore commence after all excavation has been completed. Infilling will be completed to pre-development ground levels (18 – 21m AOD) using imported inert waste.

Field A has been previously worked for mineral, was restored but now suffers poor drainage due to differential settlement. Restoration of Field A will primarily involve using material excavated from Field B (such as overburden, unsaleable mineral or basal clay) to regrade and address the differential levels across it. This will be supplemented with imported inert waste materials where required to achieve Field A's restoration levels.

In order to ensure adequate drainage, a slight domed restoration profile is proposed. Surface water will runoff to drainage ditches around the perimeter which will lead to two attenuation ponds. One will be located in the south-eastern corner of the Site and the other in the south-western corner.

Restoration will be undertaken in lifts to achieve the restoration profile minus the topsoil and sub soil layer. Up to 420,000 tonnes of waste will be accepted at the Site. It is anticipated that restoration of the Site will take 2 years.

The proposed development is presented in the engineering schematic, included as Appendix 01.

1.1.1 Basal Subgrade Model

The basal subgrade to the Site will be formed by the base of mineral extraction in in-situ London Clay.

1.1.2 Side Slope Subgrade Model

The side slope subgrade will be formed by extraction of the Lynch Hill Gravel Member. A portion of sand and gravel will remain in-situ to protect the engineered sidewall geological barrier installed prior to restoration.

During the construction of the geological barrier, the side wall of the trench will comprise the Lynch Hill Gravel Member which will be exposed during the infilling.

1.1.3 Basal Geological Barrier Model

The Site is underlined by 150m of London Clay. The London Clay is classified as "Unproductive Strata" and typically exhibits permeabilities of c. $1x10^{-7}$ – $1x10^{-11}$ m/s. The London Clay therefore meets the requirements of a geological barrier and no further artificial basal barrier is required underneath the Site.

1.1.4 Side Slope Geological Barrier Model

In advance of mineral extraction, a geological barrier will be constructed around the perimeter of the Site which will be at least 1m thick with a maximum permeability of <1x10-7m/s. This will be installed in trenches a minimum of 1m wide dug to the top of the London Clay.

1.1.5 Waste Mass Model

The Site will only accept inert waste. Strict waste acceptance procedures will be in place at the Site to ensure that non-inert waste is not accepted at the Site. The Site will be restored in a single-phase following extraction.

1.1.6 Capping System Model

Once the Site is filled to a level profile with imported inert fill the sub-soils and topsoil originally removed will be replaced. Therefore, there is no requirement for an engineered cap.

2.0 STABILITY RISK ASSESSMENT

Each of the six principal components of the conceptual stability site model has been considered and the various elements of that component have been assessed with regard to stability.

The principal components considered are:

- The basal subgrade.
- The side slope subgrade.
- The basal geological barrier.
- The side slope geological barrier.
- The waste.
- The capping system.

2.1 Risk Screening

Issues relating to stability and integrity for each principal component of the proposed development have been subject to a preliminary review to determine the need to undertake further detailed geotechnical analyses. The following sections present the results of this screening exercise.

2.1.1 Basal Subgrade Screening

The base of the Site will be formed by in-situ London Clay. Each aspect of the stability and deformability of the basal subgrade identified in the Guidance is discussed in Table 2-1 below.

Table 2-1 Stability Components for Basal Subgrade

Excessive Deformation	Compressible subgrade	The basal subgrade will be formed by in-situ London Clay. The clay is considered effectively incompressible under the limited weight imparted by the waste mass. This component does not require further consideration.
	Basal heave	Groundwater is recorded between 15.6m aOD to 21.2m aOD, above the base of the excavation and in continuity with the underlying London Clay. The Site will be dewatered and restored dry This component does not require further consideration.
	Cavities in subgrade	The occurrence of voids within the London Clay is not recorded; therefore, this issue is not considered further.
Filling on Waste	Compressible waste	Not applicable.
	Cavities in waste	Not applicable.

Given the foregoing, it is considered that the basal subgrade system does not require further assessment.

2.1.2 Side Slope Subgrade Screening

The controlling factors that will affect the stability and deformability of the side slope subgrade are detailed in Table 2-2, below.

Table 2-2 Stability/Integrity Components of Side Slope Subgrade

Cut slope	Rock	Stability	Not Applicable
		Cavities in subgrade	Not Applicable
		Deformability	Not Applicable
	Cohesive soils	Stability	Not applicable
		Deformability	Not applicable
		Time dependent stability	Not applicable.
		Groundwater	Not Applicable
	Granular soils	Stability	Side slopes will be formed by extraction of the Lynch Hill Gravel Member within the 'picture frame' of the side slope geological barrier. These will be subject to regular Geotechnical Assessment under the requirements of the Quarries Regulations 1999. These assessments will identify any issues with the stability of the side slopes during extraction. Notwithstanding this, stability of these slopes will be considered.
		Deformability	The side slope subgrade will be formed by the in-situ Lynch Hill Gravel Member. The material is considered effectively incompressible under the limited weight imparted by the waste mass. This component does not require further consideration.
		Groundwater	Groundwater is recorded within the gravels between 15.6mAOD and 21.2mAOD. There will be no dewatering during extraction. The impact of groundwater on the stability of the side slope subgrade will need to be considered.
Fill Slope	Cohesive soils	Stability	Not applicable.
		Time dependent stability	Not applicable.

		Groundwater	Not applicable.
	Granular soils	Stability	Not applicable.
		Deformability	Not applicable.
		Groundwater	Not applicable.

Given the foregoing, it is considered that the side slope subgrade does require further assessment.

2.1.3 Basal Geological Barrier System Screening

The controlling factors that influence the stability and integrity of the basal lining system are given in Table 2-3 below.

Table 2-3 Stability/Integrity Components of Basal Lining System

Mineral only	Stability and Integrity	The basal geological barrier system will comprise the in-situ London Clay at the base of extraction. Temporary waste slopes will not be generated during the infilling of the void, therefore, there will be no instability between the waste mass and the basal geological barrier system. This component does not require further consideration.
	Compressible subgrade	The basal geological barrier will comprise in-situ London Clay which is considered to be effectively incompressible under the stresses imposed by the proposed waste mass height. This component does not require further consideration.
	Cavities	The occurrence of voids within the London Clay is not recorded therefore this issue is not considered further.
	Basal heave	Groundwater is recorded between of 15.6m aOD to 21.2m aOD, above the base of the excavation and in continuity with the underlying London Clay. The Site will be dewatered and restored dry This component does not require further consideration.
Geosynthetic / clay geological barrier	Stability and Integrity	Not applicable.
	Compressible subgrade	Not applicable.
	Cavities	Not applicable.
	Basal heave	Not applicable.

Given the foregoing, it is considered that the basal geological barrier system does not require further assessment.

2.1.4 Side Slope Geological Barrier System Screening

The controlling factors that influence the stability and integrity of the side slope geological barrier system are given in Table 2-4 below.

Table 2-4 Stability/Integrity Components of Side Slope Geological Barrier System

Unconfined	Mineral only	Stability	The side slope geological barrier will be constructed in a perimeter trench prior to the bulk extraction of Lynch Hill Gravel Member in Field B. The barrier will be constructed in lifts to form a barrier a minimum of 1m thick. The slopes of the trench may need to be battered during construction. The geological barrier will not be fully confined until the void has been restored completely. Therefore, this aspect does require further assessment.
		Integrity	The side slope geological barrier will be present in the unconfined condition. Therefore, this aspect of the assessment does require further consideration
	Geosynthetic / mineral	Stability	Not applicable.
		Integrity	Not applicable.
Confined	Mineral only	Stability	Waste will be placed into the site as a single phase and no temporary waste slopes will be generated. Therefore, no scenario will arise where the stability of the side slope geological is at risk in the confined condition. This aspect does not require further consideration.
		Integrity	The geological barrier system will remain confined at the base of the slope and buttressed by the Lynch Hill Gravel Member throughout extraction and restoration. If the geological barrier remains stable, it is clear that the integrity will not be impacted. This aspect does not require further consideration.
	Geosynthetic / mineral	Stability	Not applicable
		Integrity	Not applicable

Given the foregoing, it is considered that the side slope geological barrier system does require further assessment.

2.1.5 Waste Mass Screening

The controlling factors that influence the stability of the waste mass are presented in Table 2-5 below.

Table 2-5 Stability Components of Waste Slopes

Failure wholly in waste	Stability		Waste will be progressively tipped under dry conditions into the void. Temporary waste slopes will not be generated through progressive filling as the waste will be placed in a single phase in horizontal layers. This aspect of the assessment does not require further consideration.
Failure involving lining system and waste	Mineral only	Stability	The proposed method of working will not generate temporary waste slopes adjacent to the side slope subgrade, therefore there is no risk of potential shearing through the basal or side slope geological barriers. This aspect of the assessment does not require further consideration.
		Integrity	Not applicable
	Geosynthetic / Mineral	Stability	Not applicable
		Integrity	Not applicable

Given the foregoing, it is considered that the waste mass requires no further assessment.

Leachate Collection System

Due to the nature of the inert waste to be deposited at Medina Farm, potentially polluting leachate will not be generated. Consequently, a specific leachate collection system is not required and will not be installed.

Gas Collection System

Due to the nature of the waste to be deposited at Medina Farm, a significant volume of landfill gas will not be generated. Therefore, a gas extraction system is not warranted and will not be installed. The waste will be subject to waste acceptance criteria and waste acceptance procedures to ensure imported waste is not likely to generate landfill gas.

2.1.6 Capping System Screening

No formal capping is proposed at Medina Farm; therefore, analysis of the capping system is not considered necessary.

2.2 Lifecycle Phases

This aspect of the assessment identifies the critical phases during the development of the landfill.

Details have not been provided on how the void will be infilled; however it has been assumed that the void will be filled in a single phase though tipping in horizontal layers in dry conditions. Temporary waste slopes will not be generated.

To ensure the SRA fully addresses the key issues throughout the life of the landfill, the side slope subgrade and geological barrier system stability system has been considered.

2.3 Data Summary

The following data are required as input for the analyses undertaken for this Stability Assessment:

- Material unit weight; and
- Drained and undrained shear strength of soils.

It should be noted that there is no laboratory test data relating to the shear strength of the materials available on the Site.

There is limited available information on appropriate effective stress shear strength parameters for the in-situ materials. Boreholes have been conducted to inform mineral thickness and to inform hydrogeological elements of the design of the Site and these provide qualitative descriptions to the materials present.

Where no direct measurement of a particular property is available, reference has been made to the borehole logs, published references and relevant experience from within SLR in the same or similar materials.

The geotechnical parameter values adopted are discussed in more detail in Section 2.6.

2.4 Selection of Appropriate Factors of Safety

The factor of safety is the numerical expression of the degree of confidence that exists, for a given set of conditions, against a particular failure mechanism occurring. It is commonly expressed as the ratio of the load or action which would cause failure against the actual load or actions likely to be applied during service. This is readily determined by limit equilibrium slope stability analyses.

Prior to determining appropriate factors of safety for the various components of the model, it is necessary to identify key 'receptors' and evaluate the consequences in the event of a failure. Consideration of the following receptors is required:

- Groundwater;
- Property - relating to site infrastructure, third party property;
- Human beings (i.e. direct risk); and
- Ecological receptors.

The factor of safety adopted for each component of the model would be related to the consequences of a failure.

2.4.1 Factor of Safety for Basal Subgrade

This element has been screened out in Section **Error! Reference source not found.**; therefore, the selection of an appropriate factor of safety is not required.

2.4.2 Factor of Safety for Side Slope Subgrade

A factor of safety is of 1.3 is considered appropriate when using conservative shear strength parameters.

2.4.3 Factor of Safety for Basal Geological Barrier

This element has been screened out in Section **Error! Reference source not found.**; therefore, the selection of an appropriate factor of safety is not required.

2.4.4 Factor of Safety for Side Slope Geological Barrier

A factor of safety of 1.3 is considered appropriate when using conservative peak shear strength parameters for a slope that is to remain unsupported for a short period of time.

2.4.5 Factor of Safety for Waste Mass

This element has been screened out in Section 2.1.5; therefore, the selection of an appropriate factor of safety is not required.

2.4.6 Factor of Safety for Capping System

An assessment is not required on this component as it has been screened out in Section 2.1.6.

2.5 Justification for Modelling Approach and Software

In order to perform a comprehensive stability assessment, the components of the proposed development have to be considered not only individually but also in conjunction with one another where relevant. Any analytical techniques adopted for such an assessment should adequately represent all of the considered scenarios, i.e. the overburden to mineral ratio of the extraction faces and groundwater elevation. The methodology and the software should also achieve the desired output parameters for the assessment.

The analytical methods used in this stability assessment include:

- Limit equilibrium stability analyses for the derivation of factors of safety for the extraction slopes.

The limit equilibrium analyses have been undertaken using the package Slope/W 2021.3, version 11.2.2.23310 (Geo-Slope International). The Morgenstern-Price[4] non-circular method of analysis has been used.

2.6 Justification of Geotechnical Parameters Selected for Analysis

The following sections present a justification for the various parameters used in the stability analyses based on the following criteria:

- An assessment of the suitability of non-site-specific data, where used.
- Methods for the derivation of the parameters adopted.

A summary of the geotechnical parameters used in the design and analysis of the development are presented in tabular form for each component of the subgrade in Table 2-6.

The parameters used in the analyses have been:

- Adapted from similar work undertaken by SLR.
- Inferred from site specific data or other relevant published data.

It should be noted that the geotechnical parameters for limit equilibrium analysis include the shear strength and unit weight of each material within the model. Shear strength has been defined using effective shear strength parameters of cohesion, (c'), and the angle of shearing resistance, (ø').

The adopted parameters are presented in Table 2-6.

The angle of shearing resistance and cohesion for the Lynch Hill Gravel Member have been adopted based on borehole descriptions that indicate the material comprises sand and sub-angular to subrounded gravel. And from SLR's knowledge of similar materials. No cohesion has been applied to reflect the granular nature of the deposit.

[4] Morgenstern, N.R and Price, V.E. (1965), 'The analysis of stability of general slip surfaces' Geotechnique.

Effective shear stress parameters for the underlying London Clay have been based SLR's experience of the material and laboratory analysis conducted on London Clay in the wider area. Conservative parameters have been applied based on consolidated undrained triaxial tests and reference to literature values.

2.6.1 Parameters Selected for Basal Subgrade Analysis

Analysis of the basal subgrade is not necessary as it has been screened out in Section 2.1.1.

2.6.2 Parameters Selected for Side Slopes Subgrade Analysis

The parameters required for the side slope subgrade analysis are the angle of shearing resistance for the in-situ Lynch Hill Gravel Member. The parameters selected, based on SLR's recent experience, are presented in Table 2-6. below.

2.6.3 Parameters Selected for Basal Geological Barrier Analysis

Analysis of the basal subgrade is not necessary as it has been screened out in Section 2.1.3.

2.6.4 Parameters Selected for Side Slope Geological Barrier Analyses

The parameters required for the side slope geological barrier system are the angle of shearing resistance and cohesion of the geological barrier. This has been assigned undrained parameters in the short term for the stability analysis. The parameters selected, based on SLR's recent experience, are presented in Table 2-6. below.

2.6.5 Parameters Selected for Waste Analyses

Analysis of the basal subgrade is not necessary as it has been screened out in Section 2.1.5.

2.6.6 Parameters Selected for Capping Analyses

Analysis of the capping is not necessary as it has been screened out in Section 2.1.6.

Table 2-6 Geotechnical Design Parameters

Material	Unit Weight, γ (kN/m3)	Effective cohesion, c′ (kPa)	Angle of Shearing Resistance, ø' (°)	Typical Description
Lynch Hill Gravel Member	19	0	28	Sand and gravel mineral deposit.
London Clay Formation	19	20	18	In-situ London Clay
Side Slope Geological Barrier	18	1	28	Low permeability cohesive material

2.7 Analyses

2.7.1 Basal Subgrade Analysis

Analysis of the basal subgrade is not necessary, as it has been screened out in Section 2.1.1.

2.7.2 Side Slope Subgrade Analysis

Analysis has been carried out to consider the impact of the proposed “picture frame” trench being excavated along the perimeter of the Site.

Analyses have been carried out to understand the minimum gradient at which the picture frame trench side slopes can be excavated. This is based on acceptable factor of safety of 1.3.

The stability analysis includes the proposed 12m wide, 3m high screening bund that will be situated along the northern perimeter of the Site.

A 0.5m deep key-in trench, into the underlying London Clay, has also been assumed in the stability analyses. The “picture frame” trench will be excavated wet with no dewatering, and this is reflected in the stability model by a piezometric surface at 0.9m bgl.

A summary of the analysis results is presented in Table 2-7, below.

Figure 2-1 in Appendix 02 demonstrates that a factor of safety of 1.335 is achieved where the perimeter trench is excavated to a gradient of 1V:1.6H. This is above the acceptable minimum of 1.3.

Table 2-7 Summary of Stability Analysis

Figure	Method	Factor of Safety	Comments
App 02 - Figure 2-1	Drained Circular	1.335	3.7m deep excavation at gradient of 1V:1.6H, groundwater at 0.87m bgl. Acceptable factor of safety >1.3

2.7.3 Basal Geological Barrier

Analysis of the basal geological barrier is not necessary, as it has been screened out in Section 2.1.3.

2.7.4 Side Slope Geological Barrier Analysis

An analysis has been undertaken to consider the stability of the main mineral excavation. It has been assumed that the mineral will be excavated to a gradient of 1V:2H, whilst maintaining a minimum 5m thickness of the picture frame backfill. The resulting mineral void will be dewatered during operation, and this is reflected in the stability model by applying a reduced piezometric surface, passing through the backfill material.

Figure 2-2 in Appendix 02 returns a factor of safety of 1.343 which remains above the minimum acceptable factor of safety of 1.3.

Summary of the analysis results is presented in Table 2-8, below.

Table 2-8 Summary of Stability Analysis

Figure	Method	Factor of Safety	Comments

Figure	Method	Factor of Safety	Comments
App 02 - Figure 2-2	Drained Circular	1.343	3.2m deep excavation at gradient of 1V:2H. "Picture frame" trench backfilled with low permeability clay. Excavation dewatered. Acceptable factor of safety >1.3

2.7.5 Waste Analysis

Analysis of the waste mass is not necessary, as it has been screened out in Section 2.1.5.

2.7.6 Capping Stability Analysis

Analysis of capping is not necessary, as it has been screened out in Section 2.1.6.

2.8 Assessment

2.8.1 Basal Subgrade Assessment

Assessment of the basal subgrade is not required since it has been eliminated from consideration by the screening process within Section 2.1.1.

2.8.2 Side Slope Subgrade Assessment

Assessment of the side slope subgrade demonstrates that a 3.7m deep excavation at gradient of 1V:1.6H, with groundwater at 0.87m bgl returns an acceptable factor of safety.

2.8.3 Basal Geological Barrier Assessment

Assessment of the basal geological barrier is not required since it has been eliminated from consideration by the screening process within Section 2.1.3.

2.8.4 Side Slope Geological Barrier Assessment

Assessment of the side slope geological barrier demonstrates that a 3.2m deep excavation at gradient of 1V:2H. "Picture frame" trench backfilled with low permeability clay returns an acceptable factor of safety.

2.8.5 Waste Assessment

Assessment of the waste mass is not required since it has been eliminated from consideration by the screening process within Section 2.1.5.

2.8.6 Capping Assessment

Assessment of the capping is not required since it has been eliminated from consideration by the screening process within Section 2.1.6.

3.0 Monitoring

3.1 The Risk Based Monitoring Scheme

Based upon the foregoing Stability Risk Assessment, a simple risk-based monitoring scheme is considered appropriate for the future development of the restoration. The monitoring is limited to ensuring compliance with the tipping rules and monitoring of groundwater levels.

3.2 Basal Subgrade Monitoring

The basal subgrade will be formed by in-situ London Clay. No additional instrumentation is deemed as being required post closure.

3.3 Side Slope Subgrade Monitoring

Monitoring during construction will comprise inspection of the side slope subgrade following mineral extraction for the construction of the side slope geological barrier. No additional instrumentation is deemed as being required during construction or post closure.

3.4 Basal Geological Barrier System Monitoring

Monitoring during construction will comprise construction quality assurance to ensure compliance with the construction specification.

No additional instrumentation is deemed as being required during construction or post closure.

3.5 Sie Slope Geological Barrier System Monitoring

Monitoring during construction will comprise construction quality assurance to ensure compliance with the construction specification. Faces should be inspected daily for signs of failure.

No additional instrumentation is deemed as being required during construction or post closure.

3.6 Waste Mass Monitoring

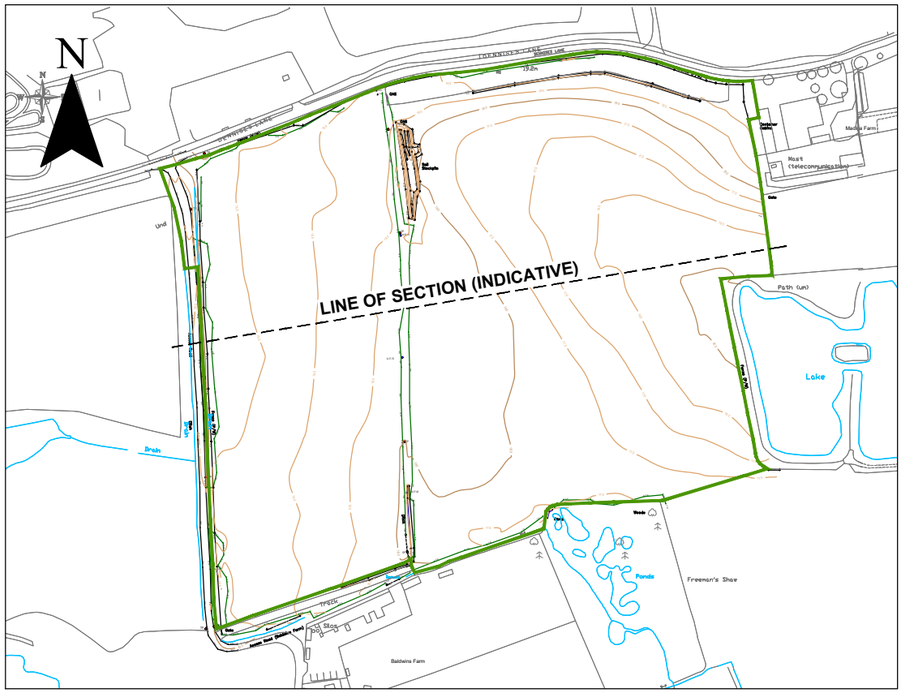
No specific monitoring is required for the waste other than to record waste elevations across the Site. Once placement is completed the majority of the waste mass will be confined within surrounding ground levels, so post completion waste mass monitoring is not required.

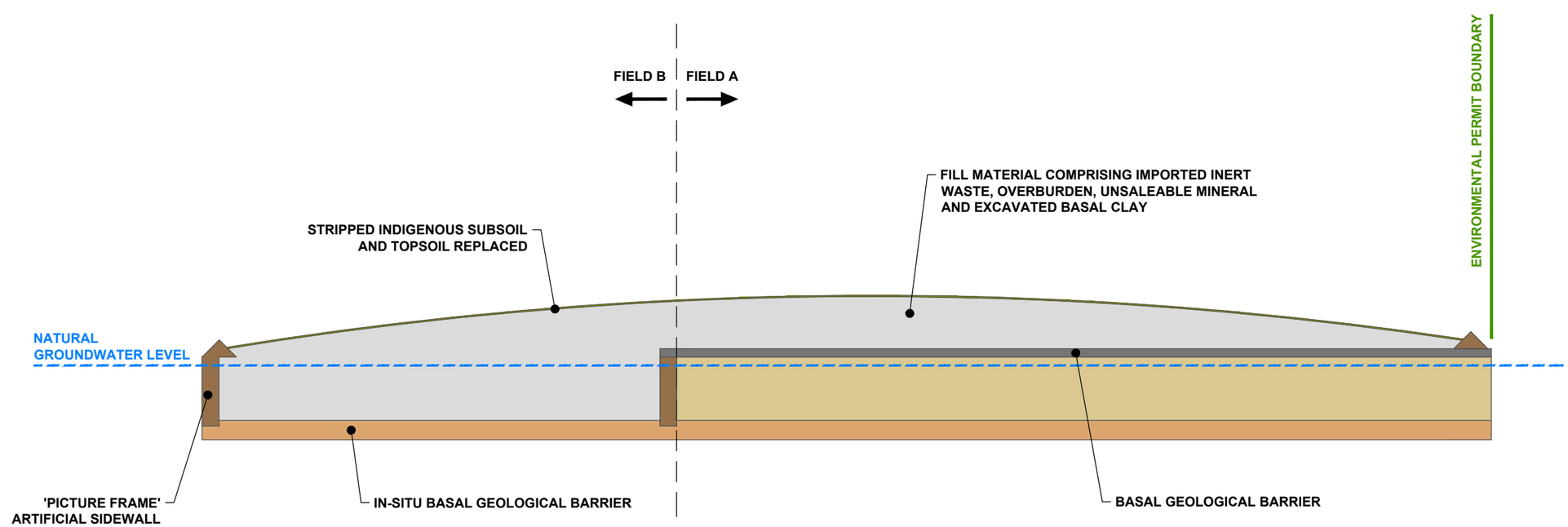
3.7 Capping Monitoring

No capping is proposed.

APPENDIX 01

Engineering Schematic





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MEDINA FARM

Gas Pipeline Stability Assessment

Prepared for: Ingrebourne Valley Limited

SLR Ref: 416.01526.00087
Version No: 1
April 2022

BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Ingrebourne Valley Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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DOCUMENT REFERENCES

TABLES

APPENDICES

1.0 Introduction

SLR Consulting Limited (SLR) has been appointed by Ingrebourne Valley Limited (IVL) to prepare a stability assessment that considers the impact of the proposed mineral extraction at Medina Farm Quarry on a series of intermediate pressure pipelines present adjacent to the northern boundary of the site. The site is located in South Ockenden at grid reference TQ 576 838 and hereafter is referred to as 'the site'.

The operator of the gas pipelines is Cadent and their Specification for safe working in the vicinity of Cadent assets[1] requires Cadent advice to be sought where surface mineral extraction is undertaken within 100m of a Cadent asset. Consultation with Cadent by IVL has resulted in the need to carry out an assessment and demonstrate that mineral extraction will not adversely impact on the gas pipelines.

SLR have undertaken an outline stability assessment that demonstrates that the proposed extraction works will not adversely impact on the adjacent gas pipeline. This document describes the manner in which the assessment has been carried out and presents the overall findings of the work.

1.1 Conceptual Stability Site Model

The conceptual stability site model has been developed from information gathered from relevant publicly available sources, site-specific data obtained from planning documents and information provided by the client.

The site currently comprises two agricultural fields; Field A is a former gravel pit that has been infilled with inert waste and poorly restored; Field B has not been previously exploited and is the subject of the proposed mineral extraction.

The site topography is generally flat, falling gently from a maximum elevation of 20m above Ordnance Datum (AOD) in the northwest corner, to a minimum of 15m AOD on the eastern boundary.

The limit of extraction outlined in the Operational Plan, included as Appendix 01, requires a 5m exclusion zone between the gas pipelines and any mineral operations. A 12m wide, 3m high, screening bund will then be positioned adjacent to the northern boundary of the site. This results in a total stand off from the gas pipelines of 17m.

Due to high groundwater levels beneath the site Field B will be worked using the process of "picture framing" ensuring the site is dewatered without affecting nearby water interests.

Field B will be stripped to a maximum depth of approx. 0.87m below ground level (bgl) where the expected water table will be reached. Perimeter trenches will then be dug to the base of the mineral at approx. 3.2m bgl and then backfilled with cohesive material with a maximum permeability of 1x10-7m/s.

Once the perimeter trenches are complete the site will be dewatered progressively via a sump in the base of the excavation.

1.1.1 Geology

A review of the British Geological Survey (BGS)[2] mapping reveals that the site is underlain by superficial deposits of the Lunch Hill Gravel Member comprising brown sand and subangular to sub rounded fine to coarse gravel to a depth of 3.2m bgl. The underlying bedrock geology comprises the London Clay Formation to a depth of approx. 150m bgl.

The superficial sand and gravel are classified as a Secondary A Aquifer with the underlying London Clay as Unproductive Strata.

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[1] Specification for Safe Working in the Vicinity of Cadent Assets, Ref: CAD/SP/SSW/22, August 2021.
[2] British Geological Survey – Available: mapapps.bgs.ac.uk/geologyofbritain/home.html, accessed April 2022

1.1.2 Groundwater Management

Groundwater is recorded at a maximum of 16.2m aOD to 21.2m aOD during winter periods. Groundwater flow through the site is predominantly in a south or southeast direction, following the regional topography. The typical unsaturated zone thickness ranges from 0.5-2.5m[3].

Extraction will be conducted following dewatering of the lined extraction area. Groundwater will be managed using collector sumps and pumping into the site water management system. Following extraction and restoration of each phase, dewatering will cease.

1.1.3 Side Slope Model

The side slope subgrade will be formed by excavating an initial perimeter trench to a maximum depth of 3.2-3.5m bgl. Once backfilled the perimeter trench will then form the side slope of the extraction area.

[3] Consultant Hydrogeologists Ltd (2016). Broadfield Farm Rayne, Essex Planning Submission: Proposed Sand and Gravel Quarry Hydrological & Hydrogeological Impact Assessment. Final Report 001. Appendix 9.2: Figures. Prepared for Tarmac Trading Ltd.

2.0 STABILITY RISK ASSESSMENT

2.1 Data Summary

The following data are required as input for the analyses undertaken for this Stability Assessment

- Material unit weight; and,
- Drained and undrained shear strength of soils.

It should be noted that there is no laboratory test data relating to the shear strength of the materials available on the site.

There is limited available information on appropriate effective stress shear strength parameters for the in-situ materials. Boreholes have been conducted to inform mineral thickness and to inform hydrogeological elements of the design of the site and these provide qualitative descriptions to the materials present.

Where no direct measurement of a particular property is available, reference has been made to the borehole logs, published references and relevant experience from within SLR in the same or similar materials.

The geotechnical parameter values adopted are discussed in more detail in Section 2.6.

2.2 Selection of Appropriate Factors of Safety

The factor of safety is the numerical expression of the degree of confidence that exists, for a given set of conditions, against a particular failure mechanism occurring. It is commonly expressed as the ratio of the load or action which would cause failure against the actual load or actions likely to be applied during service. This is readily determined by limit equilibrium slope stability analyses.

Prior to determining appropriate factors of safety for the various components of the model, it is necessary to identify key 'receptors' and evaluate the consequences in the event of a failure. Consideration of the following receptors is required:

- Groundwater
- Property - relating to site infrastructure, third party property
- Human beings (i.e. direct risk)
- Ecological receptors

The factor of safety adopted for each component of the model would be related to the consequences of a failure.

A factor of safety of 1.3 is considered appropriate when using conservative peak shear strength parameters for a slope that is to remain unsupported for a short period of time.

2.3 Justification for Modelling Approach and Software

In order to perform a comprehensive stability assessment, the components of the proposed development have to be considered not only individually but also in conjunction with one another where relevant. Any analytical techniques adopted for such an assessment should adequately represent all of the considered scenarios, i.e. the overburden to mineral ratio of the extraction faces and groundwater elevation. The methodology and the software should also achieve the desired output parameters for the assessment.

The analytical methods used in this stability assessment include:

- Limit equilibrium stability analyses for the derivation of factors of safety for the extraction slopes.

The limit equilibrium analyses have been undertaken using the package Slope/W 2021.3, version 11.2.2.23310 (Geo-Slope International). The Morgenstern-Price[4] non-circular method of analysis has been used.

2.4 Justification of Geotechnical Parameters Selected for Analysis

The following sections present a justification for the various parameters used in the stability analyses based on the following criteria:

- An assessment of the suitability of non-site-specific data, where used.
- Methods for the derivation of the parameters adopted.

A summary of the geotechnical parameters used in the design and analysis of the development are presented in tabular form for each component of the subgrade in Table 2-1.

The parameters used in the analyses have been:

- Adapted from similar work undertaken by SLR.
- Inferred from site specific data or other relevant published data.

It should be noted that the geotechnical parameters for limit equilibrium analysis include the shear strength and unit weight of each material within the model. Shear strength has been defined using effective shear strength parameters of cohesion, (c′), and the angle of shearing resistance, (ø′).

The adopted parameters are presented in Table 2-1.

The angle of shearing resistance and cohesion for the Lynch Hill Gravel Member have been adopted based borehole descriptions comprising sand and sub-angular to subrounded gravel. A conservative angle of shearing resistance has been selected for the underlying Colchester Formation gravel based on SLR's knowledge of similar materials. No cohesion has been applied to reflect the granular nature of the deposit.

Effective shear stress parameters for the underlying London Clay have been based on laboratory analysis conducted by SLR on London Clay in the wider area. Conservative parameters have been applied based on consolidated undrained analyses and reference to literature values.

Table 2-1
Geotechnical Design Parameters

Material	Unit Weight, γ (kN/m3)	Effective cohesion, c′ (kPa)	Angle of Shearing Resistance, ø' (°)	Typical Description
Lynch Hill Gravel Member	19	0	28	Sand and gravel mineral deposit.
London Clay Formation	19	20	18	In-situ London Clay
Trench Backfill	18	1	28	Low permeability cohesive material

[4] Morgenstern, N.R and Price, V.E. (1965), 'The analysis of stability of general slip surfaces' Geotechnique.

2.5 Analyses

Analysis has been carried out to consider the impact of the proposed "picture frame" trench being excavated at the northern perimeter of the site on the intermediate pressure pipelines present adjacent to the site boundary.

The Operation Plan (Appendix 01) indicates that the closet excavations will be a minimum of 17m from the gas pipeline this comprises:

- a 5m stand-off from the pipeline corridor; and
- a 12m wide, 3m high topsoil bund.

Analyses have been carried out to understand the minimum gradient at which the picture frame trench side slopes can be excavated. This is based on acceptable factor of safety of 1.3. Analyses only consider the stability of the northern flank of the trench which may impact on the integrity of the gas pipelines if failure were to occur. The southern side of the trench is not considered to be critical the integrity of the gas pipelines and therefore can be excavated to a steeper, metastable, gradient prior to backfilling.

A 0.5m deep key-in into the underlying London Clay has also been assumed in the stability analyses. The "picture frame" trench will be excavated wet with no dewatering and this is reflected in the stability model by a piezometric surface at 0.9m bgl.

A summary of the analysis results is presented in Table 2-2, below.

Figure 2-1 in Appendix 02 demonstrates that a factor of safety of 1.323 is achieved where the perimeter trench is excavated to a gradient of 1V:1.6H. This is above the acceptable minimum of 1.3.

The critical failure surface occurs immediate behind the

Table 2-2
Summary of Stability Analysis

Figure	Method	Factor of Safety	Comments
App 02 - Figure 2-1	Drained Circular	1.323	3.7m deep excavation at gradient of 1V:1.6H, groundwater at 0.87m bgl. Acceptable factor of safety >1.3
App 02 - Figure 2-2	Drained Circular	1.588	3.2m deep excavation at gradient of 1V:2H. "Picture frame" trench backfilled with low permeability clay. Excavation dewatered. Acceptable factor of safety >1.3

A second analysis has been undertaken to consider the stability of the main mineral excavation. It has been assumed that long term side slopes will be excavated to a gradient of 1V:2H, whilst maintaining a minimum 5m thickness of the picture frame backfill. The resulting mineral void will be dewatered during operation, and this is reflected in the stability model by applying a reduced piezometric surface, passing through the backfill material.

Figure 2-2 in Appendix 02 returns a factor of safety of 1.588 which remains above the minimum acceptable factor of safety of 1.3.

3.0 Conclusions

The analyses presented in Section 2.4, above, demonstrate that stability of the both the “picture framing” perimeter trench and the wider mineral excavation will remain stable during operations at Medina Farm Quarry. In addition, critical failure surfaces in both scenarios remain at least 17m from the intermediate pressure gas pipelines present on the northern boundary of the site.

APPENDIX 01

Operational Plan

DENNISES LANE
MS
19.2m
Route of underground gas pipelines
Local authority boundary
Bund B1 Topsoil
5m standoff to gas pipeline corridor
Bund A1 Topsoil 3m high
Car park
Access from Dennises Lane via existing track
Office / messroom with cycle lean-to
Hardcore surface
Inspection area & manual jet wash facility
RECEIVING AREA
Ticket office & weighbridge with security lighting
Lighting arc (15m throw, 120° spread)
Existing ETL
FIELD A
(Reclamation works & restoration)
Bund A2 Topsoil 3m high
FIELD B
(Mineral extraction & restoration)
Wheel spinner & wheel cleaner
Track
Drain
General direction of operations
Bund A3 Topsoil 3m high
Existing ETL
Bund B2 Topsoil 3m high
Issues
Silos
Ponds
FREEMAN'S SHAW
BALDWINS FARM
1st Bungalow
2nd Bungalow
Baldwins Farm Cottage
Pond
Issues
MEDINA
Pond
Mast (telecommunication)
Route of underground gas pipelines
Track
Mast (telecommunication)
Combined application boundary (red line)
Public Footpath (Thurrock FP1)
Pond
Path (um)
Lake
DENNIS ROAD
M25
17.4m
Mast (telecommunication)
N
Bunds A1, A2, B1 & B2
3m
4m 4m 4m
Bund A3
3m
4m 22m 4m
ILLUSTRATIVE BUND CROSS SECTIONS
Scale - 1:500
Public Footpath (Thurrock FP1)
Issues
FB
Pond
KEMPS FARM
FB
16.8m
Kemps Cottage
Pond
17.4m
Mast
Darnyns Road
0m 50m 100m

Version / amendment: **1616/CO/1 v5**

D.K. Symes Associates

Composite Operations Plan

Scale - **1:2,500** (at A3)

Date - **28-11-2019**

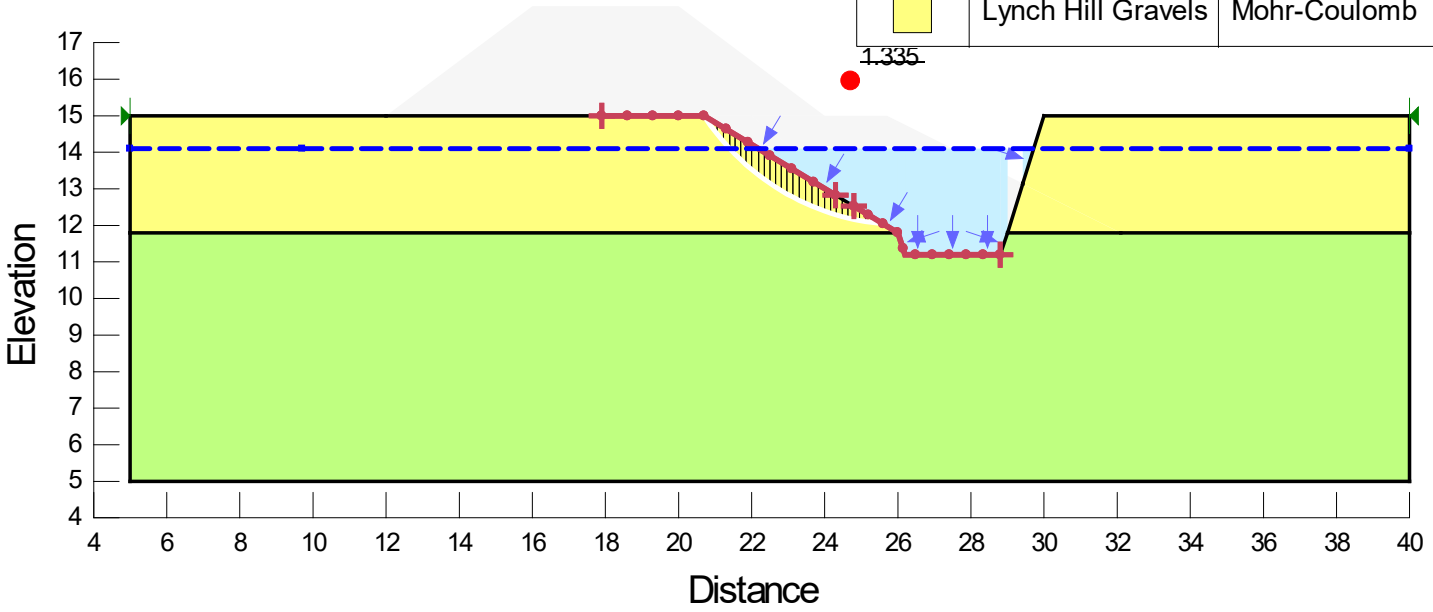
Plan No. **1616/CO/1**

APPENDIX 02

Stability Analysis

Name: Picture Frame Trench High Groundwater
Analysis Type: Morgenstern-Price
Factor of Safety: 1.335

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line
	London Clay	Mohr-Coulomb	20	20	18	1
	Lynch Hill Gravels	Mohr-Coulomb	19	0	38	1



Overburden Slope 1V:1.5H

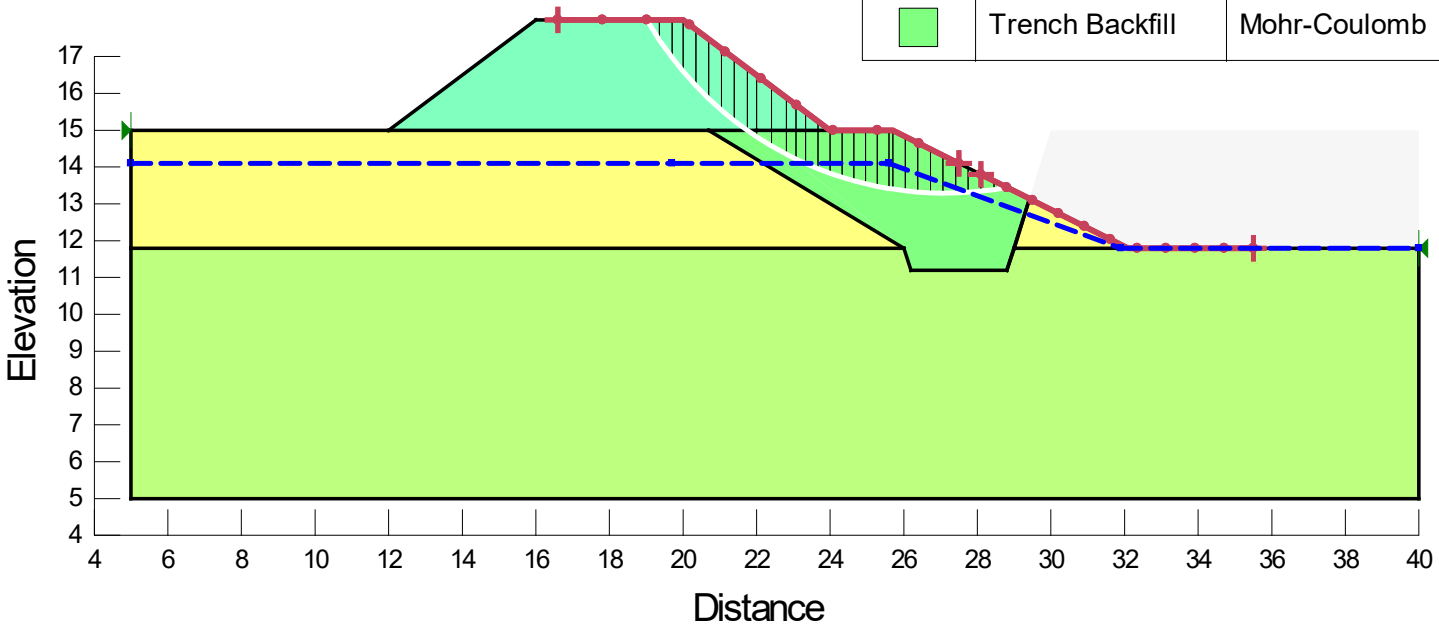
SLR

Rev. 0 - 200922 416.01526.00071 Rayne Quarry Stability App 01

Project: MEDINA FARM
GAS PIPELINE STABILITY ASSESSMENT
Date: APRIL 2022
SCALE: NTS
Drawing: **FIGURE 2-1**
Appendix. **02**

Name: Side slope excavation
Analysis Type: Morgenstern-Price
Factor of Safety: 1.343

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line
	London Clay	Mohr-Coulomb	20	20	18	1
	Lynch Hill Gravels	Mohr-Coulomb	19	0	38	1
	Stockpile	Mohr-Coulomb	18	1	28	1
	Trench Backfill	Mohr-Coulomb	18	1	28	1



Mineral Slope 1V:1.5H

SLR

Rev. 0 - 200922 416.01526.00071 Rayne Quarry Stability App 01

Project: MEDINA FARM
GAS PIPELINE STABILITY ASSESSMENT
Date: APRIL 2022
SCALE: NTS
Drawing: **FIGURE 2-2**
Appendix. **02**

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MEDINA FARM RESTORATION

Environmental Permit Application

Environmental Risk Assessment

Prepared for: Ingrebourne Valley Limited
Client Ref: 416.01526.00087

SLR Ref: 416.01526.00087
Version No: 1
November 2022

BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Ingrebourne Valley Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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EP1 Site Location Plan

EP2 Environmental Permit Boundary

EP3 Engineering Schematic

EP4 Environmental Site Setting

Plan No. 1616/R/1 v3 Proposed Restoration

Composite Operations Plan

1.0 INTRODUCTION

Ingrebourne Valley Limited (IV) has instructed SLR Consulting Limited (SLR) to prepare a bespoke Environmental Permit (EP) application to authorise an inert waste landfill for the restoration of Medina Farm, Dennises Lane, South Ockendon, Essex RM14 2XB, hereafter referred to as 'the Site'.

This Environmental Risk Assessment (ERA) is a simple assessment of the risks to the environment and human health from accidents, odour, noise and fugitive emissions that may be associated with waste operations at the facility.

This assessment has been completed in accordance with the Environment Agency (EA) Guidance Risk assessments for your environmental permit (2022)[1]. The aim of the assessment is to identify any significant risks and demonstrate that the risk of pollution or harm will be acceptable by taking the appropriate measures to manage the risks.

EA guidance requires that all receptors that are near the Site and could reasonably be affected by the activities are identified and considered as part of the assessment.

For the purposes of this risk assessment, a 2km radius from the Site's EP boundary has been adopted in reviewing potentially sensitive receptors of ecological importance along with features such as Sites of cultural and natural heritage. A radius of 500m from the Site's Environmental Permit boundary has been adopted for all other potentially sensitive receptors (for example, residential, commercial, industrial, agricultural and surface water receptors).

1.1 Proposed Development

The proposed development can be summarised as the importation of inert waste materials for the restoration of the Site by landfill.

Field A has been previously worked for mineral, was restored but now suffers poor drainage due to differential settlement while Field B contains approximately 200,000 tonnes of sand and gravel.

Field B will have the sand and gravel extracted and then be wholly restored using inert waste material imported to the Site. Restoration of Field A will primarily involve using material excavated from Field B (such as overburden, unsaleable mineral or basal clay) to regrade and address the differential levels across it. This will be supplemented with imported inert waste materials where required to achieve Field A's restoration levels.

In total approximately 420,000 tonnes of inert waste will be required to achieve the proposed restoration landform and return the fields to agricultural use. The proposed restoration landform seeks to achieve a shallow dome shape to ensure efficient drainage while maintaining ease of access for agricultural vehicles. Around the perimeter of the fields drainage ditches will collect surface water runoff and lead to two attenuation ponds. One attenuation pond will be located in the south-eastern corner of the Site and the other in the south-western corner.

The proposed restoration is illustrated in the following drawings:

- Plan No. 1616/R/1 v3 Proposed Restoration

Prior to mineral extraction in Field B and supplementary deposits to Field A, the fields will be stripped of topsoil and subsoils separately. The topsoil and subsoil will be separately stored in bunds around the perimeter of the Site for replacement later in the final restoration of the Site. Following placement of inert waste materials, the

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EA Risk assessments for your environmental permit (April 2022)- https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit (Accessed July 2022)

Site will be restored using a minimum of 0.8m of subsoil and 0.4m of topsoil. It is anticipated that there will be shortfall of indigenous soils to achieve this, therefore retained indigenous soil materials will be supplemented with imported waste soil material.

The working of the Site during the operational phase is illustrated in Plan No. 1616/CO/1 Composite Operations Plan.

Up to 220,000 tonnes per annum (tpa) of waste will be accepted at the Site. It is anticipated that restoration of the Site will take 2 years.

2.0 SITE SETTING & RECEPTORS

2.1 Site Setting

Centred on grid reference TQ 57636 83872, the Site is located approximately 2.7km to the north, north-east of South Ockendon, Essex and is approximately 17ha in size.

The site consists of two agricultural fields; Field A, a former gravel pit which has been poorly restored, and Field B, a target area for gravel extraction. The site is bounded to the north by Dennises Lane, beyond which is Stubber's Outdoor Pursuits Centre which includes three lakes and is designated as a Local Wildlife Site (LWS). To the west, the site is bounded by an unnamed road and woodland/ scrub. To the south, the site is bounded by small industrial units, a copse and farmland associated with Baldwins Farm. To the east, the site is bounded by a lake, used as a fishery, a residential property and car breakers yard.

The topography of the site is generally flat, falling gently from a maximum of approximately 20m above ordnance datum (AOD) in the north-western corner to a minimum of 15mAOD on the eastern boundary.

The location of Medina Farm is illustrated on Drawing EP1. The Environmental Site Setting is illustrated in Drawing EP4 whilst the working scheme is illustrated in the Composite Operations Plan.

Immediate surrounding land uses are identified in Table 2 below.

Table 2 Immediate Surrounding Land Uses

Boundary	Description
North	Bounding the Site to the north lies Dennises Lane, beyond this is an outdoor pursuits centre which is designated as a local wildlife site.
East	The land bounding the Site to the east consists of a fishing lake, a residential property and car breakers yard.
South	To the south, the site is bounded by small industrial units, a copse and farmland associated with Baldwins Farm.
West	Bounding the Site to the west is an unnamed road and woodland/scrub.

The wider surrounding land uses are described in further detail below:

2.1.1 Industrial/Commercial Premises

There are only a couple of industrial/commercial premises within a 500m radius of the Site boundary. The closest of these is Baldwins Farm, which is located adjacent to the south of the Site boundary.

2.1.2 Recreational Premises

Stubbers Adventure Centre, which is located approximately adjacent to the north of the Site across Dennises Lane. The adventure centre offers outdoor pursuit activities.

A fishing lake is also located adjacent to the eastern site boundary.

2.1.3 Residential Properties

There are few residential properties located within 500m of the Site's boundary. The closest residential properties from the boundary of the Site are located at Baldwins Farm which is located adjacent to the southern boundary of the Site. Further residential properties are situated at Medina Farm and Dennises Cottages located approximately 90m to the north east of the site.

2.1.4 Local Transport Network

Approximately 230m to the east of the Site lies the M25 motorway. Immediately adjacent to the Site to the north lies Dennises lane which allows access to all traffic running from west to east.

There are several other small roads and tracks within a 500m radius to the north, west and east of the Site boundary.

2.1.5 Surface Water Features

There are a number of surface water features within a 500m radius of the Site boundary. The closest of these is a brook situated approximately 40m from the northern Site boundary.

2.1.6 Agricultural/Open Ground

The Site is largely surrounded by agricultural fields and open ground, bounding the Site directly to the south and west. The expanses of land within a 500m radius from the Site boundary to the north, south and west predominantly consist of open ground and agricultural spaces.

2.1.7 Woodland

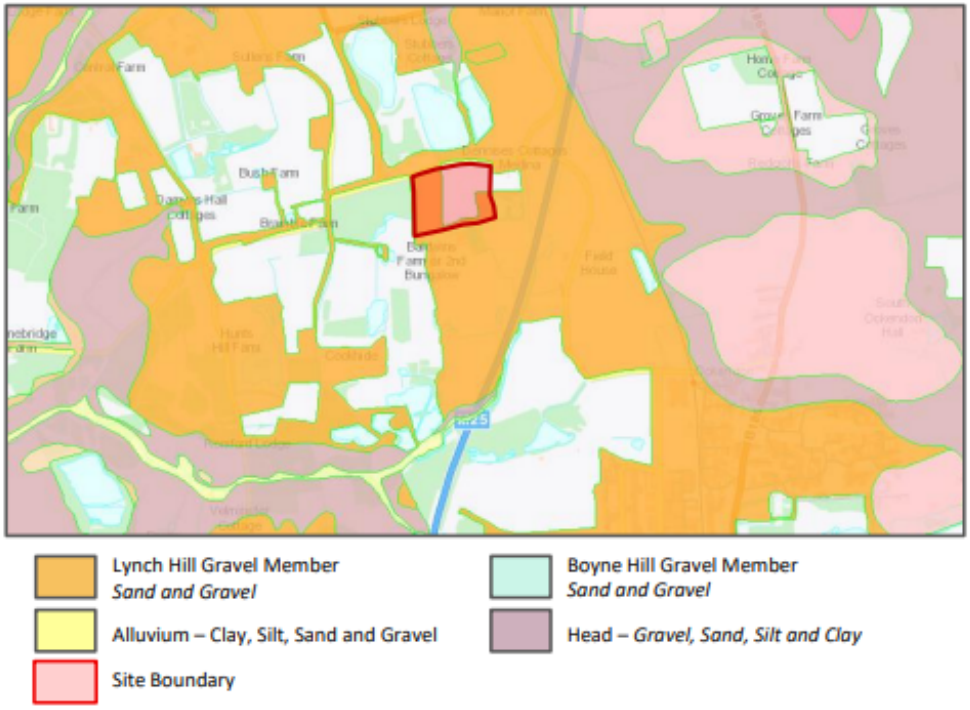
There are various parcels of woodland within 500m of the Site. There are two areas of Priority Habitat- Deciduous Woodland which lie adjacent to the Site, one area is situated alongside the southern boundary and a further area to the north west of the Site's boundary.

2.2 Geology

A review of the British Geological Survey (BGS)[2] map, indicates that the western part of the site (Field B) is underlain by the superficial deposits comprising the Lynch Hill Gravel Member. A site investigation undertaken in October 2011 encountered superficial deposits comprising brown sand and subangular to sub rounded, fine-to-coarse gravels to a depth of 3.2m below ground level (BGL). The Lynch Hill Gravel Member will be worked as part of the proposed development.

[2] British Geological Survey – Available: mapapps.bgs.ac.uk/geologyofbritain/home.html, accessed November 2022

Figure 1- Map showing Regional Superficial Geology



The mapping shows that the gravels are absent in Field A, as they have been extracted. The regional bedrock geology comprises London Clay and at depth the Lambeth Group, Thanet Formation and White Chalk sub-Group which outcrop approximately 3.7km to the south of the site. The London Clay was lithologically described as "Firm-to-stiff, brown Clay" within the 2011 site investigation and is present at depth from 3.2m below ground level (BGL) and where proven to a depth of 4.5 - 8.5m BGL (when the boreholes were terminated).

2.3 Hydrogeology

A detailed description of the hydrogeology of the area is presented in the Hydrogeological Risk Assessment in Section 5 of the application. The following summary is based on the information presented in that report.

2.3.1 Aquifer Designations

The bedrock deposits underlying the Site are classed as unproductive on the Multi-Agency Information for the Countryside (MAGIC)[3] website.

According to the BGS online mapping and confirmed from drilling of three groundwater monitoring boreholes, the superficial deposits present beneath Field B consist of Lynch Hill Gravel Member. There are significant areas of made ground in the eastern part of the site (Field A) and surrounding the western boundary of the Site.

2.3.2 Source Protection Zones

The Site is not located within a groundwater Source Protection Zone (SPZ).

[3] Multi-Agency Information for the Countryside – Available at: http://www.magic.gov.uk, accessed November 2022

2.4 Hydrology

2.4.1 Groundwater Vulnerability

The Groundwater Vulnerability layer on MAGIC map reveals that the Site lies within an area classified as unproductive.

2.4.2 Flood Zone

The Flood Map for Planning[4] confirms that the Site lies within a Flood Zone 1, which is defined as "land having a less than 1 in 1,000 annual probability of river or sea flooding".

2.5 Ecology

The MAGIC map website and an EA Habitats and Conservation screening assessment (Appendix A) conducted for the Site have been reviewed to determine the presence of any designated habitat sites and protected species within a 2km radius from the Site's boundary.

2.5.1 European/International Designated Sites

A review of the EA Habitat and Conservation screening assessment completed for the Site and the MAGIC website confirm that none of the following are situated within 2km of the Site:

- Site of Special Scientific Interest (SSSI);
- Ramsar Site;
- Special Area of Conservation; and
- Special Protection Area.

2.5.2 National/Locally Designated Sites

Local Nature Reserve

There is one Local Nature Reserve (LNR) located within 2km of the Site boundary. Cranham Marsh is situated approximately 1.1km to the north of the Site.

Protected Species

The EA Habitat and Conservation screening assessment identified a Protected Species- Code 2 located within a lake approximately 110m west of the Site.

Protected Habitat

An area of deciduous woodland classified as a protected habitat is located adjacent to the south of the Site.

Local Wildlife Sites (LWS)

There is one LWS's located within 2km of the Site boundary. Stubber's Outdoor Pursuits Centre is a designated LWS located adjacent to the north of the Site boundary.

[4] Gov.uk, Flood Map for Planning, available at https://flood-map-for-planning.service.gov.uk/, accessed in November 2022

Ancient Woodland

There are five areas of Ancient Woodland located within 2km of the Site Boundary. The closest of which is Whitehall Wood, which covers an area of 10.8 Hectares is situated approximately 960m south east of the Site.

Other Receptors

A review of the EA Habitat and Conservation screening assessment completed for the Site and the MAGIC website, confirmed that none of the following are situated within 2km of the Site:

- Area of Outstanding Natural Beauty (AONB);
- National Nature Reserve; and
- National Parks.

2.6 Cultural Heritage

Listed Buildings

There are numerous Grade II listed buildings within a 2km radius to the Site boundary. The closest Grade II listed building to the Site boundary is 'Kemps Cottage', which lies around 358m to the south east of the Site.

Registered Parks and Gardens

There is one registered park and garden located within a 2km radius of the Site boundary. Belhus Park is a registered park and garden which lies around 1.6km to the south of the Site boundary at the closest point.

Other Receptors

A review of MAGIC map confirmed that none of the following are situated within 2km of the Site:

- Registered Battlefields;
- World Heritage Sites; and
- Scheduled Monuments.

2.7 Receptors

Local Receptors within 500m of the Site are identified in Table 2, along with cultural and ecological receptors within 2km.

Table 1 Identified Receptors

Receptor Name	Receptor Type	Direction from Site	Approximate Distance from Site Boundary (at nearest point) (m)
Local receptors within 500m of the Environmental Permit Boundary as shown on Drawing EP3 Environmental Site Setting			
Protected Habitat-Deciduous Woodland	Woodland – includes surface water features	South	Adjacent
Priority Habitat-Deciduous Woodland	Woodland	North west	Adjacent

Receptor Name	Receptor Type	Direction from Site	Approximate Distance from Site Boundary (at nearest point) (m)
Open Ground	Agricultural/Open Ground	South, west, east and north east	Adjacent
Dennises Lane	Local Transport Network	North	Adjacent
Fishing Lake	Surface Water Feature/ Recreational	East	Adjacent
Stubbers Adventure Centre	Recreational Premises/ Local Wildlife Site/ Surface Water Features	North	Adjacent
Baldwins Farm	Industrial/Commercial Premises and Residential Properties/ Surface Water Features	South	Adjacent
Unknown	Surface Water Feature/ Protected Species- Code 2	West	Adjacent
Medina Farm and Dennises Cottages	Residential Properties	East	90
M25	Local Transport Network	South east	230
Kemps Farm	Residential/ Surface Water Feature	South east	358
Cultural and ecological receptors within 2km of the EP boundary as shown in Drawing EP4 Cultural and Natural Heritage			
Kemps Cottage	Grade II- Listed Building	South east	358
Bramble Farm	Grade II- Listed Building	West	600
Stubbers House	Grade II- Listed Building[5]	North	627
Belhus Park	Registered Park and Garden	South east	1,600

[5] Further Grade II listed buildings situated in the surrounding area have not been included as the three listed buildings at Stubbers House are located closest to the site.

Receptor Name	Receptor Type	Direction from Site	Approximate Distance from Site Boundary (at nearest point) (m)
Cranham Marsh	Local Nature Reserve	North	1.1km

2.8 Windrose

Figure 2-1 shows average wind patterns between 2015-2019 as identified at the London City meteorological station, which is approximately 15.2km west of the Site. The most prominent wind direction is from south west. Winds coming from the west and east are also fairly frequent, with wind from other directions being more infrequent.

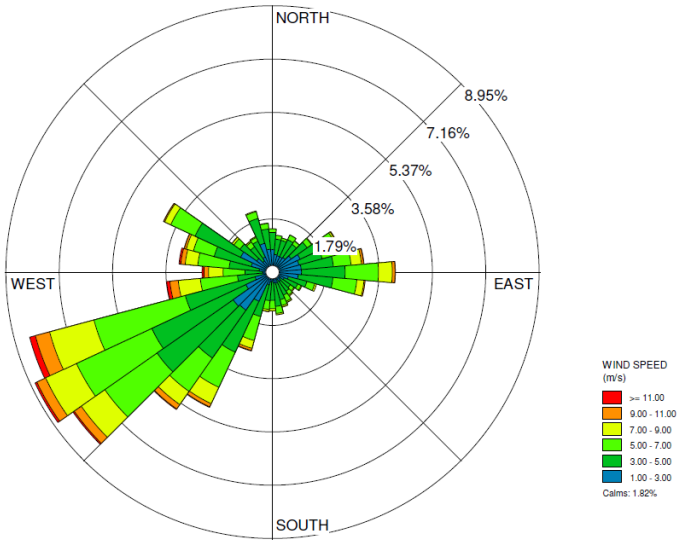


Figure 2-1
Wind Rose using 2015-2019 data from London City Meteorological Station

3.0 ENVIRONMENTAL RISK ASSESSMENT OVERVIEW AND APPROACH

This ERA complies with regulatory guidance and uses the following approach for identifying and assessing the risks in six steps:

Step 1 Identify and consider risks for your Site, and the sources of the risks;

Step 2 Identify the receptors (people, animals, property and anything else that could be affected by the hazard) at risk from your Site;

Step 3 Identify the possible pathways from the sources of the risks to the receptors;

Step 4 Assess risks relevant to your specific activity and check they're acceptable and can be screened out;

Step 5 State what you'll do to control risks if they're too high;

Step 6 Present your assessment as part of your permit application.

Step 1 is a screening step to identify the potential risks to the environment from the proposed development. The risk assessment must identify whether any of the following risks could occur and what the environmental impact could be:

- any discharge, for example sewage or trade effluent to surface or groundwater;
- accidents;
- odour (not for standalone water discharge and groundwater activities);
- noise and vibration (not for standalone water discharge and groundwater activities);
- uncontrolled or unintended ('fugitive') emissions, for which risks include dust, litter, pests and pollutants that shouldn't be in the discharge;
- visible emissions, e.g. smoke or visible plumes.

Potential risk can be screened out by carrying out tests to check whether they're within acceptable limits or environmental standards. If they are, any further assessment of the pollutant is not necessary because the risk to the environment is insignificant. In addition, the EA guidance identifies risks from specific activities (Step 4), for which additional risk assessments must be complete depending on the activity your bespoke permit relates to and where substances are released or discharged into the environment. These include:

1) Risk assessment for installations, waste and mining waste operations and landfill Sites;

2) Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater; and

3) Risk assessment for intensive farming.

Due to a high groundwater level observed across the site, it is proposed that Field B is restored using a 'picture framing' approach to enable dewatering and landfilling of the area in dry conditions. SLR Consulting are currently preparing a separate application for an abstraction license and discharge consent associated with the proposed dewatering of the Site as this will involve a discharge to surface water.

There will be no point source emissions to air resulting from the proposed development and neither will there be any Site waste arising or significant global warming potential. Therefore, only assessment of impacts on amenity, accidents, stability and groundwater are considered to be applicable for assessment in this instance. Amenity and accidents risks include the consideration of odour, noise and vibration, fugitive emissions (including dust, mud, litter and pests) and accidents in relation to the proposed development.

Step 2 identifies people or parts of the environment that could be harmed (at potentially significant risk) by the activity.

Step 3 identifies the possible pathways from the sources to these receptors.

The following tables, 3-6, present the assessment (Step 4) in terms of hazards posed, receptors and pathways, along with management and residual risks for the following hazards:

- Odour;
- Noise and Vibrations;
- Fugitive Emissions (including dust, mud, litter and pests); and
- Accidents.

Where appropriate, the assessment demonstrates how the risk of pollution or harm can be mitigated by measures to manage these risks (Step 5).

Table 2 Odour Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of Exposure**	**Consequences**	**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? Who is responsible for what?	How likely is the contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Inert waste landfill Odour from the acceptance and deposit of waste.	Sensitive receptors listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors.	Air	The proposed waste types for acceptance and on Site are all considered to be inert and non-putrescible or readily degradable. Therefore, the wastes for acceptance are not considered to be odorous. Strict waste acceptance procedures will be enforced on Site, to ensure that only permitted waste types are accepted and treated. Site operatives will conduct daily inspections of the perimeter to identify any unacceptable odours. Site operatives will also be encouraged to conduct informal inspections throughout the day and report any odours noticed. If any odours are identified the cause will be investigated. If the odours are found to be due to waste on Site, the loads will be isolated in a sealed container before removal off-Site to a suitably licenced treatment facility. Results of any investigations or inspections due to complaints will be recorded in the Site diary.	Low	Odour Nuisance and loss of amenity.	Low

			The Site Manager will be responsible for implementing risk management measures in accordance with appropriate procedures found in the operating techniques.			

Table 3 Noise Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequences	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? Who is responsible for what?	How likely is the contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Engine noise from vehicles entering/exiting the Site.	Sensitive receptors listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors.	Air	The following measures will be employed to minimise emissions of noise as far as possible for the sensitive receptors identified in Table 2: • Speed limits will be implemented for vehicles on Site and traffic calming measures introduced to help to enforce these limits; • All visitors and haulage companies will be made aware of IVL's procedures for minimising noise on Site; • Site access and operational areas will be maintained and repaired to minimise emissions of noise from uneven and poor surfacing; • Alternative non-tonal reversing signals will be used on mobile plants.	Low – intermittent and only in working hours.	Noise disturbance and loss of amenity.	Low

			Daily auditory inspections will be carried out and in response to any complaints. A record of the inspection findings will be made in the Site diary. If any noise levels are deemed a nuisance, the cause will be investigated, and mitigation measures enforced. The Site Manager will be responsible for implementing risk management measures in accordance with Operational Techniques.			
Noise from receiving and depositing waste.	Sensitive receptors listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors.	Air	The following measures will be employed to minimise emissions of noise as far as possible for the sensitive receptors identified in Table 2: Where appropriate and possible, drop heights of waste will be minimised to reduce noise. Daily auditory inspections will be carried out and in response to any complaints. A record of the inspection findings will be made in the Site diary. If any noise levels are deemed a nuisance, the cause will be investigated, and mitigation measures enforced. The Site Manager will be responsible for implementing risk management measures in accordance with Operational Techniques.	Low – only operational during working hours.	Noise disturbance and loss of amenity.	Low

Table 4 Fugitive Emissions Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequences	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? Who is responsible for what?	How likely is the contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
To Air:						
Dust from vehicle movements.	Sensitive receptors listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors.	Air	The following measures will be used to minimise mobilisation of dust from vehicle movements: • Road surfaces on Site will be maintained and regularly graded to maintain a smooth surface, which will manage and control dust; • Dampening down of active/operational areas using a water bowser and spray, as and when required; • Speed limits will be enforced to minimise the mobilisation of dust, and traffic calming measures installed to ensure speed limits are kept to; and • Roads will be inspected throughout the working day to ensure they are being kept to a high standard. Daily visual inspections will be conducted in response to any complaints. If dust is deemed a nuisance from any of these inspections, mitigation measures will be enforced to reduce any dust emissions. The result of any inspections or investigations as a result of complaints will be recorded in the Site Diary.	Medium.	Nuisance and harm to human health	Low

			The Site Manager will be responsible for implementing risk management measures in accordance with operational and management procedures.			
Dust from inert waste landfill Dust from emplacement of materials. Dust from waste/soil storage.	Sensitive receptors listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors.	Air	The following measures will be used to prevent mobilisation of dust from the emplacement of materials: • Regular monitoring of weather forecasts; • A low ground pressure (LDP) dozer will be used to smooth out soil/reclamation materials to reduce dust emissions from them; • Temporarily stopping any deposition of dusty waste during strong wind conditions; • Use of water bowsers or sprays in dry conditions to dampen loads • Any existing perimeter environmental bunds which are aren't already, will be seeded with a suitable grass seed mix which will help to reduce displacement of soil particulates in windy conditions. Daily visual inspections will be conducted in response to any complaints. If dust is deemed a nuisance from any of these inspections, mitigation measures will be enforced to reduce any dust emissions. The result of any inspections or investigations as a result of complaints will be recorded in the Site Diary. The Site Manager will be responsible for implementing risk management measures in accordance with operational and management procedures.	Medium	Nuisance and harm to human health.	Low
To Water:						
Contaminated Site run off	Sensitive receptors	Land	The following measures will be used to prevent contaminated Site run off:	Low	Contamination	Low

	listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors. Groundwater.		• Only uncontaminated, permitted inert materials will be accepted and deposited on Site. Consequently, contaminated leachate and run-off will not be generated as all waste on Site will be inert; • Strict waste acceptance procedures will be enforced to ensure that no unauthorised materials are accepted on Site; • Vehicles will undergo preventative maintenance to prevent leaks of fuel or oil on Site; • Spill kits will be stored on Site containing appropriate absorbent materials to use in the event of a spillage; • The only fuel to be stored on site will be stored within double bunded tanks. The Site's operational areas will be inspected daily for any signs of spillages or contaminated run The result of any inspections or investigations as a result of complaints will be recorded in the Site Diary. The Site Manager will be responsible for implementing risk management measures in accordance with operational and management procedures.			
Pests						
Birds, pests and insects attracted to Site	Sensitive receptors listed in Table 2 including residential, commercial, agricultural recreational and ecological	Land, Water and Air	No biodegradable or putrescible waste will be accepted on Site, and therefore the Site is not expected to attract birds, pests or vermin. Strict waste acceptance procedures will ensure that no unauthorised wastes are accepted. In the event that birds, pests and insects are identified at the Site appropriate remedial action will be taken. If necessary, a specialist pest control contractor will be	Low	Nuisance, potential risk to health	Low

	receptors.		employed to relocate the pests. Investigations will be conducted daily by Site personnel of the operational areas to identify birds, pests and insects. The result of any inspections or investigations as a result of complaints will be recorded in the Site Diary. The Site Manager will be responsible for implementing risk management measures in accordance with operational and management procedures.			
Mud/Litter						
Litter from waste	Sensitive receptors listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors.	Air	The waste types accepted on Site are unlikely to generate litter. Strict waste acceptance procedures will be followed to ensure that only authorised wastes are accepted on Site. The Site will benefit from good housekeeping procedures and all areas of the Site will be maintained clean. The Site and its immediate surroundings will be inspected on a daily basis. If litter from waste is found, action will be taken to ensure the area remains free of significant accumulations of litter and debris. The result of any inspections or investigations as a result of complaints will be recorded in the Site Diary. The Site Manager will be responsible for implementing risk management measures in accordance with appropriate procedures in the Operating Techniques.	Low	Nuisance from litter. Dangerous conditions on roads.	Low
Mud on roads	Local Road Network	Transferral of mud on vehicles wheels	Road surfaces and haul roads on Site will be maintained and will benefit from good housekeeping, to minimise the transfer of mud on Site. A road brush will be used when necessary to sweep the main access road.	Medium	Nuisance from mud. Dangerous conditions on roads.	Low

			Vehicles leaving the Site will be checked to ensure they are clear of loose waste. Vehicles leaving Site will also be cleaned using a wheel wash and checked to ensure their load is secure. In the event that mud, debris or waste arising from the Site is deposited outside the Site, the affected area will be cleaned immediately. The Site and its immediate surroundings will be inspected on a daily basis. If any mud is identified, then action will be taken to maintain the area free of significant accumulations of mud. The result of any inspections or investigations as a result of complaints will be recorded in the Site Diary. The Site Manager will be responsible for implementing risk management measures in accordance with appropriate procedures in the Operating Techniques.			

Table 5 Accidents Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequences	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? Who is responsible for what?	How likely is the contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Leakage of fuel and oils from Site plant	Local surface water features including rivers, streams and drains. Groundwater.	Land	The following measures will be implemented to manage leaks from Site plant: • Spill kits will be provided on Site containing appropriate absorbent materials for use in the event of a leakage; • Vehicles on Site will be subject to preventative maintenance in accordance with the manufacture's guidance; and • The Site staff will undertake daily visual monitoring for evidence of spillage and leakage. The result of any inspections or investigations as a result of complaints will be recorded in the Site Diary. The Site Manager will be responsible for implementing risk management measures in accordance with appropriate procedures outlined in the Operating Techniques.	Low	Contamination of surroundings	Low
Fire	Sensitive receptors listed in Table 2 including	Air and Land	The waste types authorised to be accepted on Site, are not such that will readily burn. In order to minimise the occurrence of fire, and ensure Site personnel are equipped to deal with any unlikely occurrences, the	Low	Harm to human health, harm to operations, pollution of	Low

	residential, commercial, recreational, ecological and agricultural receptors. Site personnel.		following measures will be implemented: • No burning of waste will take place on Site; • Smoking will not be permitted in the operational areas of the Site; • No flammable liquids will be stored on Site; and • Employees will receive training in fire assessment and identification, i.e. use of fire extinguishers and emergency procedures; Any fire on Site will be treated as an emergency, in the unlikely event of a fire, these actions will be taken; • Notify the Fire & Rescue Service immediately and the EA as soon as practicable; • Isolate the burning area and attempt to extinguish the fire utilising the on-Site fire extinguishers, if it is safe to do so; • Prevent, if possible, contaminated Site drainage from entering unsurfaced ground; and • Evacuate the Site if the fire is not containable. The operational areas of the Site will be inspected daily for any signs of a fire. The plant inspection schedule will include checks of any electrical equipment on Site to ensure that any faults are identified and repaired. The results of all inspections will be recorded in the Site Diary. The Site Manager will be responsible for implementing risk management measures in accordance with appropriate procedures in the Operational Techniques.		surroundings.	
Flooding	Sensitive receptors	Land	The Site lies within a Flood Zone 1, which is defined as "land having a less than 1 in 1,000 annual probability of	Very low	Harm to human health,	Negligible

	listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors. Site personnel.		river or sea flooding", and therefore has a very low probability of flooding. An evacuation plan will be implemented in the unlikely event of flooding. The Site Manager will be responsible for implementing risk management measures in accordance with appropriate procedures outlined in Operational Techniques.		contamination of groundwater and surface water.	
Unauthorised waste receipt	Sensitive receptors listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors. Site personnel.	Air, Land and Water	Strict waste acceptance procedures will ensure only authorised inert materials will be accepted at the Site. These procedures include pre-acceptance checks i.e. visual inspections upon arrival, an approved suppliers list and basic characterisation. Any unauthorised waste will be rejected and placed in a quarantined stockpile area, before disposal off-Site to an approved facility. The Site Manager will be responsible for implementing risk management measures in accordance with appropriate procedures in the Operational Techniques.	Low	Nuisance, Contamination and harm to human health.	Low
Security and Vandalism	Sensitive receptors listed in Table 2 including residential, commercial, agricultural recreational and ecological receptors. Site	Air, Land and Water	The Site will benefit from the following infrastructure to keep the Site secure, and prevent unauthorised access: • All visitors will be required to use a Sign in/Sign out book, to minimise risk of unauthorised visitors gaining access to the Site; • The Site will be secured using fencing, hedging and lockable gates to prevent any unauthorised access; • Security infrastructure will be inspected daily to identify deteriorations. In the event that damage is found, then actions will be taken to secure the access	Low	Nuisance, Contamination and harm to human health.	Low

	personnel.		and temporary repairs made. Permanent repairs will then be made as soon as practically possible. The Site Manager will be responsible for implementing risk management measures in accordance with appropriate procedures in the Operational Techniques.			

4.0 CONCLUSION

To conclude, it is considered that the operations on Site will not pose a significant risk of harm to sensitive receptors in the vicinity of the Site due to the strict waste acceptance procedures and management measures in place.

APPENDICES

Appendix A- EA Habitats and Conservation screening assessment

Nature and Heritage Conservation

Screening Report: Bespoke Waste

Reference	**EPR/LB3209FE/A001**
NGR	**TQ 57636 83872**
Buffer (m)	**228**
Date report produced	**20 May 2022**
Number of maps enclosed	**3**

The nature and heritage conservation sites and/or protected species and habitats identified in the table below must be considered in your application.

Nature and heritage conservation sites	Screening distance (m)	Further Information
Local Wildlife Sites (LWS) :	200	Appropriate Local Record Centre (LRC)
Stubber's Outdoor Pursuits Centre		

Protected Species	Screening distance (m)	Further Information
Protected Species - Code 2	up to 500m	Natural England Appropriate Local Record Centre (LRC)

Protected Habitats	Screening distance (m)	Further Information
Deciduous woodland	up to 50m	Natural England

Unfortunately we cannot provide you with the details of all protected species. This is because we either have not been given permission by the owner of the species data, or they have asked us not to identify the species as they are vulnerable. In these instances you must contact the relevant organisation listed above. A small administration charge may be incurred for this service.

Where protected species are present, a licence may be required from Natural England to handle the species or undertake the proposed works.

The relevant Local Records Centre must be contacted for information on the features within local wildlife sites. A small administration charge may also be incurred for this service.

Please note we have screened this application for protected and priority sites, habitats and species for which we have information. It is however your responsibility to comply with all environmental and planning legislation, this information does not imply that no other checks or permissions will be required.

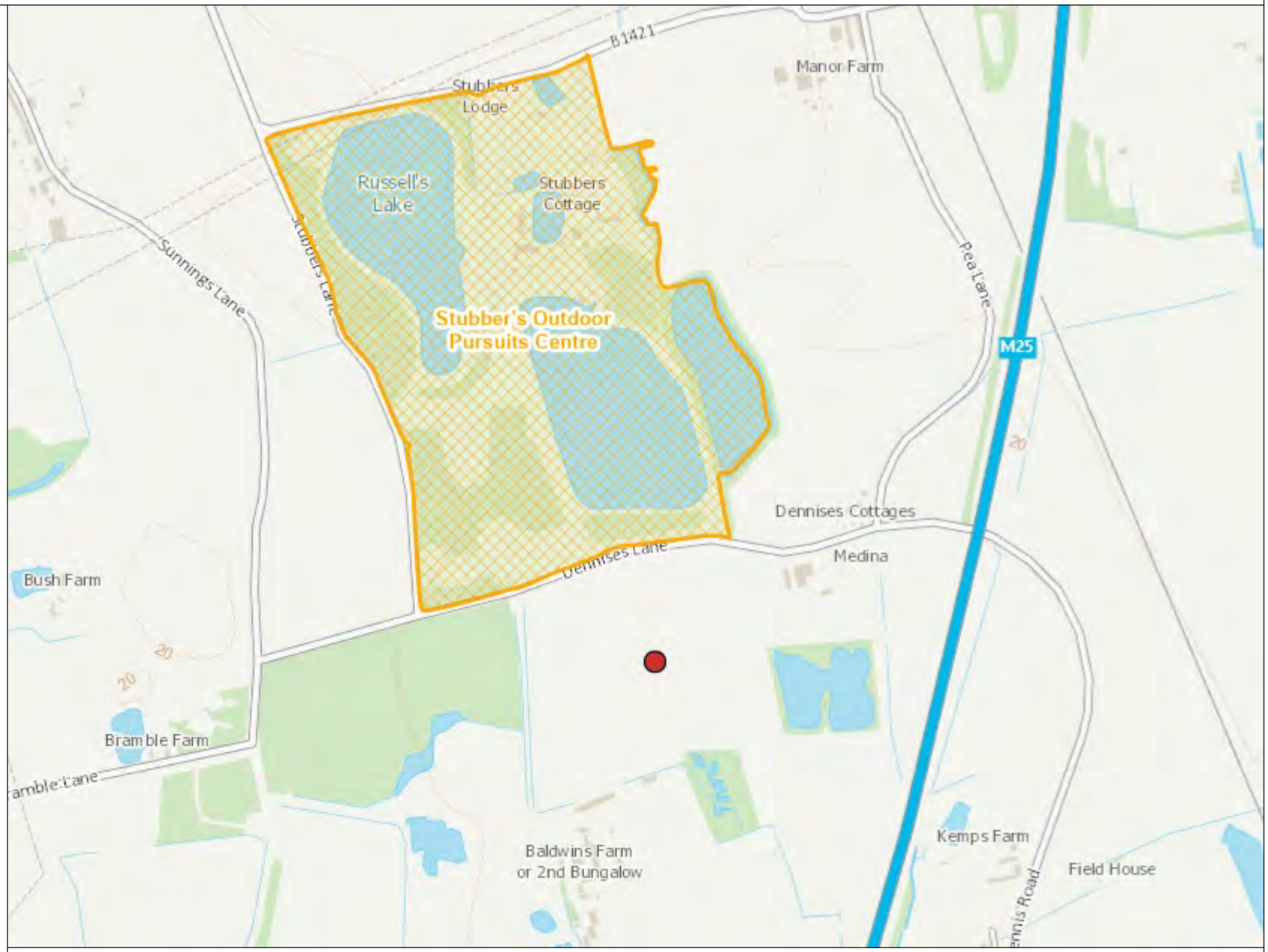
Please note the nature and heritage screening we have conducted as part of this report is subject to change as it is based on data we hold at the time it is generated. We cannot guarantee there will be no changes to our screening data between the date of this report and the submission of the permit application, which could result in the return of an application or requesting further information.

Local Wildlife Sites

Environment Agency

Legend

Local Wildlife Sites



1: 10,000

0 250

Metres

N W E S

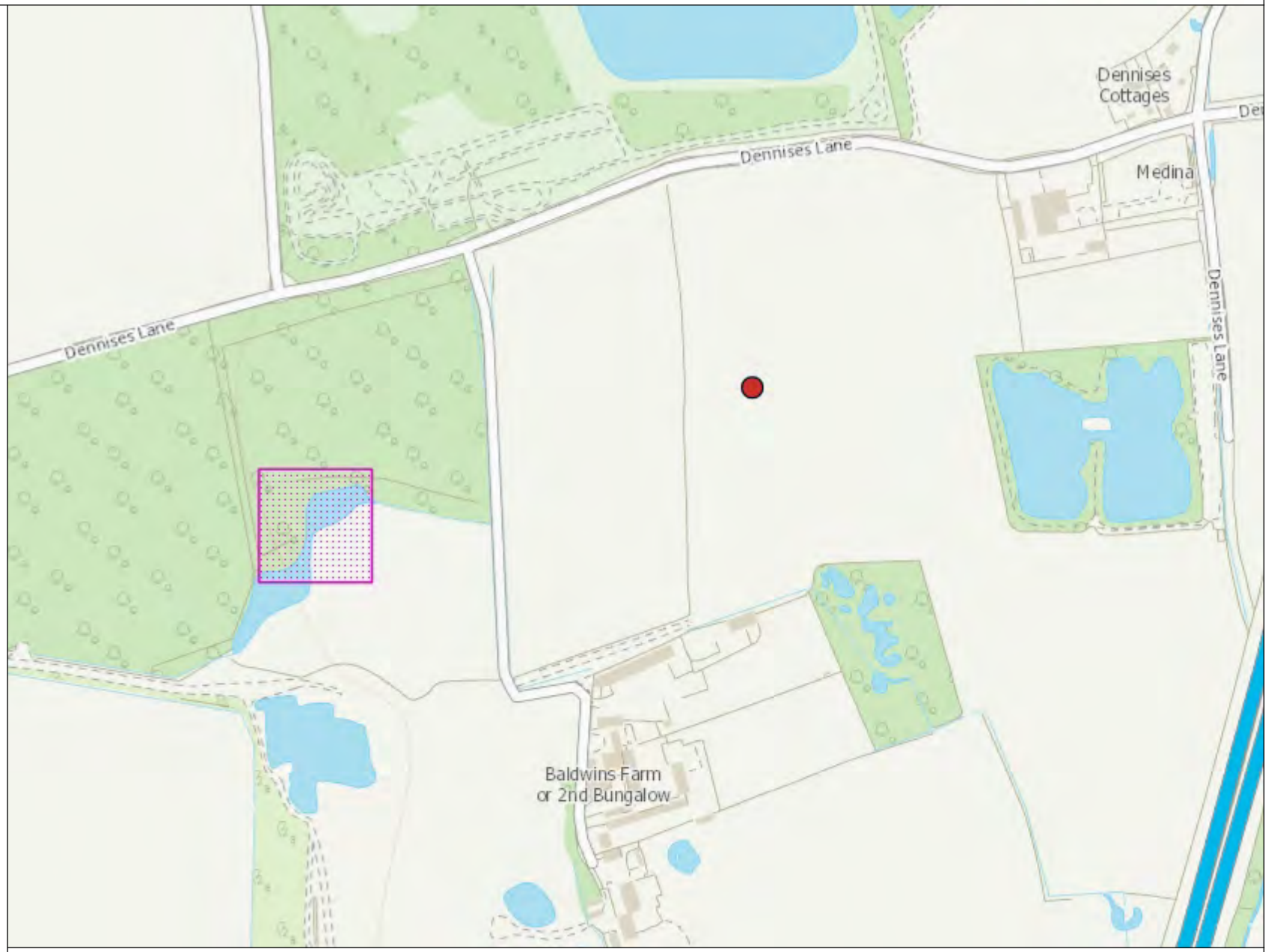
Protected Species

Environment Agency

Legend

Protected species screened for Env Permits - complete set

- Protected species, non fish
- Protected fish
- Protected fish migratory route



1: 5,000

0 125

Metres

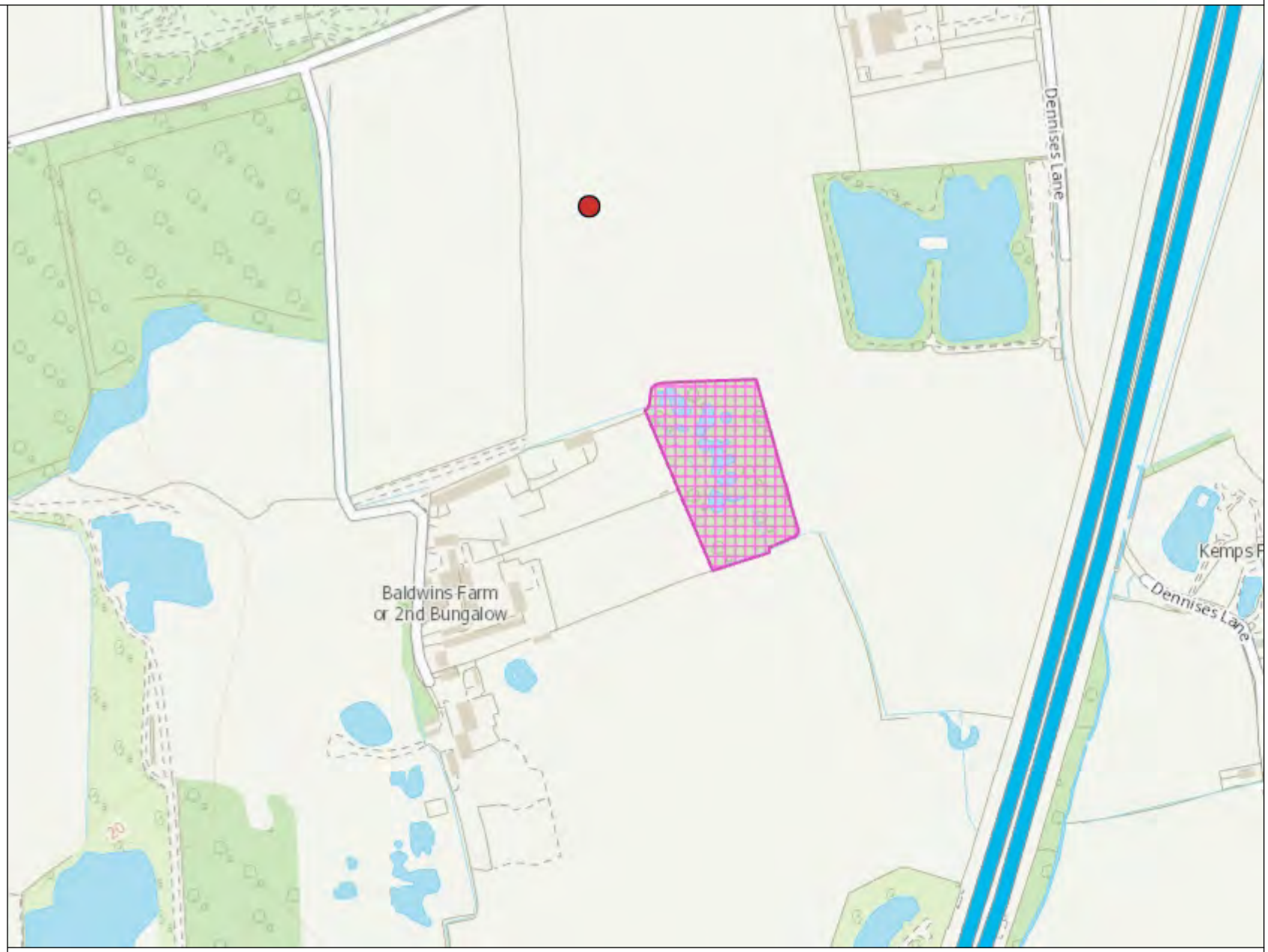
N W E S

Protected Habitats

Environment Agency

Legend

Protected Habitats screened for Env Permits



1: 5,000

0 125

Metres

N
W E
S

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Application for an environmental permit
Part B2 – General – new bespoke permit

Environment Agency

Fill in this part of the form together with parts A and F1 if you are applying for a new bespoke permit. You also need to fill in part B3, B4, B5, B6, or B7 (this depends on what activities you are applying for). Please check that this is the latest version of the form available from our website.

You can apply online for waste bespoke environmental 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

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

Contents

1 About the permit

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: EPR/LB3209FE/A001

1b Is the permit for a site or for mobile plant?

Site ☑ Now go to section 2

Mobile plant ☐ Now go to question 1c

Note: The term 'mobile plant' does not include mobile sheep dipping units.

Mobile plant

1c Have we told you during pre-application discussions that we believe that a mobile permit is suitable for your activity?

No ☐

Yes ☐

1d Have there been any changes to your proposal since this discussion?

No ☐ Now go to section 3

Yes ☐ You should send us a description of the activity you want to carry out, highlighting the changes you have made since our pre-application discussions

Document reference

Now go to section 3

2 About the site

But not mobile plant

2a What is the site name, address, postcode and national grid reference?

Site name: Medina Farm

2 About the site, continued

Address: Dennises Lane
South Ockendon
Essex

Postcode: RM14 2XB

National grid reference for the site (for example, ST 12345 67890): TQ 57636 83872

2b What type of regulated facility are you applying for?

Note: if you are applying for more than one regulated facility then go to 2c.

- Installation ☐
- Waste operation ☐
- Mining waste operation ☐
- Water discharge activity ☐
- Groundwater activity (point source) ☐
- Groundwater activity (discharge onto land) ☐

What is the national grid reference for the regulated facility (if only one)? (See the guidance notes on part B2.)

- As in 2a above ☑
- Different from that in 2a ☐ Please fill in the national grid reference below

National grid reference for the regulated facility

Now go to question 2d

2 About the site, continued

2c If you are applying for more than one regulated facility on your site, what are their types and their grid references?

See the guidance notes on part B2.

Regulated facility 1

National grid reference

What is the regulated facility type?

Installation ☐

Waste operation ☐

Mining waste operation ☐

Water discharge activity ☐

Groundwater activity (point source) ☐

Groundwater activity (discharge onto land) ☐

Regulated facility 2

National grid reference

What is the regulated facility type?

Installation ☐

Waste operation ☐

Mining waste operation ☐

Water discharge activity ☐

Groundwater activity (point source) ☐

Groundwater activity (discharge onto land) ☐

Use several copies of this page or separate sheets if you have a long list of regulated facilities. Send them to us with your application form. Tell us below the reference you have given these extra sheets.

Document reference

Now go to question 2d

2 About the site, continued

2d Low impact installations (installations only)

Are any of the regulated facilities low impact installations?

No ☑

Yes ☐ If yes, tell us how you meet the conditions for a low impact installation (see the guidance notes on part B2 – 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 ☐

2e Treating batteries

Are you planning to treat batteries? (See the guidance notes on part B2.)

No ☑

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

Document reference for the explanation

2f Ship recycling

Is your activity covered by the Ship Recycling Regulations 2015? (See the guidance notes on part B2.)

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

2g Multi-operator installation

If the site is a multi-operator site (that is there is more than one operator of the installation) then fill in the table below the application reference for each of the other permits.

Table 1 – Other permit application references

Not applicable.

3 Your ability as an operator

If you are only applying for a standalone water discharge or for a groundwater activity, you only have to fill in question 3d.

3a Relevant offences

Applies to all except standalone surface water discharges and groundwater discharges (see the guidance notes on part B2).

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/YYYY)

3 Your ability as an operator, continued

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

Now go to question 3b

Please also complete the details in Appendix 2.

3b Technical ability

Relevant waste operations only (see the guidance notes on part B2).

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

Please select **one** of the following:

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

or

We will have a certified Competence Management System within 12 months and have enclosed evidence of the contract with an accredited certification body ☐

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
  - 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 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 ☑
- I will complete my qualification within four weeks of starting the permitted activities and have enclosed evidence of my registration with WAMITAB or my EPOC booking as appropriate ☐
- **For medium- and high-risk tier activities other than landfill**
  I will complete the qualification within 12 months and have enclosed evidence of registration with WAMITAB and, where relevant, EPOC booking. I understand I must complete either four specified units of the relevant qualification or an EPOC within four weeks of the permitted activities commencing ☐

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)

First name Refer to Appendix B - TCM Details

Last name

Phone

Mobile

Email

3 Your ability as an operator, continued

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 Appendix B - TCM Details	

Document reference: Appendix B - TCM Details

Now go to question 3c

Please also complete the details in Appendix 2.

3c Finances

Installations, waste operations and mining waste operations only.

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.

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: Appendix C - Expenditure Plan

Now go to question 3d

3d Management systems (all)

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

3 Your ability as an operator, continued

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) ☐

Green dragon ☐

Own management system ☐

EC Eco-Management and Audit Scheme (EMAS) ☐

EMAS Easy ☐

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

Document reference/s: Appendix D - EMS Summary

4 Consultation

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

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

4a A sewer managed by a sewerage undertaker?

No ☑

Yes ☐ Please name the sewerage undertaker

4b A harbour managed by a harbour authority?

No ☑

Yes ☐ Please name the harbour authority

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

No ☑

Yes ☐ Please name the fisheries committee

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

But not any mobile plant

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 B2.)

Document reference/s of the plans: Section 3 - Drawings

5b Provide the relevant sections of a site condition/baseline report if this applies

See the guidance notes on part B2 for what needs to be marked on the plan.

Document reference of the report: Not applicable

If you are applying for an installation, tick the box to confirm that you have sent in a baseline report ☐

5 Supporting information, continued

5c Provide a non-technical summary of your application

See the guidance notes on part B2.

Document reference of the summary: Section 2 - Non-Technical Summary

5d 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 ☑

Yes ☐ Provide a fire prevention plan (see the guidance notes on part B2). You need to highlight any changes you have made since your pre-application discussions.

Document reference of the plan:

6 Environmental risk assessment

Provide an assessment of the risks each of your proposed regulated facilities poses to the environment. The risk assessment must follow the methodology set out in 'Risk assessments for your environmental permit' at www.gov.uk/government/collections/technical-guidance-for-regulated-industry-sectors-environmental-permitting or an equivalent method.

Document reference for the assessments: Section 4 - Environmental Risk Assessment

For Waste and Installation Permits only

All bespoke waste and installations permit applications must carry out a climate change risk assessment if the planned duration of the operation is more than 5 years. This will normally be reviewed and discussed with you as part of our compliance activities. However, we may require you to submit your climate change risk assessment as part of your application depending on your risk screening score. We will consider the information contained within your climate change risk assessment when we grant your permit. Conditions may be applied to some permits to manage climate risks.

6b Climate change risk screening

See the guidance to Part B2.

Mark your score in each category in the table below. Add each individual score to give a total.

CATEGORY	SCREENING QUESTIONS	SCORE	YOUR SCORE
1 TIMESCALES	How long will a permit be required for this site/activity?		
	5 years or less of operation. No need to fill in the rest of the screening. You do not need to fill in a risk assessment. Please go straight to question 7.	0	
	Less than 20 years of operation	1	1
	Until between 2040 and 2060 (between 20 and 40 years from now)	3	
	Until 2060 or beyond (more than 40 years from now)	5	
2 FLOODING	What is your site's risk of flooding from rivers or the sea?		
	Not in a flood-risk zone	0	
	Very low or Low	1	1
	Medium	2	
	High	5	
3 WATER USE	If you use water for your site operations or fire prevention, what is the source of your water?		
	Water not required	0	
	Mains water	1	1
	Surface water or groundwater abstraction	5	
		TOTAL SCREENING SCORE	3

If your total screening score is 5 or more, complete the climate change risk assessment and submit it with your permit application.

If you expect to operate for 5 years or less, you do not need to submit a risk assessment with your application, regardless of your screening score.

You must enter your score for every category in the table above. If you expect to operate for 5 years or less you may enter 'Not Applicable' for categories 2 and 3.

6 Environmental risk assessment, continued

Document reference of the risk assessment (if submitted with application)

Not applicable

If your total screening score is less than 5 we may still request your risk assessment as part of determining this application if we believe you face unmanaged climate risks.

If we do not review your risk assessment as part of your application, it will form part of your Environmental Management System and we will discuss it with you as part of our compliance activities.

7 How to contact us

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

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

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

Email: enquiries@environment-agency.gov.uk

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

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

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

Feedback

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

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

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

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

Would you like a reply to your feedback?

Yes please ☐

No thank you ☐

Crystal Mark 19103
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

£

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

Appendix 1 – Low impact installation checklist

See the guidance notes on part B2.

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

Date of birth (DD/MM/YY)

3 Technical ability - date of birth information

Name Appendix B- TCM Details

Date of birth (DD/MM/YY)

Application for an environmental permit
Part B4 – New bespoke waste operation permit

Environment Agency

Fill in this part of the form, together with parts A, B2 and F1, if you are applying for a new bespoke permit for a waste operation. 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.

You can apply online for waste bespoke environmental permits.

Apply online for an environmental permit.

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 waste operations are you applying for?

Fill in Table 1a with details of what you are applying for.

Fill in a separate table for each waste operation you are applying for. 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 extra sheet.

Document reference

Types of waste accepted

For each line in Table 1a, fill in a separate document to list those wastes you will accept on the site for that operation, giving the List of Wastes catalogue code (search for 'Technical guidance on how to assess and classify waste' at www.gov.uk/government/organisations/environment-agency). If you need to exclude waste from your activity or facility by restricting the description, quantity, physical nature, hazardous properties, composition or characteristic of the waste, include these in the document. Send it to us with your application form.

1 What waste operations are you applying for?, continued

Table 1a – Waste operations which do not form part of an installation

Name of the waste operation	Description of the waste operation	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity (if this applies) (See note 1)	Non-hazardous waste treatment capacity (if this applies) (See note 1)
Add extra rows if you need them. If you do not have enough room, go to the line below or send a separate document and give us the document reference here	Use the description from the guidance. Include any extra detail that you think would help to accurately describe what you want to do			
Medina Farm Restoration	Landfill for inert waste	D1	0.00	210,000.00
			0.00	
For all waste operations	Total storage capacity (see note 2)			
	Annual throughput (tonnes each year)			220,000.00

Notes

1 By 'capacity', we mean:

- the total landfill capacity (cubic metres) for landfills
- the total treatment capacity (tonnes each day) for waste treatment
- the total storage capacity (tonnes) for waste-storage operations

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

1 What waste operations are you applying to vary?, continued

Please provide the document reference. 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: Appendix E - List of Wastes

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 Deposit for recovery purposes (see Appendix 4 and the guidance notes on part B4)

Are you applying for a waste recovery activity involving the permanent deposit on waste on land for construction or land reclamation (including landfill restoration)?

No ☑ Go to section 2

Yes ☐

Are you applying for an inert landfill permit that includes a restoration activity using waste?

No ☑ Go to section 2

Yes ☐ Please send us a copy of your restoration plan in accordance with our guidance at https://www.gov.uk/guidance/landfill-operators-environmental-permits/restore-your-landfill-site

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

No ☑ Go to section 2

Yes ☐

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

No ☐

Yes ☐

Please send us a copy of your waste recovery plan that complies with our guidance at https://www.gov.uk/guidance/waste-recovery-plans-and-permits. You need to highlight any changes you have made since your pre-application discussions. Also give us the reference number of the document with your justification.

Please note that there is an additional charge for the assessment of a waste recovery plan that must be submitted as part of this application. For the charge see https://www.gov.uk/topic/environmental-management/environmental-permits.

Document reference

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 waste operations.

Fill in one table for each waste operation.

Table 2 – Emissions

Name of the waste operation	Medina Farm			
Point source emissions to air				
Emission point reference and location	Source	Parameter	Quantity	Unit
none				
Point source emissions to water (other than sewers)				
Emission point reference and location	Source	Parameter	Quantity	Unit
Being applied for separately				
Point source emissions to sewers, effluent treatment plants or other transfers off site				
Emission point reference and location	Source	Parameter	Quantity	Unit
none				
Point source emissions to land				
Emission point reference and location	Source	Parameter	Quantity	Unit
none				

Supporting information

3 Operating techniques

3a Technical standards

Fill in Table 3a for each waste operation you refer to in Table 1a above and list the 'appropriate measures' you are planning to use. If you are using the standards set out in the relevant technical guidance(s) (TGN) there is no need to justify using them within your documents in Table 3a.

You must justify your decisions in a separate document if:

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

This justification could include a reference to the Environmental Risk Assessment provided in part B2 of the application form.

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 technical guidance
- how you will meet other standards set out in the relevant technical guidance

Table 3a – Technical standards

Fill in a separate table for each waste operation.

Waste operation	Medina Farm	
Description of the waste operation Add extra rows if you need them	Appropriate measure (TGN reference)	Document reference (if appropriate)
	Waste Recovery Plans and Deposit for Recovery	April 2021
	Permits	
	Waste Acceptance Procedures for Waste	April 2021
	Recovery	
	Control and Monitor Emissions for your EP	May 2021
	Develop a Management System: EP	August 2021
	Risk assessment for your environmental permit	April 2022

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: Section 1 - Non-Technical Summary

3b General requirements

Fill in a separate table for each waste operation.

Table 3b – General requirements

Name of the waste operation	Medina Farm
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 Section 7- Dust Management Plan
If the technical guidance or your risk assessment shows that odours are an important issue, send us your odour management plan. **If your activity type is listed in the guidance document 'Control and monitor emissions for your environmental permit' as needing an odour management plan, or your risk assessment shows that odours are an important issue, you need to send us your odour management plan.**	Document reference or references Not applicable
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 applicable

3 Operating techniques, continued

We may need to ask for management plans or risk assessments in other circumstances based on our regulatory experience. If you are unsure as to whether you need to submit a management plan with your application, please discuss this with the Environment Agency prior to submission.

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

3c 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 in Table 3c, you must answer the questions in the related document.

Table 3c – Questions for specific sectors

Sector	Appendix
Recovery to land for agricultural benefit of compost like outputs from the treatment of mixed municipal solid wastes	See the questions in appendix 1
Inert landfill and deposit of waste on land for construction, land reclamation, restoration or improvement	See the questions in appendix 2

General information

4 Monitoring

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

You should also describe any environmental monitoring. Tell us:

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

Document reference: Section 6 - Environmental Setting and Site Design

4b Point source emissions to air only

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

Document reference of the assessment: Not applicable

5 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.

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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

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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 appendices 1 to 2.

Appendix 1 – Specific questions for the recovery to land for agricultural benefit of compost like outputs from the treatment of mixed municipal solid wastes

1 Please provide an accurate and reliable characterisation of your compost like outputs (CLO). This should be based on sampling and analysis of the CLO produced by the treatment (MBT) process over a 12-month period and in accordance with section 2 of TGN 6.15

Document reference

2 Please provide an agricultural benefit assessment for the use of your CLO. This should be based on section 2 of TGN 6.15 and should be signed and dated by an appropriate technical expert

Document reference

3 Please provide a site-specific risk assessment of risks to soil and food chain receptors. This should be based on Schedule 2 of TGN 6.15 and include a map with a green outline showing the boundary of the area being treated and include:

- locations where the waste will be stored and spread
- any spring, well or borehole used to supply water for domestic or food production purposes that is within 250 metres of the area being treated
- any spring, well or borehole not being used for domestic or food production purposes that is within 50 metres of the area being treated
- any European designated sites (candidate or Special Area of Conservation, proposed or Special Protections Area in England and Wales or Ramsar Site) or Sites of Special Scientific Interest (SSSI) which are within 500 metres of the place where waste is to be stored or spread
- the location of public rights of way
- any Groundwater Source Protection Zones
- surface watercourses
- any buildings or houses within 250 metres of the area being treated
- land drains within the boundary

Document reference

4 Are the technical standards and measures fully in line with those set out in section 3 of TGN 6.15?

No ☐ Provide justification for departure from TGN 6.15 and a copy of the proposed technical standards, measures or procedures

Document reference

Yes ☐

Appendix 2 – Specific questions for inert waste landfill and deposit for recovery operations

1 Please provide your Environmental Setting and Site Design (ESSD) report

Document reference: Section 6 - Environmental Setting and Site Design

Note: You should use the Environment Agency template to help you develop an environmental setting and site design (ESSD) report.

2 Please provide your Waste Acceptance Procedures (including Waste Acceptance Criteria)

Document reference: Section 9 - Waste Acceptance Procedure

3 Have you provided a hydrogeological risk assessment (HRA) for the site?

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

Yes ☐ Document reference: Section 5 - Hydrogeological Risk Assessment

4 Have you completed an outline engineering plan for the site?

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

Yes ☐ Document reference: Section 6 - Environmental Setting and Site Design

5 Have you provided a stability risk assessment (SRA) for your site?

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

Yes ☐ Document reference: Section 8 - Stability Risk Assessment

Appendix 2 – Specific questions for inert waste landfill and deposit for recovery operations, continued

6 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

Yes ☐ Document reference Section 6 - Environmental Setting and Site Design

7 Have you completed a plan for closing the site and procedures for looking after the site once it has closed?

No ☐ If no for deposit for recovery activities please refer to the section of your ESSD that explains why this is unnecessary for your site

Yes ☐ For inert waste landfill you must provide a closure plan

Document reference Section 6 - Environmental Setting and Site Design

Spreading waste to support plant growth

8a Does the activity involve the deposit of waste to create or treat a growing medium (R10 for land treatment)?

No ☑

Yes ☐

8b If you answered 'yes' to question 8a, does the R10 activity include the spreading of waste to improve the quality of the growing medium (e.g. soil conditioner to improve existing soil profile)?

No ☐

Yes ☐ Go to question 8c

8c If you have answered 'Yes' to question 8b, have you completed a benefit statement?

No ☐ Please explain why

Document reference

Yes ☐

Note: Refer to our guidance when completing your statement (including EPR 8.01, section 6).

Application for an environmental permit
Part F1 – Charges and declarations

Environment Agency

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

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

The form can be:

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

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

Contents

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

1 Working out charges

You must fill in this section.

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

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

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

Installation	Waste	Mining waste	Medium Combustion Plant (MCP)/Specified Generator (SG)	Water discharge/point source discharge to groundwater	Groundwater spreading onto land
	1				

Table 2 – Charge type (A)

Charge activity reference	Charge activity description	What are you applying to do? E.g. new, minor variation, normal variation, substantial variation, surrender, low risk surrender, transfer	Amount
e.g. 1.17.3	e.g. Sect 5.2 landfill for hazardous waste	e.g. transfer	e.g. £5,561
1.17.7	Landfill for inert waste	new	£ 13,203.00
Total A			£ 13,203.00

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

Table 3 – Additional assessment charges (B)

Part 1.19 Charges for plans and assessments			Tick appropriate
Reference	Plan or assessment	Charge	
1.19.1	Waste recovery plan	£1,231	☐
1.19.2	Habitats assessment (except where the application activity is a flood risk activity)	£779	☐
1.19.3	Fire prevention plan (except where the application activity is a farming installation)	£1,241	☐
1.19.4	Pests management plan (except where the application activity is a farming installation)	£1,241	☐
1.19.5	Emissions management plan (except where the application activity is a farming installation)	£1,241	☑
1.19.6	Odour management plan (except where the application activity is a farming installation)	£1,246	☐
1.19.7	Noise and vibration management plan (except where the application activity is a farming installation)	£1,246	☐
1.19.8	Ammonia emissions risk assessment (intensive farming applications only)	£620	☐
1.19.9	Dust and bio-aerosol management plan (intensive farming applications only)	£620	☐
	Advertising	£500	☐
Total B			£ 1,241.00

Total charges

Total A plus total B £ 14,444.00

2 Payment

Tick below to show how you have paid.

Cheque ☐

Postal order ☐

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

Credit or debit card ☐

Electronic transfer (for example, BACS) ☐

Remittance number PSCAPPINGRE111

Date paid (DD/MM/YYYY) 11/01/2023

How to pay

Paying by cheque, postal order or cash

Cheque details

Cheque made payable to

Cheque number

Amount £ 14,444.00

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

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

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

I have enclosed cash with my application ☐

2 Payment, continued

Paying by credit or debit card

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

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

Paying by electronic transfer BACS reference

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

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

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

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

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

Provide a unique reference number for the application, i.e. do not only use the company name only: PSCAPPINGRE111

State who is paying (full name and whether this is the agent/ applicant/other): Ingrebourne Valley Limited, applicant

Fee paid: £ 14,444.00

Date payment sent (DD/MM/YYYY): 11/01/2023

Now read section 3 below

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

3 Privacy notice

The Environment Agency runs the environmental permit application service.

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

Our personal information charter explains:

- your rights
- what we do with your personal information

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

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

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

What personal information we collect

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

- name
- date of birth

3 Privacy notice, continued

- address
- email address

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

- name
- address
- email address

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

- convictions
- bankruptcy

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

Your responsibility with other people's personal information

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

What we do with your personal information

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

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

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

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

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

See the environmental permitting guidance for guidance on national security.

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

Where your personal information is processed and stored

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

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

How long we keep your personal information

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

Removing personal information from the public register

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

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

Contact

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

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

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

3 Privacy notice, continued

Email: dataprotection@environment-agency.gov.uk

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

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

Now read section 4 below

4 Confidentiality and national security

Confidentiality

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

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

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

Please treat the information in my application as confidential ☐

National security

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

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

You cannot apply for national security via this application.

Now fill in section 5

5 Declaration

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

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

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

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

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

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

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

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

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

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

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

5 Declaration, continued

Name

Title (Mr, Mrs, Miss and so on)	Mr
First name	Andrew
Last name	Clark
on behalf of (if relevant; for example, a company or organisation and so on)	Ingrebourne Valley Limited
Position (if relevant; for example, in a company or organisation and so on)	Director
Today's date (DD/MM/YYYY)	25/01/2023

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)	☐

Name

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

Now go to section 6

6 Application checklist

You must fill in this section.

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

You must do the following:

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

6 Application checklist, continued

Question reference	Document title	Document reference
	See Contents Page	

7 How to contact us

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

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

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

Email: enquiries@environment-agency.gov.uk

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

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

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

8 Where to send your application

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

Please send your filled in application form to:

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

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

Or

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

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

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

Feedback

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

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

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

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

Would you like a reply to your feedback?

Yes please ☐

No thank you ☐

For Environment Agency use only

Date received (DD/MM/YYYY)

Our reference number

Payment received?

No ☐

Yes ☐ Amount received

£

MEDINA FARM RESTORATION

Environmental Permit Application

Dust and Emissions Management Plan

Prepared for: Ingrebourne Valley Limited

Client Ref: 416.01526.00087

SLR Ref: 416.01526.00087
Version No: 1
November 2022

BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Ingrebourne Valley Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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Table 1 Version Control

Issue	Date	Description of Changes
1.0	November 2022	

1.0 Introduction

Ingrebourne Valley Limited (IV) has instructed SLR Consulting Limited (SLR) to prepare a bespoke Environmental Permit (EP) application to authorise an inert waste landfill for the restoration of Medina Farm, Dennises Lane, South Ockendon, Essex RM14 2XB, hereafter referred to as 'the Site'.

This Dust Management Plan (DMP) had been prepared in support of the EP application. The implementation of the DMP shall be under the control of the Site management. This plan shall be incorporated into the Site procedures and shall be revised as necessary to ensure it remains appropriate to the activates occurring on Site and that any changes in conditions relating to dust management are dealt with as part of those revisions. In particular, the monitoring procedures and compliance actions will be updated as required by the procedures within the DMP.

The DEMP is a 'live document', in this respect the dust control measures, and management procedures contained within it will be updated on a periodic basis. This DEMP will be kept in the Site office and be available to all employees.

1.1 Site Location and Setting

Medina Farm is located 2.7km to the north north-east of South Ockendon in Essex at grid reference TQ 57636 83872. It is approximately 17ha in size.

The site consists of two agricultural fields; Field A, a former gravel pit which has been poorly restored, and Field B, a target area for gravel extraction. The site is bounded to the north by Dennises Lane, beyond which is Stubber's Outdoor Pursuits Centre, a designated Local Wildlife Site, which includes three lakes. To the west, the site is bounded by an unnamed road and woodland/ scrub. To the south, the site is bounded by small industrial units, a copse and farmland associated with Baldwins Farm. To the east, the site is bounded by a lake, used as a fishery, a residential property and car breakers yard.

The topography of the site is generally flat, falling gently from a maximum of approximately 20m above ordnance datum (AOD) in the north-western corner to a minimum of 15mAOD on the eastern boundary.

The site lies across two local authority boundaries; Thurrock Council to the south and Havering Council to the north. Havering Council has declared an Air Quality Management Area for nitrogen dioxide and particular matter which covers the entire London Borough of Havering. A section of the north of the Site is situated within the Havering Council AQMA.

The location of Medina Farm is illustrated on Drawing EP1.

2.0 Site Operations Description

The proposed development can be summarised as the importation of inert waste materials for the restoration of the Site by landfill.

Field A has been previously worked for mineral, was restored but now suffers poor drainage due to differential settlement while Field B contains approximately 200,000 tonnes of sand and gravel.

Field B will have the sand and gravel extracted and then be wholly restored using inert waste material imported to the Site. Restoration of Field A will primarily involve using material excavated from Field B (such as overburden, unsaleable mineral or basal clay) to regrade and address the differential levels across it. This will be supplemented with imported inert waste materials where required to achieve Field A's restoration levels.

In total approximately 420,000 tonnes of inert waste will be required to achieve the proposed restoration landform and return the fields to agricultural use. The proposed restoration landform seeks to achieve a shallow dome shape to ensure efficient drainage while maintaining ease of access for agricultural vehicles. Around the

perimeter of the fields, drainage ditches will collect surface water runoff and lead to two attenuation ponds. One attenuation pond will be located in the south-eastern corner of the Site and the other in the south-western corner.

The proposed restoration is illustrated in the following drawings:

- Plan No. 1616/R/1 v3 Proposed Restoration

Prior to mineral extraction in Field B and supplementary deposits to Field A, the fields will be stripped of topsoil and subsoils separately. The topsoil and subsoil will be separately stored in bunds around the perimeter of the Site for replacement later in the final restoration of the Site. Following placement of inert waste materials, the Site will be restored using a minimum of 0.8m of subsoil and 0.4m of topsoil. It is anticipated that there will be shortfall of indigenous soils to achieve this, therefore retained indigenous soil materials will be supplemented with imported waste soil material.

The working of the Site during the operational phase is illustrated in Plan No. 1616/CO/1 Composite Operations Plan.

Up to 220,000 tonnes per annum (tpa) of waste will be accepted at the Site. It is anticipated that restoration of the Site will take 2 years.

The activities which may give rise to dust emissions on Site include:

- Reception of inert waste materials; and
- Deposit of inert waste materials.

It is recognised that activities on Site could lead to release of fugitive emissions of dust particles (between 2.5 and 10 micrometres) and therefore it is a requirement to control these activities in order to prevent or mitigate potential releases of dust.

Measures incorporated into the design of the Site to assist with dust control include:

- Site operations are managed such that any material received that is identified as having a high potential for the generation of dust emissions (i.e. particularly dry loads) is managed following best practice;
- Drop heights are minimised where possible to reduce resuspension of dust;
- Vehicles will be restricted to defined routes; and
- Internal haul routes are maintained and repaired.

2.1 Specified Waste Management Activities

The waste management activities that will be carried out at the site, under the conditions of the permit, as specified in Annex I of the Waste Framework Directive are detailed below:

2.1.1 Landfill

D1: Deposit into or onto land.

2.2 Sensitive Receptors

Medina Farm is located within a predominantly agricultural landscape approximately 2.7km north, north-east of South Ockendon, Essex. The site is bounded to the north by Dennises Lane, beyond which is an outdoor pursuits centre which includes three lakes. To the west, the site is bounded by an unnamed road and woodland/ scrub. To the south, the site is bounded by small industrial units, a copse and farmland associated with Baldwins Farm.

To the east, the site is bounded by a lake, probably a former gravel pit now used as a fishery, a residential property and car breakers yard.

There are few residential properties located near the site. The closest residential properties from the boundary of the Site are located at Baldwins Farm which is located adjacent to the southern boundary of the Site. Further residential properties are situated at Dennises Cottages located approximately 115m to the north east of the site.

The closest receptors within a 1km radius of the site which are considered to be sensitive to dust and other emissions such as NO_2 from onsite mobile plant and road vehicles are presented in Table 1-1.

The sensitivity of receptors to dust has been determined with reference to the Institute of Air Quality Management (IAQM) Mineral Guidance[1].

Table 2-1 Sensitive Receptors

Receptor	Direction from Permit Boundary	Receptor Type	Receptor Sensitivity to Dust	Distance from Permit Boundary(m)
R1	North	Local Transport Network	Low	Adjacent
R2	North	Recreational Premises	Medium	Adjacent
R3	East	Industrial/ Commercial Premises	Medium	Adjacent
R4	East	Recreational Premises	Medium	Adjacent
R5	South	Industrial/ Commercial Premises	Medium	Adjacent
R6	North east	Residential dwellings	High	107
R7	South east	Residential dwellings/ Listed Buildings	High	358
R8	South east	Recreational	Medium	650
R9	West	Residential dwellings/ Listed Buildings	High	633
R10	North	Residential dwellings/ Listed Buildings	High	627
R11	West	Residential dwellings	High	761
R12	North	Residential dwellings	High	830

[1] IAQM, Guidance on the Assessment of Mineral Dust Impacts for Planning, 2016.

2.2.1 Ecological Receptors

The Multi-Agency Geographic Information for the Countryside (MAGIC)[2] website was utilised to identify sensitive ecological sites in proximity to the Site. The following European or International designations were not identified within 2km of the Site:

- Special Scientific Interest (SSSI)
- Special Area of Conservation (SAC);
- Special Protection Areas (SPA); or
- RAMSAR

Other Receptors

A review of the MAGIC map website confirms that none of the following are situated within 2km of the Site:

- National Parks;
- Area of Outstanding Natural Beauty; and
- National Nature Reserves.

The MAGIC map website and an EA Habitats and Conservation screening assessment (Please refer to Appendix A of the associated Environmental Risk Assessment) conducted for the Site have confirmed the following receptors within 2km of the Site's boundary.

Local Nature Reserve

There is one Local Nature Reserve (LNR) located within 2km of the Site boundary. Cranham Marsh is situated approximately 1.1km to the north of the Site.

Protected Species

The EA Habitat and Conservation screening assessment identified a Protected Species- Code 2 located within a lake approximately 110m west of the Site.

Protected Habitat

An area of deciduous woodland classified as a protected habitat is located adjacent to the south of the Site.

Local Wildlife Sites (LWS)

There is one LWS's located within 2km of the Site boundary. Stubber's Outdoor Pursuits Centre is a designated LWS located adjacent to the north of the Site boundary.

Ancient Woodland

There are five areas of Ancient Woodland located within 2km of the Site Boundary. The closest of which is Whitehall Wood, which covers an area of 10.8 Hectares is situated approximately 960m south east of the Site.

Registered Parks and Gardens

There is one registered park and garden located within a 2km radius of the Site boundary.

- Belhus Park is a registered park and garden which lies around 650m to the south east from the Site boundary at the closest point.

[2] www.magic.gov.uk accessed December 2021

Listed Buildings

There are numerous Grade II listed buildings within a 2km radius to the Site boundary. The closest Grade II listed building to the Site boundary is 'Kemps Cottage', which lies around 358m to the south east of the Site.

A review of MAGIC map confirmed that none of the following are situated within 2km of the Site:

- Registered Battlefields;
- World Heritage Sites; and
- Scheduled Monuments.

3.0 POTENTIAL DUST EFFECTS

3.1 Prevailing Meteorological Conditions

The most important climatic parameters governing the generation and dispersal of fugitive dust are:

- Wind speed will affect the potential for dust entrainment and the distance it may travel;
- Wind speed determines the broad transport of the emission and the sector of the compass into which the emission is dispersed; and

Rainfall is an important climatological parameter in the generation of dust; sufficient amounts of rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995)[3] rainfall greater than 0.2mm per day is sufficient to suppress dust emissions.

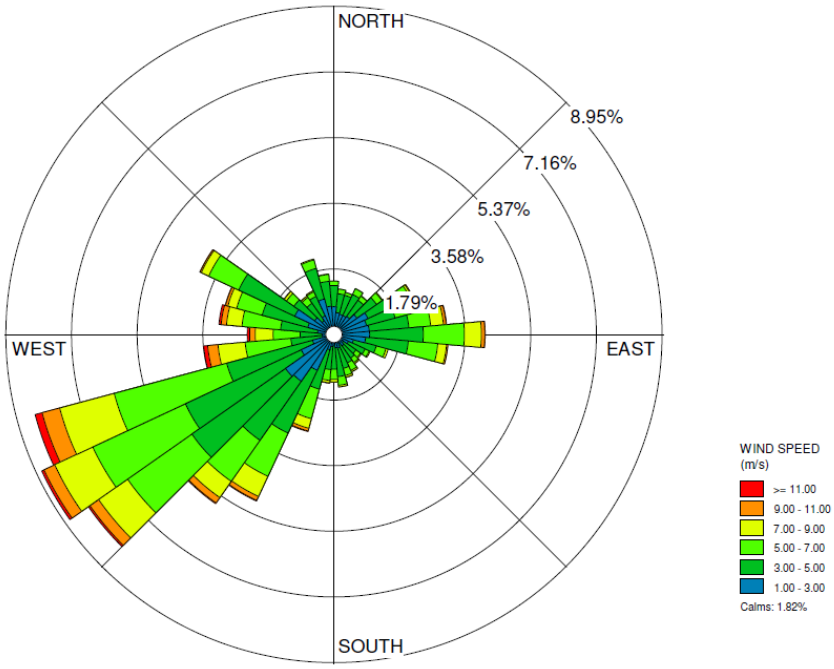
3.1.1 Local Wind Speed and Direction

Wind speed and direction data from the meteorological observation station at London City, located approximately 15.2km to the west of the Site is displayed below (Figure 2-1). The wind rose represents an average of data taken from 2015-2019. This data is considered representative of the Site Conditions.

Figure 2-1 indicates that the prevailing wind direction is from the southwest, with approximately 8% of winds in this location coming from the south-west. Winds from the west and east are somewhat prominent, with winds occurring approximately 4% respectively from these directions. Winds from the north and south are relatively infrequent. On this basis, locations to the northeast of the Site have the highest potential for impacts from any emissions from the Site.

Figure 1-1 Wind Rose using 2015-2019 data from London City Meteorological Station

[3] Arup & Ove Arup Environmental. Environment Effects of Surface Mineral Workings. DoE, October 1995



3.1.2 Rainfall Data

Relevant rainfall data applicable to the Site has been obtained from the Met Office Website[4]. of UK mapped climate averages for 1991-2020. Data is taken from the Stanford-le-hope (Thurrock) climate station, which is the closest climate station to the Site. The average rainfall >1mm/day for the area is 160-170 days per year, comprising approximately 43% of the year. It is therefore considered that on those days the natural suppression given by the rainfall would eliminate sources of dust across the Site.

Rainfall is typically lower in the summer months, which combined with higher temperatures will increase drying time of material. Therefore, the potential for dust generation and subsequent transfer of airborne dust emissions beyond the Site boundary is higher during the summer months.

Table 3-1 External Sources of Dust or Other Emissions

Name	Address	Type of business	Direction from boundary	Distance (m)
Agricultural Activities	Surrounding area	Agriculture	All directions	Adjacent
Baldwins Farm	Baldwins Farm, Dennises Ln, South Ockendon, Upminster RM14 2XB	Used and end of life vehicles / historical landfill site	South	Adjacent

[4] Meteorological Office, UK Climate Averages https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages Accessed November 2022

Name	Address	Type of business	Direction from boundary	Distance (m)
Medina Farm	Medina Farm, Dennises Ln, South Ockendon, Upminster RM14 2XB	Use and end of life vehicles	North east	90

4.0 Operations at Medina Farm

4.1 Deliveries

Waste is received at the Site via road by sheeted Heavy Goods Vehicles (HGVs).

4.1.1 Waste Acceptance

Strict waste acceptance procedures will be implemented to ensure that only suitable inert wastes are accepted at the Site. These procedures identify actions and procedures to be taken:

- prior to accepting waste at the Site, including source checking of the waste characterisation data provided by the waste producer;
- during waste delivery to ensure that the wastes are as described, and as permitted within the Environmental Permit;
- if waste not permitted by the Environmental Permit is delivered to Site.

The waste acceptance procedures to be employed at the Site are detailed further within the Waste Acceptance Procedure document.

4.1.2 Waste Types

The types of waste that will be accepted at the Site for recovery comprise construction, demolition and excavation wastes.

A full list of wastes proposed for acceptance classified in accordance with the European Waste Catalogue is included as Appendix 01.

4.2 Overview of Site Operations

Access to the Site can be gained via Dennises Lane in the north-west of the Site. The layout of the Site is illustrated on Drawing DMP1.

The following measures will be designed and implemented into the operation of the Site.

Access road

The Site is accessed via Baldwins Farm Lane which is hardcore surfaced. In addition, the receiving area of the Site will be provided with hardstanding.

Material handling and construction of screening bunds

Bunds will be constructed and designed with a smooth profile to the wind. Screening bunds will be sown with grass seed to stabilise the soil and prevent dust generation.

Movement of Plant, Machinery and Vehicles

The Site's haulage roads will be maintained and repaired when required. All roads and operational areas will be swept where necessary to reduce dust emissions. The access road and haul roads will be sprayed with a water bowser when necessary. Any spillage or loose material will be clear regularly to minimise potential entrainment.

All vehicles exiting the Site will pass through a wheel wash, with the weighbridge operator inspecting the vehicle prior to permitting the vehicle to exit the Site.

A road sweeper will be deployed on the impermeable surfaced roads, to prevent the track-out of material.

Restoration

Haulage route across the surface of the restored area will be restricted to designated routes to minimise the entrainment of loose fine material.

Waste will be deposited on Site at a maximum rate of up to 220,000 tonnes per annum for use in restoration of the void. Restoration of the Site is anticipated to be completed in approximately 2 years.

The Site operates between 7am and 6pm Monday to Friday with no work on Saturdays, Sundays or Bank Holidays.

5.0 Dust and Particulate (PM10) Management

5.1 Responsibility for Implementation of the DEMP

There will be a trained Site Manager on Site during working hours, who is responsible for dust management and conducting or delegating visual observations. The Site Manager will be responsible for ensuring effective dust control is achieved by good operational practices, including:

- Identifying and monitoring the intensity of activities with a high potential for dust generation;
- Monitoring weather conditions during periods of such activity;
- Planning and preparing for the implementation of contingency measures;
- Responding to potential and actual dust monitoring issues; and
- Ceasing operations in the event that significant off-site impacts cannot be avoided.

Responsibilities will be allocated to specific personnel to ensure dust generation is avoided or effectively controlled, as presented in Table 3-1.

Table 5-1 Dust Management Responsibilities

Actions	Responsibility
Monitoring meteorological forecast	Site Manager
Routine daily visual dust monitoring	Site Manager
Routine monthly visual dust monitoring	Site Manager
Coordinating plant area cleaning	Site Manager
Application of plant dust suppression	Site Manager
Completing dust event forms	Site Manager
Liaison with public and regulator	Site Manager

Actions	Responsibility
Coordinating dust management plan updates	Site Manager

5.2 Training

All personnel on Site understand their responsibility to ensure the generation of dust is minimised. Each employee is made aware of the importance of dust control and the most effective measures available to minimise such emissions either as part of the induction process, or as a specific training exercise. Training incorporates the following aspects:

- Key activities with the highest potential for dust generation;
- Methodology of visual dust assessments;
- Importance of unofficial visual dust assessments during everyday work and how to report visible dust emissions;
- How to respond to a complaint from a member of the public;
- The complaints protocol and escalation method;
- What to do in the event of a dust emission incident, and who to inform;
- The importance of the DEMP, its 'active' format and its location;
- Any dust monitoring methods incorporated on Site at the time;
- Overview of the prevailing winds and how this affects daily operations;
- Key aspects to look out for during routine operations with regard to dust generating activities;
- Cleaning regime on Site (routine and intermittent);
- Regime of maintenance of onsite plant;
- Routine measures that can be incorporated into daily work schedules to minimise dust and emissions (i.e. no idling, minimise drop heights, traversing across base of stockpiles, covering of loads); and
- Additional measures that can be undertaken to minimise dust and emissions (i.e. notification of relevant person visual dust plumes are identified, remedial actions).

Refresher training is provided every 2 years.

5.3 Incident Reporting

Incidents of high dust levels will be reported to the Site Manager and recorded in the daily logbook. Any incidents that have created dust issues off Site shall be reported to the EA as appropriate.

5.4 Sources and Control of Fugitive Dust/Particulate Emissions

5.4.1 Sources

Potential dust sources at the Site are:

- Road vehicles entering and leaving the Site, tracking material out onto public highway;
- Internal vehicle / plant movements within the Site;

- Unloading of inert waste material from HGVs;
- Deposit of inert waste material into the Site void; and
- Exhaust emissions from onsite vehicles / plant and from offsite HGVs.

5.4.2 Potential Dust Sources and Magnitude

Potential magnitude of dust emissions from sources at the Site, with consideration of the design and application of control measures in place, are presented in Table 3-2. The review of potential dust sources is used to inform the assessment of risk and the selection of appropriate controls.

Table 5-2 Dust Release Inventory

Dust Source	Potential Magnitude of Emissions	Reasons
Vehicle movements – access road	Low	The Site is accessed via Baldwins Farm Lane which is hardcore surfaced. Minimal track-out from Site due to hardstanding reception area and wheel washing. Vehicles are covered when entering or exiting the Site (sheeting or enclosed vehicles). The Site has been designed to ensure that road going vehicles will not need to venture off the hardstanding reception area.
Vehicle movements – internal haul roads	Low	Internal haul roads are regularly inspected and repaired. Haul roads will be sprayed and swept when necessary. Vehicles will be restricted to defined routes. Vehicle exhausts will be directed upwards. Speed limits and a chicane system will be installed. The mobile plant used to deposit inert waste within the landfill void will not track off on to the hardstanding reception are of the public highway.
Construction of screening bunds	Medium	Operations will cease during windy and dry conditions. The operation duration is temporary and intermittent. Screening bunds will be seeded as soon as conditions permit following completion.
Unloading of HGVs	Low	HGV loads will be visibly inspected to identify any potential dusty material. Drop heights of material from the HGV will be minimised. Water suppression will be used to dampen the imported material where required to mitigate fugitive releases (i.e. during periods of dry / windy weather).
Material stockpiles	Low	Water suppression will be used to dampen the stockpile where required to mitigate fugitive releases (i.e. during periods of dry / windy weather).

Dust Source	Potential Magnitude of Emissions	Reasons
		Stockpiles will be temporary following offloading of waste, prior to deposit into the landfill void.
Depositing of waste into the void (restoration)	Low	Material must be handled when dry and friable. Inert material generally has a medium dust potential. Fugitive releases during periods of dry / windy weather. Water suppression will be used to dampen the material where required to mitigate fugitive releases (i.e. during periods of dry / windy weather). Restoration will cease during dry and windy conditions or if dust has the potential to result in nuisance to nearby receptors. Haulage roads across the restored area will be restricted to define routes to minimise entrainment of loose fines material into the atmosphere. A significant proportion of the infilling operation will take place at a level screened by the Site's topography.
Vehicle emissions	Low	Small number of vehicles in use at the Site.

5.4.3 Source-Pathway-Receptor Routes

The pathway for the majority of the releases is atmospheric dispersion; primarily from the dust/particulate source (e.g. wind whipping of stockpiles and handling operations). The source-pathway-receptor routes are detailed in Table 3-3.

Table 5-3 Source-Pathway-Receptor Routes

Source	Pathway	Receptor	Type of Impact	Where Relationship Can Be Interrupted
Vehicle movements	Falling from lorries. Track-out from the Site onto the public road network by HGVs.	High sensitivity receptors located within 50m of the Site entrance along Dennises Lane.	Visual soiling, also consequent resuspension as airborne particulates.	The Site has been designed to ensure that road going vehicles will not need to venture off the hardstanding reception area, therefore the accumulation of debris on vehicles whilst on Site is anticipated to be minimal. All HGVs transferring material to or from the Site shall be covered (contained vehicles or sheeted). Vehicles leaving the Site will pass through a wheel wash.
Construction of screening bunds	Atmospheric dispersion during the construction	High sensitivity receptors located within	Visual soiling, also consequent resuspension	The screening bunds will be shaped into a smooth profile to reduce risk of wind generation dust blow.

Source	Pathway	Receptor	Type of Impact	Where Relationship Can Be Interrupted
	of screening bunds	140m of the Site boundary	as airborne particulates	Screening bunds will be watered during dry weather to minimise effects of erosion. Operations will cease until weather conditions improve if dry or windy. Screening bunds will be seeded as soon as reasonably possible.
Unloading of HGVs	Atmospheric dispersion during the unloading of HGVs	High sensitivity receptors located within 140m of the Site boundary.	Visual soiling and airborne particulates	Monitoring of meteorological conditions to ensure activities in proximity / upwind of offsite receptors are minimised / delayed during exceptionally dry / windy conditions. Drop heights of material from the HGVs will be minimised. Water suppression will be used to dampen the imported material where required to mitigate fugitive releases (i.e. during periods of dry / windy weather).
Material within the stockpiles	Atmospheric dispersion from external storage piles.	High sensitivity receptors located within 140m of the Site boundary.	Visual soiling, also consequent resuspension as airborne particulates.	Stockpiles will have a maximum height of 6m. Water suppression will be used to dampen stockpiles where required (i.e. during periods of dry / windy weather), minimising the fugitive dust source potential. Minimise source strength by means of low drop heights and shielding of active stockpiles from wind whipping. Monitoring of meteorological conditions to ensure activities in proximity / upwind of offsite receptors are minimised / delayed during exceptionally dry / windy conditions. Restriction of vehicles movements within the bunded area, clear designation of stockpile base to mitigate resuspension of dust by vehicles.
Depositing of waste into the void (restoration)	Atmosphere dispersion from depositing waste into the northern void.	High sensitivity receptors located within 140m of the Site boundary	Visual soiling, also consequent resuspension as airborne particulates.	A significant proportion of infilling operations are screened by the topography of the Site. Drop heights will be minimised.

Source	Pathway	Receptor	Type of Impact	Where Relationship Can Be Interrupted
				Handling and spreading of inert materials will be dampened by the water bowsers when necessary. Restoration activities will be suspended during dry and windy weather conditions. Haulage across the surface of the restored area will be restricted to defined routes to minimise entrainment of loose fine material. Restored land will be seeded or planted during next available planting season.
Vehicle emissions	Atmospheric dispersion.	High sensitivity receptors located within 10m of Dennises Lane.	Airborne particulates.	Small number of vehicles in use at the Site

Table 5-4 Control Measures for Dust/PM10 and Other Emissions

Abatement Measure	Description / Effect	Overall Consideration and Implementation	Trigger for Implementation
Site / process layout in relation to receptors	There are few sensitive receptors within the surrounding area and prevailing wind direction. Screening bunds have been constructed around the site boundary eliminating pathways to sensitive receptors.	In combination with other measures to reduce dust and particulate generation this assists to maximise the distance between the source and receptor, reducing the pathway effectiveness.	Implemented at all times that the Site is operational.
Site speed limit and minimisation of vehicle movements on Site	Reducing vehicle movements reduces emissions from vehicles. A speed limit of 15mph is enforced on internal haul roads which reduces re-suspension of particulates by vehicle movements. Haulage of material will be restricted to designated haul routes throughout the Site	Implement as part of good practice and incorporated into training / induction process. Signs clearly presented around the Site.	Used at all times that the Site is operational.

Abatement Measure	Description / Effect	Overall Consideration and Implementation	Trigger for Implementation
	and the restored area to avoid the disturbance of unprepared surfaces.		
Minimising drop heights for material	Minimisation of the height at which materials are handled reduces the distance over which debris, dust and particulates could be blown and dispersed by winds.	Implement as part of good practice and incorporated into the training process.	Implemented at all times that the Site is operational. During periods of prolonged dry and windy weather conditions, consideration given to visual assessment of dust plumes being generated from existing drop heights and reduced / ceased as required.
Good housekeeping	A consistent, regular housekeeping regime is in place to ensure Site is regularly checked and issues remedied to prevent and remove dust and particulate build up. Any spillages or loose or muddy deposits will be cleared regularly to minimise the potential for entrainment.	Easy to implement and requires minimal equipment. Encourages a sense of pride and satisfaction amongst the staff which promotes vigilance and a positive culture.	Implemented at all times that the Site is operational.
Sheeting of loaded vehicles (unless enclosed)	Prevents the escape of debris, dust and particulates from vehicles as they travel.	Vehicles would be checked upon entering and prior to leaving the Site.	Implemented at all times that the Site is operational.
Surfacing of vehicle routes	Site has surfaced access and reception area. Other trafficked areas will be sprayed with water during dry and windy conditions. Haul roads will be managed to prevent the generation of significant quantities of dust.	Hardstanding surfaces reflect industry best practice.	Surfaces are periodically inspected for signs of wear or damage. Remedial works will be commissioned as required.
Wheel washing of vehicles travelling on public highways	May remove some dirt, dust and particulates from the lower parts of vehicles, reducing track-out.	Once the vehicle has passed through the wheel wash, the weighbridge operator will check the vehicles for cleanliness before	Implemented at all times that the Site is operational.

Abatement Measure	Description / Effect	Overall Consideration and Implementation	Trigger for Implementation
		permitting the vehicle to leave the Site.	
Road sweeping	Road sweeper will be deployed regularly on the access road to remove all mud and other materials, which would otherwise be tracked-out onto the public highway. In the event, that dust or mud is deposited onto the public highway the road sweeper will be deployed to remove all the mud and other material.	Encourages a sense of pride and satisfaction amongst the staff which promotes vigilance and a positive culture. The road sweeper will be inspected regularly and maintained in accordance with the manufacture's specification.	Road sweeping will be implemented periodically. Additional road sweeping maybe undertaken if during inspections mud and other materials are identified or if a member of the public has submitted a complaint that mud is being tracked out of the Site. All operatives will be made aware of the mobilisation of smaller particles while operating the road sweep.
Marking of stockpile base	Clear delineation of stockpile areas minimises the risk of vehicles traversing across loose particulates on the ground and causing re-suspension or re-distribution across the Site.	Easy method to implement, with clear line marking provided on the ground at the storage areas.	Implemented at all times when the Site is operational. May not be available during periods when stockpiling for a specific reason is required to be re-located for short periods of time. All operatives will be made aware of any areas where clear signage is not available during this short period.
Restriction of vehicles on unmade ground	Restricting the number of vehicles allowed to traverse on non-hardstanding surfaces. Haulage routes across the surface of the landfill will be restricted to defined routes. This significantly reduces the potential for material to be tracked across the Site and resuspended.	HGV access for delivery vehicles is limited to the hardstanding reception area and routes across restored areas and are clearly signposted.	Implemented at all times when the Site is operational.
Dust Suppression	Water suppression can be a highly effective way of reducing the dust potential	Water suppression is available (via a water bowser) at all material storage areas.	Implemented as required, to be determined by the Site Manager by monitoring of meteorological conditions

Abatement Measure	Description / Effect	Overall Consideration and Implementation	Trigger for Implementation
	at-source, eliminating the pathway to the receptors.		and identification of material received with a high dust potential. In the event that the water suppression is not operational for a short period of time (i.e. malfunction or maintenance) where it is identified to be required, handling and processing operations would be temporarily suspended.
Visual Dust Monitoring	Visual dust monitoring provides a cost-effective method of monitoring that allows for pro-active, immediate response to dust generating events.	All operations with the potential to cause airborne dust emissions will be monitored by the Site Manager. Daily visual assessment is undertaken by Site operatives for airborne or deposited dust. Daily assessments include the following areas: • Perimeter walk around for visible dust plumes travelling offsite; • If required, offsite walkover surveys; • Storage areas; and • Site haul roads, access road and public highway near Site exit. • Site operatives who undertake visual assessments have appropriate training. Details recorded would include (as a minimum): • Weather conditions (qualitative wind speed, direction, rainfall)	In the event that visual dust monitoring identifies dust being transported beyond the Site boundary and mitigation measures fail to resolve the issue, all dust generating activities will cease until the source of the dust has been identified and steps taken to prevent the off-site emissions. Additional visual monitoring will be undertaken where: • Particularly dusty conditions are detected on Site by operational staff; • Dust emissions are evident near the boundary during any activity; and • In response to complaints being received – in this situation off-site monitoring must also be carried out at appropriate locations.

Abatement Measure	Description / Effect	Overall Consideration and Implementation	Trigger for Implementation
		• Current site operations (location of activities); • Identification of any significant dust on site or dispersion beyond the site boundary; and • Additional mitigation measures put in place, if required.	
Maintenance of plant and equipment	Maintenance of plant and equipment provides an effective control of airborne dust emissions.	A programme of planned maintenance will be carried out in accordance with manufacturer's specification on all plant equipment, to optimise efficiency.	Implemented at all times when the Site is operational.

6.0 Other Considerations

6.1.1 Water Usage / Availability

Usage of water for dust suppression is sporadic and short-term as it is heavily dependent on weather conditions. Water usage for the wheel wash will be provided via an off-site source supply. On this basis, it can be sensibly determined that there is not a supply issue with regards to water for dust suppression measures.

6.1.2 Water Usage / Availability During Drought

Water for use in dust suppression is sourced from an off-site source supply. There are no alternative sources of water at the Site, this is due to the temporary nature of the Site. In the event of a drought, it is anticipated that there will be no barrier to continue to draw mains water for use in dust suppression as per normal operations.

6.1.3 Enclosure of Waste Operations

Due to the size and nature of the Site being a former quarry, the ability to enclose the Site is not feasible.

6.2 Visual Dust Monitoring

Visual dust monitoring provides a cost-effective method of monitoring that allows for pro-active, immediate response to dust generating events.

Daily visual assessment is undertaken on a daily basis by Site operatives for airborne or deposited dust. Daily assessments include, as a minimum, a visual assessment of the following areas (identified as areas / activities with the highest potential for dust generation):

- Perimeter walk around;
- If required, offsite walkover surveys;
- Material storage areas;
- Internal haul routes; and

- Access road and public highway near Site exit.

Based upon the size of the Site, it is considered viable for daily monitoring to include a walkover of the entire perimeter (permit boundary) as the routine. If this is not possible, a minimum of 3 perimeter locations shall be assessed, including a minimum of one per boundary (i.e. northern / western / southern / eastern). The location of the monitoring points will be determined based upon the wind direction and the location of dust generating activities (depositing of waste) being undertaken on Site / off Site at the time.

All visual monitoring is recorded in the daily logbook and made available to EA as required. Details recorded include (as a minimum):

- Weather conditions (qualitative wind speed, direction, rainfall);
- Current site operations (location of activities);
- Identification of any significant dust on Site or dispersion beyond the Site boundary; and
- Additional mitigation measures put in place, if required.

Site operatives who undertake visual dust assessments have appropriate training.

An increase in the frequency and scale of visual monitoring will be undertaken where:

- Particularly dusty conditions are detected on Site by operational staff;
- Dust emissions are evident near the boundary during any activity; and/or
- In response to complaints being received – in this situation off site monitoring will also be carried out at appropriate locations.

In the event that visual dust monitoring identifies dust being transported beyond the Site boundary and mitigation measures fail to resolve the issue, all dust generating activities will cease until the source of the dust has been identified and steps taken to prevent the off-site emissions.

In the event that continuous offsite dust emissions are detected (i.e. more than 2 days in a row) alongside complaints being received by members of the public, correspondence with the EA will be undertaken to discuss subsequent steps.

7.0 Dust Complaint Procedure

Complaints may be notified by a member of the public directly to the Site Management or indirectly through the regulator. Complaints received directly by the Site Management will be recorded in the Site logbook and reported to the regulator. The following details shall be recorded in the Complaint and Investigation Record Form, included as Appendix 03:

- Date, time and name of complainant (if provided);
- Nature of complaints;
- Locality of complaint;
- Summary of resulting investigations and actions taken; and
- Date at which the complainant was updated with the outcome / remedial actions undertaken, if required.

The objective of this response to complaints received is to investigate the incident and review the Site practices and dust controls in place at the time of the event to allow for additional controls to be put in place, thus preventing a repeat of the incident. If necessary, the complainant(s) and the regulator would be informed of the findings of the investigation and any actions subsequently taken.

Investigations will include, but not be limited to the following:

- Visit by a member of Site Management to the location of the complaint, to verify the issue (If complaint is made after the event this may not be possible);
- A review of Site activities in operation at the time of the incident;
- A review of the dust monitoring results for the period of the incident, if applicable;
- For recurring events, the frequency of visual monitoring should be increased to a twice daily basis;
- A review of control measures and dust suppression in place at the time of the incident (i.e. application of water, drop heights during transfer etc)
- A review of the meteorological conditions at the time of the incident (i.e. recorded wind direction and wind speed recorded in the Site logbook); and
- Reporting of findings (in Appendix 03 complaints and investigation record form).

The escalation procedures in the event that subsequent dust complaints are received are as follows:

- Initial Complaint – Initial/first time contact received – complaint investigated, and contingency actions taken by site management.
- Complaint Level 1 – An interaction that has not been resolved to the satisfaction of the complainant or where frequent contact has been received from the public via the regulators. Complaints investigated by senior management team and remedial actions taken.
- Complaint Level 2 – Unresolved complaint – this may involve support from Environmental Consultants to review, investigate, determine required actions and respond to the complaint.

IVL will, on a worst-case basis, aim to deal with any complaints on the same working day as they're received and responded to within 7 days with a formal written response. If complaints are raised through the regulator, rather than directly to Site management, it may take longer for Site operatives to be informed however they will be dealt with as soon as management are aware of the compliant. Within this response time, action will be occurring on Site to investigate and remediate against any issues the compliant has drawn attention to.

7.1 Liaison with Community Regulators

The Site Manager (or nominated representative) shall act as a liaison with the regulator and local community for issues relating to dust emissions off-Site. Maintaining good communications with the local community will help prevent anxieties occurring.

If appropriate, key issues will be communicated between both sides, including but not limited to the following:

- Presentation of the monitoring scheme and the latest dust monitoring results;
- Update on the working scheme of the Site and when/where future operations will be;
- Summary of the dust controls on Site and any updates/improvements undertaken / planned;
- Provision of a contact for the Site should any issues arise between the meetings; and
- Observe and alleviate any anxieties or complaints member of the public have experienced.

7.2 Record Keeping

IVL will keep records of all dust monitoring, dust contingency actions, investigations and complaints on Site for a minimum period of 2 years; these shall be made available to the regulator for examination on request.

8.0 DEMP Update and Review

This DMP is an active, controlled document which forms part of the Site Mangement documentation. It shall be reviewed on an annual basis, as a minimum by senior Site management. Given that the document is a point of reference for daily operations, it shall be updated as required should any of the following situations occur:

- Significant changes are made to the plant or operational practices;
- The regulator specifically requests for the DMP to be updated; or
- Following investigations into dust control, additional measures are adopted that are not contained within the document.

On review of Site operations and the effectiveness of the DMP, senior management are required to make any changes deemed appropriate to ensure dust emissions are kept to a minimum.

9.0 CONCLUSION

The overall conclusion from the studies undertaken as part of this application is that there will not be a significant environmental impact as a result of the inert waste landfill for the restoration of Medina Farm.

Ingrebourne Valley is fully committed to ensuring the highest standards are met and will undertake its activities in a manner consistent with best practices and the company environmental policies.

APPENDIX 01

Waste Lists

Table 1 Waste Types for Landfill

EWC Code	Description	Exclusions
01	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS	
01 01	wastes from mineral excavation	
01 01 02	wastes from mineral non-metalliferous excavation	
01 04	wastes from physical and chemical processing of non-metalliferous minerals	
01 04 09	waste sand and clays	
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 01	concrete, bricks, tiles and ceramics	
17 01 01	concrete	Selected C & D waste only[(a)]
17 01 02	bricks	Selected C & D waste only[(a)]
17 01 03	tiles and ceramics	Selected C & D waste only[(a)]
17 01 07	mixtures of concrete, bricks, tiles and ceramics	Selected C & D waste only[(a)]
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding topsoil and peat, excluding soil and stones from contaminated sites
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	

EWC Code	Description	Exclusions
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
19 12 05	glass	
19 12 09	minerals (such as sand and stones) from the treatment of waste aggregates that are otherwise naturally occurring minerals	Excluding fines from treatment of any non-hazardous waste or gypsum from recovered plasterboard.
19 12 12	crushed bricks, tiles, concrete and ceramics, including mixtures of minerals	Excludes metal from reinforced concrete and fines from treating any non-hazardous waste or gypsum from recovered plasterboard
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	Excluding topsoil and peat
[a] Selected C & D waste (construction and demolition waste): with low contents of other types of materials (like metals, plastics, organics, wood, rubber etc). The origin of the waste must be known. No C & D waste from buildings polluted with dangerous substances No C & D waste from buildings treated or painted with materials containing dangerous substances in significant amounts		

Table 2 Waste Types for Restoration

EWC Code	Description	Exclusions
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding soil and stones from contaminated sites

EWC Code	Description	Exclusions
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	

APPENDIX 02

Dust Event Form

Staff Details	
Name of author:	
Event notified by:	
Description of event:	
Date:	
Time:	
Investigation Details	
Activities taking place during time of event:	
Dust mitigation techniques employed at time of event:	
Summary of weather conditions leading up to and during the event:	
Details of corrective actions:	
Notes:	
Closure	
Site supervisor review date:	
Site supervisor signature (to confirm no further action required):	

APPENDIX 03

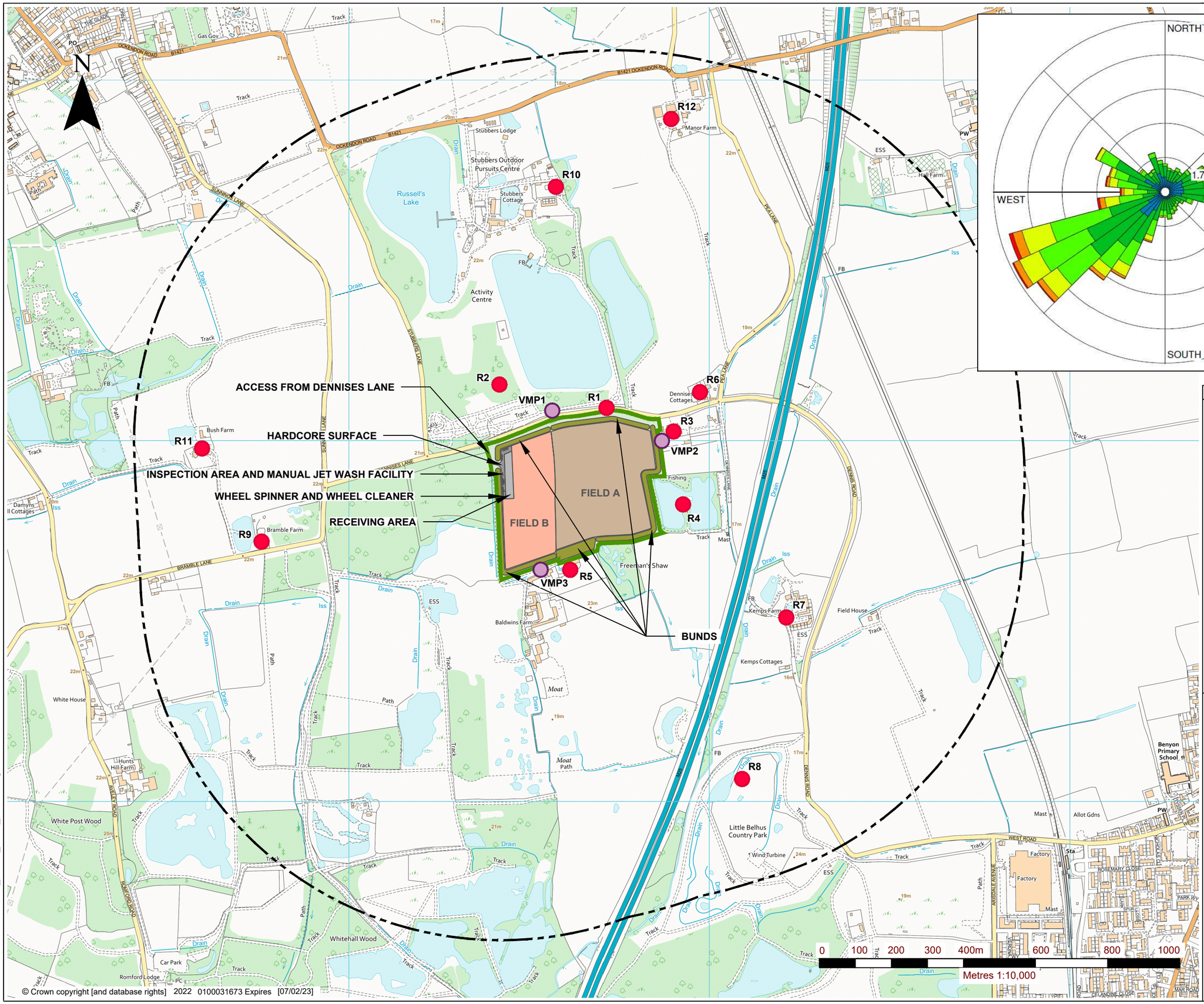
Dust Complaint Form

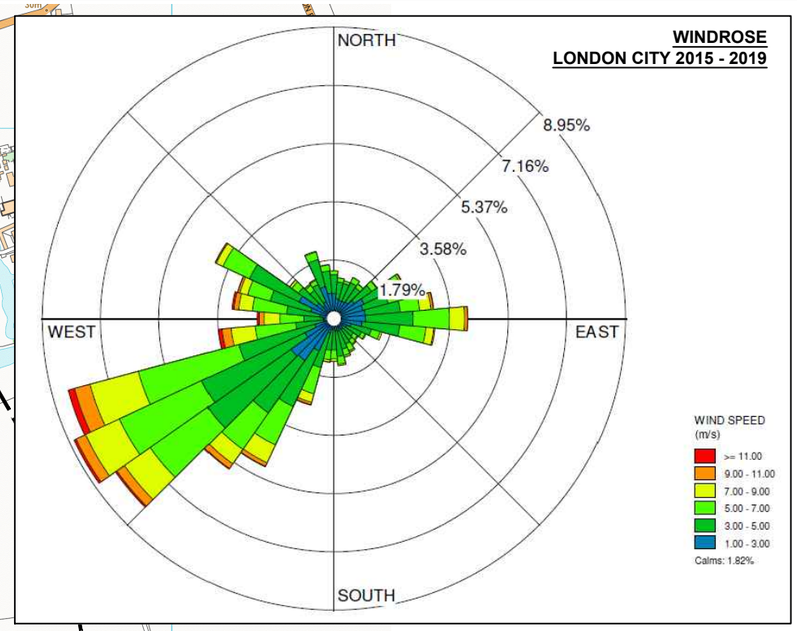
Complainant Details	
Complainant Name:	
Address and postcode:	
Complainant contact details (telephone/ email):	
Date & time of complaint:	
Complaint reference number:	
Complaint details:	
Investigation Details	
Investigation carried out by:	
Investigator position/role:	
Date & time of investigation:	
Weather conditions at time of complaint and investigation:	
Wind speed and direction at time of complaint and investigation:	
Investigation findings:	

Complainant Details	
Feedback given to NRW and/or local authority?	
Date feedback given:	
Feedback given to complainant and/or public?	
Date feedback given:	
Review and Improve	
Improvements needed to prevent a reoccurrence:	
Proposed date for completion of required improvements:	
Actual date of completion (to be filled in once completed):	
If proposed date for completion of improvements was missed, state why:	
Does the dust management plan need updating?	
Date that the dust management plan was updated (if applicable):	
Closure	
Site supervisor review date:	
Site supervisor signature (to confirm no further action required):	

DRAWINGS

Dust Management Plan





LEGEND

- ENVIRONMENTAL PERMIT BOUNDARY
- 1km BOUNDARY OFFSET
- DUST SENSITIVE RECEPTOR

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MEDINA FARM

ENVIRONMENTAL PERMIT APPLICATION

DUST MANAGEMENT PLAN

DMP1

Scale	Date
1:10,000 @ A3	MAY 2022

01526.00087.13.DMP1.0_DUST_MAN_PLAN.dwg

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MEDINA FARM RESTORATION

Environmental Permit Application

Environmental Setting and Site Design

Prepared for: Ingrebourne Valley
Client Ref: 416.01526.00087

SLR Ref: 416.01526.00087
Version No: 1
November 2022

BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Ingrebourne Valley Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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APPENDICES

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EP3 Engineering Schematic

EP4 Environmental Site Setting

HRA1 Groundwater Monitoring Plan

HRA2 Hydrogeological Cross-Section

DOCUMENT VERSION

Table 1 Version Control

Issue	Date	Description of Changes
1.0	November 2022	Original

1.0 INTRODUCTION

1.1 Report Context

Ingrebourne Valley Limited (IV) has instructed SLR Consulting Limited (SLR) to prepare a bespoke Environmental Permit (EP) application to authorise an inert waste landfill for the restoration of Medina Farm, Dennises Lane, South Ockendon, Essex RM14 2XB, hereafter referred to as 'the Site'.

This Environment Setting and Site Design (ESSD) report sets out the conceptual model, the environmental setting and site design, and is supported by the risk assessments submitted in this application.

1.2 Site Details

1.2.1 Site Location and Access

Medina Farm is located 2.7km to the north north-east of South Ockendon in Essex at grid reference TQ 57636 83872. It is approximately 17ha in size.

The site consists of two agricultural fields; Field A, a former gravel pit which has been poorly restored, and Field B, a target area for gravel extraction. The site is bounded to the north by Dennises Lane, beyond which is Stubber's Outdoor Pursuits Centre, a designated Local Wildlife Site, which includes three lakes. To the west, the site is bounded by an unnamed road and woodland/ scrub. To the south, the site is bounded by small industrial units, a copse and farmland associated with Baldwins Farm. To the east, the site is bounded by a lake, used as a fishery, a residential property and car breakers yard.

The topography of the site is generally flat, falling gently from a maximum of approximately 20m above ordnance datum (AOD) in the north-western corner to a minimum of 15mAOD on the eastern boundary.

The location of Medina Farm is illustrated on Drawing EP1. The Environmental Site Setting is illustrated in Drawing EP4.

1.3 Specified Waste Management Activities

The waste management activities that will be carried out at the site, under the conditions of the permit, as specified in Annex I of the Waste Framework Directive are detailed below:

1.3.1 Landfill

D1: Deposit into or onto land

1.4 Application Boundaries and Site Security

The Environment Permit Boundary is illustrated on Drawing EP2.

The Site will benefit from the following infrastructure to keep the Site secure, and prevent unauthorised access:

- Visitor Sign in/Sign out book; and
- Perimeter fencing/hedging and lockable gates.

1.5 Site Context

Surrounding land-use and receptors are identified on Drawing EP4 Environmental Site Setting. Immediate surrounding land uses are identified in Table 2 below.

Table 2 Immediate Surrounding Land Uses

Boundary	Description
North	Bounding the Site to the north lies Dennises Lane, beyond this is an outdoor pursuits centre which is designated as a local wildlife site.
East	The land bounding the Site to the east consists of a fishing lake, a residential property and car breakers yard.
South	To the south, the site is bounded by small industrial units, a copse and farmland associated with Baldwins Farm.
West	Bounding the Site to the west is an unnamed road and woodland/scrub.

The wider surrounding land uses are described in further detail below:

1.5.1 Industrial/Commercial Premises

There are only a couple of industrial/commercial premises within a 500m radius of the Site boundary. The closest of these is Baldwins Farm, which is located adjacent to the south of the Site boundary.

1.5.2 Recreational Premises

Stubbers Adventure Centre, which is located approximately adjacent to the north of the Site across Dennises Lane. The adventure centre offers outdoor pursuit activities.

A fishing lake is also located adjacent to the eastern site boundary.

1.5.3 Residential Properties

There are few residential properties located within 500m of the Site's boundary. The closest residential properties from the boundary of the Site are located at Baldwins Farm which is located adjacent to the southern boundary of the Site. Further residential properties are situated at Medina Farm and Dennises Cottages located approximately 90m to the north east of the site.

1.5.4 Local Transport Network

Approximately 230m to the east of the Site lies the M25 motorway. Immediately adjacent to the Site to the north lies Dennises lane which allows access to all traffic running from west to east.

There are several other small roads and tracks within a 500m radius to the north, west and east of the Site boundary.

1.5.5 Surface Water Features

There are a number of surface water features within a 500m radius of the Site boundary. The closest of these is a fishing lake situated along the eastern Site boundary.

1.5.6 Agricultural/Open Ground

The Site is largely surrounded by agricultural fields and open ground, bounding the Site directly to the south and west. The expanses of land within a 500m radius from the Site boundary to the north, south and west predominantly consist of open ground and agricultural spaces.

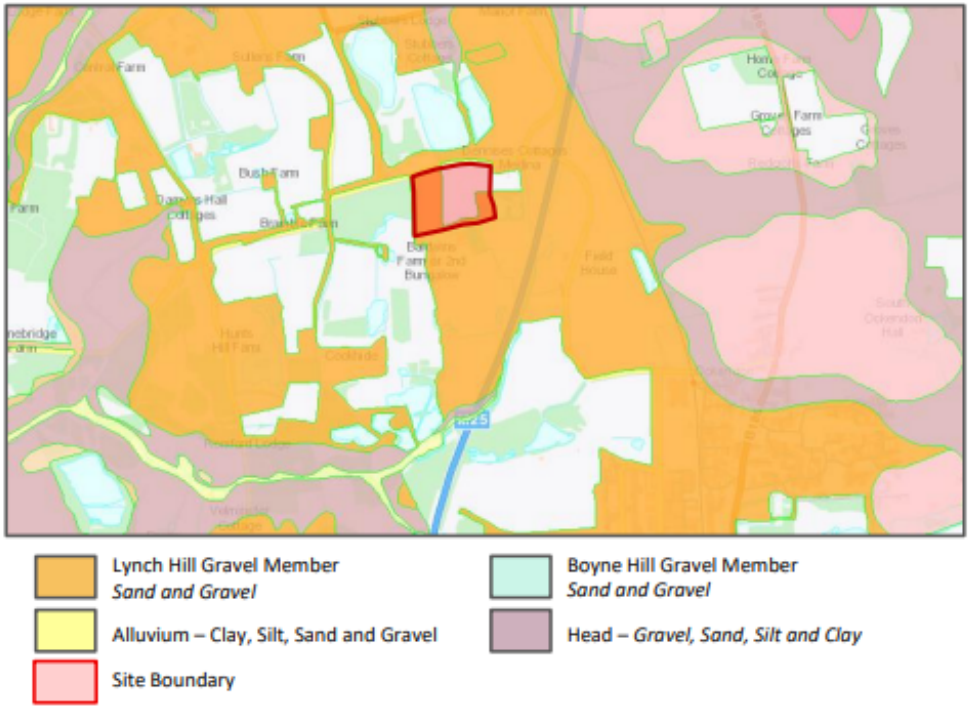
1.5.7 Woodland

There are various parcels of woodland within 500m of the Site. There are two areas of Priority Habitat- Deciduous Woodland which lie adjacent to the Site, one area is situated alongside the southern boundary and a further area to the north west of the Site's boundary.

1.6 Geology

A review of the British Geological Survey (BGS)[1] map, indicates that the western part of the Site (Field B) is underlain by the superficial deposits comprising the Lynch Hill Gravel Member. A site investigation undertaken in October 2011 encountered superficial deposits comprising brown sand and subangular to sub rounded, fine-to-coarse gravels to a depth of 3.2m below ground level (BGL). The Lynch Hill Gravel Member will be worked as part of the proposed development.

Figure 1- Map showing Regional Superficial Geology



The mapping shows that the gravels are absent in Field A, as they have been extracted. The regional bedrock geology comprises London Clay and at depth the Lambeth Group, Thanet Formation and White Chalk sub-Group which outcrop approximately 3.7km to the south of the site. The London Clay was lithologically described as "Firm-to-stiff, brown Clay" within the 2011 site investigation and is present at depth from 3.2m below ground level (BGL) and where proven to a depth of 4.5 - 8.5m BGL (when the boreholes were terminated).

[1] British Geological Survey – Available: mapapps.bgs.ac.uk/geologyofbritain/home.html, accessed June 2022

1.7 Hydrogeology

A detailed description of the hydrogeology of the area is presented in the Hydrogeological Risk Assessment in Section 5 of the application. The following summary is based on the information presented in that report.

Aquifer Designations

The bedrock deposits underlying the Site are classed as unproductive on the Multi-Agency Information for the Countryside (MAGIC)[2] website.

According to the BGS online mapping and confirmed from drilling of three groundwater monitoring boreholes, the superficial deposits present beneath Field B consist of Lynch Hill Gravel Member. There are significant areas of made ground in the eastern part of the site (Field A) and surrounding the western boundary of the Site.

Source Protection Zones

The Site is not located within a groundwater Source Protection Zone (SPZ).

1.8 Hydrology

Groundwater Vulnerability

The Groundwater Vulnerability layer on MAGIC map reveals that the Site lies within an area classified as unproductive.

Flood Zone

The Flood Map for Planning[3] confirms that the Site lies within a Flood Zone 1, which is defined as "land having a less than 1 in 1,000 annual probability of river or sea flooding".

1.9 Ecology

The MAGIC map website and an EA Habitats and Conservation screening assessment (Appendix 08) conducted for the Site have been reviewed to determine the presence of any designated habitat sites and protected species within a 2km radius from the Site's boundary.

1.9.1 European/International Designated Sites

A review of the EA Habitat and Conservation screening assessment completed for the Site and the MAGIC website confirmed that none of the following are situated within 2km of the Site:

- Site of Special Scientific Interest (SSSI)
- Ramsar Site;
- Special Area of Conservation; and
- Special Protection Area.

Local Wildlife Sites (LWS)

There is one LWS's located within 2km of the Site boundary. Stubber's Outdoor Pursuits Centre is a designated LWS located adjacent to the north of the Site boundary.

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[2] Multi-Agency Information for the Countryside – Available at: http://www.magic.gov.uk, accessed June 2020
[3] Gov.uk, Flood Map for Planning, available at https://flood-map-for-planning.service.gov.uk/, accessed in June 2022

Other Receptors

A review of the EA Habitat and Conservation screening assessment completed for the Site and the MAGIC website confirmed that none of the following are situated within 2km of the Site:

- Ramsar Site;
- Special Area of Conservation; and
- Special Protection Area.

1.9.2 National/Locally Designated Sites

Local Nature Reserve

There is one Local Nature Reserve (LNR) located within 2km of the Site boundary. Cranham Marsh is situated approximately 1.1km to the north of the Site.

Protected Species

The EA Habitat and Conservation screening assessment identified a Protected Species- Code 2 located within a lake approximately 110m west of the Site.

Protected Habitat

An area of deciduous woodland classified as a protected habitat is located adjacent to the south of the Site.

Ancient Woodland

There are five areas of Ancient Woodland located within 2km of the Site Boundary. The closest of which is Whitehall Wood, which covers an area of 10.8 Hectares is situated approximately 960m south east of the Site.

Other Receptors

A review of the EA Habitat and Conservation screening assessment completed for the Site and the MAGIC website, confirmed that none of the following are situated within 2km of the Site:

- Area of Outstanding Natural Beauty (AONB);
- National Nature Reserve; and
- National Parks.

1.10 Cultural Heritage

Listed Buildings

There are numerous Grade II listed buildings within a 2km radius to the Site boundary. The closest Grade II listed building to the Site boundary is ‘Kemps Cottage’, which lies around 358m to the south east of the Site.

Registered Parks and Gardens

There is one registered park and garden located within a 2km radius of the Site boundary.

- Belhus Park is a registered park and garden which lies around 650m to the south east from the Site boundary at the closest point.

Other Receptors

A review of MAGIC map confirmed that none of the following are situated within 2km of the Site:

- Registered Battlefields;
- World Heritage Sites; and

- Scheduled Monuments.

1.11 Receptors

Local Receptors within 500m of the Site are identified in Table 3, along with cultural and ecological receptors within 2km.

Table 3 Identified Receptors

Receptor Name	Receptor Type	Direction from Site	Approximate Distance from Site Boundary (at nearest point) (m)
Local receptors within 500m of the Environmental Permit Boundary as shown on Drawing EP3 Environmental Site Setting			
Protected Habitat-Deciduous Woodland	Woodland – includes surface water features	South	Adjacent
Priority Habitat-Deciduous Woodland	Woodland	North west	Adjacent
Open Ground	Agricultural/Open Ground	South, west, east and north east	Adjacent
Dennises Lane	Local Transport Network	North	Adjacent
Fishing Lake	Surface Water Feature/ Recreational	East	Adjacent
Stubbers Adventure Centre	Recreational Premises/ Local Wildlife Site/ Surface Water Features	North	Adjacent
Baldwins Farm	Industrial/Commercial Premises and Residential Properties/ Surface Water Features	South	Adjacent
Unknown	Surface Water Feature/ Protected Species- Code 2	West	Adjacent
Medina Farm and Dennises Cottages	Residential Properties	East	90
M25	Local Transport Network	South east	230

Receptor Name	Receptor Type	Direction from Site	Approximate Distance from Site Boundary (at nearest point) (m)
Kemps Farm	Residential/ Surface Water Feature	South east	358
Cultural and ecological receptors within 2km of the EP boundary as shown in Drawing EP4 Cultural and Natural Heritage			
Kemps Cottage	Grade II- Listed Building	South east	358
Bramble Farm	Grade II- Listed Building	West	600
Stubbers House	Grade II- Listed Building[4]	North	627
Belhus Park	Registered Park and Garden	South east	1,600
Cranham Marsh	Local Nature Reserve	North	1.1km

1.11.1 EA Position Statement on the Location of Landfills

The Site is not located within a groundwater Source Protection Zone (SPZ). The underlying bedrock deposits are classified as a Secondary A Aquifer according to the MAGIC website. The EA Position Statement on the Location of Landfills[5] states that the EA will object to sites which lie within a 'SPZ2 or 3' or 'in a principal aquifer'. As the Site does not meet these criteria, there should be no objection to the location of the proposed development.

2.0 SOURCE

2.1 Site Development

2.1.1 Historical Development

The historic land use of the Site have been determined by review of a Groundsure Insight report, enclosed as Appendix 07. The principal changes in land use are summarised below

- 1866; EP area consists of two fields. The surrounding area is predominantly open ground or used for agricultural purposes. A couple of farms are present within 500m including Baldwin's Farm to the south and Kemp's farm to the south east. A A small lane (now known as Dennises Lane) is present which is situated along the northern EP boundary and an access track to Baldwins Farm runs adjacent and parallel to the eastern EP boundary,
- 1895-1898; Proposed EP area remains unchanged. The area surrounding the Site now includes the Romford and Grays railway line which has been constructed approximately 600m to the east of the EP boundary.

[4] Further Grade II listed buildings situated in the surrounding area have not been included as the three listed buildings at Stubbers House are located closest to the site.
[5] The Environmental Agency's approach to groundwater protection, February 2018, Version 1.2

- 1921; The proposed Site and surrounding area remains unchanged.
- 1954; A unnamed lake is now present approximately 100m to the west of the Site.
- 1967; Stubbers located adjacent to the north of the EP area is now designated as 'Stubbers Youth Camp'. Residential properties located to the east of the Site, along Dennises Lane are now labelled as 'Denisses Cottages'. Further development of the local transport network continues. The town of north Ockendon is now visible to the northeast of the Site. The Site remains unchanged.
- 1974-1975; Stubbers Youth Camp now 'Stubbers Outdoor Pursuits Centre', has been developed to include a Caravan site. A sand and gravel pit has been developed adjacent to the south west of the Site.
- 1987-1988; Stubbers Outdoor Pursuits Centre now includes a lake, referred to as 'Russel's Lake'. The sand and gravel pit located to the west of the Site is now a 'Disused workings' which includes a couple of small buildings. The M25 motorway has now been constructed and is situated approximately 230m to the southeast of the Site boundary. Belhus Wood Country Park has been developed, situated approximately 650m to the south of the Site.
- 2001; Stubbers Outdoor Pursuits Centre now includes three lakes. A further lake is situated adjacent to the east of the Site.
- 2010-2022; Site area remains unchanged, still consisting of two agricultural fields.

A review of the Groundsure Insight report reveals there are a number of historical industrial land uses within 500m of the Site, which had the potential to once have been contaminative to the local area. These include;

- Unspecified Disused Workings, located 4m south from the Site;
- Two Sand and Gravel Pits, the closest of which was located 10m south from the Site;
- Four Gravel Pits, the closest of which was located 63m west from the Site;
- Unspecified Works, located 63m south from the Site;
- Two Electric Substation, the closest of which was located 136m south from the Site; and
- An Unspecified Heap located 434m north of the Site.

Recent Industrial Land Use

There are eight current or recent industrial land uses registered within a 500m radius of the Site, these are included within Table 4;

Table 4- Recent Industrial Land Uses

Activity	Company	Location (m)
Silo (Farming)	Unknown	17 South
General Construction Supplies	Roof Kits Direct	49 South
Telecommunications Feature	Unknown	50 East
Second-hand Vehicles	Scrapcaressex.com	93 South
Second-hand Vehicles	Ams Cash4cars	113 South
Vehicle Hire and Rental	P B Van Hire & Sales	117 East

Activity	Company	Location (m)
Telecommunications Feature	Unknown	177 East
Electricity Sub Station	Unknown	213 Southwest

Adjacent Former Waste Management Activity Boundaries

A Groundsure Insight report was commissioned for Medina Farm to identify key features within the area. Section 3 of the report identifies Waste and Landfill features within the area and can be referred to for further information.

One recorded active or recent landfills (Environmental Agency records) has been identified within 500m of the Site:

- Lafarge Redland Agregates Ltd, Baldwin Farm is operated by Tarmac Aggregates Limited, classified as Landfill taking Non-Biodegradable Wastes (EA/EPR/BP3197ND/V003) located adjacent to the south east site boundary.

One historical landfill (British Geological Survey) has been identified within 500m of the Site boundary at Baldwin's Farm (BGS No. 2634) located adjacent to the southeast site boundary.

There are seven historical landfills identified within 500m of the Site boundary according to the Historical Environmental Agency (EA) records which include sites which existed before the waste licensing regime and therefore do not have a permit, as well as sites where permits have since been revoked. The closest of which are :

- Baldwins Farm, operated by Redland Aggregates to accept inert, industrial, commercial and household waste, located adjacent to the south east site boundary.
- Baldwins Farm, operated by Redland Aggregates to accept industrial, commercial, and household waste. This waste licence waste surrendered in 1984.
- Baldwins Farm, operated by Redland Aggregates to accept commercial and household waste

No historical waste sites (Local Authority records) have been identified within 500m of the Site boundary. However, there were five active or recent waste sites (EA records) identified within 500m of the Site boundary, the closest of which is:

- Redland, Baldwin Farm which is classified as a 'Landfill taking Non-Biodegradable Waste' located approximately 457m west of the Site.

There were twenty-four waste exemption activities identified within 500m of the Site. Thirteen of those waste exemptions were registered at:

- Baldwins Farms, reference WEX233848 located approximately 50m south of the Site. The waste exemption is categorised use of waste in construction.

Pollution Incidents

A review of the Groundsure Insight report produced for the Site reveals there are have been eight recent pollution incidents recorded within 500m of the Site. The closest pollution incident is detailed below:

- A pollution incident occurred in May 2019, approximately 48m south of the Site, the pollutant was classified as inert materials and wastes and was classed as category 4 (no impact) impact to water and air and a category 2 (significant) impact to land.

A further notable pollution incident is detailed below:

- A pollution incident occurred in May 2019, approximately 158m south of the Site, the pollutant was classified as specific waste materials and was classed as a category 2 (significant) impact to water and land and category 3 (minor) impact to air.

2.1.2 Proposed Development

The proposed development can be summarised as the importation of inert waste materials for the restoration of the Site by landfill.

Field A has been previously worked for mineral, was restored but now suffers poor drainage due to differential settlement while Field B contains approximately 200,000 tonnes of sand and gravel.

Field B will have the sand and gravel extracted and then be wholly restored using inert waste material imported to the Site. Restoration of Field A will primarily involve using material excavated from Field B (such as overburden, unsaleable mineral or basal clay) to regrade and address the differential levels across it. This will be supplemented with imported inert waste materials where required to achieve Field A's restoration levels.

In total approximately 420,000 tonnes of inert waste will be required to achieve the proposed restoration landform and return the fields to agricultural use. The proposed restoration landform seeks to achieve a shallow dome shape to ensure efficient drainage while maintaining ease of access for agricultural vehicles. Around the perimeter of the fields, drainage ditches will collect surface water runoff and lead to two attenuation ponds. One attenuation pond will be located in the south-eastern corner of the Site and the other in the south-western corner.

The proposed restoration is illustrated in the following drawings:

- Plan No. 1616/R/1 v3 Proposed Restoration

Prior to mineral extraction in Field B and supplementary deposits to Field A, the fields will be stripped of topsoil and subsoils separately. The topsoil and subsoil will be separately stored in bunds around the perimeter of the Site for replacement later in the final restoration of the Site. Following placement of inert waste materials, the Site will be restored using a minimum of 0.8m of subsoil and 0.4m of topsoil. It is anticipated that there will be shortfall of indigenous soils to achieve this, therefore retained indigenous soil materials will be supplemented with imported waste soil material.

The working of the Site during the operational phase is illustrated in Plan No. 1616/CO/1 Composite Operations Plan.

Up to 220,000 tonnes per annum (tpa) of waste will be accepted at the Site. It is anticipated that restoration of the Site will take 2 years.

Waste Types

All waste accepted at the Site will be inert, and no contaminated materials will be accepted. Documentation will accompany all waste material accepted, which will be reviewed in accordance with the Site's waste pre-acceptance and acceptance procedures to ensure any materials used are suitable for use in the restoration operations.

Table 5- Waste Types for Landfill

EWC Code	Description	Exclusions
01	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS	

EWC Code	Description	Exclusions
01 01	wastes from mineral excavation	
01 01 02	wastes from mineral non-metalliferous excavation	
01 04	wastes from physical and chemical processing of non-metalliferous minerals	
01 04 09	waste sand and clays	
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 01	concrete, bricks, tiles and ceramics	
17 01 01	concrete	Selected C & D waste only[(a)]
17 01 02	bricks	Selected C & D waste only[(a)]
17 01 03	tiles and ceramics	Selected C & D waste only[(a)]
17 01 07	mixtures of concrete, bricks, tiles and ceramics	Selected C & D waste only[(a)]
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding topsoil and peat, excluding soil and stones from contaminated sites
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 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
19 12 05	glass	
19 12 09	minerals (such as sand and stones) from the treatment of waste aggregates that are otherwise naturally occurring minerals	Excluding fines from treatment of any non-hazardous waste or gypsum from recovered plasterboard.
19 12 12	crushed bricks, tiles, concrete and ceramics, including mixtures of minerals	Excludes metal from reinforced concrete and fines from treating any non-hazardous waste or gypsum from recovered plasterboard

EWC Code	Description	Exclusions
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	Excluding topsoil and peat
[a] Selected C & D waste (construction and demolition waste): with low contents of other types of materials (like metals, plastics, organics, wood, rubber etc). The origin of the waste must be known. No C & D waste from buildings polluted with dangerous substances No C & D waste from buildings treated or painted with materials containing dangerous substances in significant amounts		

Table 6 - Waste Types for Restoration

EWC Code	Description	Exclusions
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding soil and stones from contaminated sites
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	

3.0 PATHWAY AND RECEPTOR

3.1 Geology

3.1.1 Regional Geology

Soils and Superficial Deposits

The Cranfield Soilscapes online soil map viewer[6] indicates that the Site is underlain by 'Loamy soils with naturally high groundwater'. A site investigation undertaken in 2019 found topsoils to have a thickness of 0.3 to 0.4m, with greater thickness observed to overlie areas of made ground.

According to BGS online mapping[7] and confirmed from drilling of three groundwater monitoring boreholes, the superficial deposits present beneath Field B consist of the Lynch Hill Gravel Member. There are significant areas of made ground in the eastern part of the Site (Field A) and surrounding the western boundary of the Site.

Bedrock

The regional bedrock geology comprises London Clay and at depth the Lambeth Group, Thanet Formation and White Chalk sub-Group which outcrop approximately 3.7km to the south of the Site. The London Clay was lithologically described as "Firm-to-stiff, brown Clay" within the 2011 site investigation and is present at depth from 3.2m below ground level (BGL) and where proven to a depth of 4.5 - 8.5m BGL (when the boreholes were terminated).

The regional bedrock geology, based on BGS[8] mapping, is summarised in Table 7.

Table 7- Summary of Site Geology

Geological Strata	Lithological Description	Typical Thickness (m)
Lynch Hill Gravels	Brown sand and sub-angular to sub-rounded, fine-to-coarse gravels.	2.20 - 3.20
London Clay	Very stiff grey silty clay with bands of silt and sand.	Up to 150
Lambeth Group	Variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate.	Up to 39
Thanet Formation	Glauconite-coated, nodular flint at base, overlain by pale yellow-brown, fine-grained sand that can be clayey and glauconitic. Rare calcareous or siliceous sandstones.	0 to 30
White Chalk Sub-group	White Chalk with flints.	100+

[6] Cranfield Soil and Agrifood Institute Soilscapes Online Soil Map Viewer (Accessed 19th May 2022) http://www.landis.org.uk/soilscapes/
[7] BGS Geoindex Superficial Deposits 1:50,000 Scale Mapping, available at: https://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed 19th May 2022)
[8] BGS Geoindex Bedrock Geology 1:50,000 Scale Mapping, available at: https://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed 19th May 2022). Lithological descriptions and deposit thicknesses from the BGS Lexicon of Named Rock Units, available at: https://www.bgs.ac.uk/lexicon/ (Accessed 19th May 2022)

3.1.2 Site-specific Geology

Three new boreholes were drilled at the Site in November 2019[9] and with historic groundwater monitoring boreholes providing further geological detail. Their locations are displayed on Drawing HRA1, and the geological logs are included in Appendix 01.

The boreholes indicate that:

- There is limited grass covered topsoil overlying the Site and ranging in depth from 0.1 to 0.4m below ground level (BGL);
- A layer of gravelly clay lies beneath the topsoil down to a depth range from 0.6 to 1.1m BGL, with some cobbles and more sand to the north of the Field B;
- Beneath this lies the Lynch Hill Gravel Member, down to a depth range typically between 2 and 3.2m BGL;
- Under this is less than 0.5m of firm brown and grey clay, followed by stiff brown and grey clay identified as the London Clay Formation.

The Lynch Hill gravel is described as “Brown SAND and GRAVEL” in boreholes MF19_01 and MF19_02 and as “Brown SAND and subangular to subrounded fine to coarse GRAVEL” in BF01 to the north of the Site (driller descriptions).

The depth and elevations of Lynch Hill Gravels encountered at each of the three boreholes are provided in Table 8.

Table 8- On-Site Depth and Elevations of Lynch Hill Gravels

Borehole ID	Easting	Northing	Top of Lynch Hill Gravels (m BGL)	Base of Lynch Hill Gravels (m BGL)	Thickness of Lynch Hill Gravels (m)	Top Elevation of London Clay (m AOD)
BF01	557518.1	183979.5	1.10	3.20	2.10	16.06
BF02	557879	183686	n/a	n/a	n/a	13.42
BF05	557289	183947	4.80	6.80	2.00	15.86
MF19_01	557420.3	183837.1	0.90	3.00	2.10	16.72
MF19_02	557512	183649.2	0.60	2.10	1.50	16.71
MF19_03	557838	183871	0.30	2.00	1.70	13.82

[9]SI Drilling (November 2019) Medina Farm Boreholes MF19_01, MF1_02, MF19_03, SI Drilling Ref: Fm-HnR-3025-Rev E

3.2 Hydrology

3.2.1 Surface Water

Local Surface Water Features and Locations

There are a number of surface water features within a 500m radius of the Site boundary. The closest of these is a fishing lake situated along the eastern Site boundary.

3.2.2 Flood Zone

The Site is located within a Flood Zone 1[10], which is defined as "having a less than 1 in 1,000 annual probability of river or sea flooding".

3.3 Hydrogeology

A detailed description of the hydrogeology of the area was presented in the 2019 HIA and the following summary is based on the information presented in that report.

3.3.1 Aquifer Characteristics

The EA classifies the Lynch Hill Gravels as a Secondary A Aquifer, described as:

> *"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"*

The underlying London Clay is classified as Unproductive Strata and the Lambeth Group and Thanet Sands are also Secondary A Aquifers. The underlying Chalk Subgroup is defined as a Principal Aquifer that is:

> *"layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale."*

A laboratory permeability test was undertaken on a single bulk sample of the Lynch Hill gravels from neighbouring Baldwins Farm Quarry[11]. The permeability test results recorded a coefficient of permeability of $4.1x10^{-4}$m/sec.

3.3.2 Groundwater Levels and Flow

Groundwater level monitoring data has been provided by Ingrebourne Valley for nine boreholes installed within both made ground and the Lynch Hill gravels across the wider area. Monitoring data is available for the period December 2011 to March 2022 and is summarised within Table 9, with hydrographs for the period in Appendix 02.

Table 9- Water Level Elevations within the Lynch Hill Gravels and Made Ground

BHID	Screened Strata	BH Ground Elevation (m AOD)	Water Level Elevation (m AOD)			Range (m)	Avg. Water Depth (m BGL)
			Min.	Mean	Max.		

[10] Flood Map for Planning Service, available at https://flood-map-for-planning.service.gov.uk/, accessed in July

		BH Ground	Water Level Elevation (m AOD)			Range	Avg. Water
BF01	Lynch Hill Gravels (LHG)	19.26	17.33	18.04	18.90	1.57	1.22
BF02	Made Ground (MG)	17.82	14.41	14.99	15.61	1.20	2.82
BF04	MG to 3.0 then LHG	20.22	15.83	18.76	19.87	4.04	1.46
BF05	MG to 4.8m then LHG	20.66	19.39	20.10	21.24	1.85	2.56
BF06	MG to 1.6m then LHG	22.64	19.84	20.28	20.75	0.91	2.36
BF07	Made Ground	21.63	18.59	19.44	20.3	1.71	2.19
MF19_01	Lynch Hill Gravels	20.42	18.34	18.99	19.7	1.36	1.43
MF19_02	Lynch Hill Gravels	19.52	17.84	18.27	18.75	0.91	1.25
MF19_03	LHG banded with brown clay	16.58	13.99	14.71	15.91	1.92	1.87

The monitoring data indicate that groundwater levels have a typical seasonal variation of approximately 0.9 to 2 metres with higher ranges corresponding to particularly wet winters. A maximum elevation of 21.24m AOD was observed at BF05 (to the north-west of the Site) in March 2013 and a minimum of 13.99m AOD was observed at MF19_03 (along the eastern boundary) in September 2020.

The unsaturated zone ranges from 1 to 2.5m BGL across the Site. Groundwater flow across the area is in a predominantly south or south-easterly direction, following the regional topography which dips to the base of a valley in which the Running Water Brook flows. However, some of the boreholes are installed in isolated remnants of the Lynch Hill Gravels which are separated by areas of backfilled lower permeability waste materials, whilst others are installed solely within backfilled material. The hydraulic characteristics of this material are not well understood. Given the variability of ground conditions it is unlikely that a consistent water table and groundwater flow direction is present in the area. Given the general groundwater flow direction, any impact from the proposed landfill would be on either the natural sand and gravel to the south and south-east of the Site, either directly through the sidewall or indirectly through the reworked material under Field A, as indicated in Drawing HRA1 and Drawing HRA2. Flow is likely to follow local permeable routes and discharge into ditches adjacent to the landfilled areas.

The nearest monitoring boreholes to Site are BF01 located on the northern perimeter, MF19_01 located on the western perimeter and MF19_02 located on the southern Perimeter, north of Baldwin's Farm. MF19_03 is located along the eastern edge of the previously landfilled area.

3.3.3 Groundwater Quality

Groundwater quality monitoring at Medina Farm has been undertaken from boreholes BF01, BF02 and BF05 in the surrounding deposits between 2012 and 2022 and from three boreholes installed around the perimeter of the Site (MF19_01, MF19_02 and MF19_03) between 2020 and March 2022.

Based on the groundwater flow direction BF01, BF05 and MF19_01 are considered to be up-gradient boreholes whilst MF19_02, MF19_03 and BF02 are considered to be down-gradient.

[11] SLR Consulting Ltd, February 2019. Cockhide Farm Quarry Hydrogeological Impact Appraisal, report on behalf of Ingrebourne Valley Ltd. SLR Ref.: 427.01526.00019

As no landfilling has taken place within the western portion of the Site to date it is considered that MF19_02 is also reflective of background water quality however BF02 and MF19_03 are down-gradient of the previously landfilled area and are therefore considered to already be reflective of down-gradient groundwater.

For the purpose of this HRA monitoring data from BF01, BF05, MF19_01 and MF19_02 are considered to be reflective of background water quality.

Monitoring data have also been provided for three ponds located to the west of the Site (Ponds 1-3), these are likely to comprise a mixture of surface water and groundwater and are potentially reflective of wider water quality.

Background Groundwater Quality

As outlined above background water quality can be represented by BF01, BF05, MF19_01 and MF19_02. The monitoring data for all WAC substances are presented in Table 10 and Table 11 and time-series graphs are included in Appendix 03.

Table 10- Background Groundwater Quality Monitoring Data- BF01 & BF05

Determinand (mg/l unless otherwise stated)	UK DWS (mg/l)	BF01					BF05				
		Detected	Count	Minimum	Mean	Maximum	Detected	Count	Minimum	Mean	Maximum
Arsenic	0.01	21	21	0.002	0.003	0.009	6	6	0.007	0.017	0.03
Barium	1.3	9	9	0.036	0.093	0.118	0	-	-	-	-
Cadmium	0.005	0	21	<0.00008	-	<0.00008	0	6	<0.00008	-	<0.00048
Chromium	0.05	1	21	<0.001	-	0.001	2	6	<0.001	-	<0.006
Copper	2	16	21	<0.0003	0.001	0.003	1	6	<0.0003	-	<0.0018
Mercury	0.001	3	9	<0.00001	-	0.00002	0	-	-	-	-
Nickel	0.02	21	21	0.009	0.019	0.028	6	6	0.013	0.018	0.024
Lead	0.01	6	21	<0.0002	-	0.001	3	6	<0.0002	0.0007	0.002
Zinc	-	21	21	0.001	0.004	0.009	5	6	<0.006	0.003	<0.006
Chloride	250	21	21	27.1	129	200	6	6	210	295	334
Fluoride	1.5	2	9	<0.5	-	2.83	0	-	-	-	-
Sulphate	250	21	21	47.5	183	264	2	6	<2	-	47.2
DOC	-	9	9	318	754	960	6	6	0.91	2.33	3.48
TDS	-	21	21	0.500	5.57	10.0	0	-	-	-	-

Table 11- Background Groundwater Quality Monitoring Data- MF19_01 & MF19_02

Determinand (mg/l unless otherwise stated)	UK DWS (mg/l)	MF19_01					MF19_02				
		Detected	Count	Minimum	Mean	Maximum	Detected	Count	Minimum	Mean	Maximum
Arsenic	0.01	27	27	0.001	0.006	0.013	27	27	0.001	0.003	0.005
Barium	1.3	27	27	0.112	0.244	0.312	27	27	0.058	0.1	0.185
Cadmium	0.005	0	27	<0.00008	-	<0.00008	1	27	<0.00008	-	0.0001
Chromium	0.05	7	27	<0.001	-	0.001	1	27	<0.001	-	0.001
Copper	2	10	27	<0.0003	-	0.006	27	27	0.0003	0.002	0.006
Mercury	0.001	0	27	<0.00001	-	<0.00001	1	27	<0.00001	-	0.00001
Nickel	0.02	27	27	0.0039	0.007	0.017	27	27	0.008	0.010	0.012
Lead	0.01	2	27	<0.0002	-	0.0004	4	27	<0.0002	-	0.0004
Zinc	-	26	27	<0.001	0.003	0.010	26	27	<0.001	0.003	0.006
Chloride	250	27	27	190	236	279	27	27	90.1	183	306
Fluoride	1.5	1	27	<0.5	-	0.947	16	27	<0.5	1	1.03
Sulphate	250	19	27	<2	84	338	27	27	30.3	99	434
DOC	-	19	26	<0.3	2.23	9.99	26	27	<0.3	2.93	6.82
TDS	-	27	27	1740	2102	2380	27	27	908	1263	2550

The background groundwater quality data indicate that the regional groundwater quality is poor with elevated concentrations of several determinands above their respective UK Drinking Water Standards (DWS) including chloride, sulphate, arsenic, and nickel.

The following is noted:

- Monitoring boreholes BF05, MF19-01 and BF01 all recorded concentrations arsenic in exceedance of the UK DWS (0.01 mg/l). A maximum background concentration of 0.03 mg/l was recorded in BF05. Since summer 2019, concentrations have generally stayed below the DWS with infrequent exceedances at MF19_01.
- Nickel shows elevated concentrations across the Site, slightly exceeding the UK DWS of 0.02 mg/l in BF01 & BF05 with maximum concentrations of 0.035 mg/l and 0.026 mg/l.
- Chloride exceeded DWS in all monitoring boreholes except BF01. BF01 & MF19_02 show a generally steady trend through time and BF05 levels of chloride are decreasing. However, there is a rise in chloride levels at MF19_01 through the monitoring period.
- The majority of sulphate concentrations within the up-gradient boreholes have been at or below the UK DWS of 250 mg/l. BF01 has shown a general decreasing trend over the monitoring period and is frequently recorded below 200 mg/l since winter 2019. Since Summer 2020, the DWS has been exceeded on three occasions within MF19_01 and MF19_02 with a maximum of 440 mg/l recorded; and
- During the recording period, there have been several organics recorded in background water quality. Most notably, benzene was recorded in MF19_01 at a maximum concentration of 25.2 ug/l.

Down-Gradient Groundwater Quality

As outlined above down-gradient groundwater quality can be represented by BF02 and MF19_03. The monitoring data for all WAC substances is presented in Table 12- Down-Gradient Groundwater Quality Monitoring Data- BF02 & MF19_03 and time-series graphs are included in Appendix 04.

The monitoring data indicate that:

- Generally, the down-gradient water quality is better that up-gradient with only one determinand exceeding the UK DWS.
- Sulphates have been significantly above the DWS at both BF02 & MF19_03. These are expected results given the proximity of various anthropogenic sources including historic landfills.
- Trends of arsenic and sulphate suggest that the influence of historic landfills on groundwater quality may be declining.

Table 12- Down-Gradient Groundwater Quality Monitoring Data- BF02 & MF19_03

Determinand (mg/l unless otherwise stated)	UK DWS (mg/l)	BF02					MF19_03				
		Detected	Count	Minimum	Mean	Maximum	Detected	Count	Minimum	Mean	Maximum
Arsenic	0.01	20	20	0.002	0.004	0.006	8	9	<0.0005	0.001	0.002
Barium	1.3	8	8	0.042	0.054	0.07	9	9	0.065	0.075	0.086
Cadmium	0.005	0	20	<0.00008	4×10^{-5}	<0.00008	0	9	<0.00008	0.00004	<0.00008
Chromium	0.05	0	20	<0.001	0.0005	<0.001	0	9	<0.001	0.001	<0.001
Copper	2	6	20	<0.0003	0.0008	0.005	9	9	0.0006	0.001	0.002
Mercury	0.001	1	8	<0.00001	5.63×10^{-6}	0.00001	0	9	<0.00001	0.000005	<0.00001
Nickel	0.02	20	20	0.0008	0.002	0.006	9	9	0.0012	0.002	0.004
Lead	0.01	10	20	<0.0002	0.0003	0.001	1	9	<0.0002	0.0001	0.0003
Zinc	-	13	20	<0.001	0.004	0.018	7	9	<0.001	0.002	0.004
Chloride	250	20	20	8.2	47	83.5	9	9	15.9	41	177
Fluoride	1.5	0	8	<0.5	0.25	<0.5	0	9	<0.5	0	<0.5
Sulphate	250	20	20	57.6	144	380	9	9	200	258	374
DOC	-	18	20	<0.3	5.03	9.5	9	9	3.18	6.64	9.79
TDS	-	8	8	527	619	815	9	9	749	796	924

Surface Water Quality

Surface Water monitoring has been completed from 2012 until the present from POND 1, POND 2 and POND 3, located to the south-west of the Site. Monitoring data for the period 2018 to 2022 is presented in Table 13 and Table 14.

The monitoring data show that concentrations of chlorides in Ponds 2 & 3 are very infrequently elevated above the UK Drinking Water Standards of 250 mg/l. Both ponds have small drainage ditches running into them carrying runoff from the surrounding agriculture and limited road network. Sources may include animal waste or potassium chloride fertilisers.

Unlike the historic data representing groundwater, 10 years' worth of monitoring surface water quality show no general trends. There are some isolated spikes, some random variations in the data, and in some cases contaminant concentrations are unique to each location and have remained steady throughout the monitoring period. Arsenic is the only determinand showing any signs of general decline.

Time-series chemographs for key determinands are presented in Appendix 05.

Table 13- Surface Water Quality- Pond 1 and Pond 3

Inorganics	UK DWS (mg/l)	POND 1					POND 3				
Determinand		Detected	Count	Minimum	Mean	Maximum	Detected	Count	Minimum	Mean	Maximum
Arsenic (mg/l)	0.01	16	0.002	0.003	0.006	0.014	8	8	0.001	0.003	0.005
Barium (mg/l)	1.3	9	0.035	0.046	0.055	0.06	3	3	0.027	0.077	0.129
Cadmium (mg/l)	0.005	16	<0.00008	0.00004	<0.00008	<0.001	0	8	<0.00008	-	<0.00048
Chromium (mg/l)	0.05	16	<0.001	0.0007	0.003	0.011	0	8	<0.001	-	<0.006
Copper (mg/l)	2	16	<0.0003	0.0005	0.001	<0.005	8	8	0.0007	0.003	0.007
Mercury (mg/l)	0.001	9	<0.00001	0.000005	<0.00001	<0.0002	0	3	<0.00001	-	<0.00001
Nickel (mg/l)	0.02	16	0.004	0.004	0.005	<0.01	8	8	0.001	0.011	0.019
Lead (mg/l)	0.01	16	<0.0002	0.0002	0.0005	<0.01	3	8	<0.0002	-	<0.0012
Zinc (mg/l)	-	16	<0.001	0.003	0.005	<0.01	8	8	0.002	0.005	0.009
Chloride (mg/l)	250	16	131	157	181	190	8	8	3.30	191	297
Fluoride (mg/l)	1.5	9	<0.5	0.25	<0.5	<0.5	0	3	<0.5	-	<0.5
Sulphate (mg/l)	250	16	8.6	27.6	48	111	6	8	<2	80	183
DOC (mg/l)	-	16	4.6	8.99	14.0	14	8	8	5.76	8.36	10.1
TDS (mg/l)	-	9	608	713	808	808	3	3	153	928	1440

Table 14- Surface Water Quality Monitoring Data- Pond 2

Determinand (mg/l unless otherwise stated)	UK DWS (mg/l)	POND 2				
		Detected	Count	Minimum	Mean	Maximum
Arsenic	0.01	17	17	0.002	0.004	0.009
Barium	1.3	8	8	0.082	0.107	0.14
Cadmium	0.005	0	17	<0.00008	-	<0.00008
Chromium	0.05	2	17	<0.001	-	0.003
Copper	2	13	17	<0.0003	0.001	0.002
Mercury	0.001	0	11	<0.00001	-	<0.00001
Nickel	0.02	17	17	0.008	0.010	0.013
Lead	0.01	3	17	<0.0002	-	0.0004
Zinc	-	17	17	0.001	0.002	0.005
Chloride	250	17	17	161	199	256
Fluoride	1.5	0	8	<0.5	-	<0.5
Sulphate	250	17	17	16.5	53	411
DOC	-	17	17	4.78	8.15	11
TDS	-	8	8	735	977	1130

3.4 Receptors and Compliance Points

3.4.1 Groundwater

The primary receptors assumed for this assessment are in accordance with those required by Schedule 22 (Groundwater Activities) of the Environmental Permitting Regulations, 2016, these are as follows:

- For Hazardous Substances the receptor is assumed to be the groundwater within the Lynch Hill Gravels adjacent to the Site, taking account of immediate dilution in the aquifer but without any dispersion or attenuation in the aquifer pathway; and
- For Non-Hazardous Pollutants the receptor has been assumed to be the groundwater at the down-gradient Site boundary (down-gradient boreholes) within the Lynch Hill Gravels.

3.4.2 Groundwater Abstractions and Source Protection Zones

The EA has confirmed that the proposed development is not located within a groundwater Source Protection Zone (SPZ) and there are no licensed abstractions within a 2km radius of the Site.

Thurrock Borough Council has indicated that they do not have any records of private water supplies within a 2km radius of the Site.

3.4.3 Surface Water

The Site is located in an area with several surface water features. The closest of these is a fishing lake situated along the eastern Site boundary.

Due to a high groundwater level observed across the site, it is proposed that Field B is restored using a 'picture framing' approach to enable dewatering and landfilling of the area in dry conditions. The Field will be dewatered via a sump in the base of the excavation and the water discharged to Pond 1 to the southwest of the Site. Applications for the necessary water abstraction (transfer) licence and surface water discharge environmental permit will be made separately.

3.4.4 Amenity (Nuisance and Health Issues)

For the purposes of the risk assessment for amenity and accidents, the potential receptors that need to be considered are presented in Drawing EP4 and have been set out within Table 3, in Section 1.11 of this report. The amenity and accident risks are considered in detail in the Environmental Risk Assessment (ERA), which is included in Section 4 of this EP application.

4.0 POLLUTION CONTROL MEASURES

4.1 Site Engineering

4.1.1 Basal and Side Slope Engineering

Field B

Due to a high groundwater level observed across the Site, it is proposed that Field B is restored using a 'picture framing' approach to enable dewatering and landfilling of the area in dry conditions. During the mineral extraction phase, a perimeter trench will be dug and filled with low permeability clay. This combined with the low permeability London Clay underlying the base of the Site will form a geological barrier around the base and sidewalls of the excavation area to enable dewatering and contain inert waste to be deposited to restore the void.

The sidewall geological barrier will be constructed using low permeability indigenous overburden or imported waste materials from excavations where there is no suspicion of contamination. The basal geological barrier will comprise in-situ London Clay.

The Field will be dewatered via a sump in the base of the excavation and the water discharged to Pond 1 to the southwest of the Site. Applications for the necessary water abstraction (transfer) licence and surface water discharge environmental permit will be made separately. In the event that water within the void of the Site is unsuitable for abstraction and discharge, for example due to poor water quality, cells will be formed within the Site so that water can be managed internally to the Site via pumping between cells so that mineral extraction and restoration can be undertaken in dry conditions.

Field A

There will be no excavation of Field A. Following stripping of topsoil and subsoil, a basal and sidewall geological barrier will be confirmed or installed. Assuming an in-situ barrier cannot be confirmed, a basal and sidewall geological barrier will be constructed using suitable low permeability indigenous overburden or imported waste materials from excavations where there is no suspicion of contamination.

The geological barrier will be a minimum thickness of 1m at a permeability no greater than 1 x 10^{-7} m/s.

The engineering of the Site is conceptually illustrated on Drawing EP3.

Material Characterisation Testing

Prior to acceptance on Site all materials proposed for use in geological barrier construction, will be subject to characterisation. As per EA guidance[12], before waste is sent for recovery or disposal, it should be subject to a basic characterisation to determine the properties of the waste and demonstrate the material is suitable both physically and chemically for the required use. The waste producer/holder will be required to send the necessary waste characterisation information to IVL in advance of delivery to Site. The enables IVL to control and monitor waste being accepted on Site.

Only cohesive materials from non-contaminated sources capable of achieving a permeability of at least 1 x 10-7 m/s will be accepted.

Construction Quality Assurance

Records will be maintained at the Site of all geological barrier construction activities, and shall include the identity (source, quantity, dates of delivery) of all geological barrier material, and the results of any chemical and physical testing undertaken on material. Details of unsuitable material, including the source of the material, the reasons that it was considered unsuitable and the action taken will also be recorded.

A Construction Quality Assurance (CQA) Plan for the construction of the sidewall and basal geological barrier will be prepared in advance of landfilling, subject to EA guidance[13] and EA agreement. As per the EA guidance, the CQA for the Site, will include

- Drawings of the proposed geological barrier engineering;
- Specification of the proposed materials which will be used to construct the barrier – including the type and frequency of conformance testing;
- Pass or fail criteria for all the materials which will be used to construct the geological barrier;
- Details of conformance testing;

[12] Dispose of waste to landfill, waste characterisation – last updated 21st April 2021
[13] EA Landfill operators: environmental permits. Construction quality assurance (CQA) – last updated 17th February 2022

- Details of how the geological barriers will be installed;
- Procedure for agreeing changes to the design;
- Details of the measures which will be taken when any non-compliance materials are identified; and
- Details of the information you will include in the validation report.

All materials to be used in the construction of the barrier will satisfy the physical, geotechnical and chemical properties required for the Site. Therefore, the focus of CQA will be on the acceptance only of materials suitable to achieve the overall specification.

Chemical Properties

To ensure the selected materials are suitable from a chemical point of view, the following procedure will be followed:

- Material to be used in the construction of the geological barrier will be subject to comprehensive characterisation testing by the producer to demonstrate that it is chemically suitable for use and is in compliance with the waste acceptance criteria for the Site. Only material demonstrated to be suitable for acceptance will be delivered to Medina Farm;
- IVL will maintain transfer notes for all materials used in the geological barrier construction. These records shall be available for inspection at the Site but will not form part of the CQA validation Report/s;
- Periodic compliance testing of imported material will also be undertaken. The results of testing of material will be maintained by IVL and will be available for inspection by the EA;
- Waste materials used in the geological barrier will be subject to continual visual inspection by IVL to detect any material that is unsuitable from a physical point of view, and to observe for signs of chemical contamination that may be evidenced by changes in appearance or odour; and
- Any material considered unsuitable for use in the barrier will be isolated and removed from the Site.

4.1.2 Capping

The site will be brought to level with inert waste materials, following this the site will be restored using a minimum of 0.8m of site-derived subsoil and 0.4m of site-derived topsoil.

Given the nature of the materials employed, it is not considered that there is a requirement for an engineered cap.

4.2 Restoration

The proposed restoration is illustrated in the following drawings:

- Plan No. 1616/R/1 v3 Proposed Restoration

Prior to mineral extraction in Field B and supplementary deposits to Field A, the fields will be stripped of topsoil and subsoils separately. The topsoil and subsoil will be separately stored in bunds around the perimeter of the Site for replacement later in the final restoration of the Site. Following placement of inert waste materials, the Site will be restored using a minimum of 0.8m of subsoil and 0.4m of topsoil. It is anticipated that there will be shortfall of indigenous soils to achieve this, therefore retained indigenous soil materials will be supplemented with imported waste soil material.

The working of the Site during the operational phase is illustrated in Plan No. 1616/CO/1 Composite Operations Plan.

Up to 220,000 tonnes per annum (tpa) of waste will be accepted at the Site. It is anticipated that restoration of the Site will take 2 years.

4.3 Management

4.3.1 Water Management System

As the groundwater table is located close to the ground surface, the site will be dewatered prior to the extraction of gravel. The site will be dewatered via the method of picture framing. Picture framing is a practice implemented to avoid working the ground while groundwater (water within the ground) is present, also known as working a site 'wet'. As mineral is only being extracted from the western field, dewatering will only occur within this area. The Field will be dewatered via a sump in the base of the excavation and the water discharged to Pond 1 to the southwest of the Site. Applications for the necessary water abstraction (transfer) licence and surface water discharge environmental permit will be made separately. In the event that water within the void of the Site is unsuitable for abstraction and discharge, for example due to poor water quality, cells will be formed within the Site so that water can be managed internally to the Site via pumping between cells so that mineral extraction and restoration can be undertaken in dry conditions.

Waste accepted on Site will only be inert in nature and therefore do not pose a leachate risk to surrounding groundwater.

While the risk to groundwater is low, as outlined in the HRA and ERA documents, the construction of a sidewall and basal geological barrier will offer additional protection to groundwater in the region.

To ensure sufficient drainage at the Site is achieved once restored, there will be a slight increase in the height across the two fields. The drainage gradient will be in the region of a 1 in 40 to 1 in 80 slope. The restored landform is designed to guide surface water to the north, east, south and west of the Site where it will be collected by drainage ditches. These drainage ditches will lead to two attenuation ponds, one located in the south-east corner and one in the south-west corner of the Site.

4.3.2 Leachate Generation, Management and Monitoring

The Site will only accept inert waste and therefore waste on Site should not produce any leachate which could results in any significant discharge of hazardous or non-hazardous substances. As such, the Site does not require a management system for leachate prevention including artificial sealing liner, leachate management or any other engineering/management structures.

4.3.3 Landfill Gas Generation and Management

Due to the nature of the waste proposed to be accepted on Site being inert, there will be little to no significant quantities of landfill gas generated. Accordingly, there is no requirement to undertake landfill gas management on Site.

4.4 Post Closure Controls (Aftercare)

The Site will be restored to a very shallow dome shaped agricultural field. To ensure efficient drainage at the Site is achieved, there will be a slight increase in the height across the two fields. The change in height will be gradual and not noticeable which will maintain the openness of the Green Belt.

Following the restoration, the land will be subject to a period of aftercare to ensure that it is successfully brought back to agricultural use. The access road to the west of the Site will be retained for the after use of the Site.

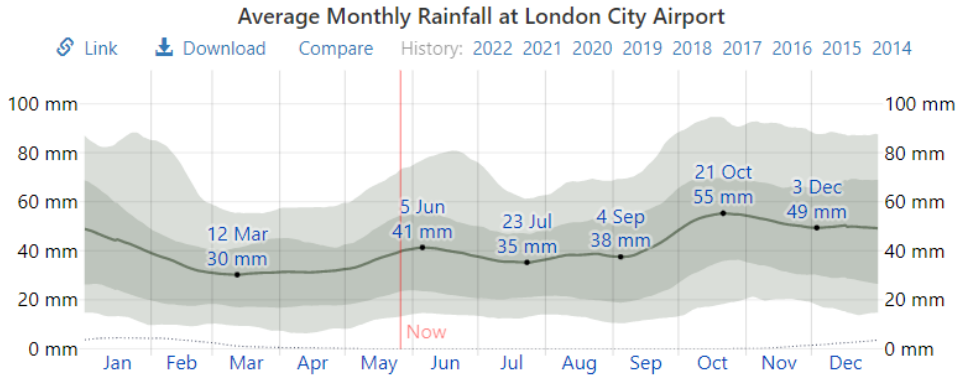
The Site will be restored and monitored in accordance with the conditions of the EP. IVL will satisfy all surrender conditions stated within the EP post closure of the Site.

5.0 MONITORING

5.1 Weather

Precipitation data was taken from an online source[14] which uses data from NASA's MERRA-2 Modern-Era Retrospective Analysis. Average rainfall is displayed below, calculated over a sliding 31-day period centred around each day of the year. Additionally, the 25th & 75th and 10th and 90th percentile bands are displayed. Data is taken from London City Airport weather station as this is the closest station to the Site.

Highest average rainfall was in October, while lowest average rainfall was in March.



The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the corresponding average snowfall.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	44.6mm	34.5mm	30.5mm	31.2mm	36.9mm	40.3mm	35.5mm	38.3mm	40.2mm	54.6mm	51.6mm	50.4mm

Figure 1 – Monthly Average Rainfall

5.1.1 Prevailing Wind Direction and Strength

Wind speed and direction data from the London City meteorological station located approximately 15.2km to the west of the Site is displayed below (Figure 2). The wind rose represents an average of data taken from 2015-2019. This data is considered representative of the Site conditions.

Figure 2 indicates that the prevailing wind direction is from the southwest, with approximately 8% of winds in this location coming from the south-west. Winds from the west and east are somewhat prominent, with winds occurring approximately 4% respectively from these directions. Winds from the north and south are relatively infrequent. On this basis, locations to the northeast of the Site have the highest potential for impacts from any dust emissions from the Site.

[14] Weatherspark.com – accessed June 2022

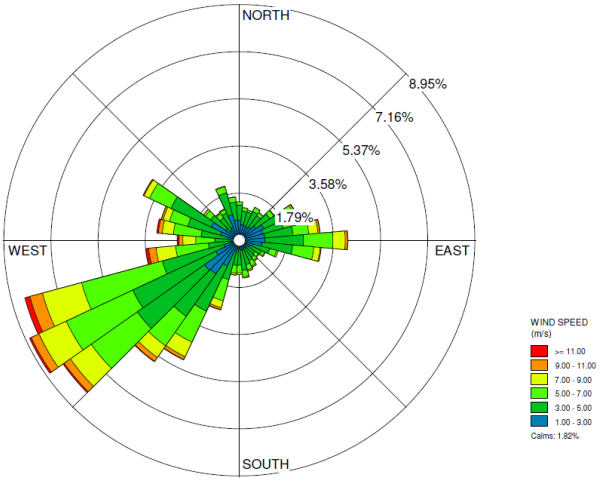


Figure 2 - Wind Rose using 2015-2019 data from London City Meteorological Station

5.2 Gas Monitoring Infrastructure

Gas monitoring will be undertaken on Site, where all groundwater wells will be combined for gas monitoring also. There are five boreholes on Site which have been monitored since 2011 for a number of parameters, including methane (CH4), carbon dioxide (CO2) and water elevation.

Following the restoration of each phase, in-waste gas wells will be installed at a frequency of 2 per ha, as shown on Drawing EP5. A total of 34 in-waste gas monitoring wells will be installed and monitoring on the Site.

Monitoring will be undertaken in accordance with the schedule in Table 15, unless otherwise agreed in writing with the EA.

Table 15- Gas Monitoring Schedule

Location	Frequency	Measurement and Analytical Suite	Monitoring Method
BF01, MF19_01, MF19_02, BF02, MF19_03	Monthly	Methane, Carbon Dioxide, Oxygen, Differential Pressure, Atmospheric Pressure and Meteorological Data.	As in LFTGN03 'Guidance on the Management of Landfill Gas' (2014). Record whether the ground is waterlogged, frozen or snow covered.

5.2.1 Gas Data

Landfill gas on Site has been monitored at each of the boreholes since 2011. CH4 and CO2 have been summarised below with data from 2011-2022, to provide a background reference point (Figure 3 and respectively). Raw results can be found in Appendix 06.

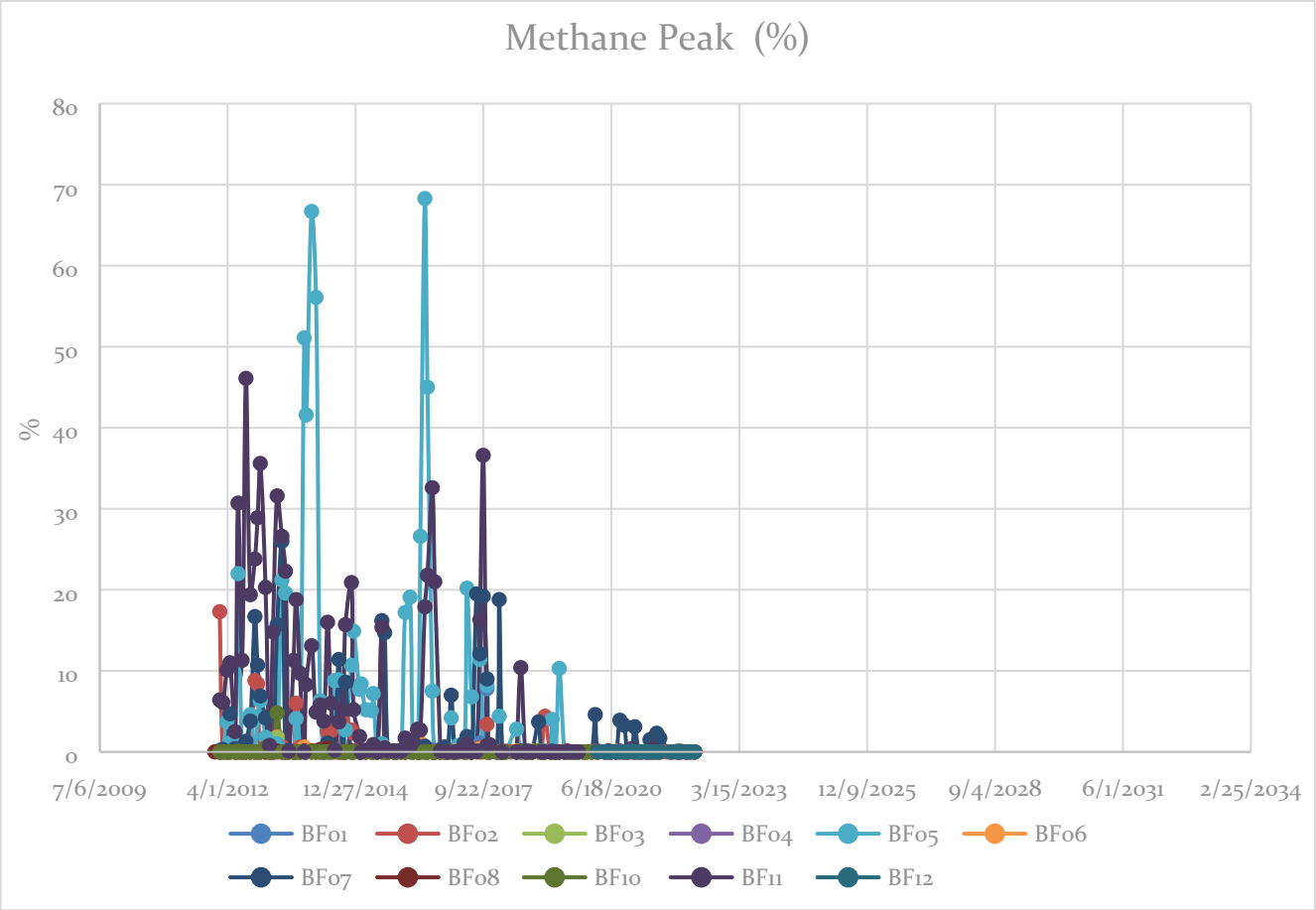


Figure 3 – CH4 Peak Results, Medina Farm Boreholes, 2011-2022

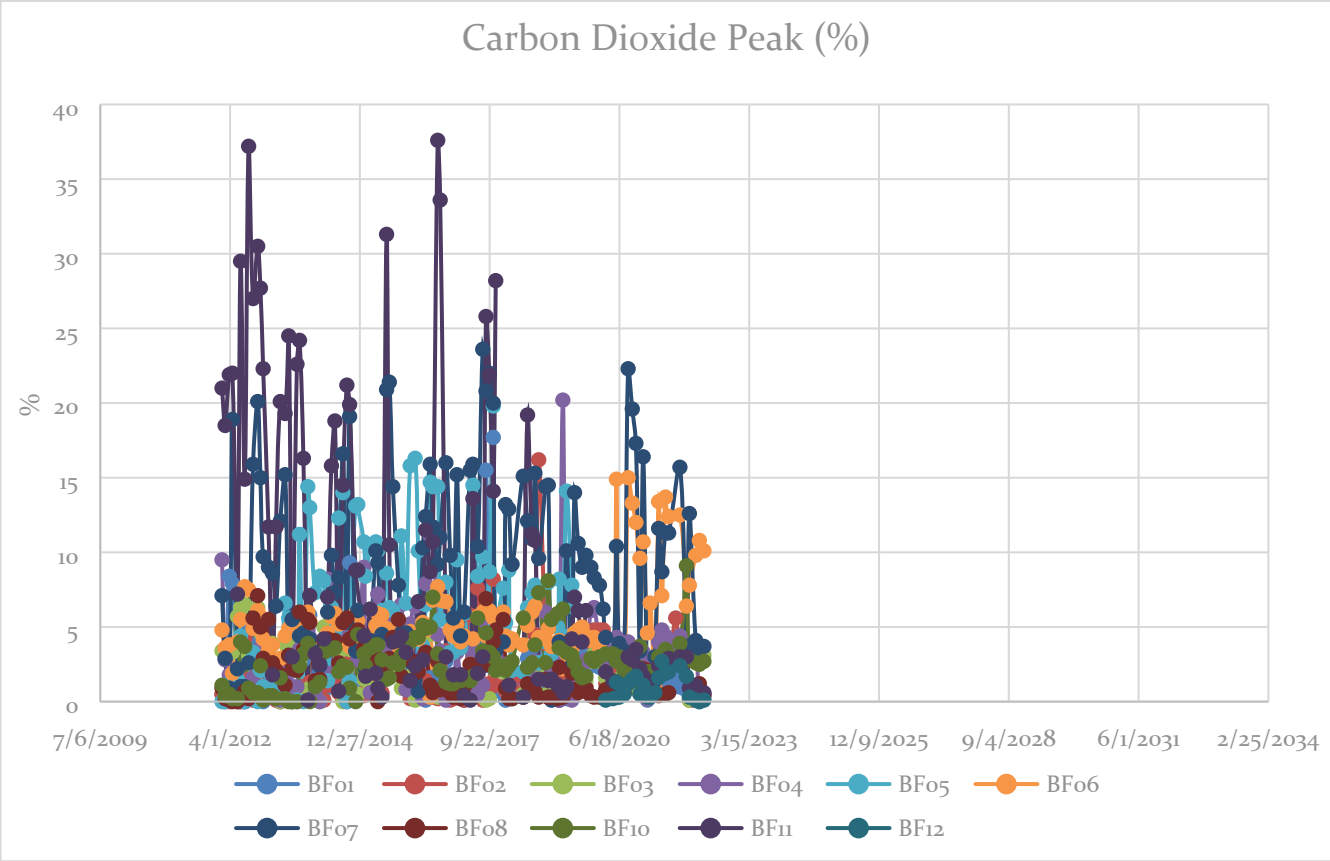


Figure 4 – CO2 Peak Results, Medina Farm Boreholes, 2011-2022

5.3 Surface Water Monitoring Infrastructure

During the operational phase it is proposed that surface water will be monitored on a regular basis to ensure that the discharge of groundwater does not result in a deterioration of surface water quality and to ensure that discharge can be ceased in the event of the release of substances above the stipulated limits.

Prior to the commencement of any dewatering, samples will be collected on a weekly basis for a minimum of 4 weeks to confirm the water quality of water in the quarry void. These will be assessed against the limits stipulated in a surface water discharge environmental permit to be obtained. In the event that monitoring indicates that the required limits are not met then no discharge will take place. Water in the void will be managed internally to the site via the creation of cells and the pumping water between cells.

As the operational site discharge shall convey groundwaters from within the picture-framed Field B, it is appropriate that during the initial monitoring round, a groundwater sample from BF01 is tested for an extended suite which contains all organics which have a defined Environmental Quality Standard. Any organics detected to have elevated concentrations during this round would be tested in subsequent surface water samples.

Surface water monitoring will be undertaken in accordance with the requirements of a water abstraction (transfer) licence and surface water discharge environmental permit to be applied for separately.

5.4 Groundwater Monitoring

The monitoring of groundwater quality around the perimeter of the Site will be carried out using the existing network of monitoring boreholes. It is considered that BF01 may be lost as a result of site operations. If this were to occur, it would be replaced with an additional up-gradient borehole proposed along the northern boundary of the Site, with the location agreed with the EA prior to installation.

In keeping with inert landfill guidance, it is proposed that ongoing groundwater level and quality monitoring is undertaken from at least one up-gradient and two down-gradient boreholes.

Groundwater level monitoring indicates that groundwater flow is in a broadly east or south-easterly direction across the Site. It is therefore proposed that the following boreholes are used for groundwater quality monitoring purposes going forward:

- Up-gradient: **BF01**, **MF19_01**
- Cross-gradient: **MF19_02**
- Down-gradient: **BF02**, **MF19_03**

Whilst BF05 has been included within the report to typify background groundwater it is noted that this is installed within made ground and was therefore excluded as a background borehole in setting the EALs. This borehole is not therefore considered to be representative of groundwater quality in the Lynch Hill Gravels and has been excluded from the ongoing monitoring schedule. It is also noted that MF19_02 was included as a background borehole in the HRA, however once landfilling commences it is considered to be cross-gradient.

The proposed monitoring schedule is outlined in Table 17 below, and monitoring locations are shown on Drawing HRA1. The proposed schedule is based on current EA landfill monitoring guidance and the results of this HRA.

The respective monitoring boreholes are based on the understanding of the hydrogeological regime of the Site and recorded groundwater elevation data.

Table 16- Proposed Groundwater Monitoring Schedule

Groundwater Monitoring Locations	Monitoring Frequency	Measurement and Analytical Suite
Up-gradient: BF01 MF19_01	Monthly	Groundwater elevation (m BGL), Chloride, ammoniacal nitrogen, pH, electrical conductivity, temperature, DO, REDOX, and suspended solids
Cross-gradient: MF19_02	Quarterly	Total alkalinity, magnesium, potassium, sulphate, calcium, sodium, chromium (VI), copper, iron, lead, nickel, zinc, manganese, selenium, cyanide, BOD, TPH, COD
Down-gradient: BF02 MF19_03	Annual for the first 6 years… then every 2 years	Hazardous Substances, including: Arsenic (III) and (V), Mercury, speciated PAH, BTEX, TPH and Mineral Oil

5.5 Leachate

The inert waste is not expected to produce leachate, therefore there will be no leachate monitoring.

6.0 SITE CONDITION REPORT

A Site Condition Report (SCR) is only necessary for a site/area of a site where waste is not being permanently deposited. As all areas covered by the EP boundary on Site at Medina Farm will be subject to deposits of waste, a SCR is not needed for this application.

APPENDICES

APPENDIX 01

Borehole Logs

SI DRILLING
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Borehole No
BF01
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 27/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.10			Grass over TOPSOIL with cobbles
								Brown SAND with cobbles and CLAY traces
					1.10			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					3.20			Firm brown CLAY
					3.60			Stiff grey CLAY
					4.00			End of Borehole at 4.00 m

Remarks: Standpipe installed. Water added to assist boring from 1.10m - 3.20m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF02
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 27/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.10			Grass over TOPSOIL
								Brown sandy CLAY with low cobble content, concrete and brick (MADE GROUND)
					1.80			Brown sandy CLAY with low cobble content, waste, wood and brick (MADE GROUN)
					4.40			Firm brown CLAY
					4.80			Stiff grey CLAY
					5.10			End of Borehole at 5.10 m

Remarks: Standpipe installed.

SI DRILLING
Cable Percussion Ltd

Borehole No
BF03
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 27/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.20			Grass over TOPSOIL with low cobble content and fill traces
								Brown SAND and subangular to subrounded fine to coarse GRAVEL with traces of brown clay
					2.80			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					3.20			Firm brown CLAY
					3.60			Firm grey CLAY
					3.80			End of Borehole at 3.80 m

Remarks: Standpipe installed.

SI DRILLING
Cable Percussion Ltd

Borehole No
BF04
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 25/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Grass over TOPSOIL with low cobble content
					0.80			Dark grey sandy CLAY with low cobble content and traces of brick and concrete (MADE GROUND)
					3.00			Soft brown sandy CLAY with low cobble contrent
					4.40			Firm brown CLAY
					4.80			Stiff grey CLAY
					5.10			End of Borehole at 5.10 m

Remarks: Standpipe installed.

SI DRILLING
Cable Percussion Ltd

Borehole No
BF05
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 26/10/2011	Logged By

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.10			Grass over TOPSOIL with cobbles
								Dark brown sandy CLAY with cobbles, brick, concrete MADE GROUND
					1.80			Dark brown oily WASTE
					4.80			Dark brown oily SAND and GRAVEL
					6.80			Firm brown CLAY
					7.20			Stiff grey CLAY
					7.50			End of Borehole at 7.50 m

Remarks: Standpipe installed

SI DRILLING
Cable Percussion Ltd

Borehole No
BF06
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 26/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.20			Grass over TOPSOIL with low cobble content
								Brown sandy CLAY with low cobble content and brick and concrete traces (MADE GROUND)
					1.60			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					7.20			Firm brown CLAY
					7.50			Stiff grey CLAY
					7.80			End of Borehole at 7.80 m

Remarks: Standpipe installed. Water added to assist boring from 3.00m - 4.60m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF07
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 25/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.20			Grass over TOPSOIL with low cobble content
								Brown SAND and subangular to subrounded fine to coarse GRAVEL (MADE GROUND)
					1.00			Dark brown sandy silty CLAY with waste (MADE GROUND)
					2.50			Soft brown sandy gravelly CLAY/clayey SAND with traces of waste (MADE GROUND)
					7.60			Firm brown CLAY
					8.10			Stiff grey CLAY
					8.50			End of Borehole at 8.50 m

Remarks: Standpipe installed. Water added to assist boring from 2.50m - 7.60m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF08
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 25/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Grass over TOPSOIL with brown sandy gravel and traces of brick and concrete
					1.00			Brown SAND and subangular to subrounded medium GRAVEL with brown clay lenses
					3.60			Firm to stiff brown CLAY
					4.10			Stiff grey CLAY
					4.50			End of Borehole at 4.50 m

Remarks: Standpipe installed. Water added to assist boring from 1.50m - 3.00m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF09
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 26/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.10			Grass over TOPSOIL with low cobble content
								Brown sandy CLAY with low cobble content of brick and concrete (MADE GROUND)
					1.30			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					3.20			Firm brown CLAY
					3.50			Stiff grey CLAY
					3.80			End of Borehole at 3.80 m

Remarks: Standpipe installed. Water added to assist boring from 1.30m - 2.50m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF10
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 28/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Grass over TOPSOIL with sand and gravel and clay traces
					1.30			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					3.00			Dark grey SAND and subangular to subrounded fine to coarse GRAVEL (oily)
					5.70			Firm brown CLAY
					6.00			Stiff grey CLAY
					6.30			End of Borehole at 6.30 m

Remarks: Standpipe installed.

SI DRILLING
Cable Percussion Ltd

Borehole No
BF11
Sheet 1 of 1

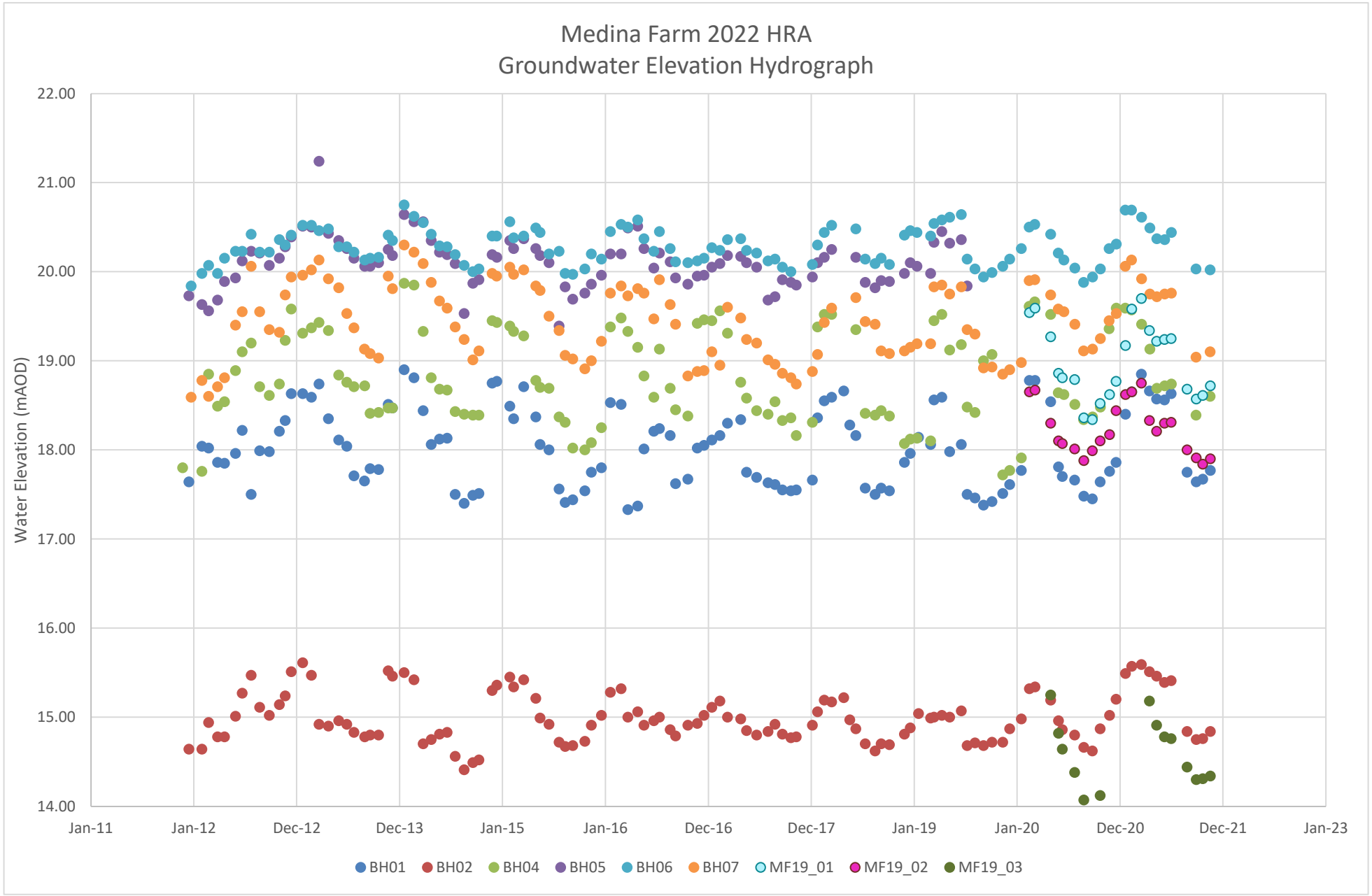
Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 28/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Grass over TOPSOIL with sand and brick fill (MADE GROUND)
					0.80			Waste with wood, brick, concrete and some brown clay traces (oily) (MADE GROUND)
					3.20			Firm brown CLAY
					3.60			Stiff grey CLAY
					3.80			End of Borehole at 3.80 m

Remarks: Standpipe installed.

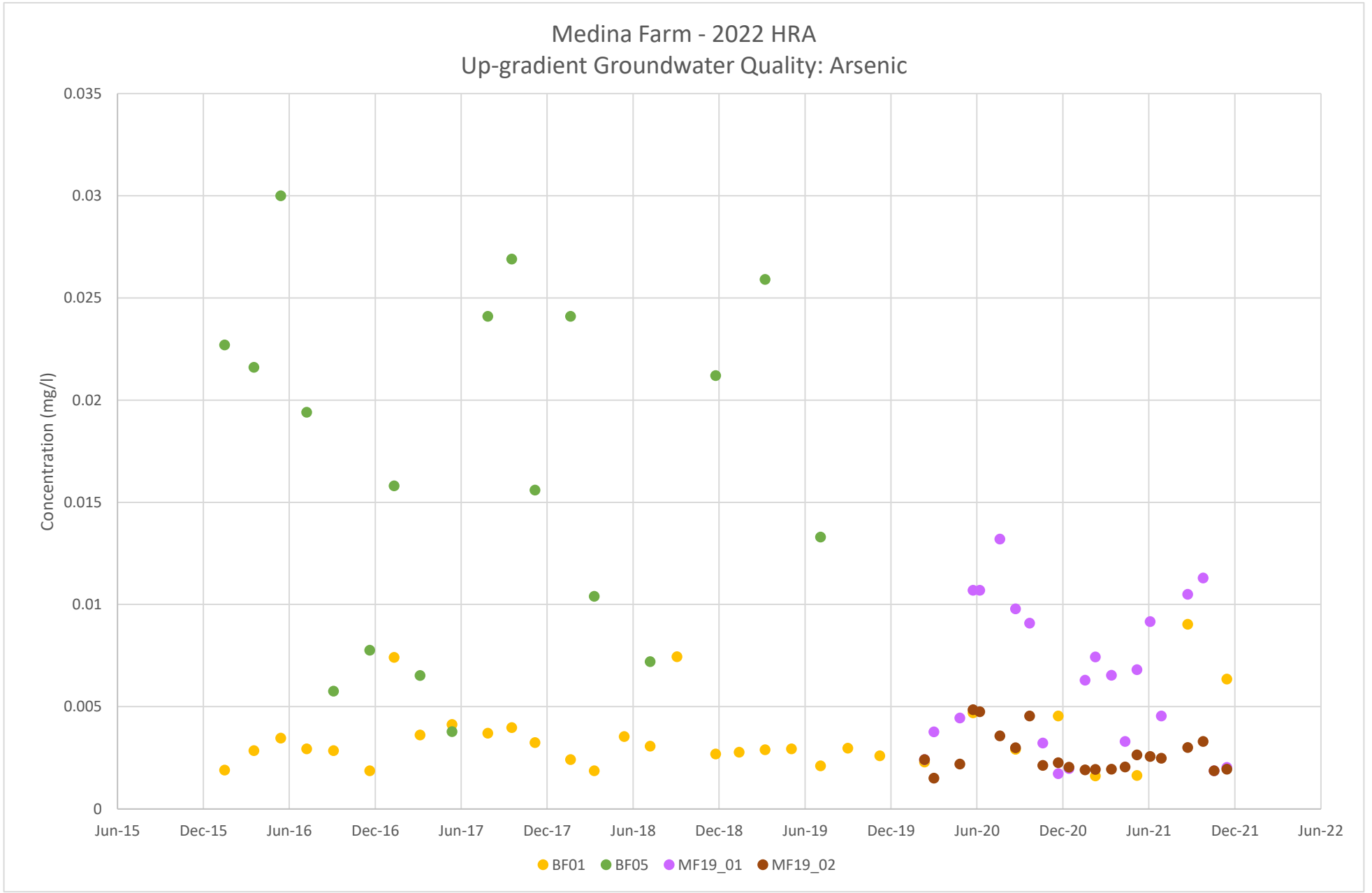
APPENDIX 02

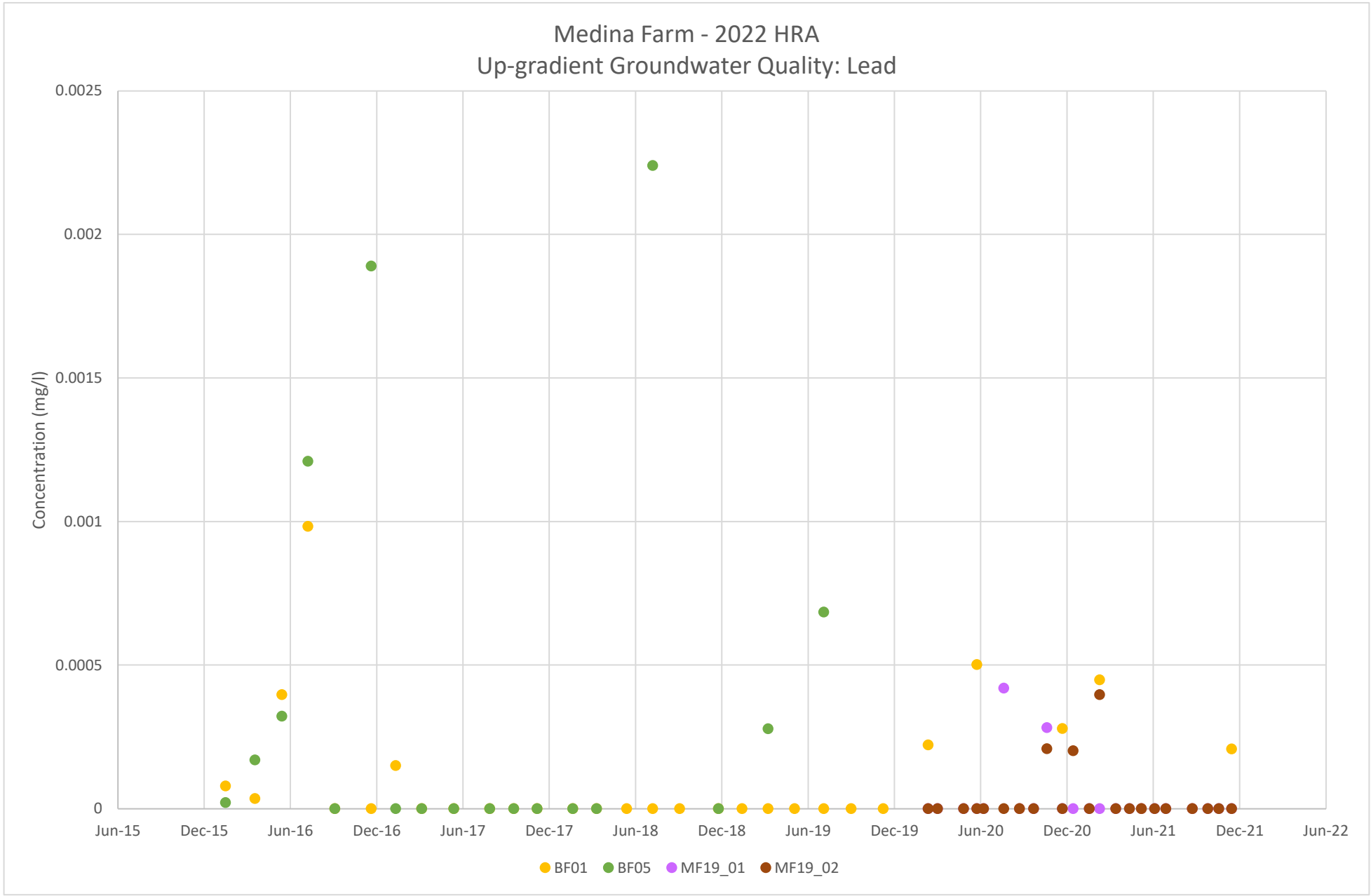
Groundwater Level Hydrograph

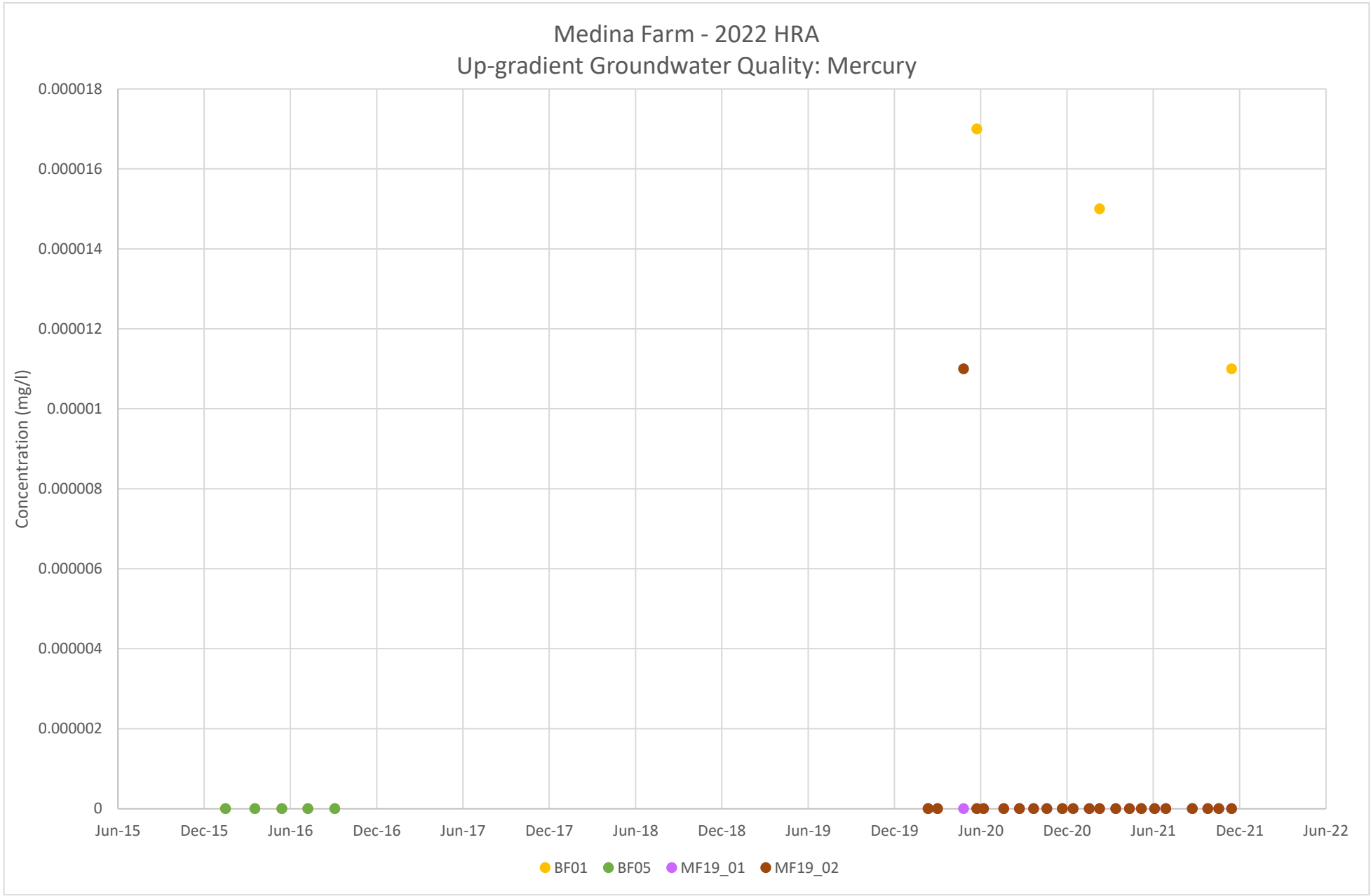

Medina Farm 2022 HRA
Groundwater Elevation Hydrograph
Water Elevation (mAOD)
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
14.00
Jan-11
Jan-12
Dec-12
Dec-13
Jan-15
Jan-16
Dec-16
Dec-17
Jan-19
Jan-20
Dec-20
Dec-21
Jan-23
BH01
BH02
BH04
BH05
BH06
BH07
MF19_01
MF19_02
MF19_03

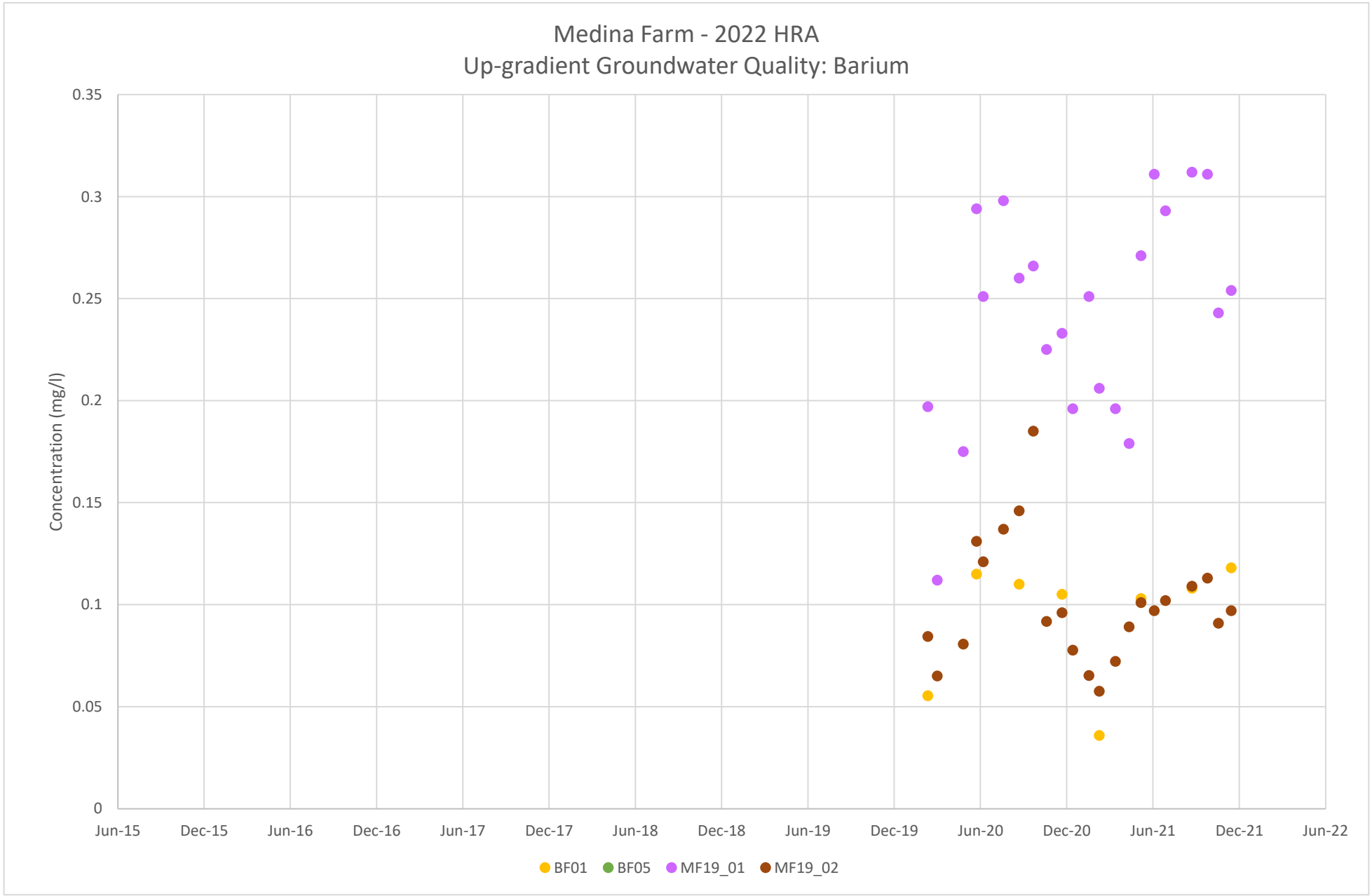
APPENDIX 03

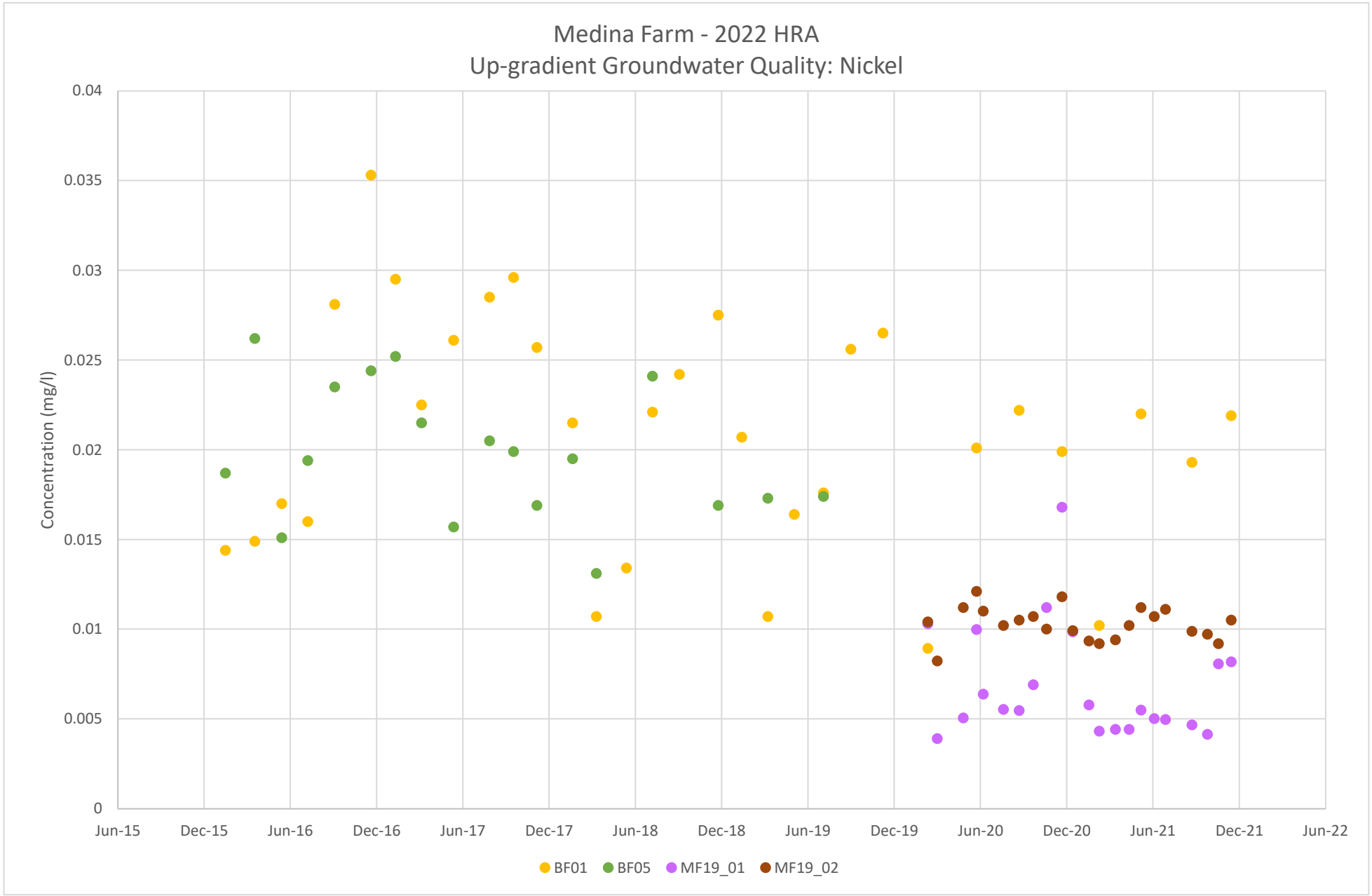
Background Groundwater Quality Time-Series Graphs

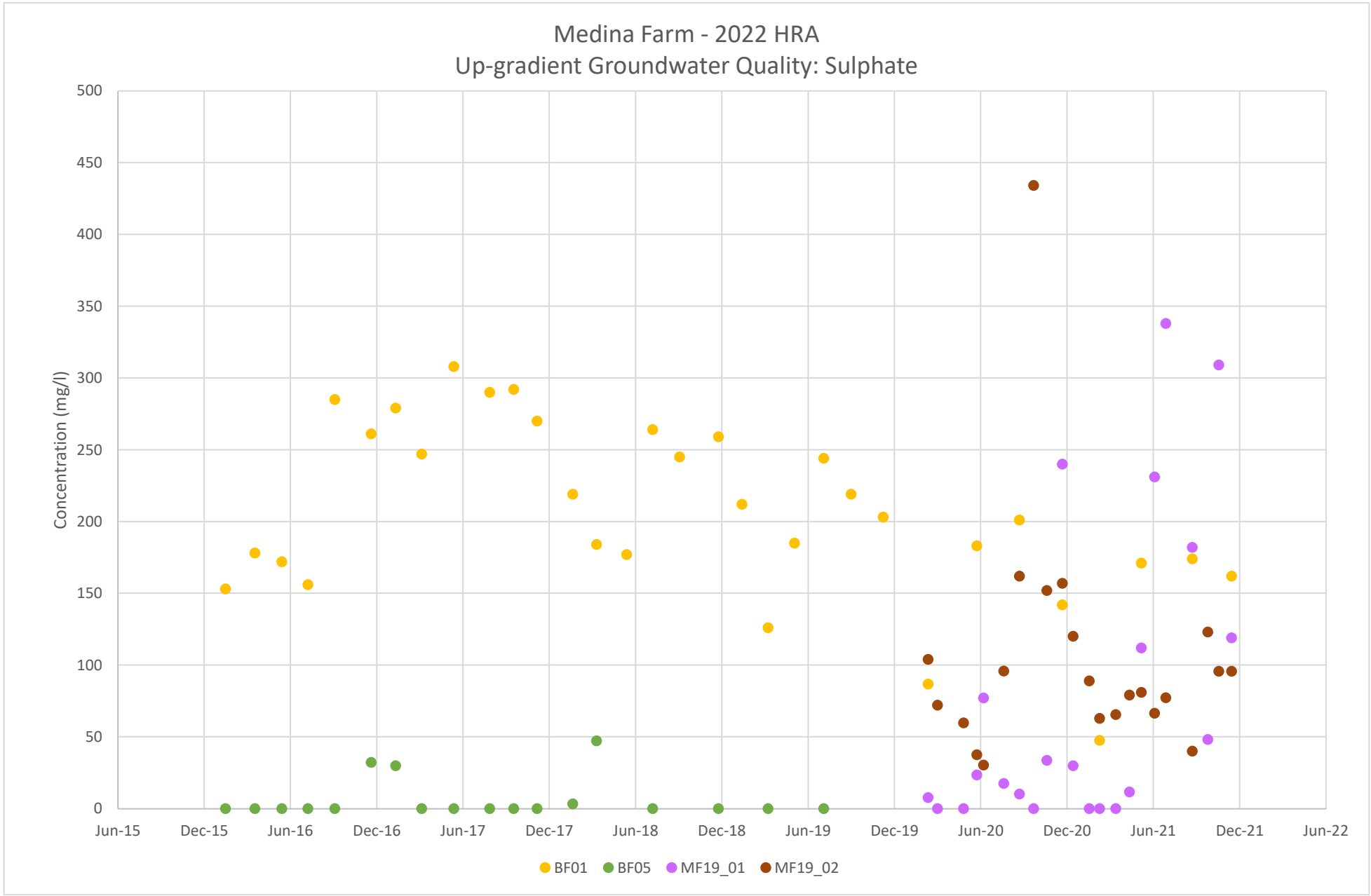

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Arsenic
Concentration (mg/l)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

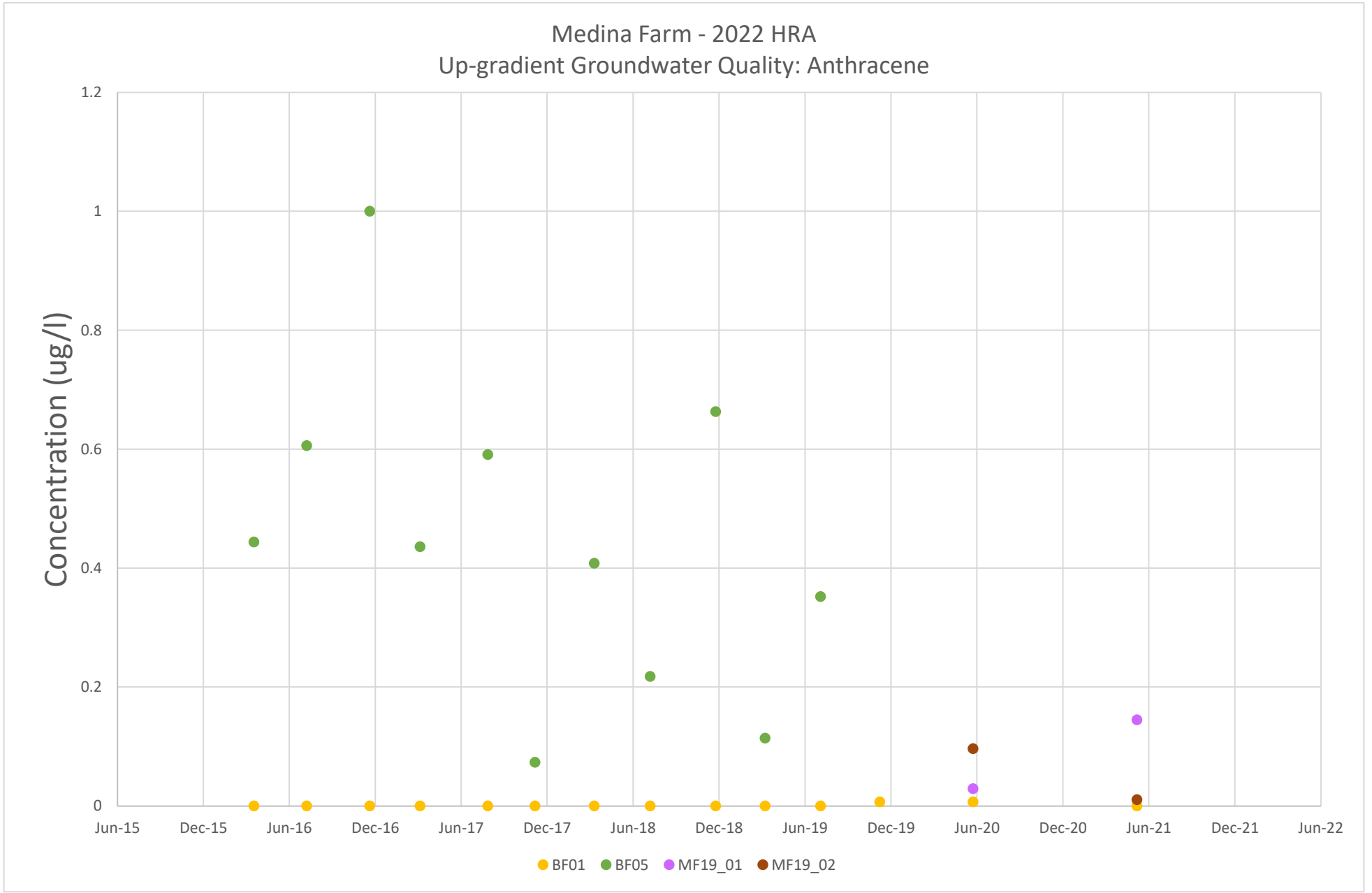

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Lead
Concentration (mg/l)
0.0025
0.002
0.0015
0.001
0.0005
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

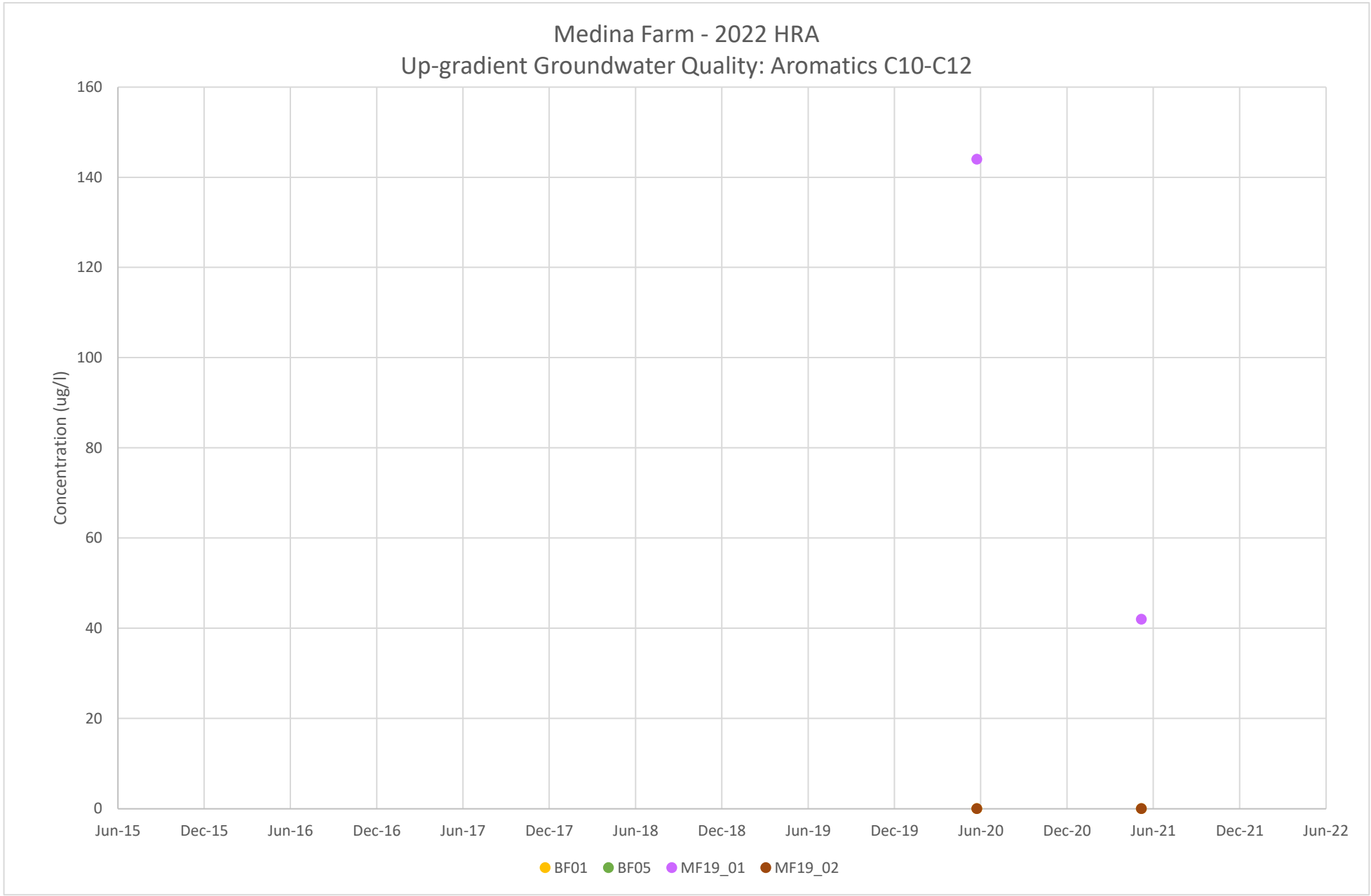

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Mercury
Concentration (mg/l)
0.000018
0.000016
0.000014
0.000012
0.00001
0.000008
0.000006
0.000004
0.000002
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

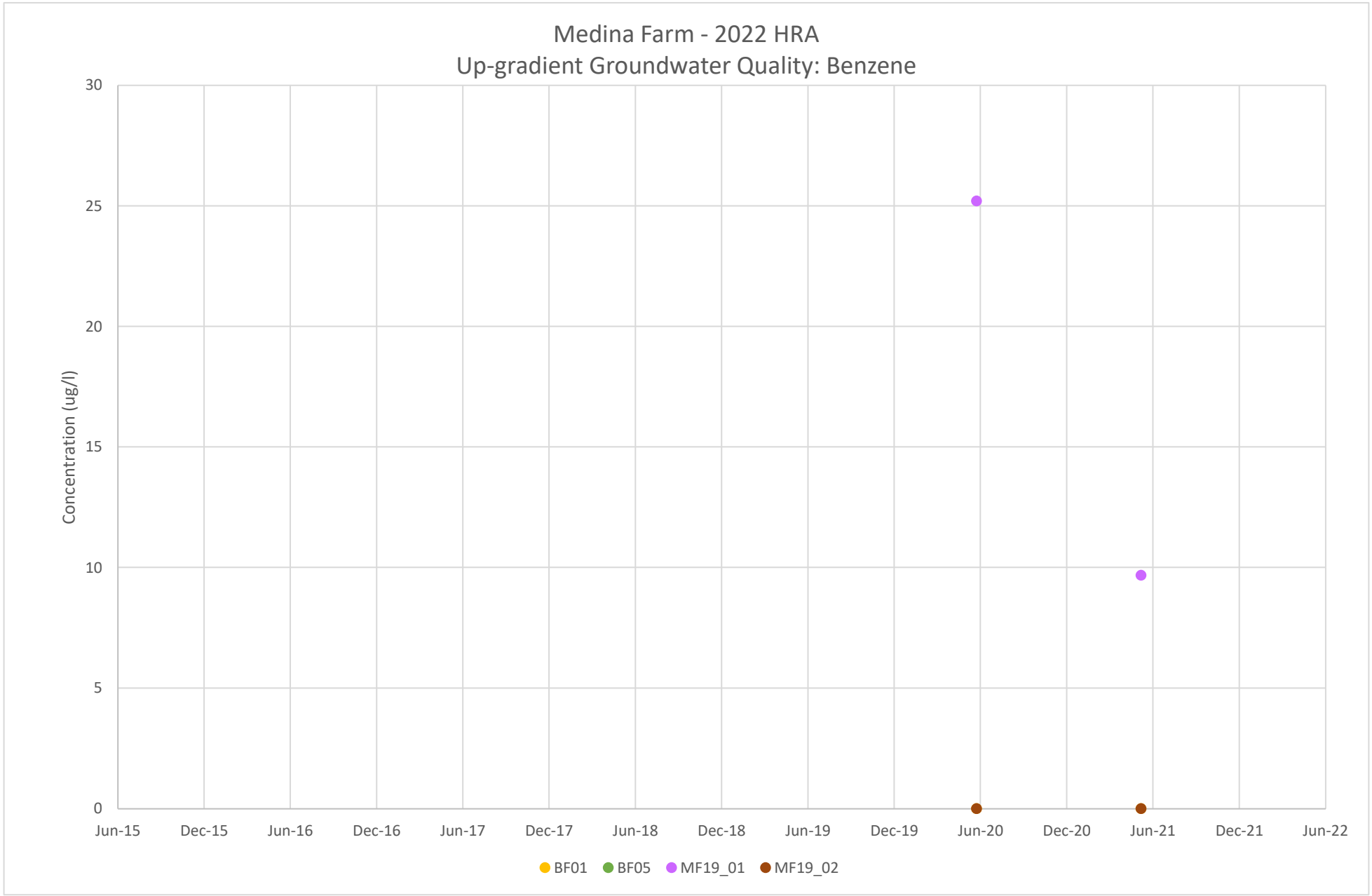

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Barium
Concentration (mg/l)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02


Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Nickel
Concentration (mg/l)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02


Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Sulphate
Concentration (mg/l)
500
450
400
350
300
250
200
150
100
50
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

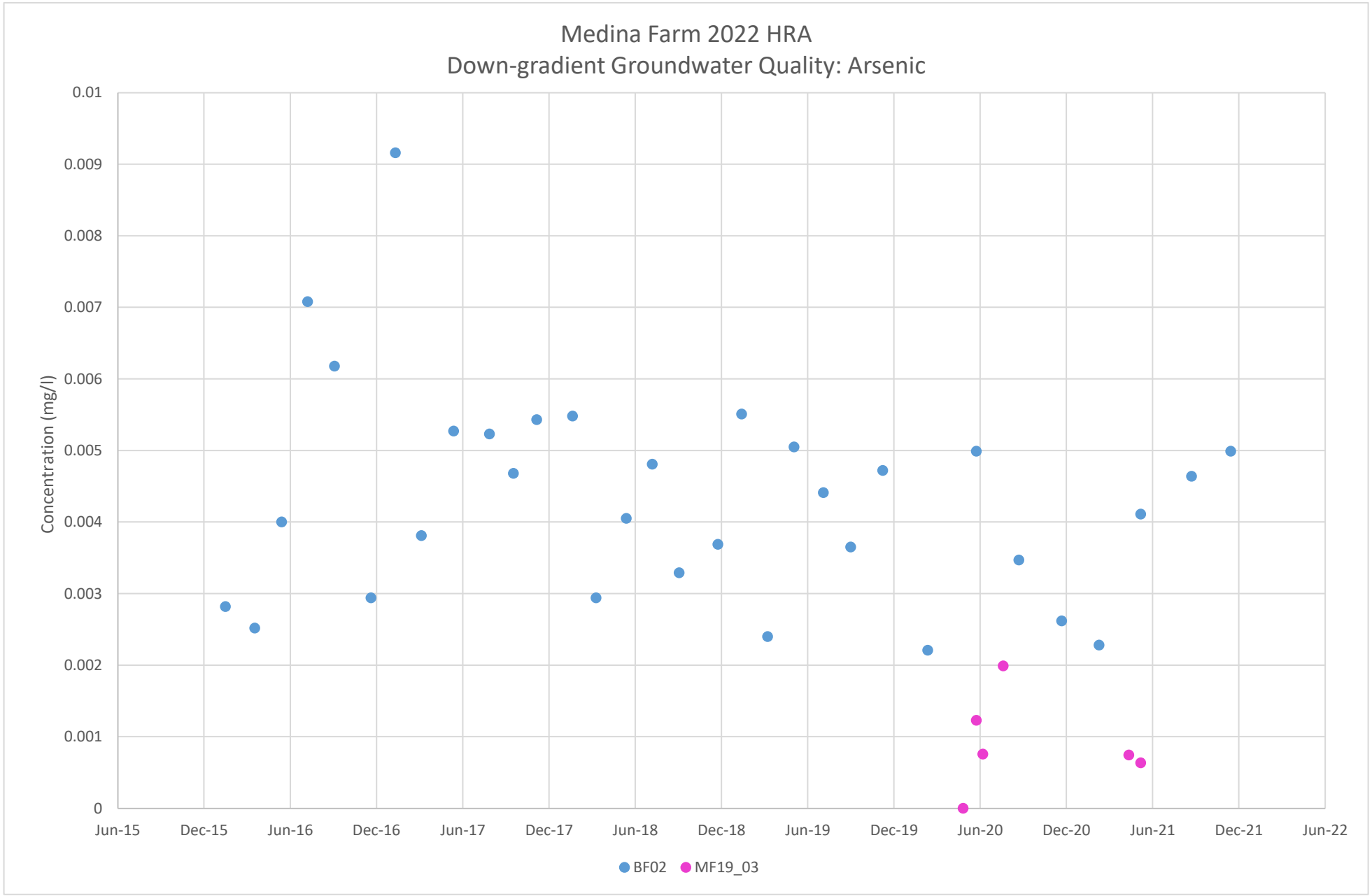

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Anthracene
Concentration (ug/l)
1.2
1
0.8
0.6
0.4
0.2
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

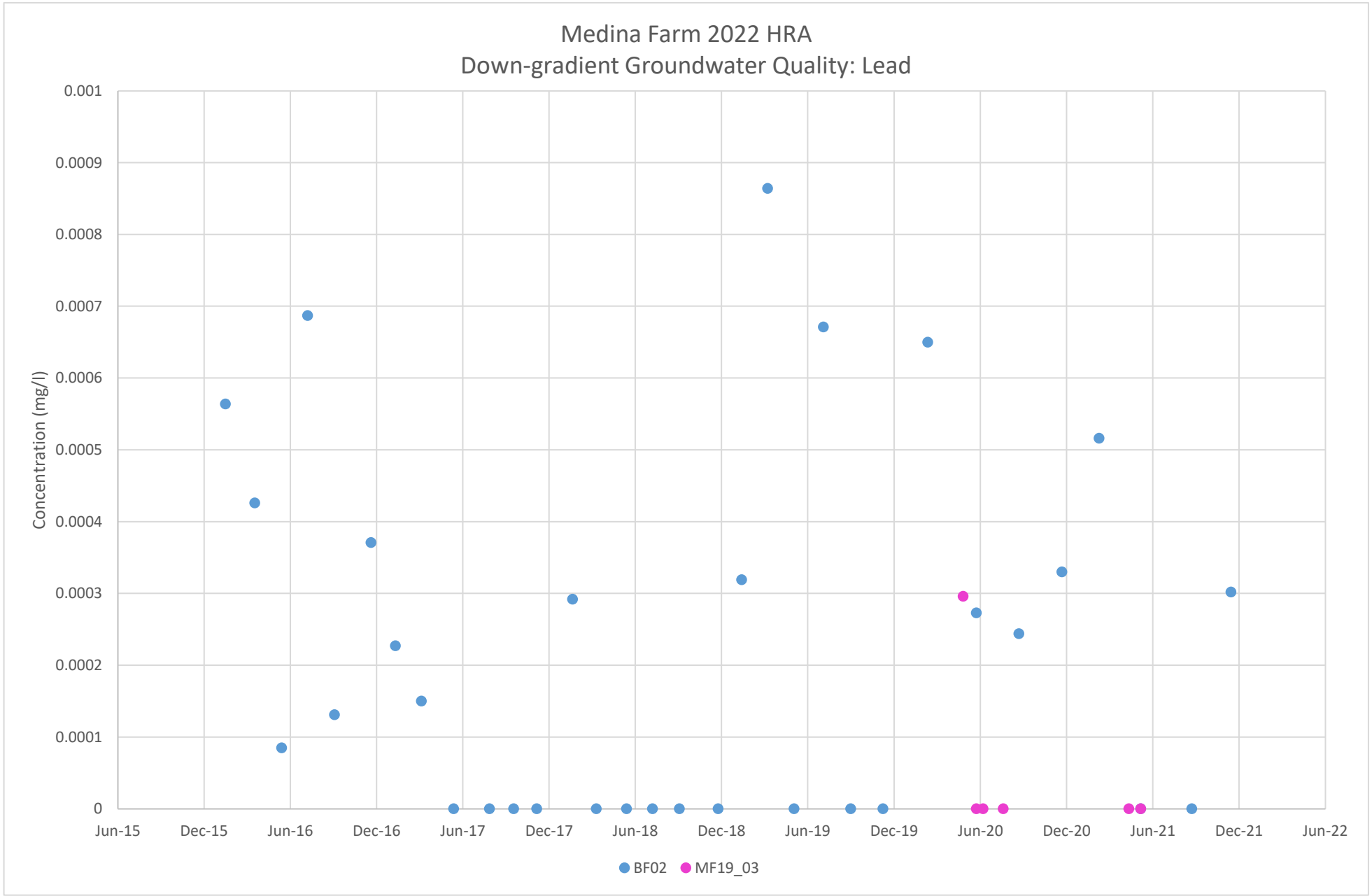

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Aromatics C10-C12
Concentration (ug/l)
160
140
120
100
80
60
40
20
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

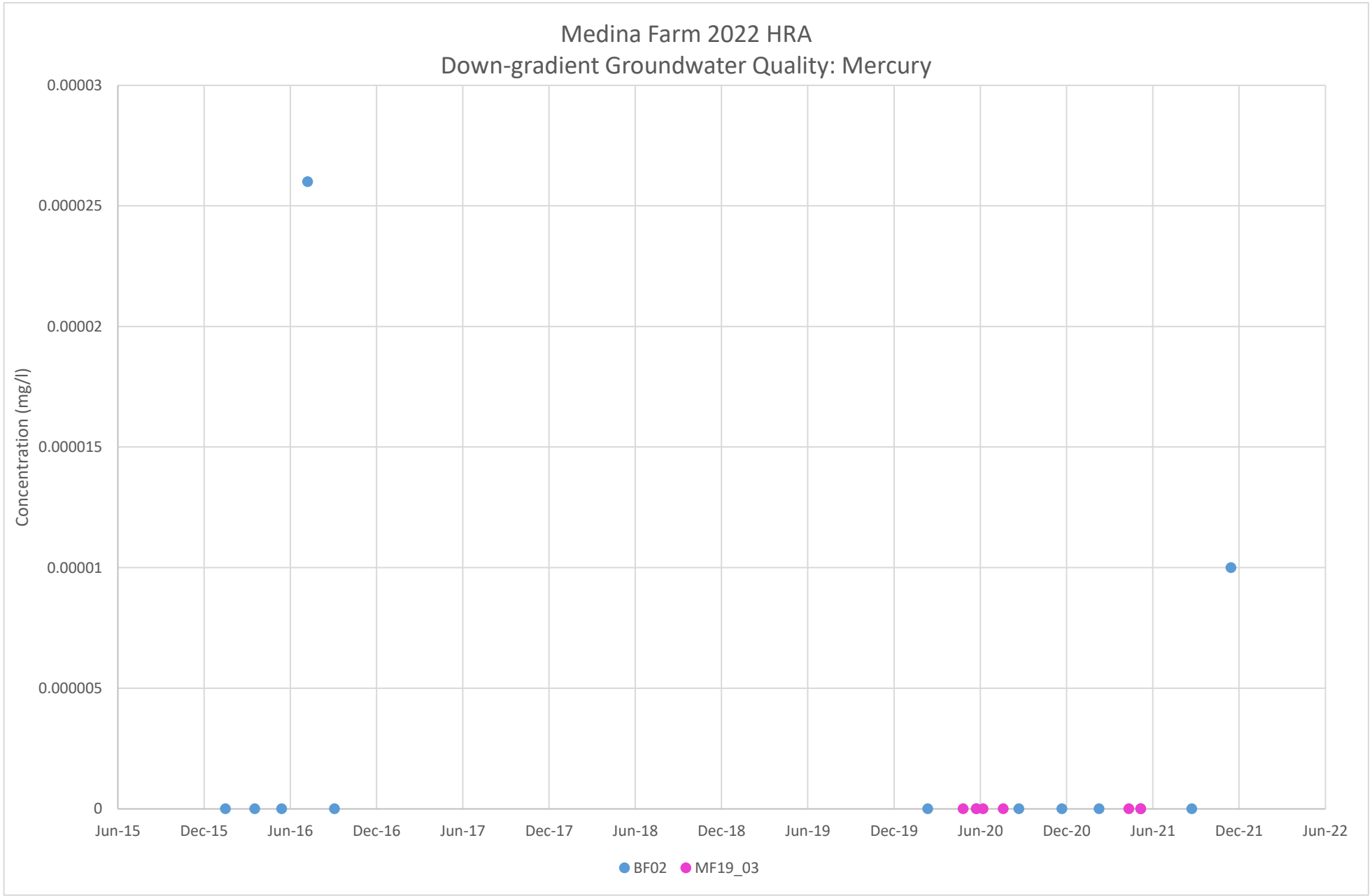

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Benzene
Concentration (ug/l)
30
25
20
15
10
5
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

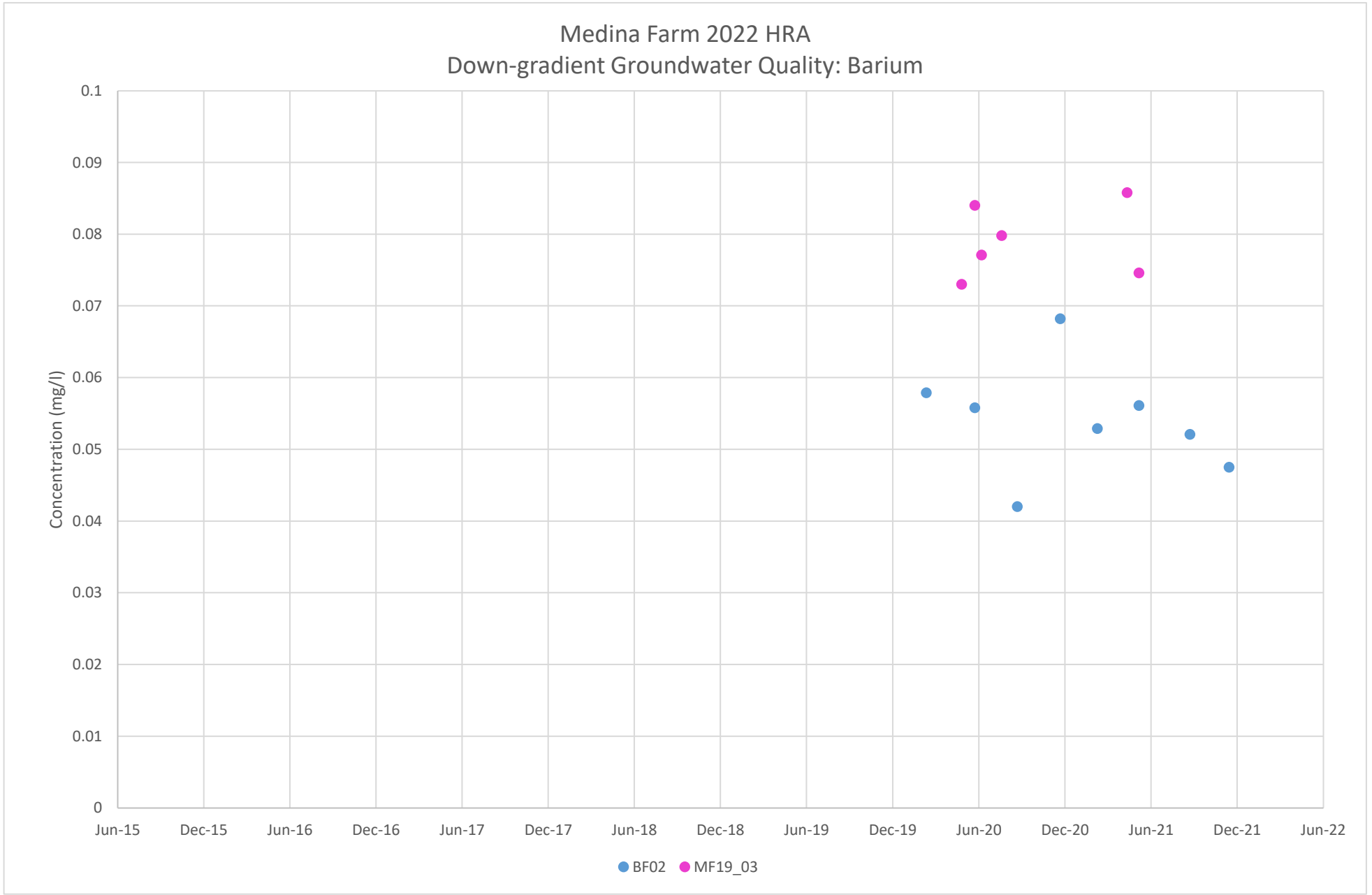
APPENDIX 04

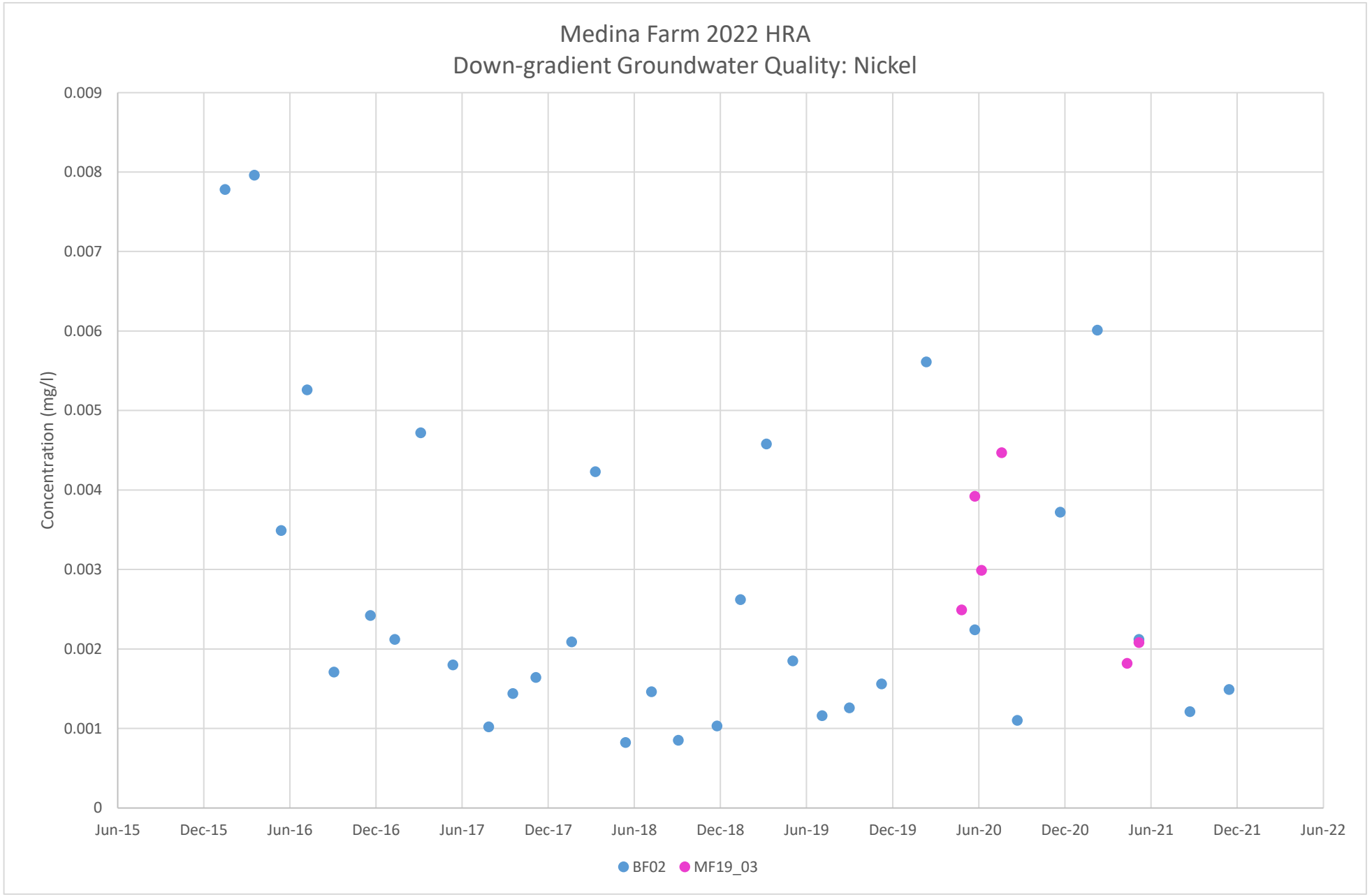
Down-gradient Groundwater Quality Time-Series Graphs

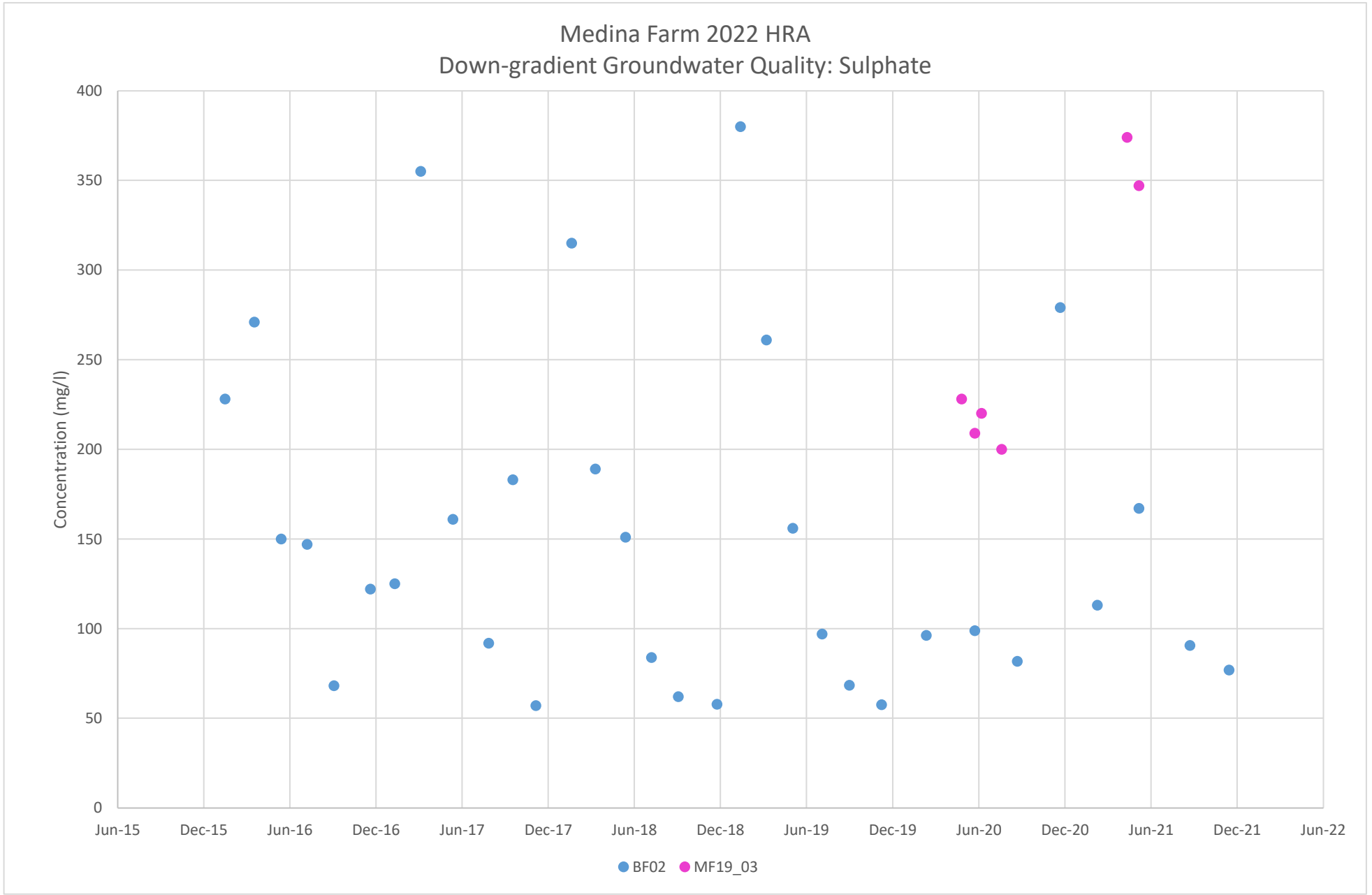

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Arsenic
Concentration (mg/l)
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

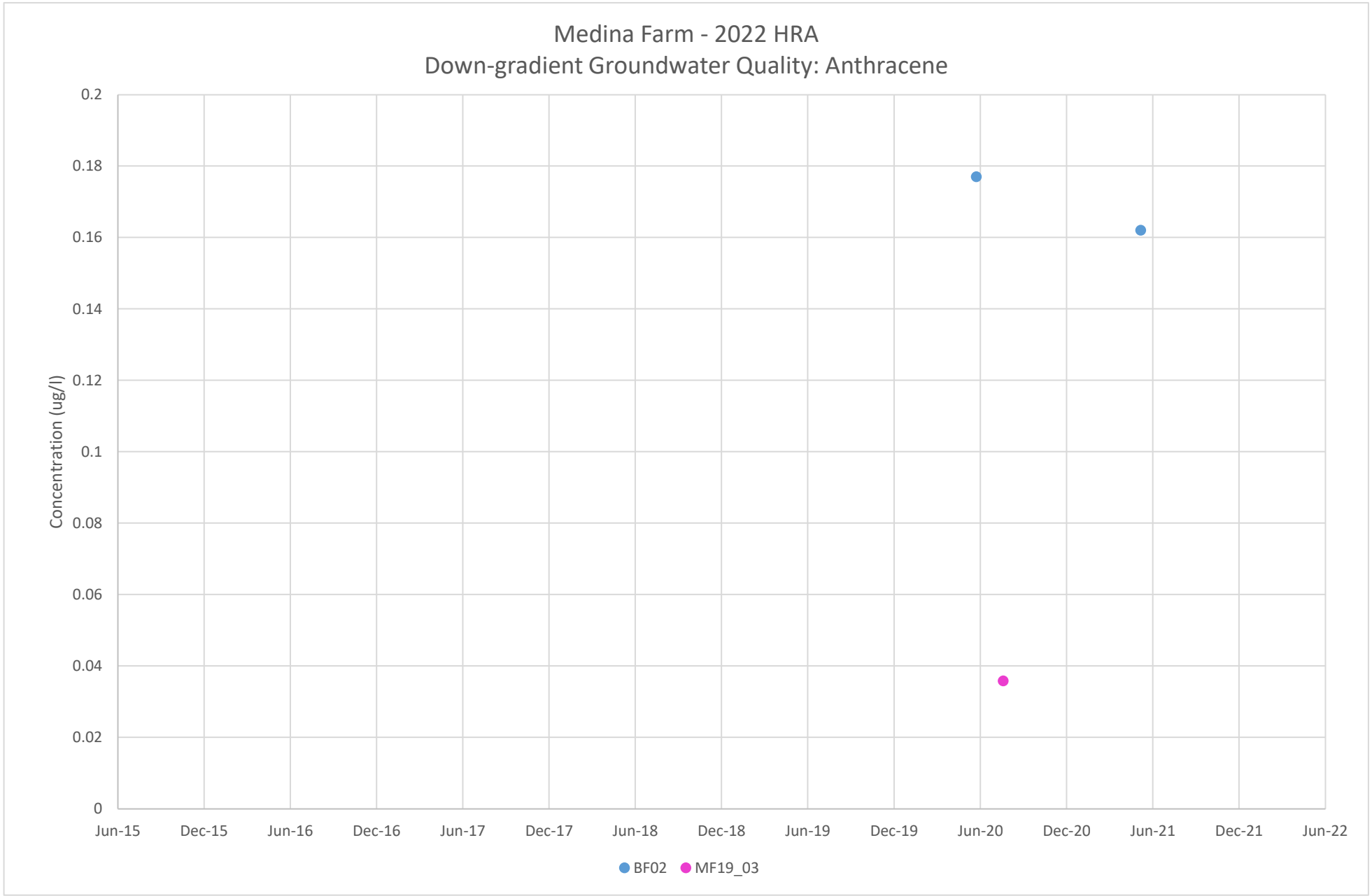

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Lead
Concentration (mg/l)
0.001
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

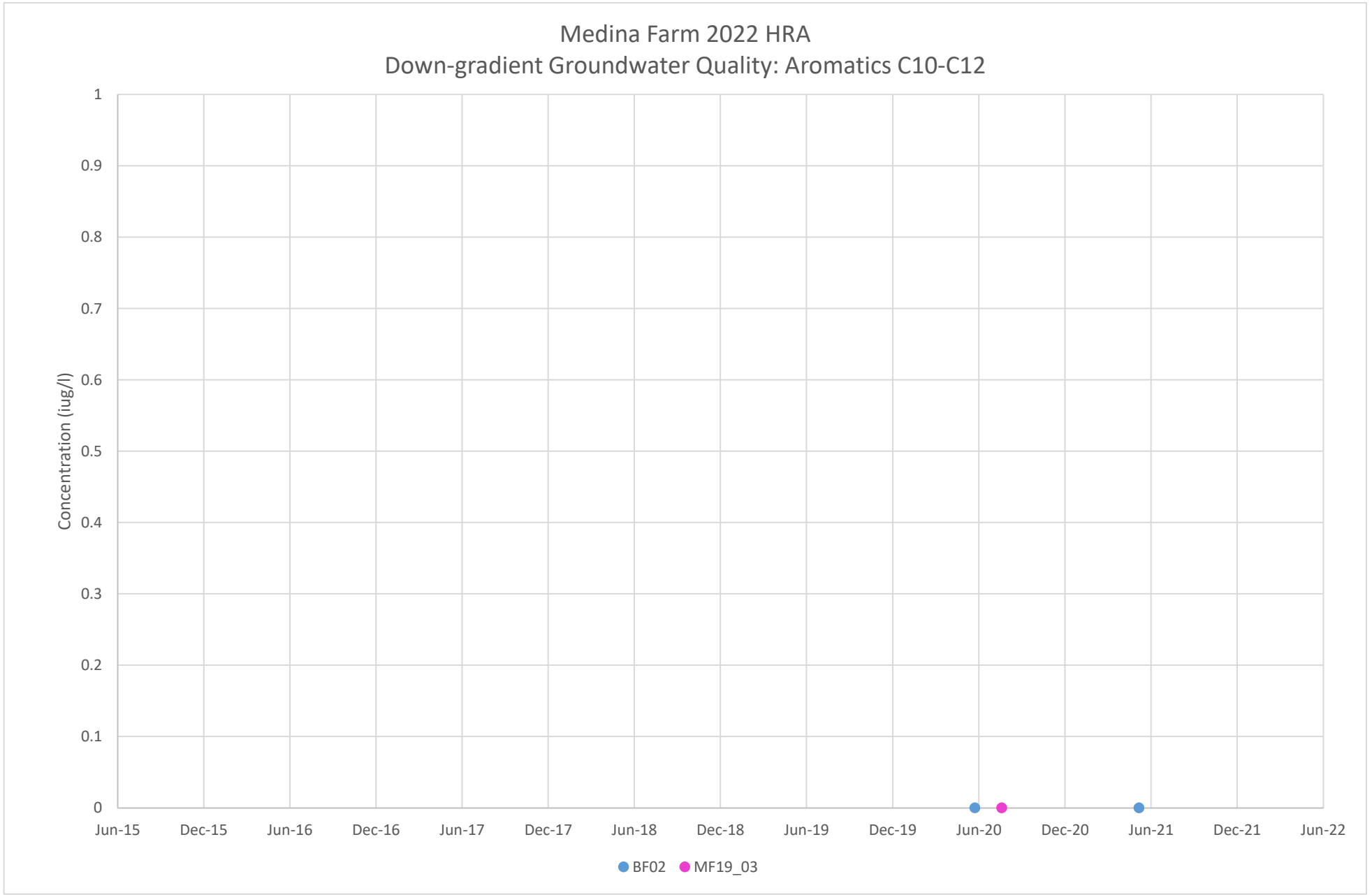

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Mercury
Concentration (mg/l)
0.00003
0.000025
0.00002
0.000015
0.00001
0.000005
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

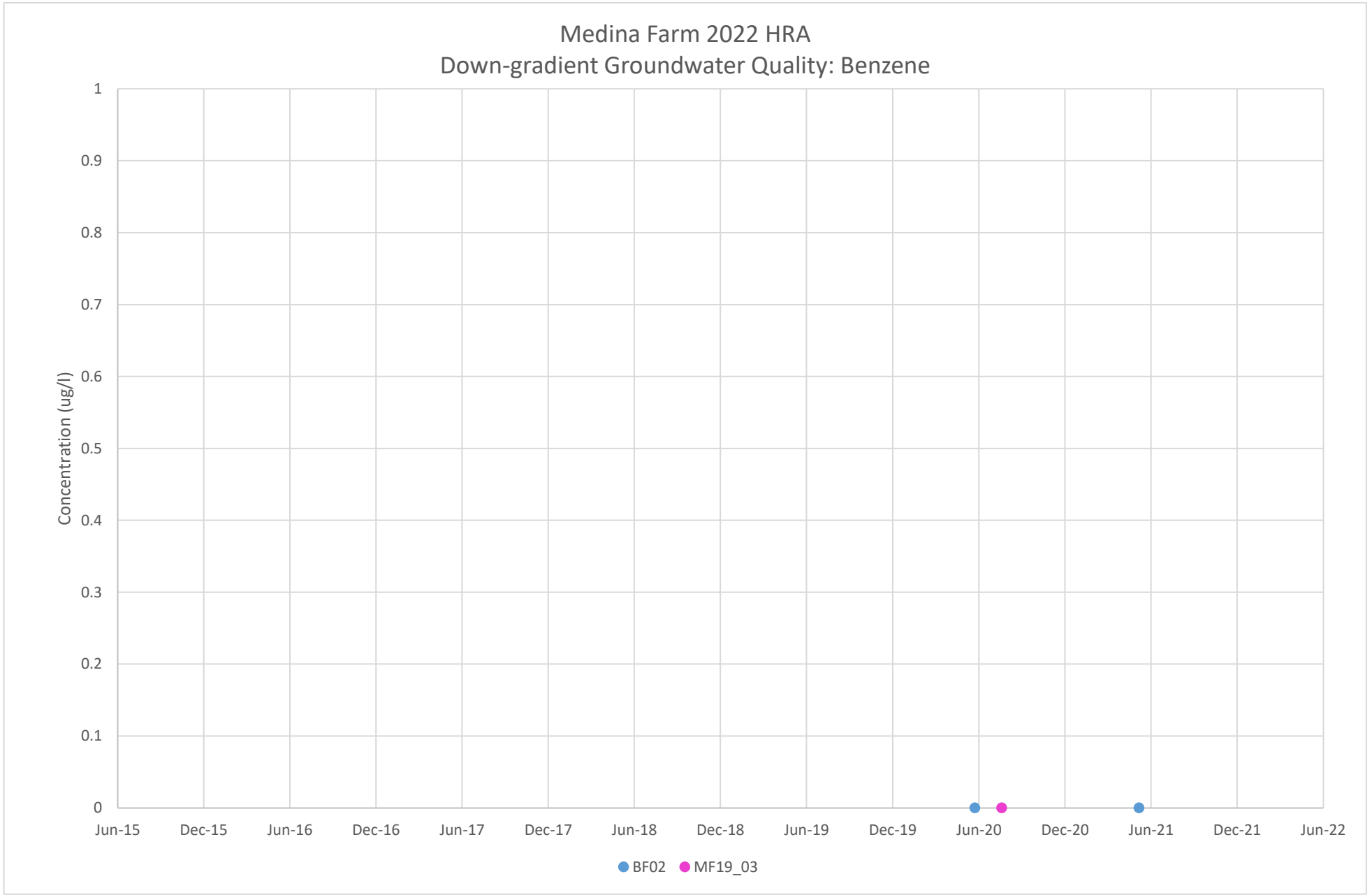

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Barium
Concentration (mg/l)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03


Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Nickel
Concentration (mg/l)
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03


Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Sulphate
Concentration (mg/l)
400
350
300
250
200
150
100
50
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

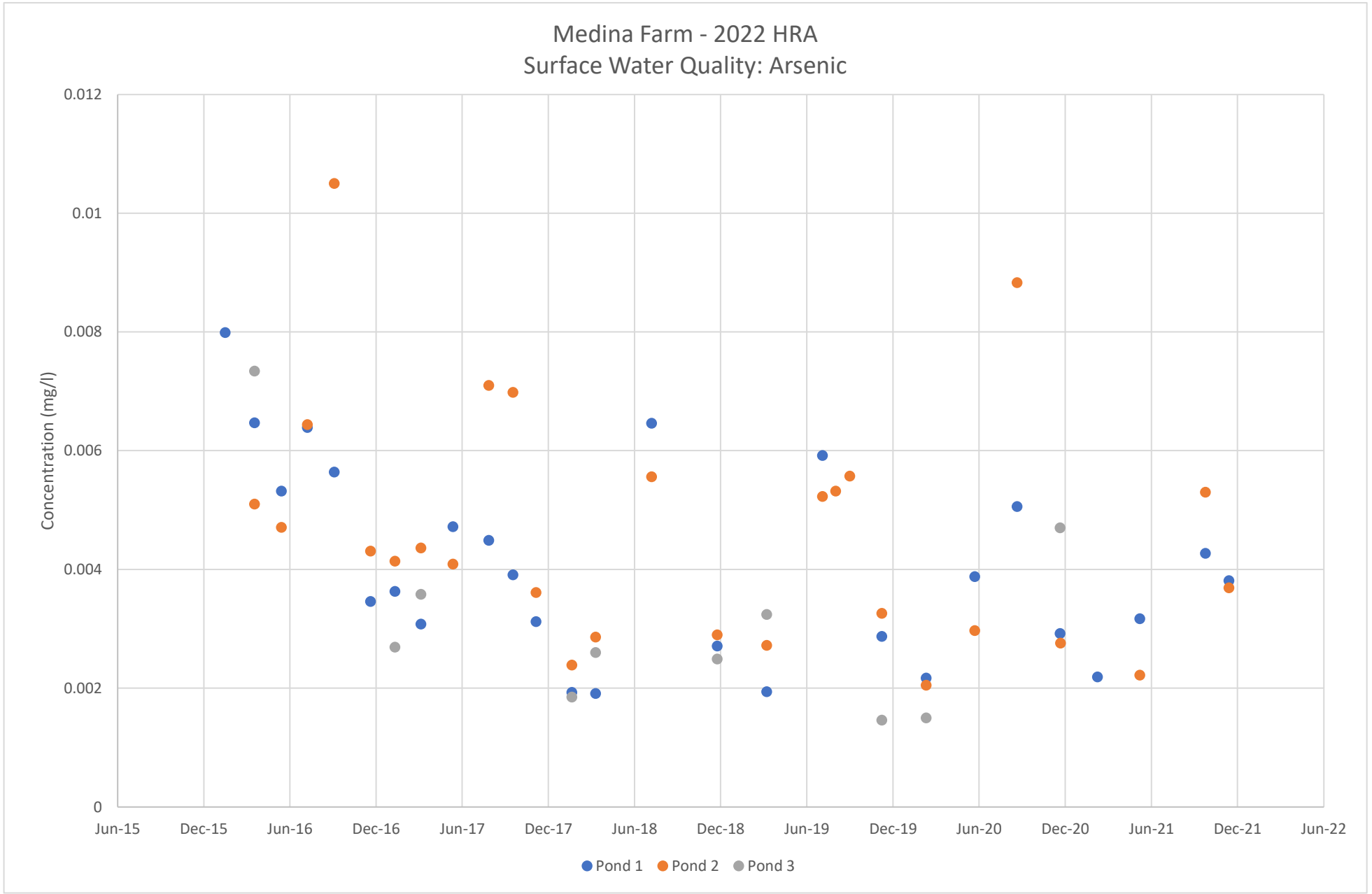

Medina Farm - 2022 HRA
Down-gradient Groundwater Quality: Anthracene
Concentration (ug/l)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

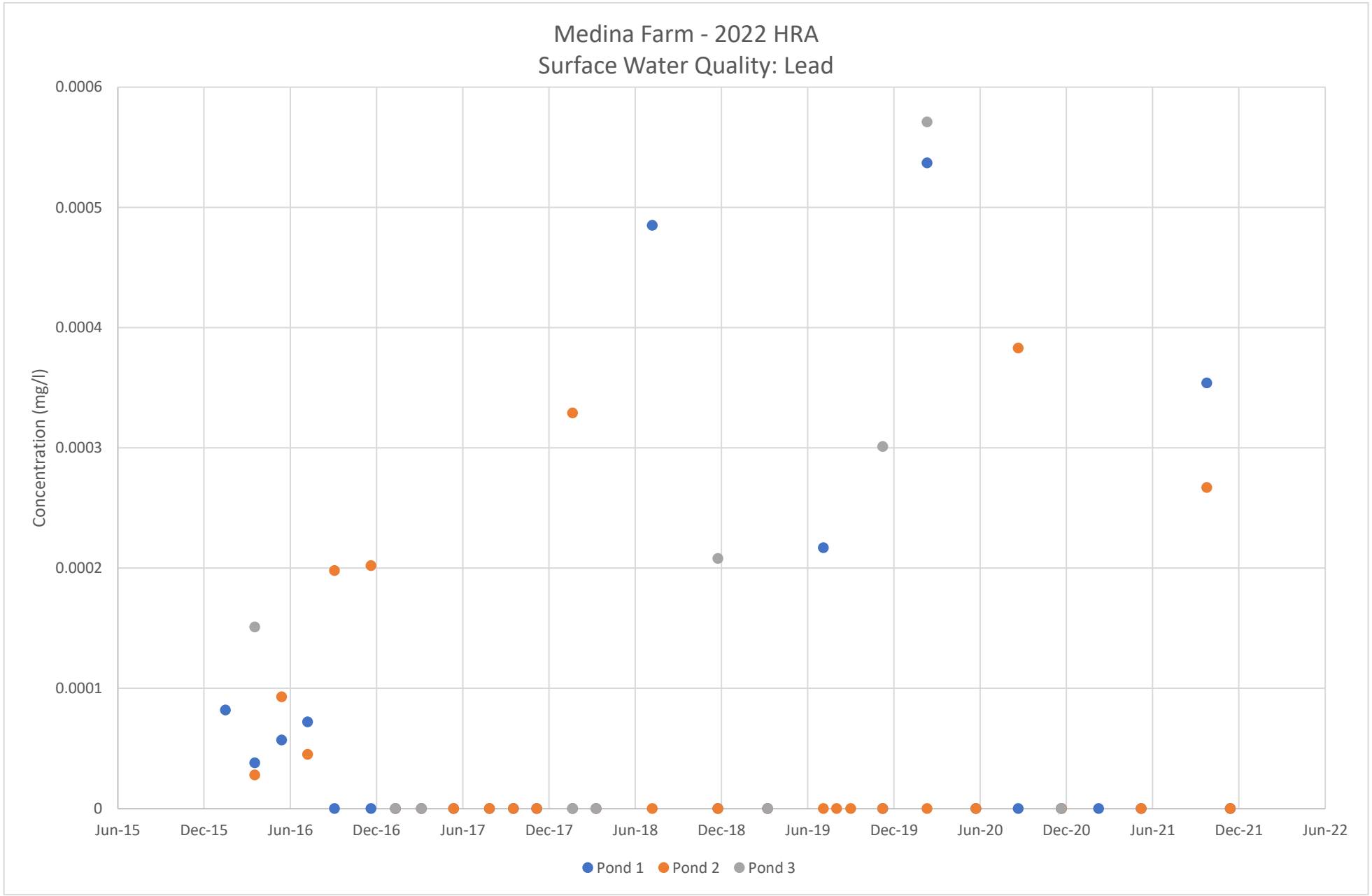

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Aromatics C10-C12
Concentration (iug/l)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

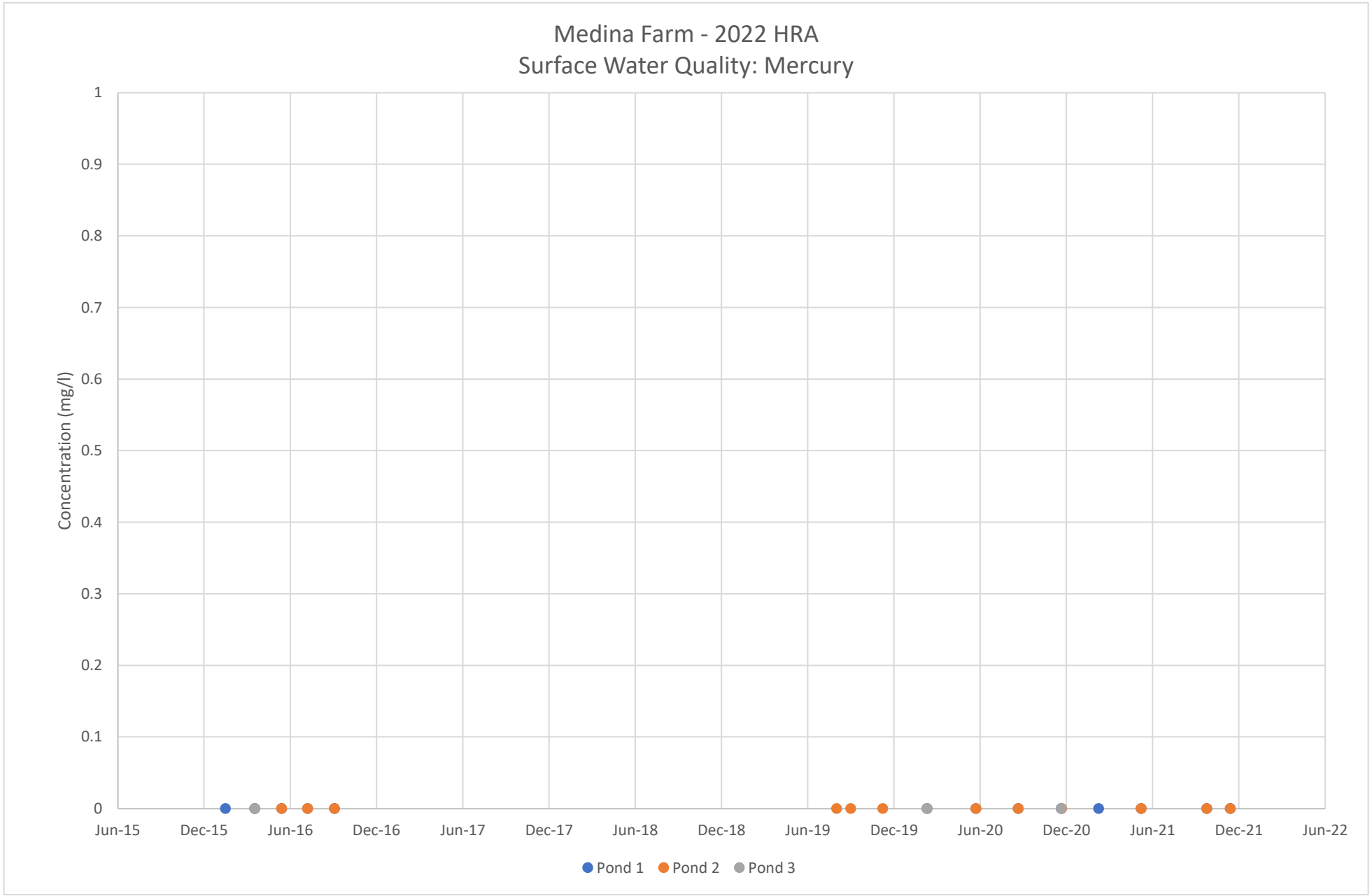

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Benzene
Concentration (ug/l)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

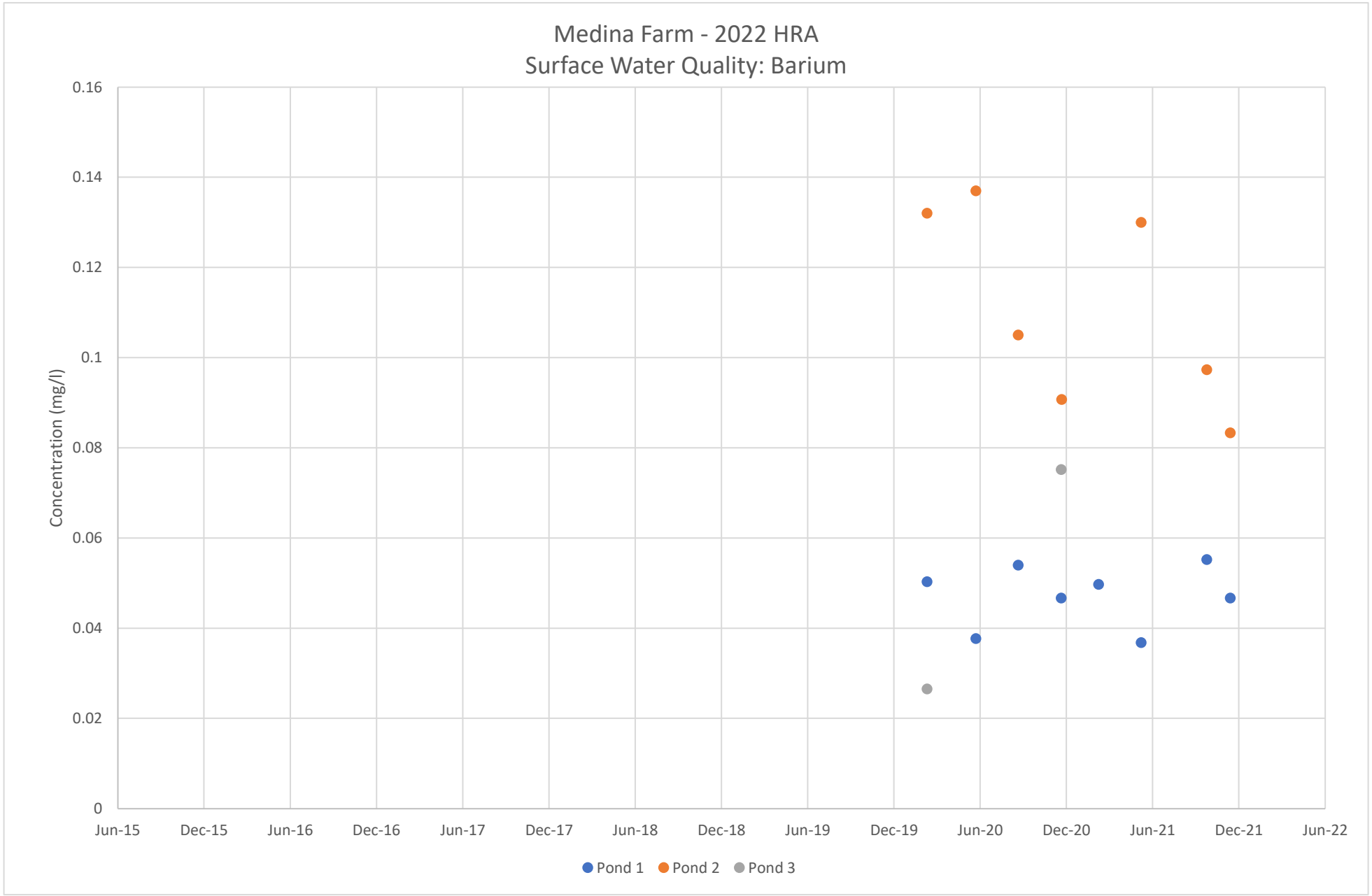
APPENDIX 05

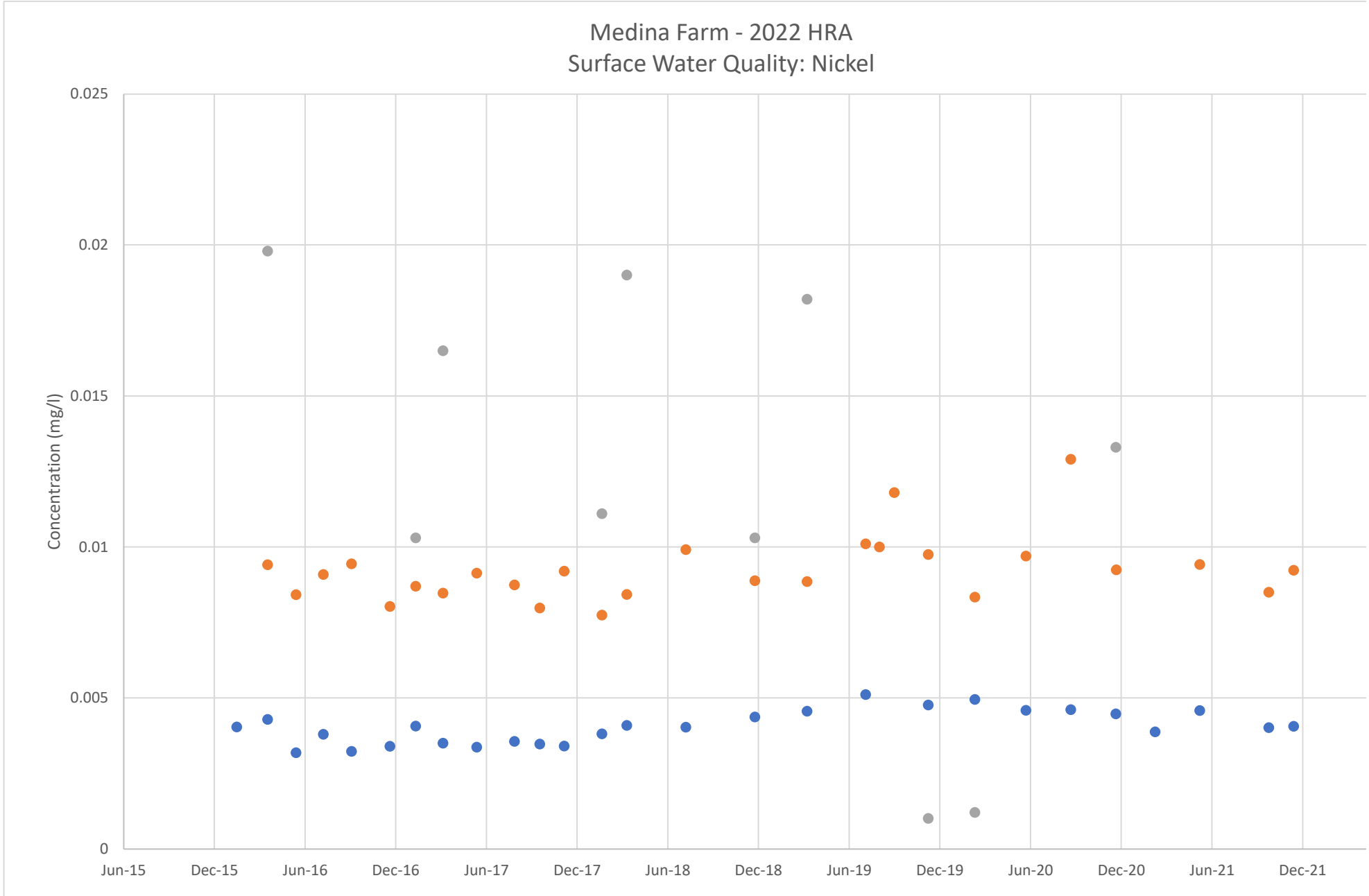
Surface Water Quality Time-Series Graphs

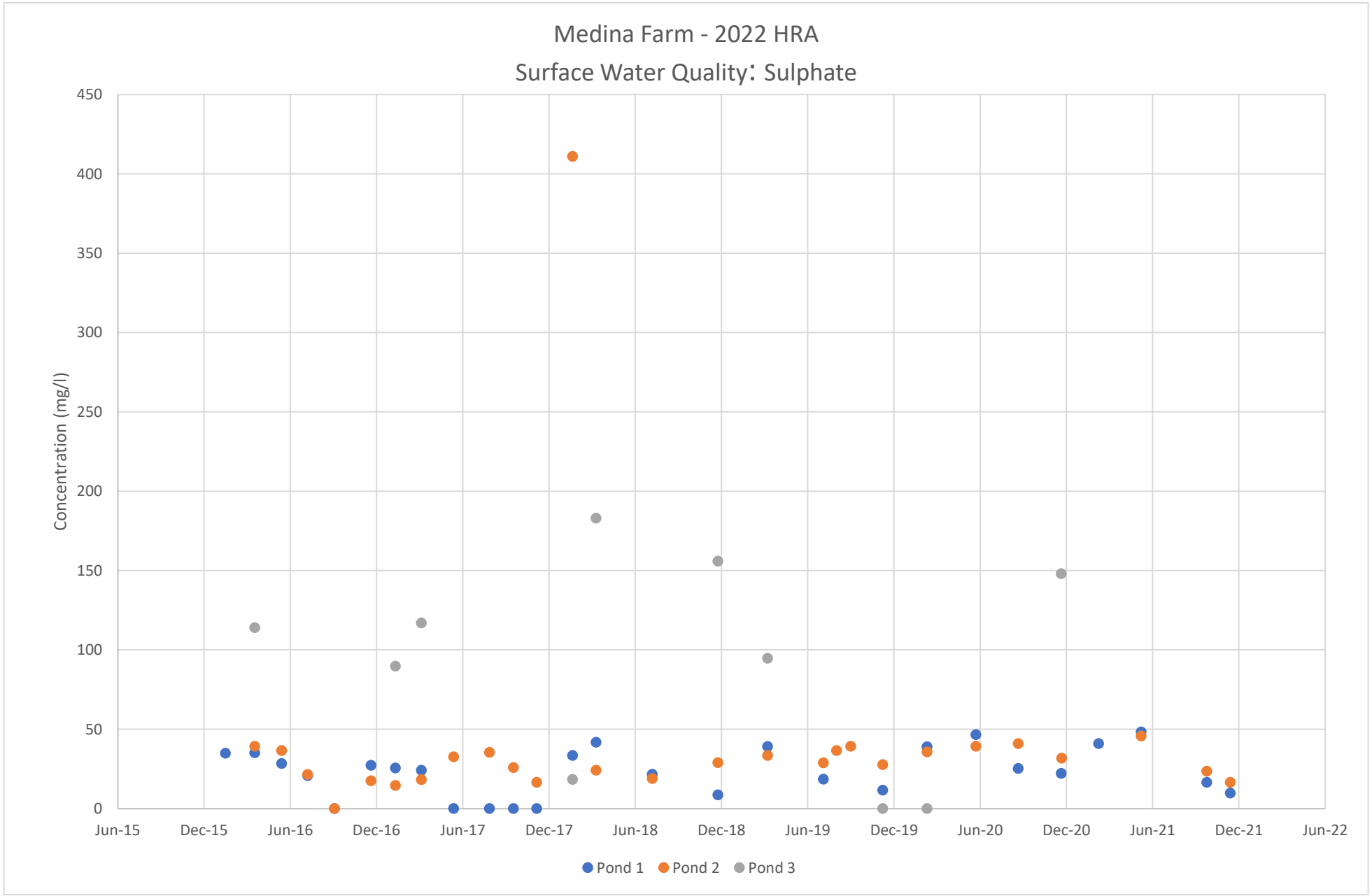

Medina Farm - 2022 HRA
Surface Water Quality: Arsenic
Concentration (mg/l)
0.012
0.01
0.008
0.006
0.004
0.002
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Pond 1
Pond 2
Pond 3

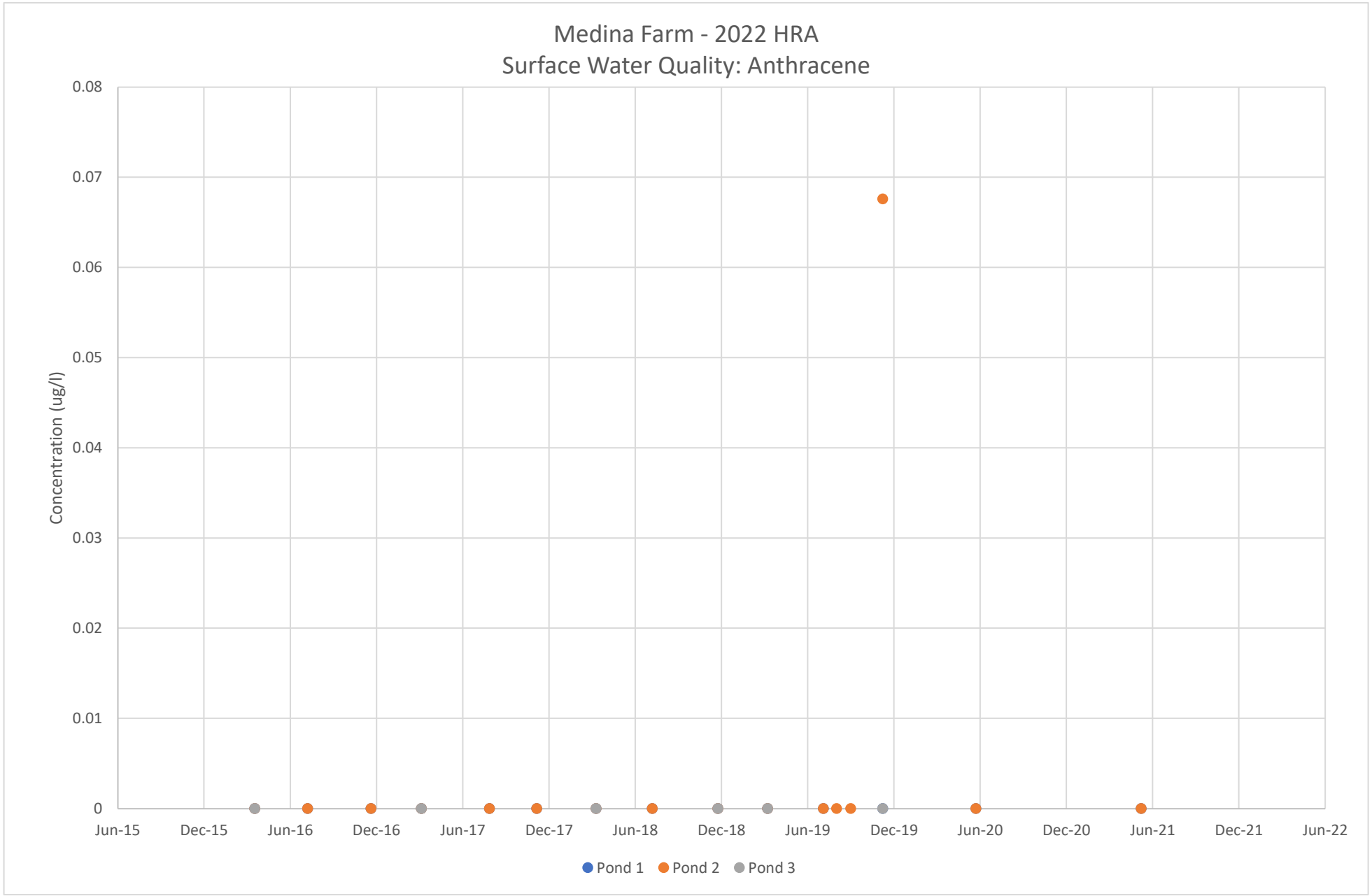

Medina Farm - 2022 HRA
Surface Water Quality: Lead
Concentration (mg/l)
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Pond 1
Pond 2
Pond 3

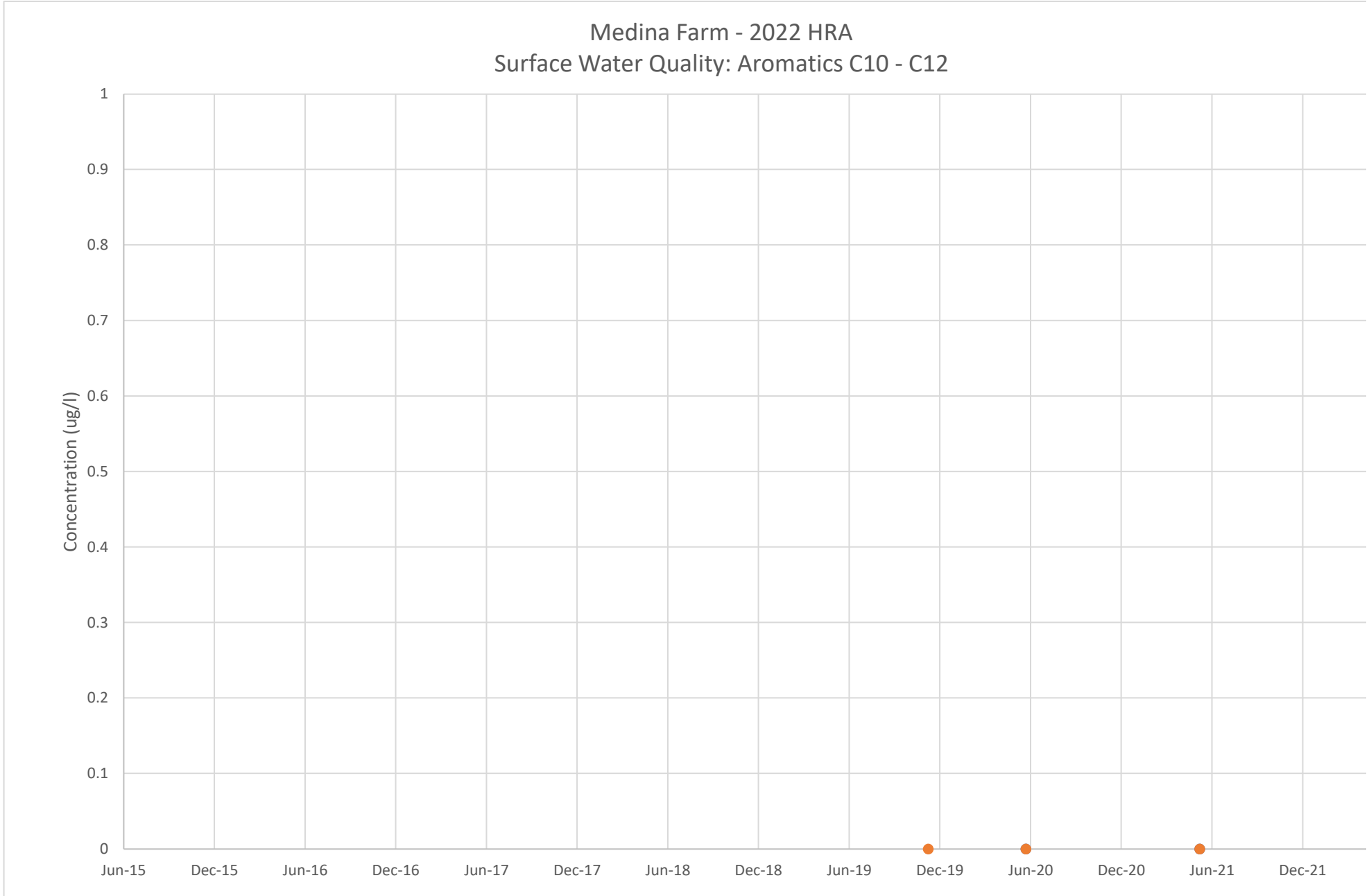

Medina Farm - 2022 HRA
Surface Water Quality: Mercury
Concentration (mg/l)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Pond 1
Pond 2
Pond 3

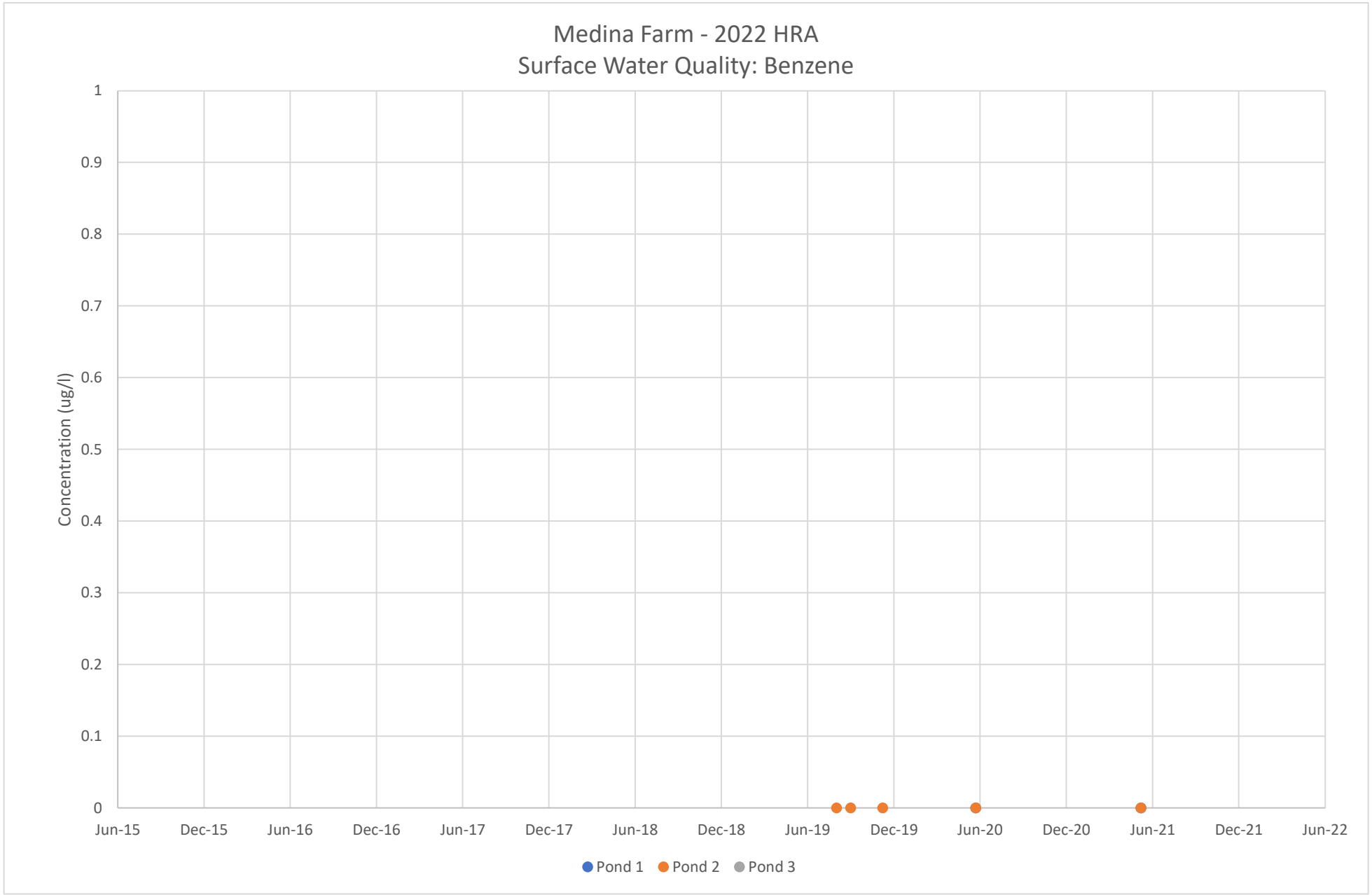

Medina Farm - 2022 HRA
Surface Water Quality: Barium
Concentration (mg/l)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Pond 1
Pond 2
Pond 3


Medina Farm - 2022 HRA
Surface Water Quality: Nickel
Concentration (mg/l)
0.025
0.02
0.015
0.01
0.005
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21


Medina Farm - 2022 HRA
Surface Water Quality: Sulphate
Concentration (mg/l)
450
400
350
300
250
200
150
100
50
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Pond 1
Pond 2
Pond 3

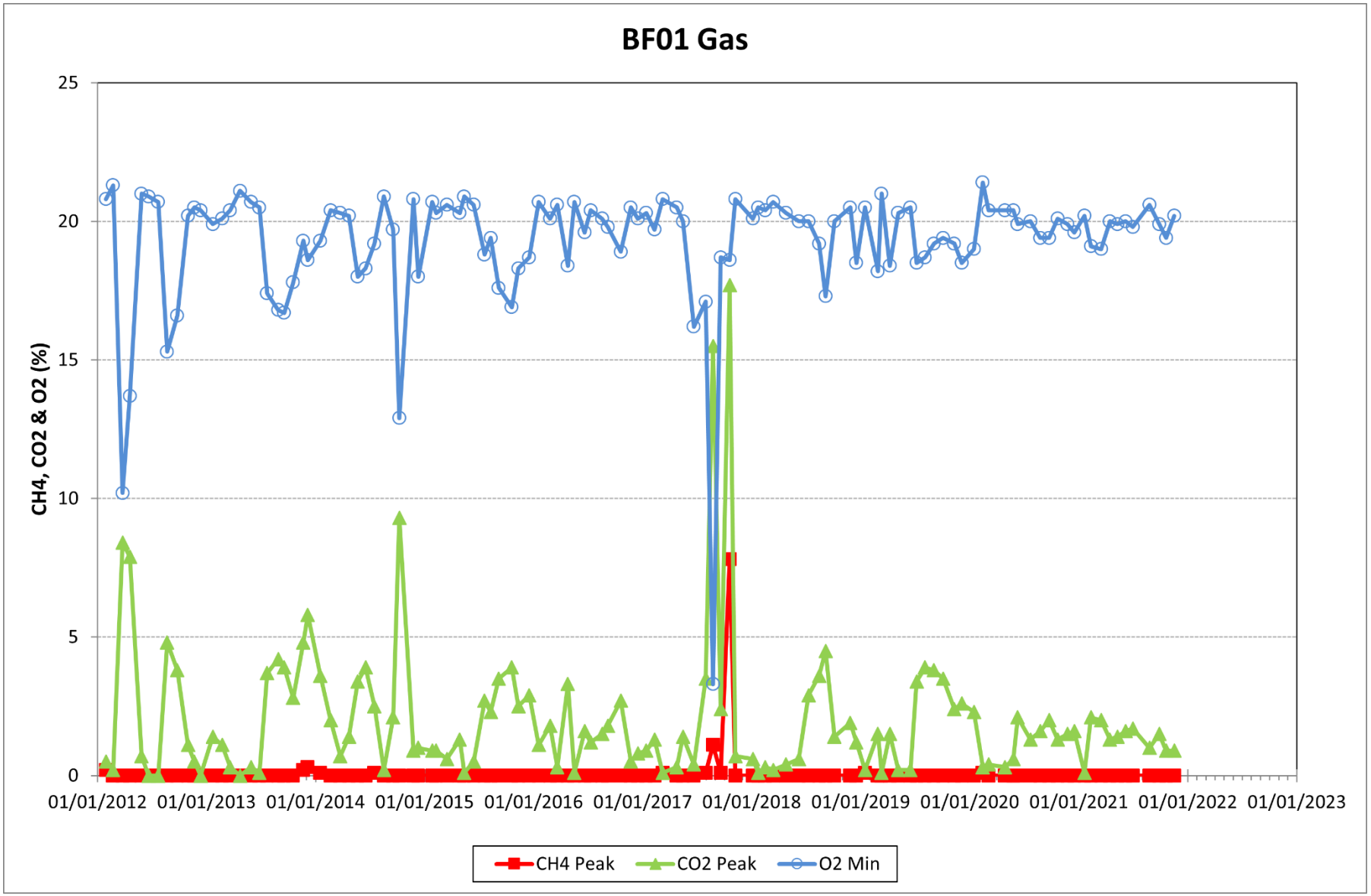

Medina Farm - 2022 HRA
Surface Water Quality: Anthracene
Concentration (ug/l)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Pond 1
Pond 2
Pond 3

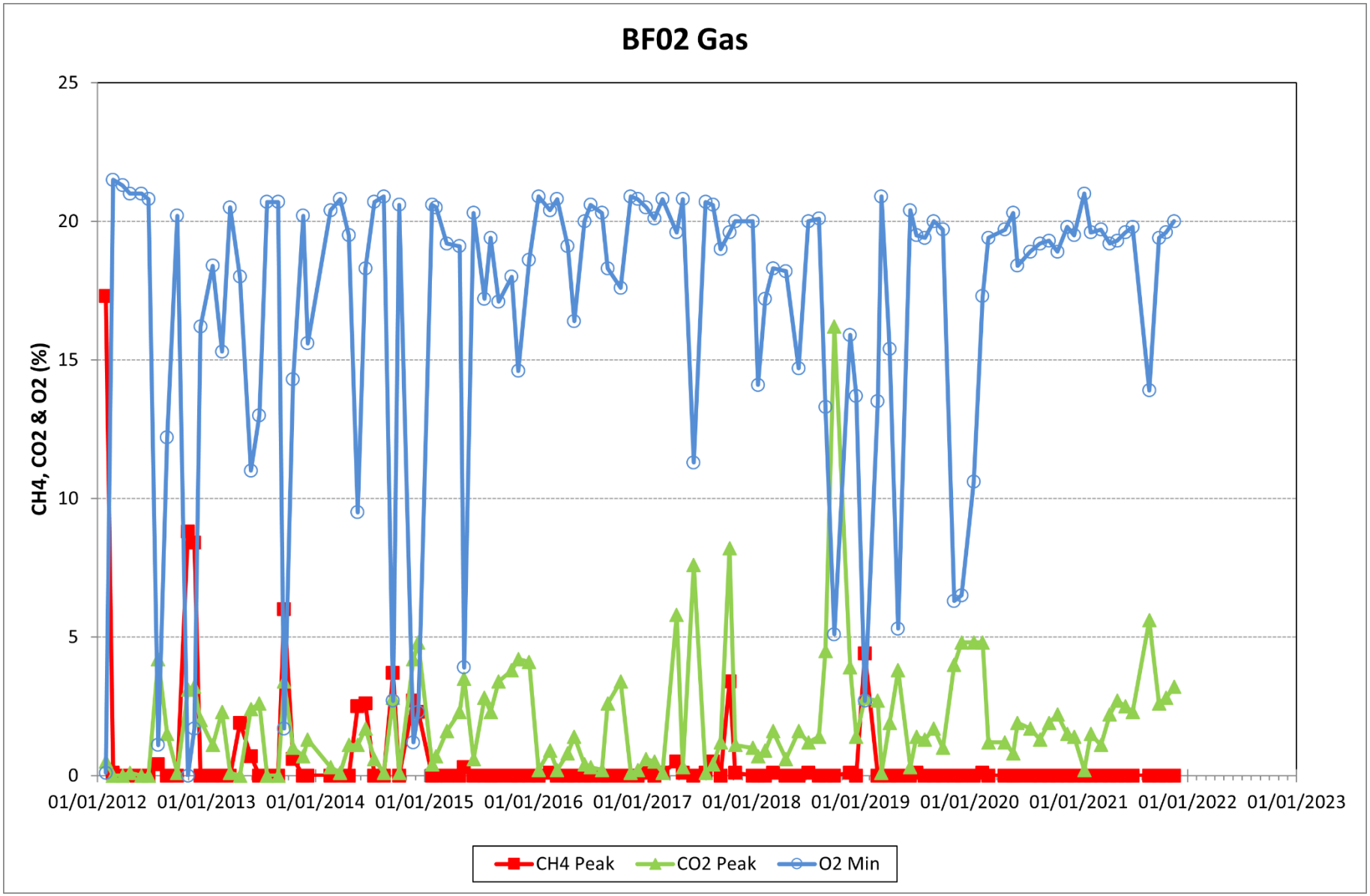

Medina Farm - 2022 HRA
Surface Water Quality: Aromatics C10 - C12
Concentration (ug/l)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21

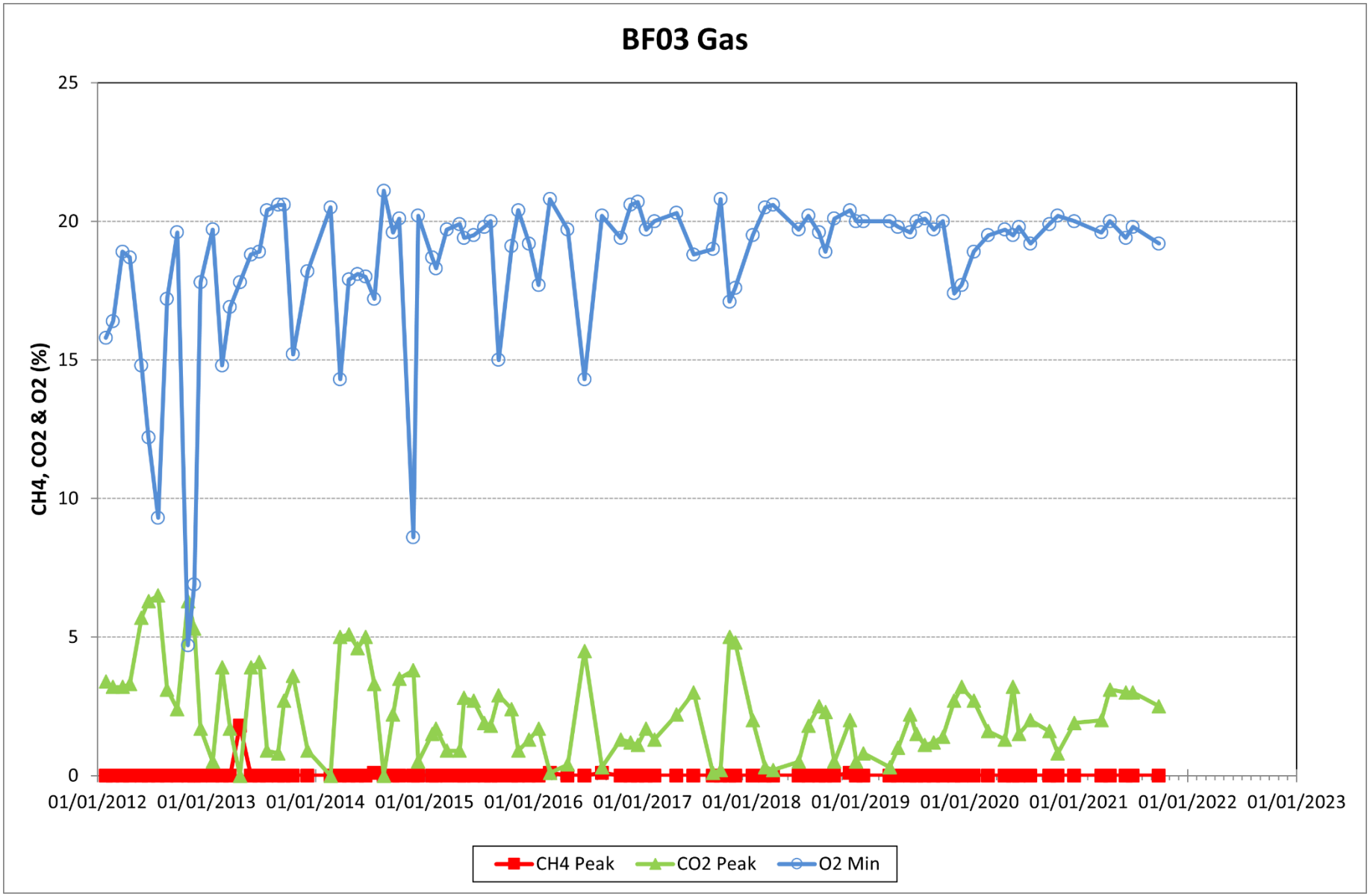

Medina Farm - 2022 HRA
Surface Water Quality: Benzene
Concentration (ug/l)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
Pond 1
Pond 2
Pond 3

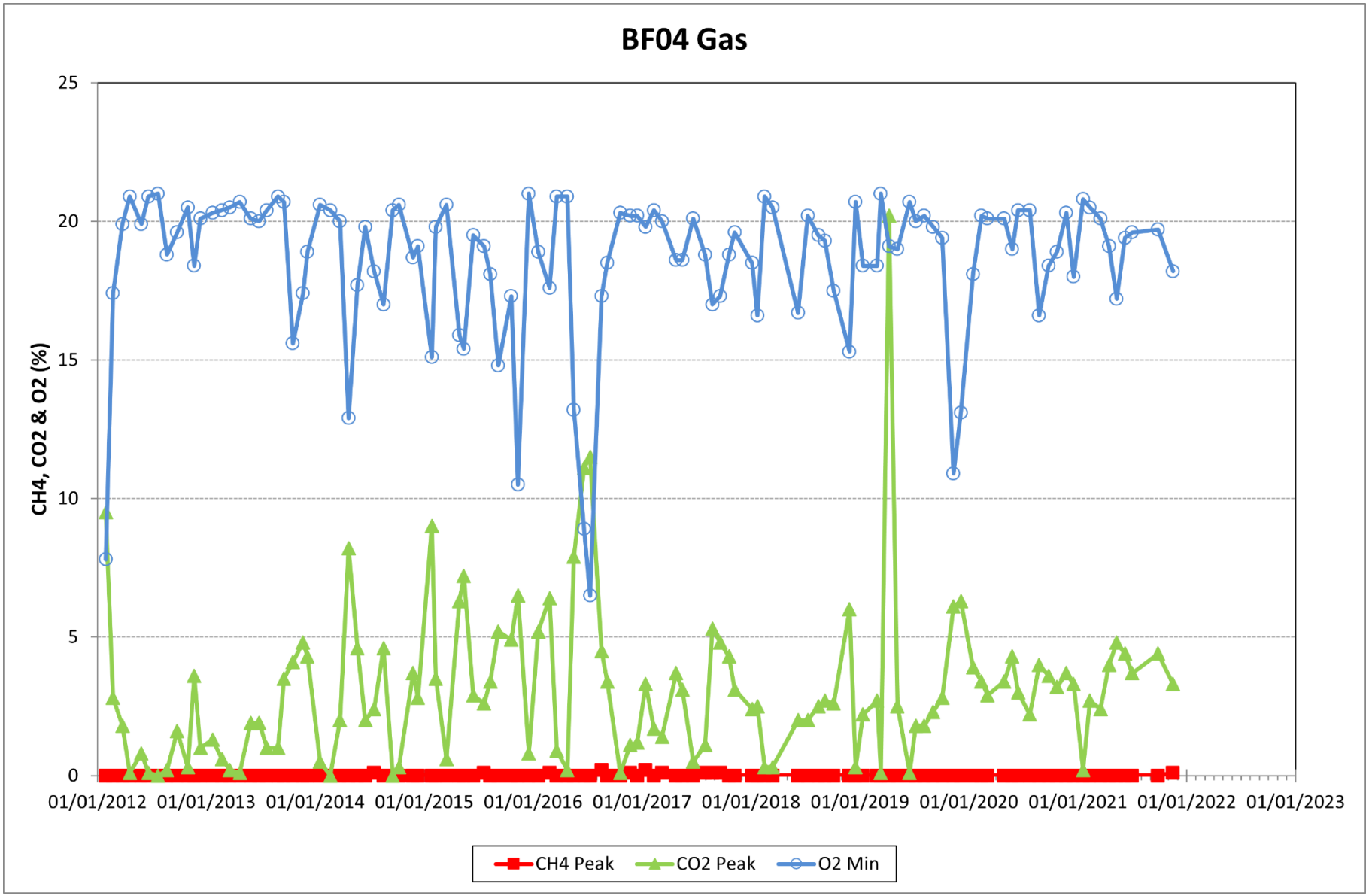
APPENDIX 06

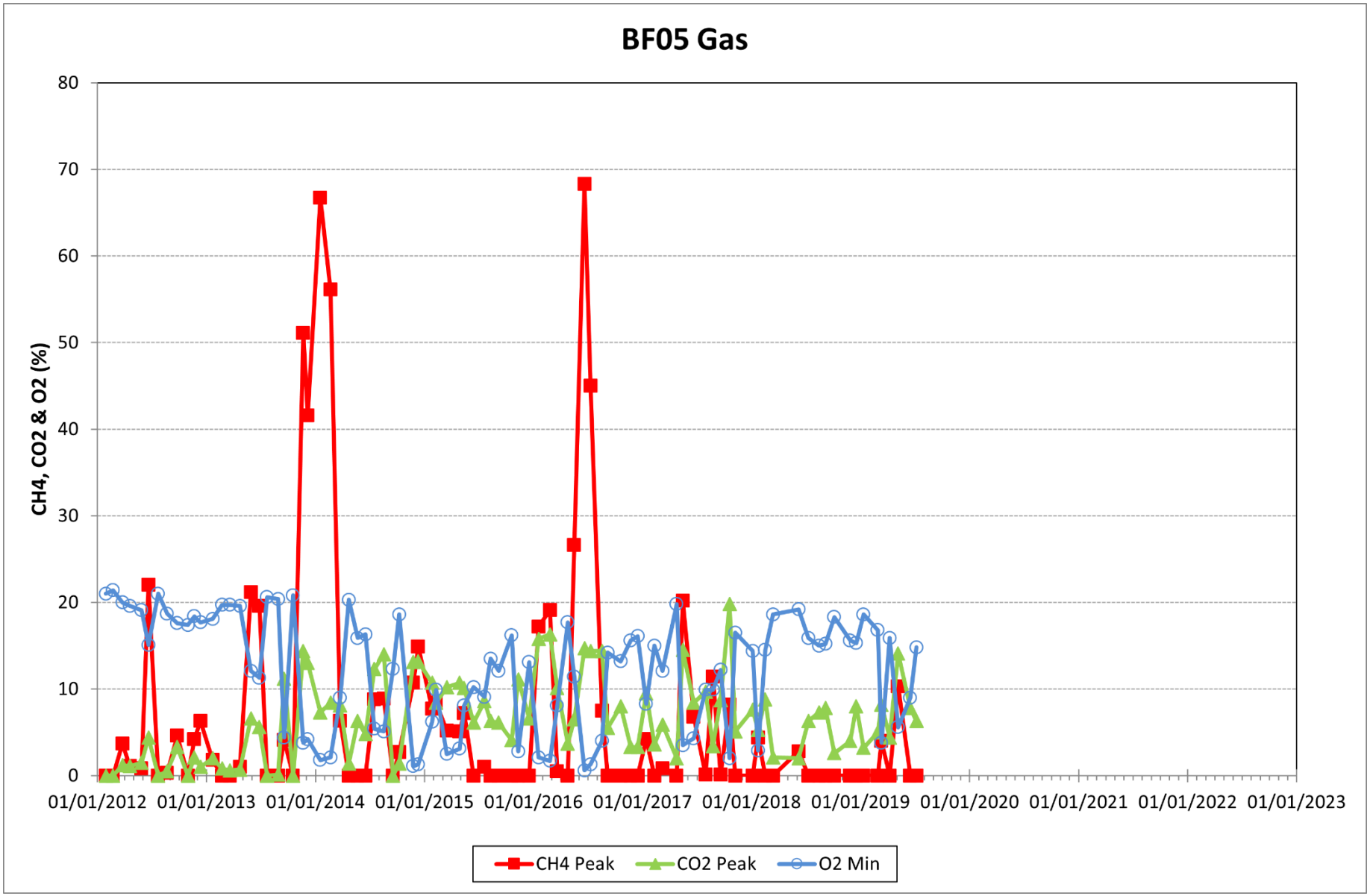
Gas Monitoring Data

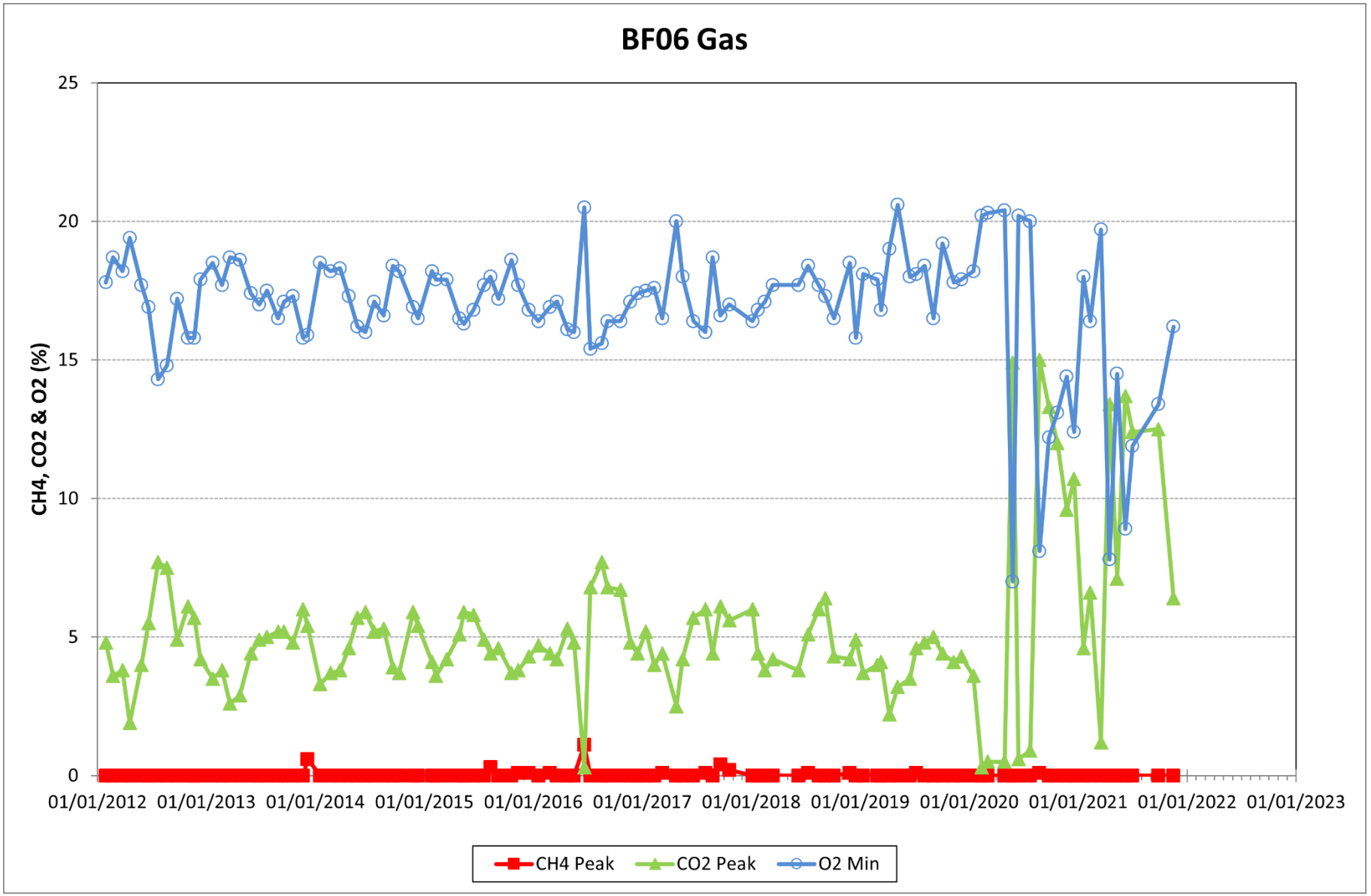

BF01 Gas
CH4, CO2 & O2 (%)
25
20
15
10
5
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min

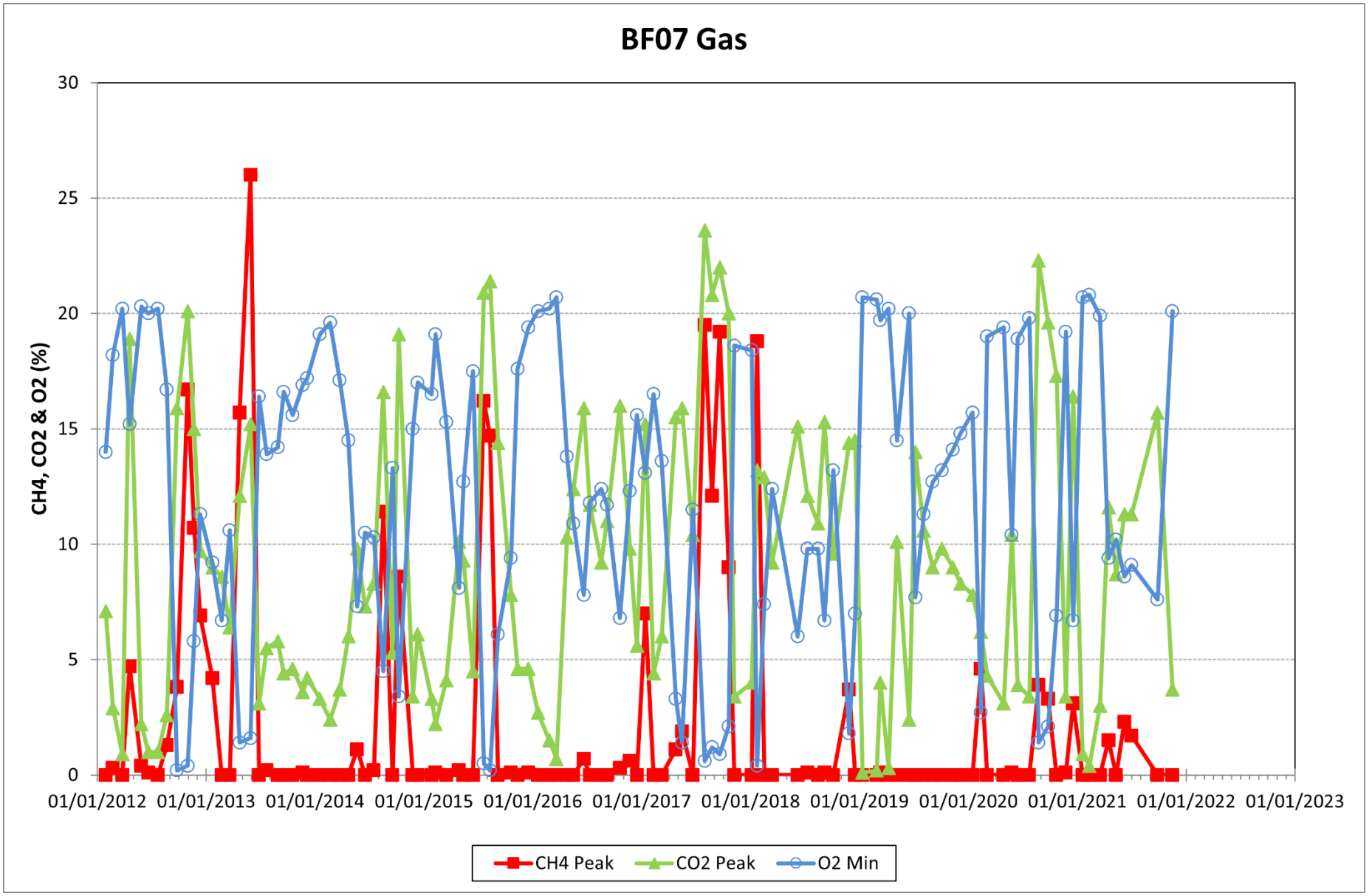

BF02 Gas
CH4, CO2 & O2 (%)
25
20
15
10
5
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min

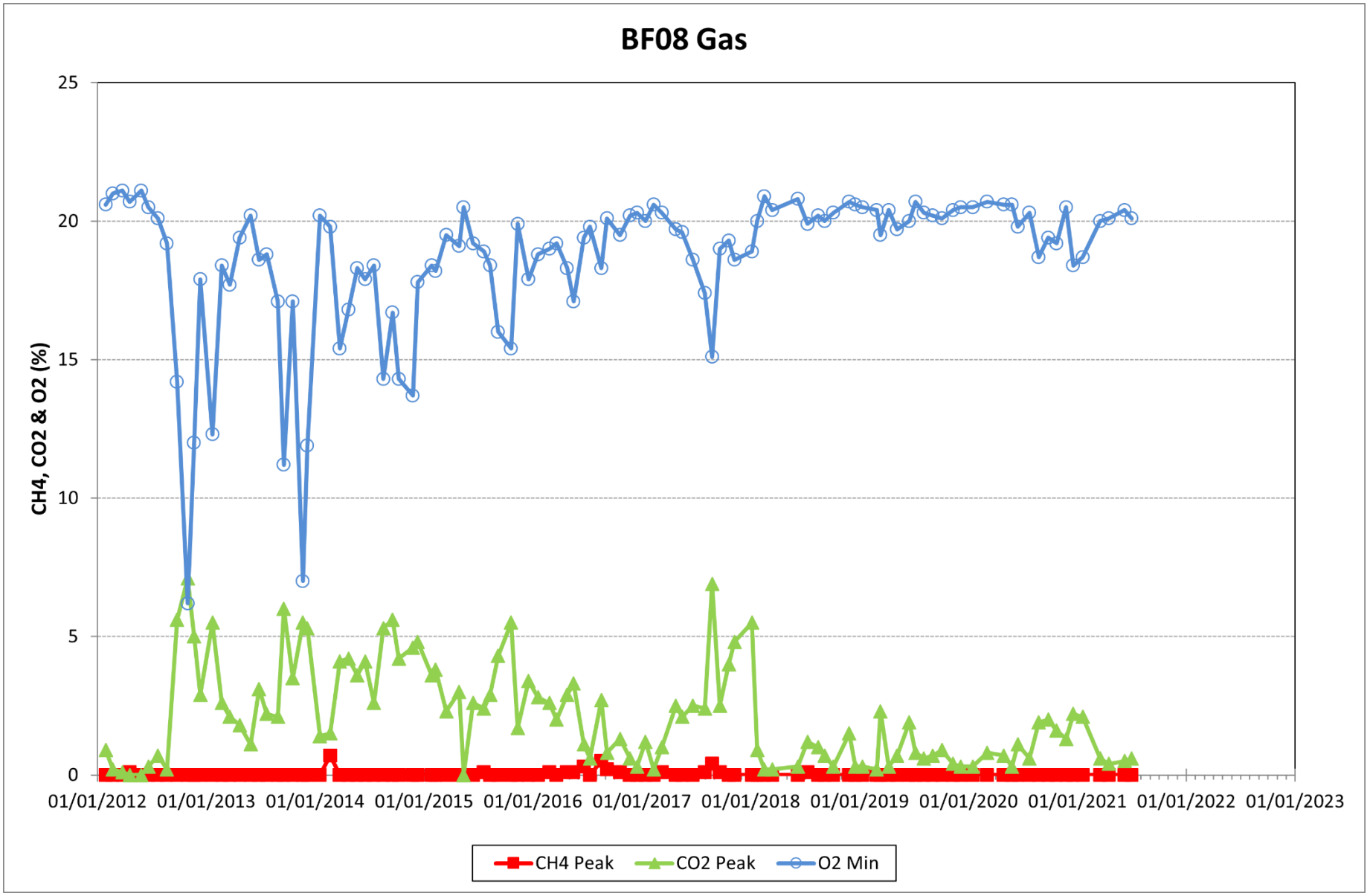

BF03 Gas
CH4, CO2 & O2 (%)
25
20
15
10
5
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min

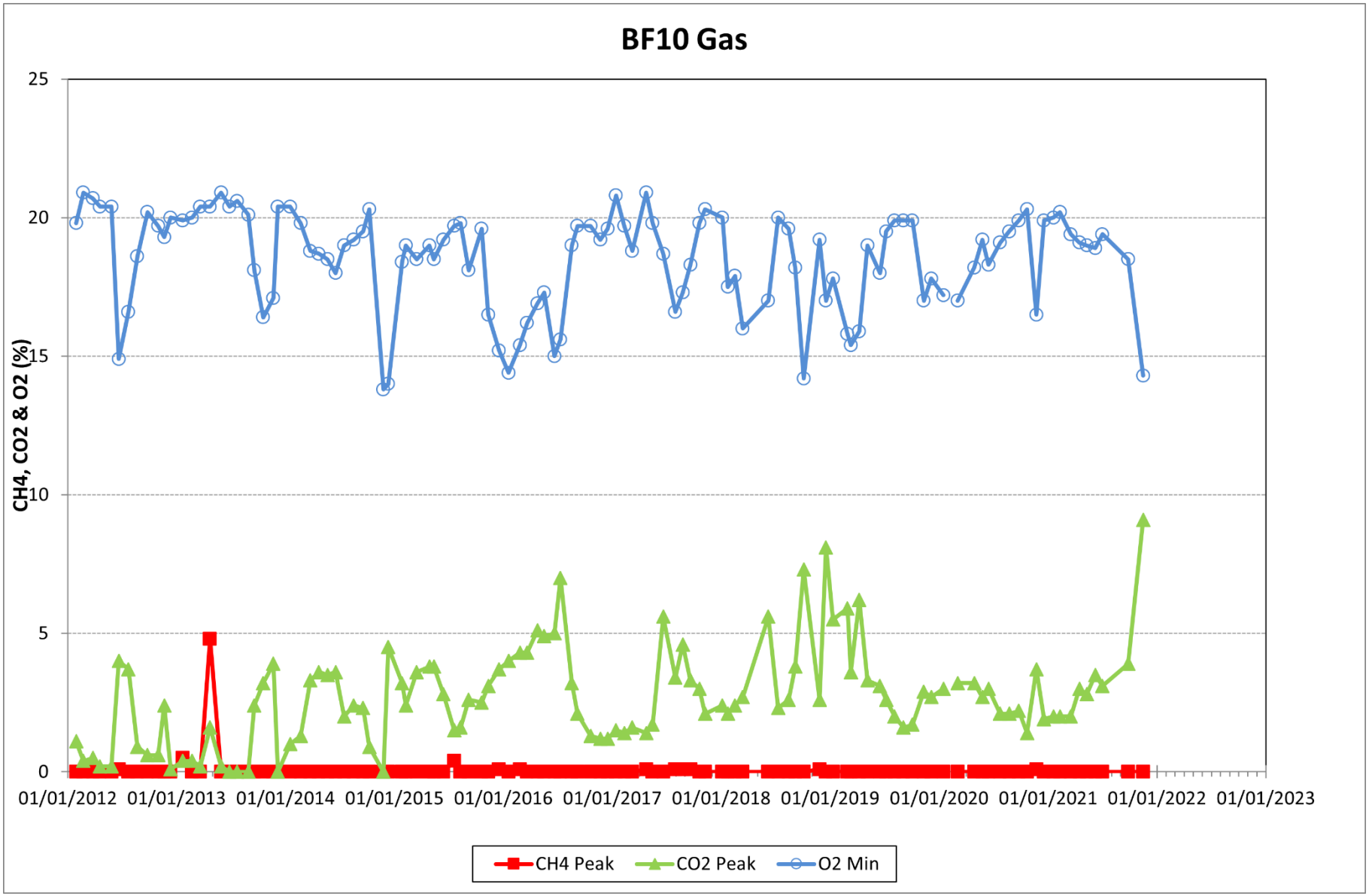

BF04 Gas
CH4, CO2 & O2 (%)
25
20
15
10
5
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min

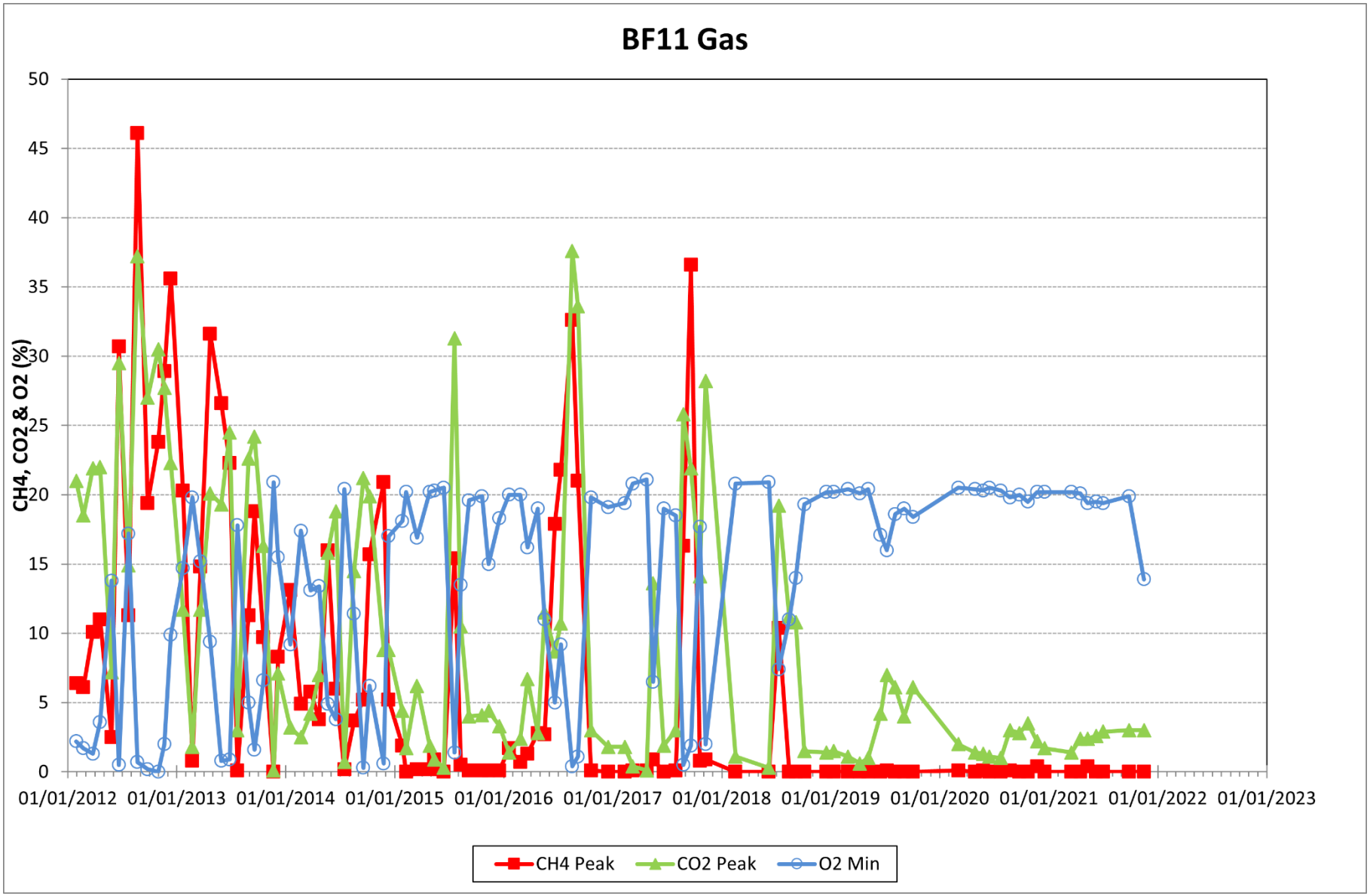

BF05 Gas
CH4, CO2 & O2 (%)
80
70
60
50
40
30
20
10
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min


BF06 Gas
CH4, CO2 & O2 (%)
25
20
15
10
5
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min


BF07 Gas
CH4, CO2 & O2 (%)
30
25
20
15
10
5
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min


BF08 Gas
CH4, CO2 & O2 (%)
25
20
15
10
5
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min


BF10 Gas
CH4, CO2 & O2 (%)
25
20
15
10
5
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min


BF11 Gas
CH4, CO2 & O2 (%)
50
45
40
35
30
25
20
15
10
5
0
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
CH4 Peak
CO2 Peak
O2 Min

APPENDIX 07

Groundsure Report

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

Order Details

Date: 26/05/2022

Your ref: EMS_784008_973482

Our Ref: EMS-784008_1011936

Site Details

Location: 557616 183864

Area: 17.21 ha

Authority: London Borough of Havering, Thurrock Council

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	0	2	5	4	-
14	1.2	Historical tanks	0	0	0	0	-
14	1.3	Historical energy features	0	0	2	0	-
15	1.4	Historical petrol stations	0	0	0	0	-
15	1.5	Historical garages	0	0	0	0	-
15	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
16	2.1	Historical industrial land uses	0	2	5	4	-
17	2.2	Historical tanks	0	0	0	0	-
17	2.3	Historical energy features	0	0	2	0	-
18	2.4	Historical petrol stations	0	0	0	0	-
18	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
19	3.1	Active or recent landfill	1	0	0	0	-
20	3.2	Historical landfill (BGS records)	0	0	0	1	-
20	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
20	3.4	Historical landfill (EA/NRW records)	3	1	1	2	-
22	3.5	Historical waste sites	0	0	0	0	-
22	3.6	Licensed waste sites	0	0	0	5	-
24	3.7	Waste exemptions	0	13	10	1	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
27	4.1	Recent industrial land uses	0	3	5	-	-
28	4.2	Current or recent petrol stations	0	0	0	0	-
28	4.3	Electricity cables	0	0	0	0	-
28	4.4	Gas pipelines	0	0	0	0	-
29	4.5	Sites determined as Contaminated Land	0	0	0	0	-

29	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
29	4.7	Regulated explosive sites	0	0	0	0	-
29	4.8	Hazardous substance storage/usage	0	0	0	0	-
29	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
30	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
30	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
30	4.12	Radioactive Substance Authorisations	0	0	0	0	-
30	**4.13**	**Licensed Discharges to controlled waters**	2	1	4	0	-
32	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
32	4.15	Pollutant release to public sewer	0	0	0	0	-
32	4.16	List 1 Dangerous Substances	0	0	0	0	-
32	4.17	List 2 Dangerous Substances	0	0	0	0	-
32	**4.18**	**Pollution Incidents (EA/NRW)**	0	1	5	2	-
34	4.19	Pollution inventory substances	0	0	0	0	-
34	4.20	Pollution inventory waste transfers	0	0	0	0	-
34	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
35	**5.1**	**Superficial aquifer**	Identified (within 500m)				
37	**5.2**	**Bedrock aquifer**	Identified (within 500m)				
38	**5.3**	**Groundwater vulnerability**	Identified (within 50m)				
40	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
40	5.5	Groundwater vulnerability- local information	None (within 0m)				
41	**5.6**	**Groundwater abstractions**	0	0	2	0	2
43	**5.7**	**Surface water abstractions**	0	0	0	1	8
45	5.8	Potable abstractions	0	0	0	0	0
45	**5.9**	**Source Protection Zones**	1	0	0	0	-
45	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
46	**6.1**	**Water Network (OS MasterMap)**	7	0	22	-	-

49	6.2	Surface water features	1	4	23	-	-
49	6.3	WFD Surface water body catchments	1	-	-	-	-
50	6.4	WFD Surface water bodies	0	0	0	-	-
50	6.5	WFD Groundwater bodies	0	-	-	-	-

Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
51	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
51	7.2	Historical Flood Events	0	0	0	-	-
51	7.3	Flood Defences	0	0	0	-	-
52	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
52	7.5	Flood Storage Areas	0	0	0	-	-
53	7.6	Flood Zone 2	None (within 50m)				
53	7.7	Flood Zone 3	None (within 50m)				

Page	Section	Surface water flooding	
54	8.1	Surface water flooding	1 in 30 year, 0.3m - 1.0m (within 50m)

Page	Section	Groundwater flooding	
56	9.1	Groundwater flooding	Low (within 50m)

Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
57	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
58	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
58	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
58	10.4	Special Protection Areas (SPA)	0	0	0	0	0
58	10.5	National Nature Reserves (NNR)	0	0	0	0	0
59	10.6	Local Nature Reserves (LNR)	0	0	0	0	2
59	10.7	Designated Ancient Woodland	0	0	0	0	7
60	10.8	Biosphere Reserves	0	0	0	0	0
60	10.9	Forest Parks	0	0	0	0	0
60	10.10	Marine Conservation Zones	0	0	0	0	0
60	10.11	Green Belt	2	0	0	0	0
61	10.12	Proposed Ramsar sites	0	0	0	0	0

61	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
61	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
61	10.15	Nitrate Sensitive Areas	0	0	0	0	0
62	**10.16**	**Nitrate Vulnerable Zones**	1	0	0	1	3
63	**10.17**	**SSSI Impact Risk Zones**	1	-	-	-	-
64	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
65	11.1	World Heritage Sites	0	0	0	-	-
65	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
65	11.3	National Parks	0	0	0	-	-
65	11.4	Listed Buildings	0	0	0	-	-
66	11.5	Conservation Areas	0	0	0	-	-
66	11.6	Scheduled Ancient Monuments	0	0	0	-	-
66	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
67	**12.1**	**Agricultural Land Classification**	Non Agricultural (within 250m)				
68	12.2	Open Access Land	0	0	0	-	-
68	12.3	Tree Felling Licences	0	0	0	-	-
69	**12.4**	**Environmental Stewardship Schemes**	0	1	2	-	-
69	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
70	**13.1**	**Priority Habitat Inventory**	1	6	4	-	-
71	13.2	Habitat Networks	0	0	0	-	-
71	13.3	Open Mosaic Habitat	0	0	0	-	-
71	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
73	**14.1**	**10k Availability**	Identified (within 500m)				
74	**14.2**	**Artificial and made ground (10k)**	2	2	5	6	-
76	**14.3**	**Superficial geology (10k)**	1	0	0	1	-

77	14.4	Landslip (10k)	0	0	0	0	-
78	14.5	Bedrock geology (10k)	1	0	0	0	-
79	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
80	15.1	50k Availability	Identified (within 500m)				
81	15.2	Artificial and made ground (50k)	2	0	7	6	-
82	15.3	Artificial ground permeability (50k)	1	0	-	-	-
83	15.4	Superficial geology (50k)	1	0	0	1	-
84	15.5	Superficial permeability (50k)	Identified (within 50m)				
84	15.6	Landslip (50k)	0	0	0	0	-
84	15.7	Landslip permeability (50k)	None (within 50m)				
85	15.8	Bedrock geology (50k)	1	0	0	0	-
86	15.9	Bedrock permeability (50k)	Identified (within 50m)				
86	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
87	16.1	BGS Boreholes	1	1	8	-	-
Page	Section	Natural ground subsidence					
89	17.1	Shrink swell clays	High (within 50m)				
90	17.2	Running sands	Very low (within 50m)				
91	17.3	Compressible deposits	Moderate (within 50m)				
93	17.4	Collapsible deposits	Very low (within 50m)				
94	17.5	Landslides	Very low (within 50m)				
95	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
97	18.1	Natural cavities	0	0	0	0	-
98	18.2	BritPits	1	0	2	7	-
99	18.3	Surface ground workings	0	5	12	-	-
100	18.4	Underground workings	0	0	0	0	0
101	18.5	Historical Mineral Planning Areas	3	1	1	8	-

102	18.6	Non-coal mining	0	0	0	0	0
102	18.7	Mining cavities	0	0	0	0	0
102	18.8	JPB mining areas	None (within 0m)				
102	18.9	Coal mining	None (within 0m)				
102	18.10	Brine areas	None (within 0m)				
103	18.11	Gypsum areas	None (within 0m)				
103	18.12	Tin mining	None (within 0m)				
103	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
104	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
105	**20.1**	**BGS Estimated Background Soil Chemistry**	10	0	-	-	-
106	**20.2**	**BGS Estimated Urban Soil Chemistry**	25	14	-	-	-
107	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
108	21.1	Underground railways (London)	0	0	0	-	-
108	21.2	Underground railways (Non-London)	0	0	0	-	-
108	21.3	Railway tunnels	0	0	0	-	-
108	21.4	Historical railway and tunnel features	0	0	0	-	-
108	21.5	Royal Mail tunnels	0	0	0	-	-
109	21.6	Historical railways	0	0	0	-	-
109	21.7	Railways	0	0	0	-	-
109	21.8	Crossrail 1	0	0	0	0	-
109	21.9	Crossrail 2	0	0	0	0	-
109	21.10	HS2	0	0	0	0	-

Recent aerial photograph

Capture Date: 18/07/2021

Site Area: 17.21ha

Recent site history - 2018 aerial photograph

Capture Date: 02/08/2018

Site Area: 17.21ha

Recent site history - 2013 aerial photograph

Capture Date: 20/04/2013

Site Area: 17.21ha

Recent site history - 2005 aerial photograph

Capture Date: 29/08/2005

Site Area: 17.21ha

Recent site history - 1999 aerial photograph

Capture Date: 03/09/1999

Site Area: 17.21ha

1 Past land use

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical energy features

1.1 Historical industrial land uses

Records within 500m	11

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
A	4m S	Unspecified Disused Workings	1987	2166500

ID	Location	Land use	Dates present	Group ID
B	10m S	Sand and Gravel Pit	1974	2140929
1	63m W	Gravel Pit	1954	2139044
B	63m S	Unspecified Works	1987	2160060
2	136m S	Electric Substation	1987	2164430
C	166m W	Electric Substation	1987	2164427
3	167m N	Gravel Pit	1974	2139034
4	250m SW	Gravel Pit	1967	2139045
5	398m W	Gravel Pit	1954	2139043
6	434m N	Unspecified Heap	1921	2136944
7	465m W	Sand and Gravel Pit	1974	2140930

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	0

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	2

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
A	154m S	Electricity Substation	1984	246740

ID	Location	Land use	Dates present	Group ID
C	199m SW	Electricity Substation	1984	246741

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical energy features

2.1 Historical industrial land uses

Records within 500m	11

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 16**

ID	Location	Land Use	Date	Group ID
A	4m S	Unspecified Disused Workings	1987	2166500
B	10m S	Sand and Gravel Pit	1974	2140929
1	63m W	Gravel Pit	1954	2139044

ID	Location	Land Use	Date	Group ID
B	63m S	Unspecified Works	1987	2160060
2	136m S	Electric Substation	1987	2164430
C	166m W	Electric Substation	1987	2164427
3	167m N	Gravel Pit	1974	2139034
4	250m SW	Gravel Pit	1967	2139045
5	398m W	Gravel Pit	1954	2139043
6	434m N	Unspecified Heap	1921	2136944
7	465m W	Sand and Gravel Pit	1974	2140930

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**0**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**2**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 16**

ID	Location	Land Use	Date	Group ID
A	154m S	Electricity Substation	1984	246740
C	199m SW	Electricity Substation	1984	246741

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

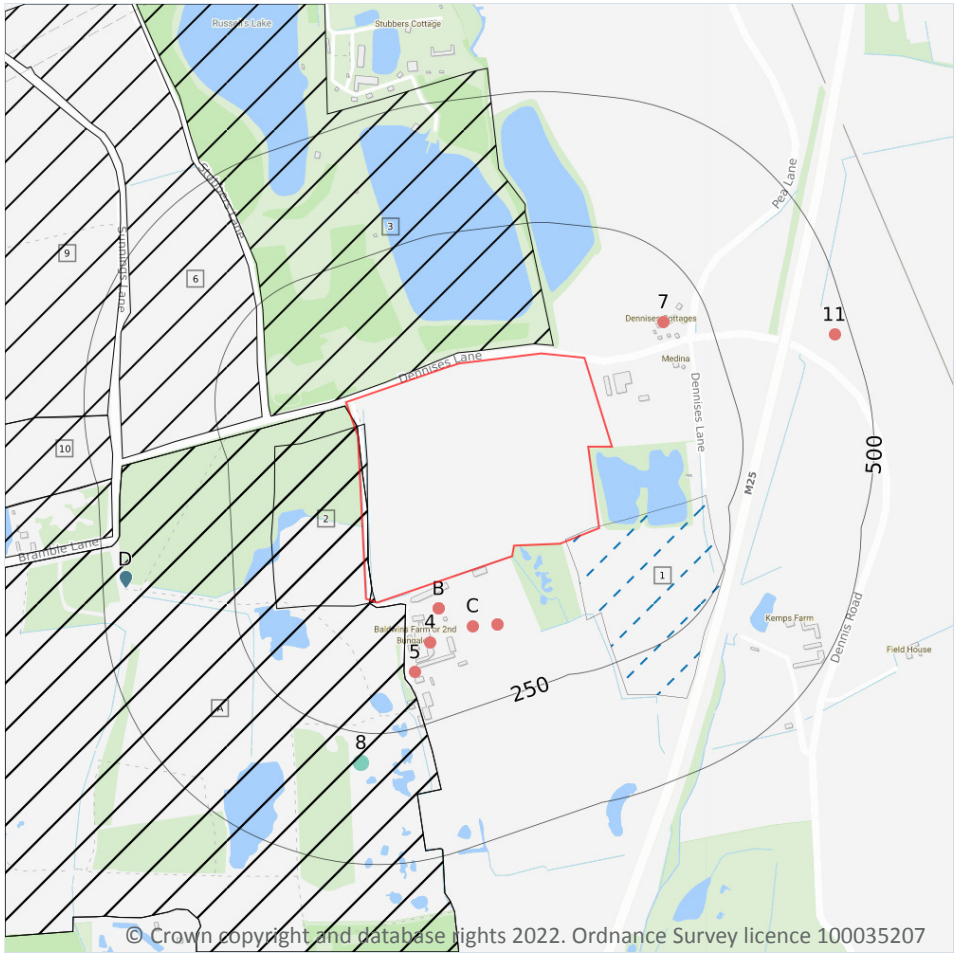
2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Active or recent landfill

Historical landfill (EA/NRW)

Historical landfill (BGS)

Licensed waste sites

Waste exemptions

3.1 Active or recent landfill

Records within 500m	1

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 19**

ID	Location	Details	
1	**On site**	**Operator: Tarmac Aggregates Limited** **Site Address: Lafarge Redland Aggregates Ltd, Baldwins Farm, Bramble Lane, South Ockendon, Thurrock, Essex, RM15 5SD**	**WML Number: 80438** **EPR Reference: LAF010** **Landfill type: A05: Landfill taking Non-Biodegradeable Wastes** **Status: Closure** **IPPC Reference: -** **EPR Number: EA/EPR/BP3197ND/V003**

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	1

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

Features are displayed on the Waste and landfill map on **page 19**

ID	Location	Address	BGS Number	Risk	Waste Type
8	308m S	Baldwin's Farm,South Ockenden, Essex	2634	Risk to minor aquifer	N/A

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	7

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 19**

ID	Location	Details		
2	**On site**	**Site Address: Baldwins Farm, South Ockendon, Essex** **Licence Holder Address: -**	**Waste Licence: Yes** **Site Reference: 139/87, THU035, AP-877** **Waste Type: Inert, Industrial, Commercial, Household** **Environmental Permitting Regulations (Waste) Reference: -** **Licence Issue: 06/07/1992** **Licence Surrender: -**	**Operator: Redland Aggregates** **Licence Holder: Redland Aggregates** **First Recorded 31/12/1950** **Last Recorded: -**

ID	Location	Details		
A	**On site**	**Site Address: Baldwins Farm Quarry, South Ockendon, Essex** **Licence Holder Address: -**	**Waste Licence: Yes** **Site Reference: 8HV025, DL033** **Waste Type: Industrial, Commercial, Household** **Environmental Permitting Regulations (Waste) Reference: -** **Licence Issue: 30/01/1978** **Licence Surrender: 25/09/1984**	**Operator: Redland Aggregates** **Licence Holder: Cawoods Aggregates (SE) Limited** **First Recorded 31/12/1947** **Last Recorded: 25/09/1984**
A	**On site**	**Site Address: Baldwins Farm Quarry, South Ockendon, Essex** **Licence Holder Address: -**	**Waste Licence: -** **Site Reference: THU064** **Waste Type: Commercial, Household** **Environmental Permitting Regulations (Waste) Reference: -** **Licence Issue: -** **Licence Surrender: -**	**Operator: Redland Aggregates** **Licence Holder: -** **First Recorded 31/12/1947** **Last Recorded: 31/12/1974**
3	10m N	Site Address: Stubbers Outdoor Pursuits Centre, Ockendon Road, Upminster Licence Holder Address: -	Waste Licence: Yes Site Reference: DL058, 8HV028, HAV022 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 05/07/1979 Licence Surrender: 06/04/1989	Operator: - Licence Holder: London Borough of Havering First Recorded 31/07/1979 Last Recorded: 07/02/1989
6	161m W	Site Address: Great Sunnings Farm, Great Sunnings, Sunnings Lane, Upminster Licence Holder Address: -	Waste Licence: Yes Site Reference: DL101, 8HV030 Waste Type: Inert, Industrial, Commercial, Household, Special, Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 07/07/1982 Licence Surrender: 31/03/1993	Operator: - Licence Holder: St Albans Sand and Gravel Company Limited First Recorded - Last Recorded: -
9	450m W	Site Address: Bush Farm, Aveley Road, Upminster Licence Holder Address: -	Waste Licence: Yes Site Reference: DL059, 8HV029 Waste Type: Inert, Industrial, Commercial, Household, Special, Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 09/08/1979 Licence Surrender: 15/03/1996	Operator: - Licence Holder: St Albans Sand and Gravel Company Limited First Recorded 31/07/1975 Last Recorded: 31/12/1992

ID	Location	Details		
10	454m W	Site Address: Land adjacent to Bush Farm, Sunnings Lane, Upminster, Essex Licence Holder Address: -	Waste Licence: - Site Reference: 8HV053 Waste Type: Inert, Commercial, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: - Licence Holder: - First Recorded 31/12/1955 Last Recorded: 13/09/1971

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	5

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 19**

ID	Location	Details		
D	457m W	Site Name: Redlands, Baldwins Farm, Thurrock Site Address: Lafarge Redland Aggregates Ltd, Baldwins Farm, Bramble Lane, South Ockendon, Thurrock, Essex, RM15 5SD Correspondence Address: Lafarge Redland Aggregates Ltd, Bradgate House, Groby, Leicester, LE6 0FA	Type of Site: Landfill taking Non-Biodegradeable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LAF010 EPR reference: - Operator: Lafarge Aggregates Ltd Waste Management licence No: 80438 Annual Tonnage: 0	Issue Date: 06/06/1987 Effective Date: - Modified: 29/04/1994 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure

ID	Location	Details		
D	457m W	Site Name: Redlands, Baldwins Farm, Thurrock Site Address: Lafarge Redland Aggregates Ltd, Baldwins Farm, Bramble Lane, South Ockendon, Thurrock, Essex, RM15 5SD Correspondence Address: -	Type of Site: Landfill taking Non-Biodegradeable Wastes Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LAF010 EPR reference: EA/EPR/BP3197ND/V003 Operator: Lafarge Aggregates Ltd Waste Management licence No: 80438 Annual Tonnage: 150000	Issue Date: 06/06/1987 Effective Date: - Modified: 29/04/1994 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure
D	457m W	Site Name: Baldwins Farm Site Address: Lafarge Redland Aggregates Ltd, Baldwins Farm, Bramble Lane, South Ockendon, Thurrock, Essex, RM15 5SD Correspondence Address: -	Type of Site: Landfill taking Non-Biodegradeable Wastes Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LAF010 EPR reference: EA/EPR/BP3197ND/V002 Operator: Lafarge Aggregates Limited Waste Management licence No: 80438 Annual Tonnage: 150000	Issue Date: 06/06/1987 Effective Date: - Modified: 18/11/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified
D	457m W	Site Name: Baldwins Farm Site Address: Lafarge Redland Aggregates Ltd, Baldwins Farm, Bramble Lane, South Ockendon, Thurrock, Essex, RM15 5SD Correspondence Address: -	Type of Site: Landfill taking Non-Biodegradeable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LAF010 EPR reference: EA/EPR/BP3197ND/V003 Operator: Tarmac Aggregates Limited Waste Management licence No: 80438 Annual Tonnage: 150000	Issue Date: 06/06/1987 Effective Date: - Modified: 08/01/2016 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure

ID	Location	Details		
D	457m W	Site Name: Baldwins Farm Site Address: Lafarge Redland Aggregates Ltd, Baldwins Farm, Bramble Lane, South Ockendon, Thurrock, Essex, RM15 5SD Correspondence Address: -	Type of Site: Landfill taking Non-Biodegradeable Wastes Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: LAF010 EPR reference: EA/EPR/BP3197ND/V003 Operator: Tarmac Aggregates Limited Waste Management licence No: 80438 Annual Tonnage: 150000	Issue Date: 06/06/1987 Effective Date: - Modified: 08/01/2016 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m **24**

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 19**

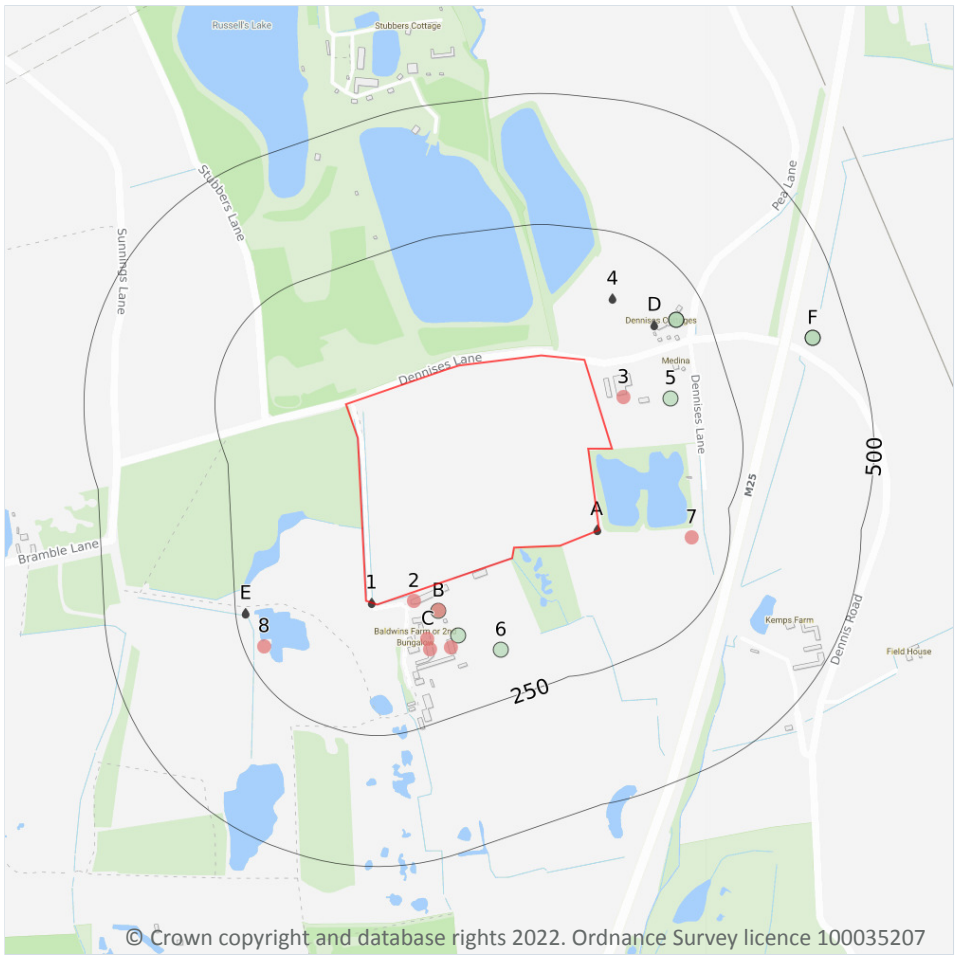
ID	Location	Site	Reference	Category	Sub-Category	Description
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX233848	Using waste exemption	Not on a farm	Use of waste in construction
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX233848	Treating waste exemption	Not on a farm	Screening and blending of waste
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX233848	Treating waste exemption	Not on a farm	Manual treatment of waste
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX233848	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX172419	Using waste exemption	On a farm	Use of waste in construction
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX151196	Treating waste exemption	Not on a farm	Sorting mixed waste

ID	Location	Site	Reference	Category	Sub-Category	Description
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX151196	Treating waste exemption	Not on a farm	Screening and blending of waste
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX151196	Treating waste exemption	Not on a farm	Recovery of scrap metal
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX151196	Storing waste exemption	Not on a farm	Storage of waste in secure containers
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX151196	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX151196	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX151196	Treating waste exemption	Not on a farm	Cleaning, washing, spraying or coating relevant waste
B	50m S	BALDWINS FARM, DENNISES LANE, UPMINSTER, RM14 2XB	WEX118841	Using waste exemption	Not on a farm	Use of waste in construction
C	102m S	Baldwins Farm Dennises Lane UPMINSTER Essex RM14 2XB	EPR/RF0502ZN /A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste in construction
4	105m S	Baldwins Farm Dennises Lane UPMINSTER Essex RM14 2XB	EPR/FF0800XS /A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste in construction
C	115m S	-	WEX284109	Using waste exemption	Not on a farm	Use of waste in construction
C	115m S	-	WEX284109	Treating waste exemption	Not on a farm	Screening and blending of waste
C	115m S	-	WEX284109	Treating waste exemption	Not on a farm	Recovery of scrap metal
C	115m S	-	WEX284109	Treating waste exemption	Not on a farm	Sorting mixed waste
C	115m S	-	WEX284109	Treating waste exemption	Not on a farm	Manual treatment of waste
C	115m S	-	WEX284109	Storing waste exemption	Not on a farm	Storage of waste in a secure place

ID	Location	Site	Reference	Category	Sub-Category	Description
5	150m S	BALDWINS FARM COTTAGE, DENNISES LANE, UPMINSTER, RM14 2XB	WEX042030	Using waste exemption	On a farm	Use of waste in construction
7	165m NE	Cockhide, Dennises Lane, Upminster, RM142XB	WEX230442	Using waste exemption	Not on a farm	Use of waste in construction
11	468m E	-	WEX237646	Disposing of waste exemption	Not on a farm	Deposit of waste from dredging of inland waters

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



Site Outline

Search buffers in metres (m)

Recent industrial land uses

Licensed Discharges to controlled waters

Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m	8

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Company	Address	Activity	Category
2	17m S	Silo	Essex, RM14	Hoppers and Silos	Farming
B	49m S	Roof Kits Direct	Baldwins Farm, Dennises Lane, Upminster, Essex, RM14 2XB	General Construction Supplies	Industrial Products
3	50m E	Mast (Telecommunication)	Essex, RM14	Telecommunications Features	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
C	93m S	scrapcaressex.com	Unit 2 Baldwins Farm Cottage, Dennises Lane, Upminster, Essex, RM14 2XB	Secondhand Vehicles	Motoring
C	113m S	Ams Cash4cars	Baldwins Farm, Dennises Lane, Upminster, Essex, RM14 2XB	Secondhand Vehicles	Motoring
C	124m S	P B Van Hire & Sales	Baldwins Farm, Dennises Lane, Upminster, Essex, RM14 2XB	Vehicle Hire and Rental	Hire Services
7	177m E	Mast (Telecommunication)	Essex, RM14	Telecommunications Features	Infrastructure and Facilities
8	213m SW	Electricity Sub Station	Greater London, RM14	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	**0**

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	**0**

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	**0**

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	0

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	7

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Address	Details	
A	**On site**	**BALDWINS FARM QUARRY, SUNNINGS LANE, BALDWINS FARM QUARRY SUNNINGS L, ANE UPMINSTER ESSEX, RM14 2DQ**	**Effluent Type: MISCELLANEOUS DISCHARGES - UNSPECIFIED Permit Number: CNTM.1278 Permit Version: 1 Receiving Water: TRIB OF THE RUNNING WATER BRK.**	**Status: REVOKED - UNSPECIFIED Issue date: 25/01/1994 Effective Date: 25/01/1994 Revocation Date: 09/07/1996**

ID	Location	Address	Details	
A	**On site**	**BALDWINS FARM QUARRY, SUNNINGS LANE, BALDWINS FARM QUARRY SUNNINGS L, ANE UPMINSTER ESSEX, RM14 2DQ**	**Effluent Type: MISCELLANEOUS DISCHARGES - MINE/GROUNDWATER AS RAISED Permit Number: CTWC.0795 Permit Version: 1 Receiving Water: TRIB OF RUNNING WATER BROOK**	**Status: REVOKED - UNSPECIFIED Issue date: 17/04/1986 Effective Date: 17/04/1986 Revocation Date: 24/01/1994**
1	**On site**	**BALDWINS FARM QUARRY, SUNNINGS LANE, BALDWINS FARM QUARRY SUNNINGS L, ANE UPMINSTER ESSEX, RM14 2DQ**	**Effluent Type: MISCELLANEOUS DISCHARGES - UNSPECIFIED Permit Number: CTWC.3181 Permit Version: 1 Receiving Water: TRIB OF RUNNING WATER BROOK**	**Status: REVOKED - UNSPECIFIED Issue date: 15/03/1989 Effective Date: 15/03/1989 Revocation Date: 11/01/1990**
4	128m NE	DENNISES LANE, DENINISES LANE, UPMINSTER, ESSEX, RM14 2XB	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CANM.0044 Permit Version: 1 Receiving Water: TRIB OF RUNNING WATER BROOK	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/08/1999 Effective Date: 24/08/1999 Revocation Date: -
D	149m NE	1 DENNISES COTTAGES, DENNISES LANE, NORTH OCKENDON, UPMINSTER, ESSEX, RM14 2XB	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CANM.0436 Permit Version: 1 Receiving Water: LAND VIA SOAKAWAY	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/06/2002 Effective Date: 17/06/2002 Revocation Date: -
E	231m W	BALDWINS FARM QUARRY, SUNNINGS LANE, BALDWINS FARM QUARRY SUNNINGS L, ANE UPMINSTER ESSEX, RM14 2DQ	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CTWC.0507 Permit Version: 1 Receiving Water: LONDON CLAY	Status: TRANSFERRED FROM COPA 1974 Issue date: 04/12/1985 Effective Date: 04/12/1985 Revocation Date: 28/11/2006
E	231m W	BALDWINS FARM QUARRY, SUNNINGS LANE, BALDWINS FARM QUARRY SUNNINGS L, ANE UPMINSTER ESSEX, RM14 2DQ	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CTWC.0507 Permit Version: 2 Receiving Water: LONDON CLAY	Status: TRANSFERRED FROM COPA 1974 Issue date: 29/11/2006 Effective Date: 29/11/2006 Revocation Date: 29/11/2018

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	8

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Details	
B	48m S	Incident Date: 23/05/2019 Incident Identification: 1704231 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
C	105m S	Incident Date: 20/03/2014 Incident Identification: 1219939 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 3 (Minor) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
5	135m E	Incident Date: 02/09/2002 Incident Identification: 104556 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
6	158m S	Incident Date: 30/05/2019 Incident Identification: 1706098 Pollutant: Specific Waste Materials Pollutant Description: Contaminated Construction & Demolition Mat & Waste	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
D	190m NE	Incident Date: 04/07/2001 Incident Identification: 13793 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
D	190m NE	Incident Date: 04/07/2001 Incident Identification: 13793 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
F	428m E	Incident Date: 05/01/2017 Incident Identification: 1494018 Pollutant: Specific Waste Materials Pollutant Description: Commercial Waste	Water Impact: Category 3 (Minor) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
F	428m E	Incident Date: 05/01/2017 Incident Identification: 1494018 Pollutant: Specific Waste Materials Pollutant Description: Contaminated Construction & Demolition Mat & Waste	Water Impact: Category 3 (Minor) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

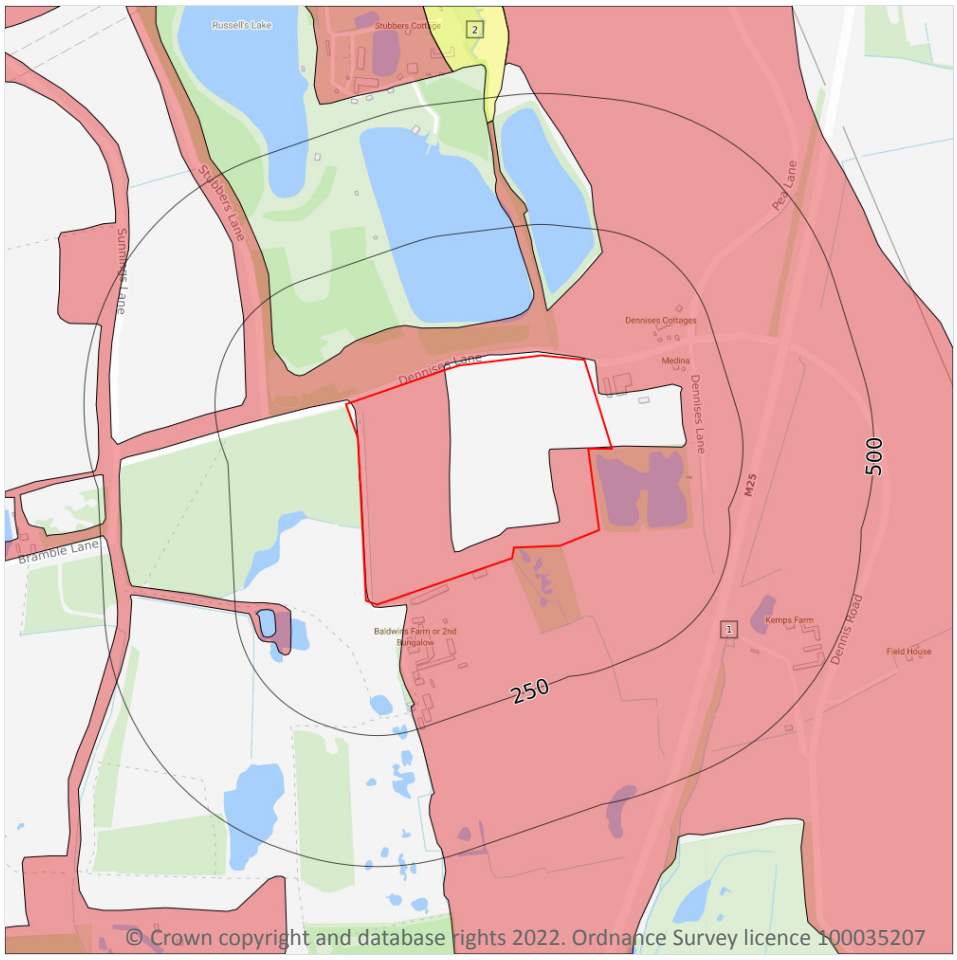
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	2

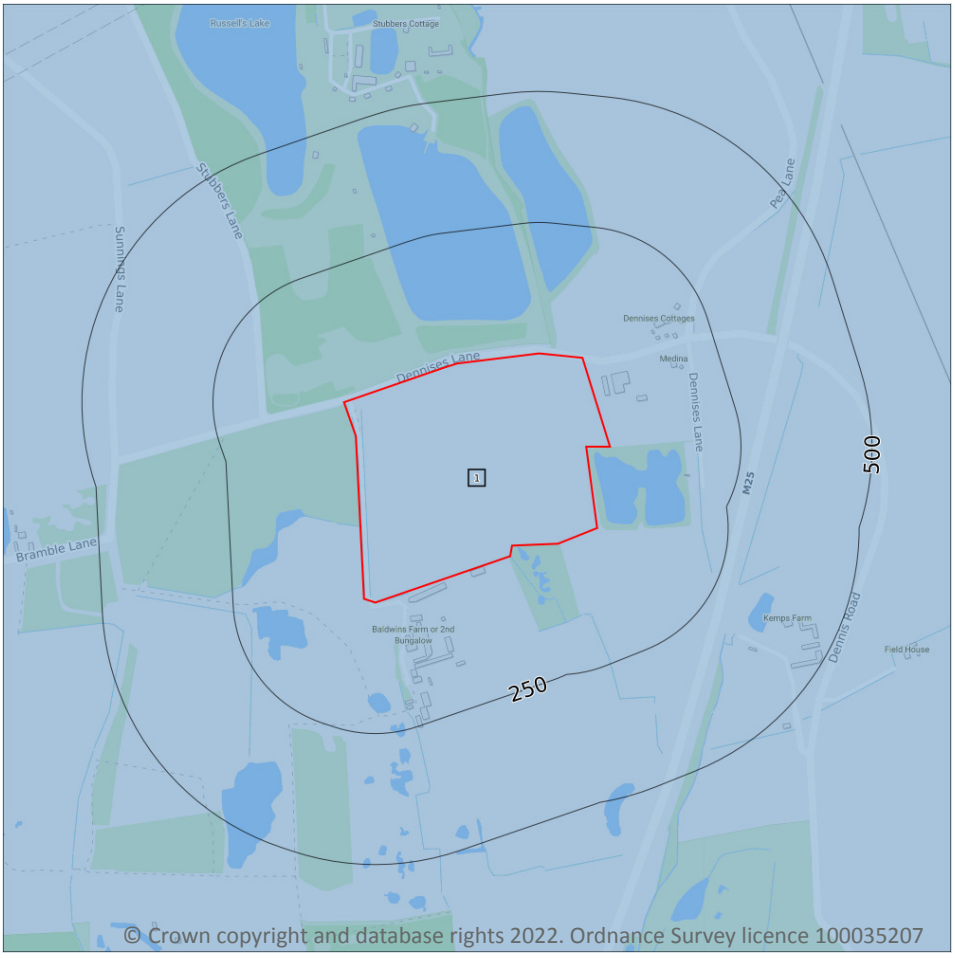
Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 35**

ID	Location	Designation	Description
1	**On site**	**Secondary A**	**Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers**
2	452m N	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	1

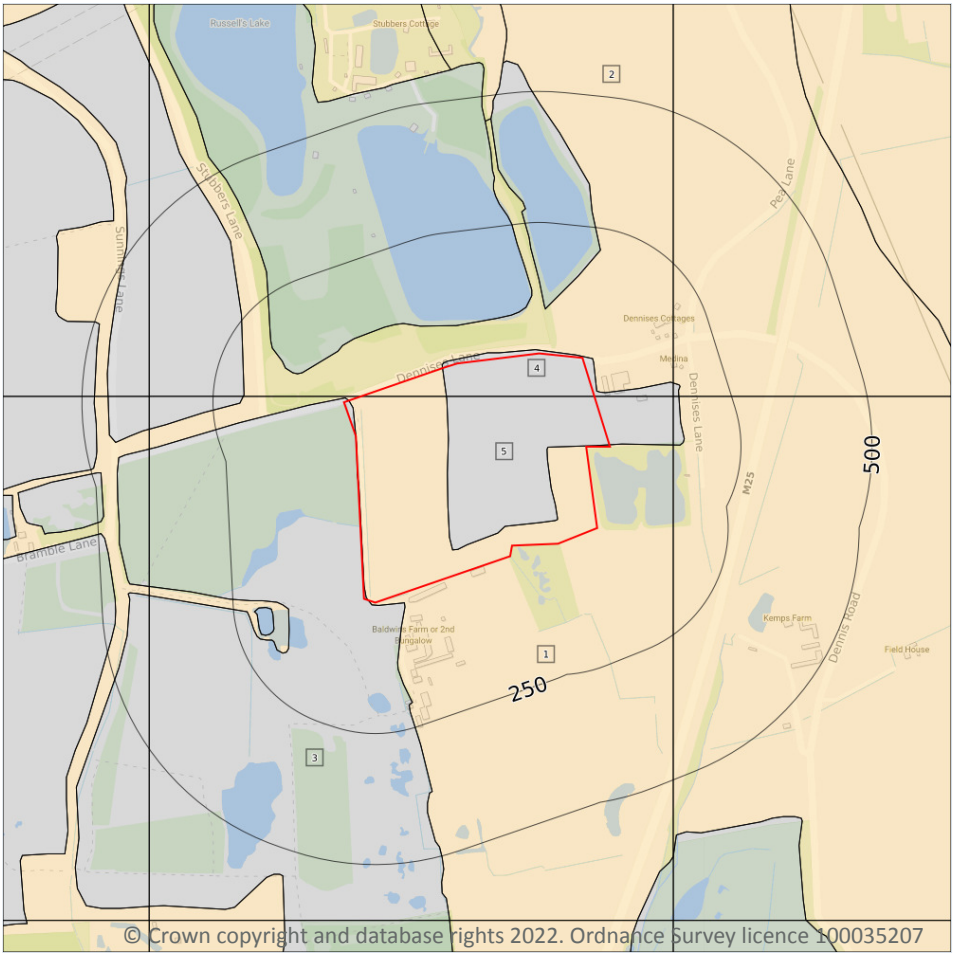
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 37**

ID	Location	Designation	Description
1	**On site**	**Unproductive**	**These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow**

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	5

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 38**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Unproductive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: High Aquifer type: Secondary Thickness: <3m Patchiness value: >90% Recharge potential: High	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Mixed
2	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Unproductive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: High Aquifer type: Secondary Thickness: <3m Patchiness value: <90% Recharge potential: High	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Mixed
3	On site	Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, No Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: >90% Recharge potential: High	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Mixed
4	On site	Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, No Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: High	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Mixed
5	On site	Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, No Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: <300mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: >90% Recharge potential: High	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Mixed

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

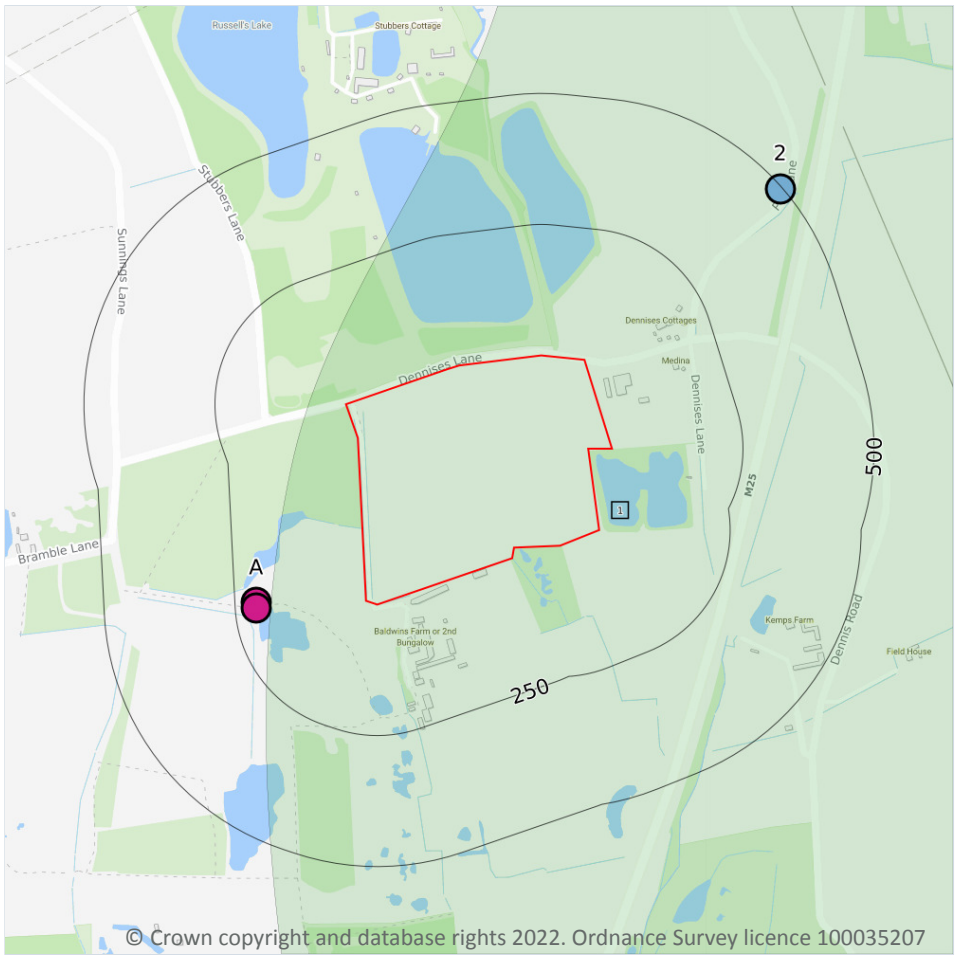
5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	4

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 41**

ID	Location	Details	
A	209m W	Status: Historical Licence No: 08/37/55/0043 Details: Mineral Washing Direct Source: THAMES GROUNDWATER Point: BALDWINS FARM QUARRY, UPMINSTER - GRAVEL PIT Data Type: Point Name: Tarmac Aggregates Limited Easting: 557200 Northing: 183610	Annual Volume (m^3): 448236 Max Daily Volume (m^3): 1697.9 Original Application No: - Original Start Date: 16/02/1967 Expiry Date: - Issue No: 104 Version Start Date: 26/10/2015 Version End Date: -
A	210m W	Status: Historical Licence No: 08/37/55/0043 Details: Mineral Washing Direct Source: THAMES GROUNDWATER Point: BALDWINS FARM QUARRY, UPMINSTER - GRAVEL PIT Data Type: Point Name: LAFARGE REDLAND AGGREGATES LIMITED Easting: 557200 Northing: 183600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 16/02/1967 Expiry Date: - Issue No: 100 Version Start Date: 01/06/1998 Version End Date: -
-	1532m N	Status: Historical Licence No: 08/37/55/0095 Details: Transfer between sources Direct Source: THAMES GROUNDWATER Point: CRANHAM MARSH NATURE RESERVE, ESSEX Data Type: Point Name: ESSEX WILDLIFE TRUST LIMITED Easting: 556880 Northing: 185440	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 02/11/1999 Expiry Date: - Issue No: 1 Version Start Date: 02/11/1999 Version End Date: -
-	1868m SE	Status: Active Licence No: TH/037/0055/011 Details: Laundry Use Direct Source: THAMES GROUNDWATER Point: BOREHOLE AT ARISDALE AVENUE, SOUTH OCKENDON Data Type: Point Name: BELMONT LAUNDRY LIMITED Easting: 558776 Northing: 182123	Annual Volume (m^3): 93,000 Max Daily Volume (m^3): 255 Original Application No: NPS/WR/031170 Original Start Date: 09/06/2016 Expiry Date: 31/03/2028 Issue No: 2 Version Start Date: 12/04/2019 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	9

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 41**

ID	Location	Details	
2	496m NE	Status: Active Licence No: 08/37/55/0076 Details: Spray Irrigation - Storage Direct Source: THAMES SURFACE WATER - NON TIDAL Point: MANOR FARM, UPMINSTER - RESERVOIR Data Type: Point Name: A P MEE (PARTNERSHIP) Easting: 558200 Northing: 184400	Annual Volume (m^3): 150,018 Max Daily Volume (m^3): 4,546 Original Application No: - Original Start Date: 14/11/1980 Expiry Date: - Issue No: 102 Version Start Date: 10/04/2007 Version End Date: -
-	759m E	Status: Active Licence No: 08/37/55/0020 Details: Spray Irrigation - Storage Direct Source: THAMES SURFACE WATER - NON TIDAL Point: KEMPS FARM, UPMINSTER - TRIB OF WENNINGTON COMMON SEWER Data Type: Point Name: MEE Easting: 558600 Northing: 183600	Annual Volume (m^3): 6,819.15 Max Daily Volume (m^3): 6,819.15 Original Application No: - Original Start Date: 15/11/1966 Expiry Date: - Issue No: 100 Version Start Date: 07/06/1978 Version End Date: -
-	935m NE	Status: Active Licence No: 08/37/55/0072 Details: Spray Irrigation - Storage Direct Source: THAMES SURFACE WATER - NON TIDAL Point: HALL FARM, UPMINSTER - RESERVOIR Data Type: Point Name: MEE Easting: 558600 Northing: 184600	Annual Volume (m^3): 15,911 Max Daily Volume (m^3): 1,637 Original Application No: W.877 Original Start Date: 11/04/1978 Expiry Date: - Issue No: 100 Version Start Date: 06/01/1997 Version End Date: -
-	1136m NE	Status: Historical Licence No: 08/37/55/0058 Details: Spray Irrigation - Direct Direct Source: THAMES SURFACE WATER - NON TIDAL Point: HALL FARM, NORTH OCKENDON - TRIB OF RAINHAM COMMON SEWER Data Type: Point Name: SUN-GRO PARTNERS Easting: 558700 Northing: 184800	Annual Volume (m^3): 6819 Max Daily Volume (m^3): 136.4 Original Application No: - Original Start Date: 18/05/1967 Expiry Date: - Issue No: 100 Version Start Date: 24/06/1985 Version End Date: -

ID	Location	Details	
-	1136m NE	Status: Historical Licence No: 08/37/55/0058 Details: Spray Irrigation - Spray Irrigation Definition Order Direct Source: THAMES SURFACE WATER - NON TIDAL Point: HALL FARM, NORTH OCKENDON - TRIB OF RAINHAM COMMON SEWER Data Type: Point Name: SUN-GRO PARTNERS Easting: 558700 Northing: 184800	Annual Volume (m^3): 6819 Max Daily Volume (m^3): 136.4 Original Application No: - Original Start Date: 18/05/1967 Expiry Date: - Issue No: 100 Version Start Date: 24/06/1985 Version End Date: -
-	1450m NW	Status: Historical Licence No: 08/37/55/0044 Details: Spray Irrigation - Direct Direct Source: THAMES SURFACE WATER - NON TIDAL Point: HIGH HOUSE FARM- POND ON UNNAMED TRIBUTARY OF R.INGREBOURNE Data Type: Point Name: TURNER Easting: 556260 Northing: 184920	Annual Volume (m^3): 1818 Max Daily Volume (m^3): 364 Original Application No: - Original Start Date: 19/09/1966 Expiry Date: - Issue No: 101 Version Start Date: 14/02/2006 Version End Date: -
-	1484m NW	Status: Historical Licence No: 08/37/55/0044 Details: Spray Irrigation - Direct Direct Source: THAMES SURFACE WATER - NON TIDAL Point: HIGH HOUSE FARM, UPMINSTER - TRIB OF RIVER INGREBOURNE Data Type: Point Name: TURNER Easting: 556200 Northing: 184900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 19/09/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/09/1970 Version End Date: -
-	1536m N	Status: Historical Licence No: 8/37/56/*S/0001 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: CRANHAM PLACE, CRANHAM Data Type: Point Name: MEE Easting: 558000 Northing: 185600	Annual Volume (m^3): 9091 Max Daily Volume (m^3): 227 Original Application No: - Original Start Date: 01/11/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/11/1966 Version End Date: -

ID	Location	Details	
-	1658m NW	Status: Historical Licence No: 08/37/55/0083 Details: Spray Irrigation - Direct Direct Source: THAMES SURFACE WATER - NON TIDAL Point: REDCROFTS FARM, NORTH OCKENDON - TRIB OF RIVER INGREBOURNE Data Type: Point Name: DAGENHAM LANDSCAPES LTD Easting: 556500 Northing: 185400	Annual Volume (m^3): 3273 Max Daily Volume (m^3): 163.6 Original Application No: - Original Start Date: 26/02/1986 Expiry Date: - Issue No: 100 Version Start Date: 26/02/1986 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	1

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

Features are displayed on the Abstractions and Source Protection Zones map on **page 41**

ID	Location	Type	Description
1	**On site**	**3**	**Total catchment**

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology

Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	**29**

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 46**

ID	Location	Type of water feature	Ground level	Permanence	Name
1	**On site**	**Inland river not influenced by normal tidal action.**	**Not provided**	**Watercourse contains water year round (in normal circumstances)**	**-**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
B	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
C	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
D	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
E	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
E	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
F	92m SE	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
G	98m W	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	101m SE	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	102m SE	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	104m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	143m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	151m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
I	160m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
J	164m E	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
J	165m E	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
K	166m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
J	166m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
J	167m E	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	-
L	167m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
M	186m E	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
M	201m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	212m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	214m S	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
O	218m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
8	221m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
P	230m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Q	234m E	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	28

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 46**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 46**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
F	**On site**	**River**	**Southall Sewer and Runningwater Brook**	**GB106037028090**	**Roding Beam and Ingrebourne**	**Roding Beam and Ingrebourne**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 46**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	5267m SW	River	Southall Sewer and Runningwater Brook	GB106037028090	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	0

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

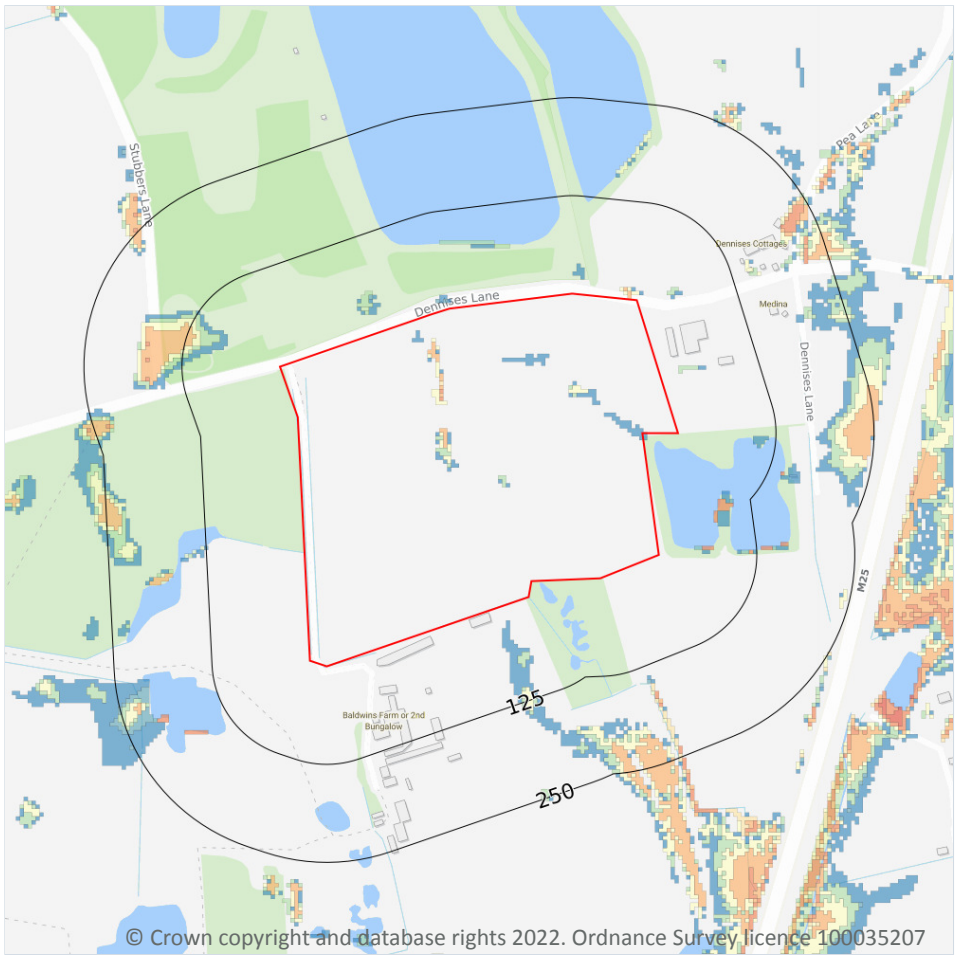
7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.3m - 1.0m**
Highest risk within 50m	**1 in 30 year, 0.3m - 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 54**

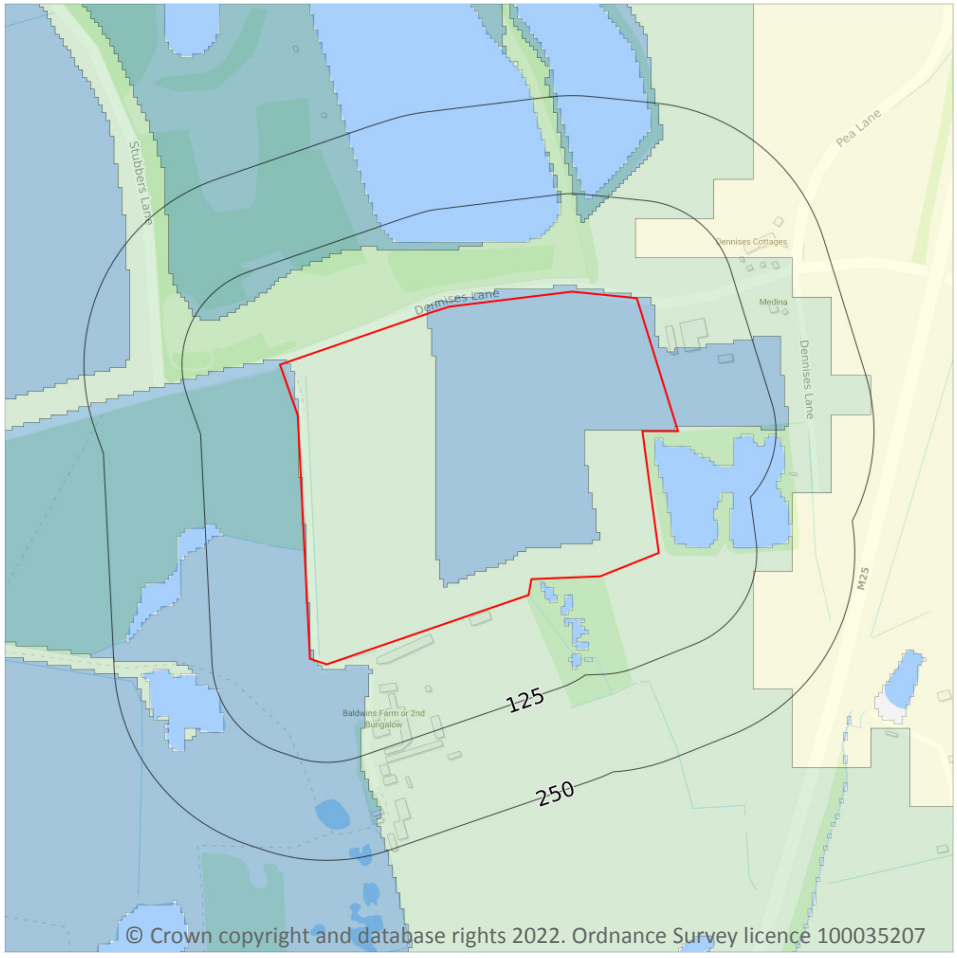
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.3m and 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	Between 0.3m and 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

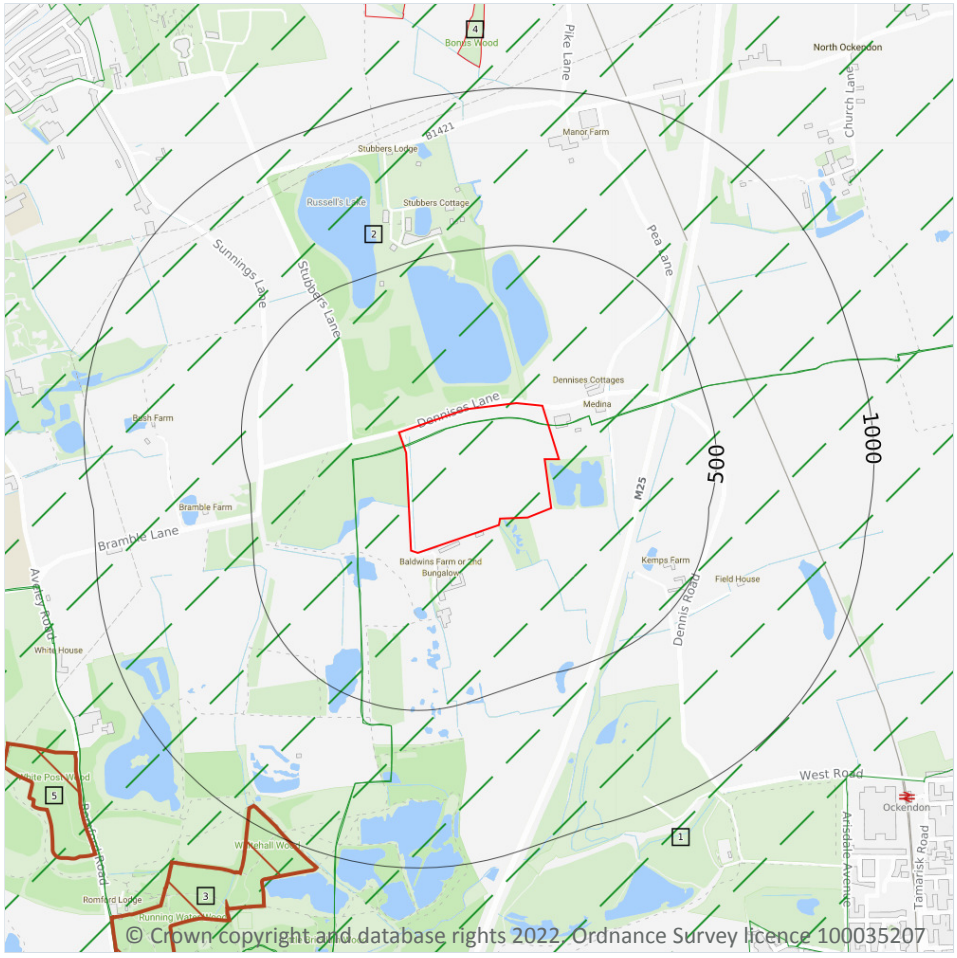
Highest risk on site	**Low**
Highest risk within 50m	**Low**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 56**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	2

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

Features are displayed on the Environmental designations map on **page 57**

ID	Location	Name	Data source
4	1072m N	Cranham Marsh	Natural England
A	1256m N	Cranham Marsh	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	7

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 57**

ID	Location	Name	Woodland Type
3	951m SW	Whitehall Wood	Ancient & Semi-Natural Woodland
5	1244m SW	Whitepost Wood	Ancient & Semi-Natural Woodland
-	1330m S	Unknown	Ancient & Semi-Natural Woodland
-	1466m N	Spring Wood	Ancient & Semi-Natural Woodland
-	1520m W	Warwick Wood	Ancient & Semi-Natural Woodland
-	1629m S	Oak Wood	Ancient & Semi-Natural Woodland
-	1680m SW	Warwick Wood	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	2

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 57**

ID	Location	Name	Local Authority name
1	**On site**	**London**	**Thurrock**
2	**On site**	**London**	**Havering**

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or ‘classified’) under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

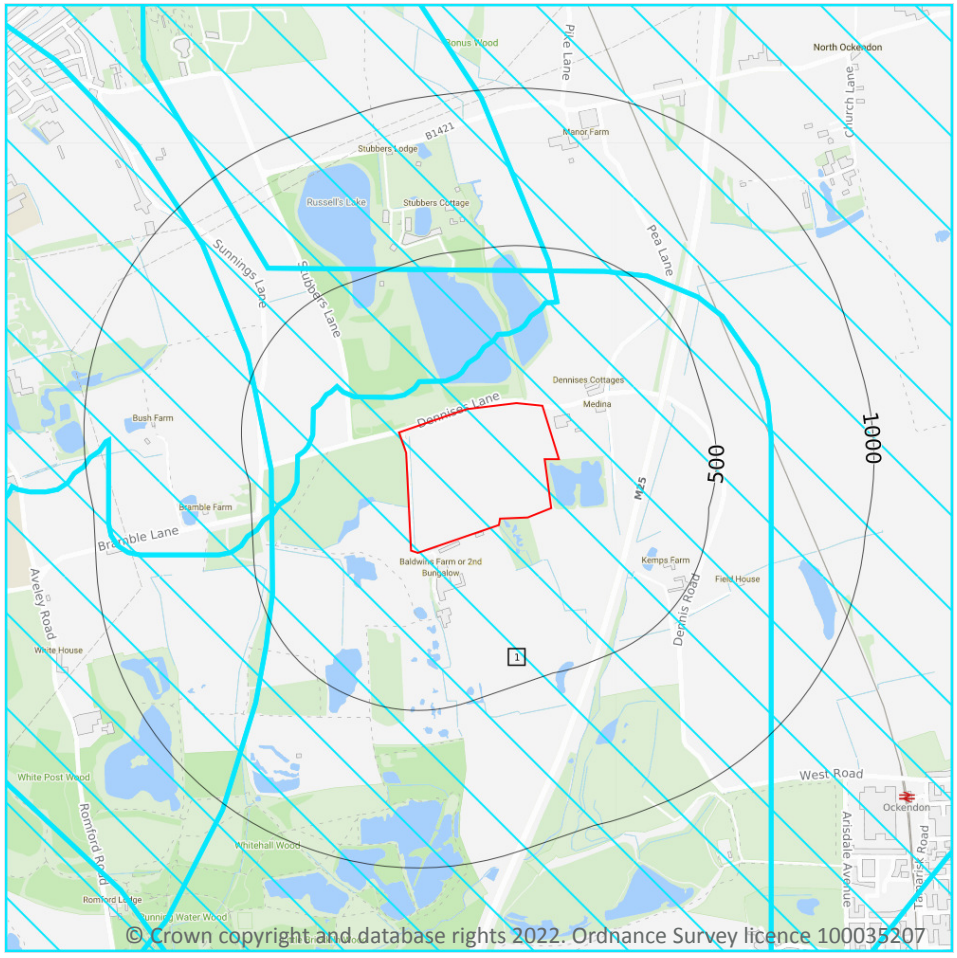
Records within 2000m	5

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	**Southall Sewer and Runningwater Brook NVZ**	**Surface Water**	**802**	**Existing**
424m W	Ingrebourne NVZ	Surface Water	440	Existing
748m SE	Mardyke NVZ	Surface Water	442	Existing
1900m NE	Mardyke NVZ	Surface Water	442	Existing
1958m N	Ingrebourne NVZ	Surface Water	440	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 63**

ID	Location	Type of developments requiring consultation
1	On site	**All applications - All planning applications (except householder) outside or extending outside existing settlements/urban areas affecting greenspace, farmland, semi natural habitats or landscape features such as trees, hedges, streams, rural buildings/structures. Infrastructure - Pipelines, pylons and overhead cables. any transport proposal including road, rail and by water (excluding routine maintenance). airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, review of minerals permissions (romp), extensions, variations to conditions etc. oil & gas exploration/extraction. Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha. Residential - Residential development of 10 units or more. Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units. Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 750m², manure stores > 3500t. Waste - Landfill. incl: inert landfill, non-hazardous landfill, hazardous landfill. Discharges - Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream.**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

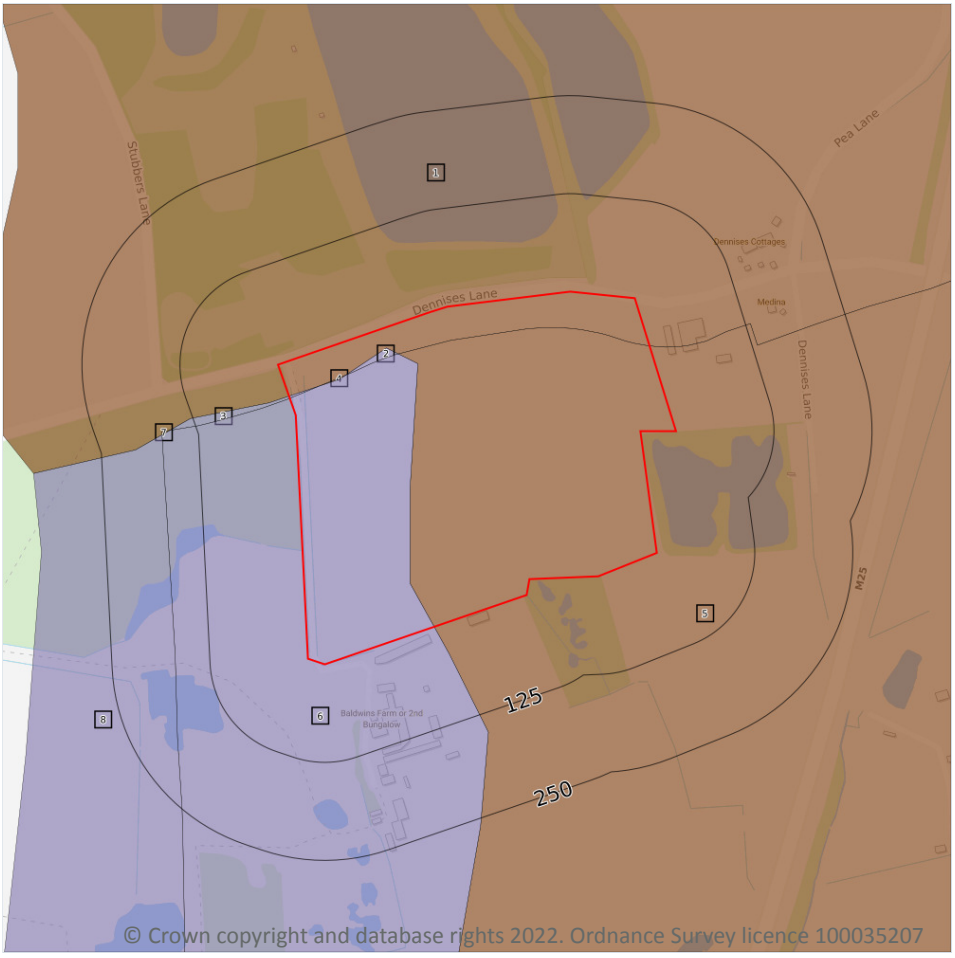
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	8

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 67**

ID	Location	Classification	Description
1	**On site**	**Grade 1**	**Excellent quality agricultural land. Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.**

ID	Location	Classification	Description
2	**On site**	**Non Agricultural**	**-**
3	**On site**	**Non Agricultural**	**-**
4	**On site**	**Grade 1**	**Excellent quality agricultural land. Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.**
5	**On site**	**Grade 1**	**Excellent quality agricultural land. Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.**
6	**On site**	**Non Agricultural**	**-**
7	158m W	Grade 1	Excellent quality agricultural land. Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.
8	169m W	Non Agricultural	-

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	3

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

Location	Reference	Scheme	Start Date	End date
1m N	AG00459620	Entry Level Stewardship	01/09/2013	31/08/2018
178m E	AG00459620	Entry Level Stewardship	01/09/2013	31/08/2018
219m NE	AG00459620	Entry Level Stewardship	01/09/2013	31/08/2018

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations

Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks

Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	11

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 70**

ID	Location	Main Habitat	Other habitats
A	**On site**	**Deciduous woodland**	**Main habitat: DWOOD (INV > 50%)**
B	3m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	6m E	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
1	8m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
B	20m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	28m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	29m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	50m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
2	85m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	93m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	151m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

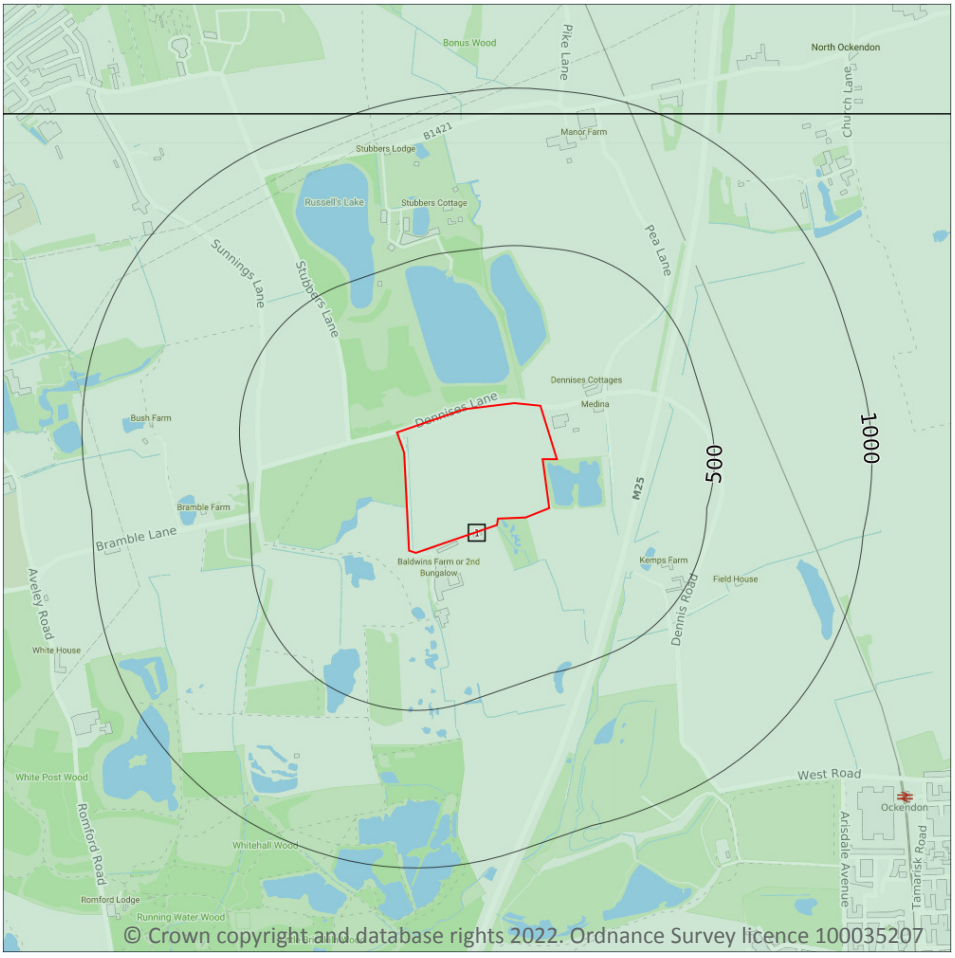
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m	1

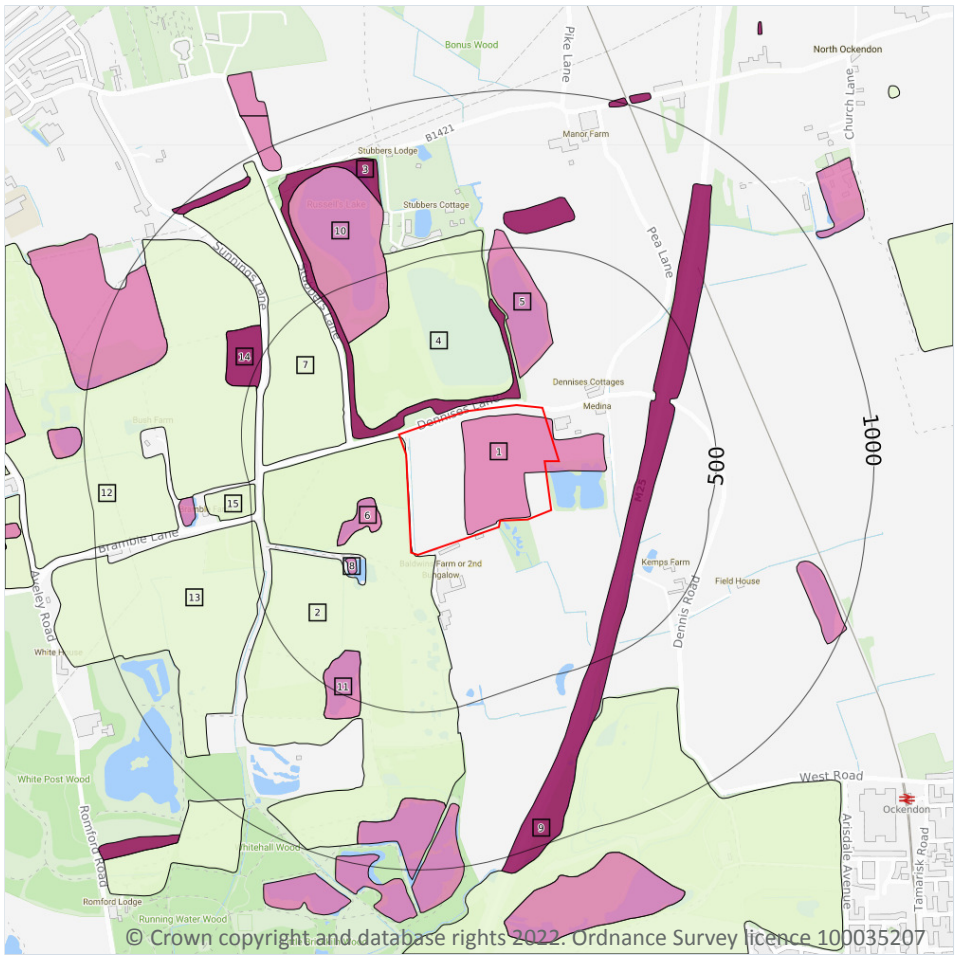
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 73**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**TQ58SE**

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	15

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

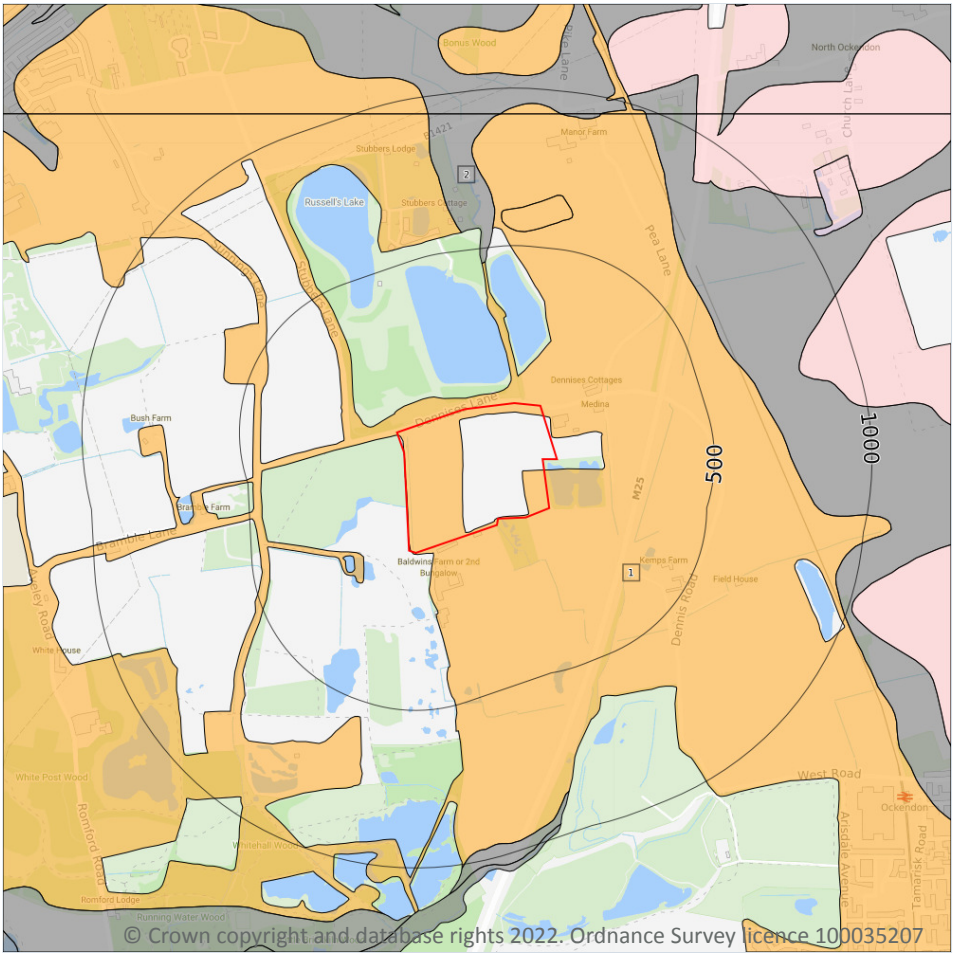
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 74**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**WGR-UKNOWN**	**Worked Ground (Undivided)**	**Unknown/unclassified Entry**
2	**On site**	**WMGR-UKNOWN**	**Infilled Ground**	**Unknown/unclassified Entry**
3	17m N	MGR-UKNOWN	Made Ground (Undivided)	Unknown/unclassified Entry
4	34m N	WMGR-UKNOWN	Infilled Ground	Unknown/unclassified Entry

ID	Location	LEX Code	Description	Rock description
5	86m N	WGR-UKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry
6	89m W	WGR-UKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry
7	169m W	WMGR-UKNOWN	Infilled Ground	Unknown/unclassified Entry
8	177m W	WGR-UKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry
9	240m E	MGR-UKNOWN	Made Ground (Undivided)	Unknown/unclassified Entry
10	331m NW	WGR-UKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry
11	355m SW	WGR-UKNOWN	Worked Ground (Undivided)	Unknown/unclassified Entry
12	456m W	WMGR-UKNOWN	Infilled Ground	Unknown/unclassified Entry
13	471m W	WMGR-UKNOWN	Infilled Ground	Unknown/unclassified Entry
14	472m W	MGR-UKNOWN	Made Ground (Undivided)	Unknown/unclassified Entry
15	484m W	WMGR-UKNOWN	Infilled Ground	Unknown/unclassified Entry

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m	2

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 76**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**LHGR-XSV**	**Lynch Hill Gravel Member - Sand And Gravel**	**Sand And Gravel**
2	453m N	HEAD-C	Head - Clay (unlithified Deposits Coding Scheme)	Clay

This data is sourced from the British Geological Survey.

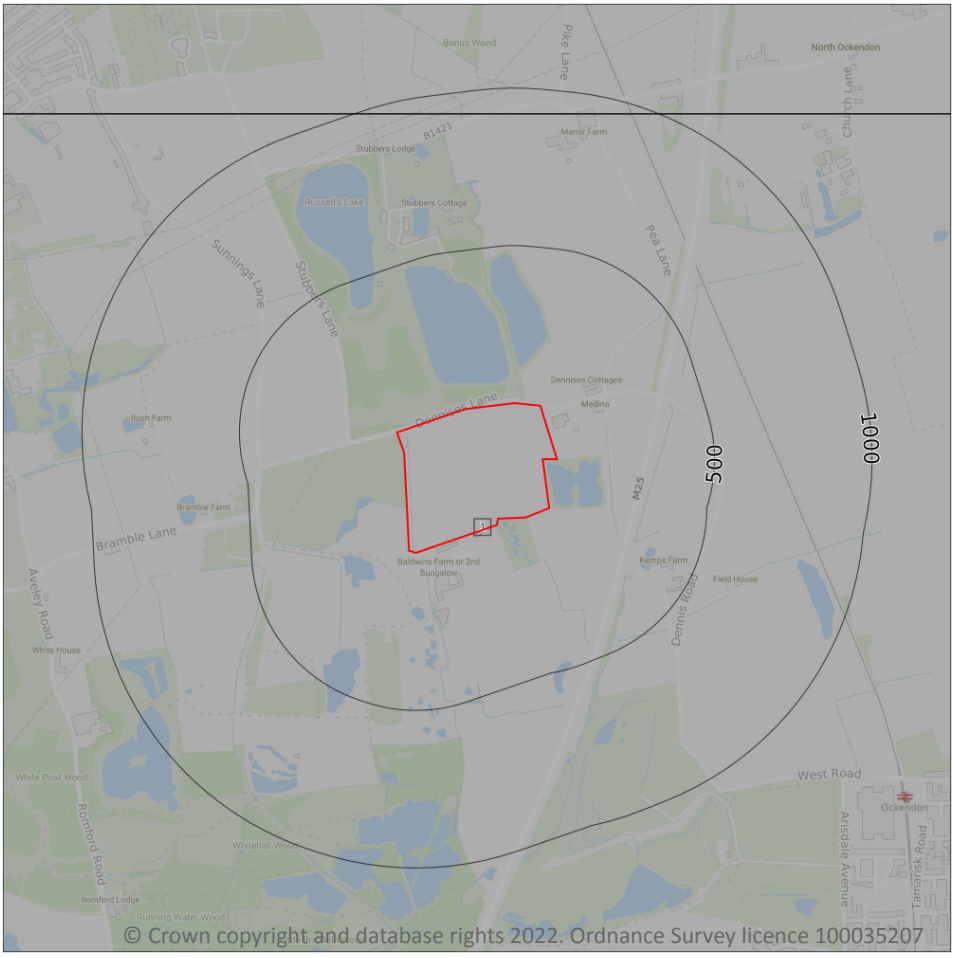
14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m	1

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 78**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**LC-CLAY**	**London Clay Formation - Clay**	**Eocene Epoch**

This data is sourced from the British Geological Survey.

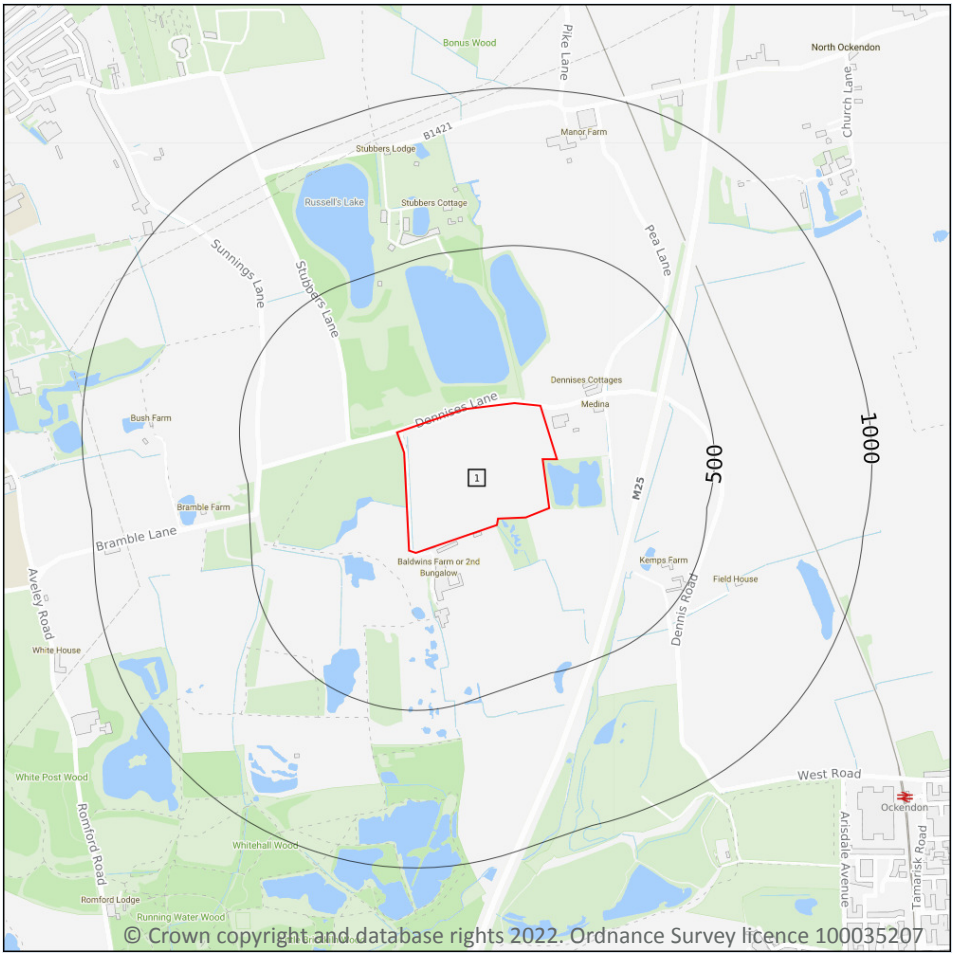
14.6 Bedrock faults and other linear features (10k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

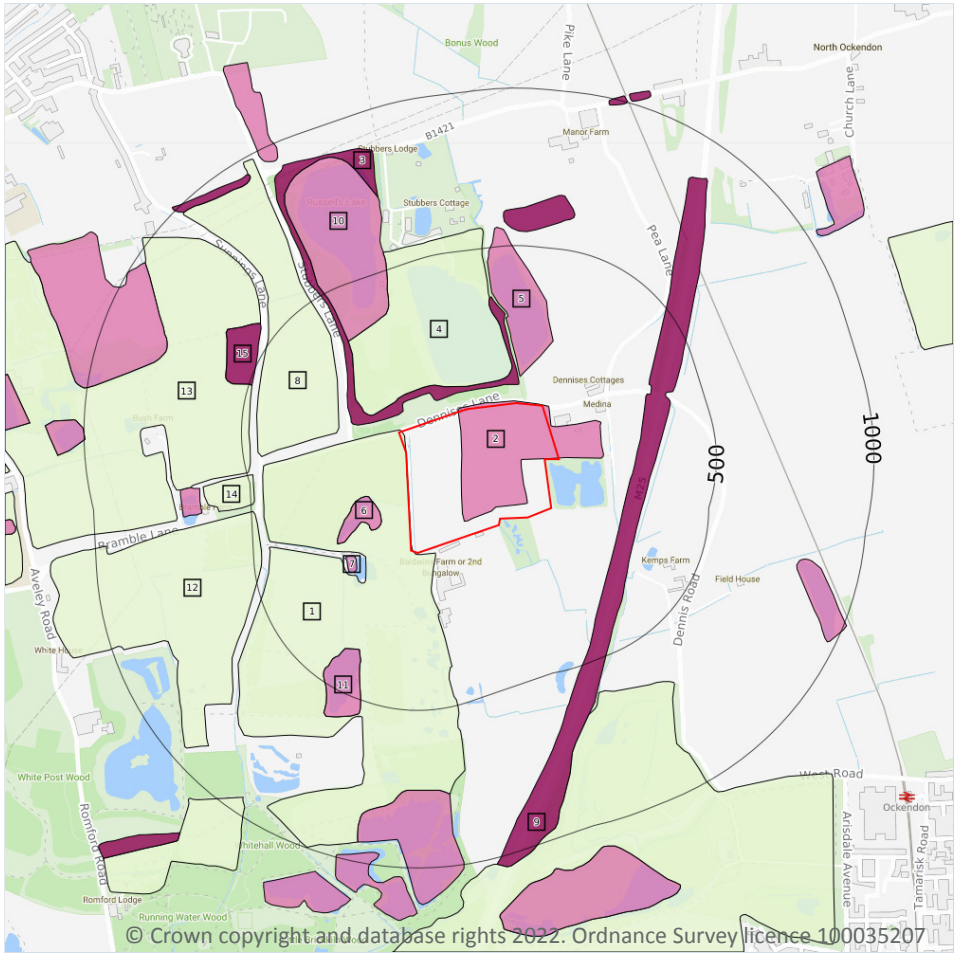
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 80**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW257_romford_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m	15

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 81**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**WMGR-ARTDP**	**INFILLED GROUND**	**ARTIFICIAL DEPOSIT**
2	**On site**	**WGR-VOID**	**WORKED GROUND (UNDIVIDED)**	**VOID**
3	54m N	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
4	72m N	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT

ID	Location	LEX Code	Description	Rock description
5	86m N	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
6	89m W	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
7	176m W	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
8	191m W	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
9	224m E	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
10	331m NW	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
11	355m SW	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
12	474m W	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
13	475m W	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
14	483m W	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT
15	490m W	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

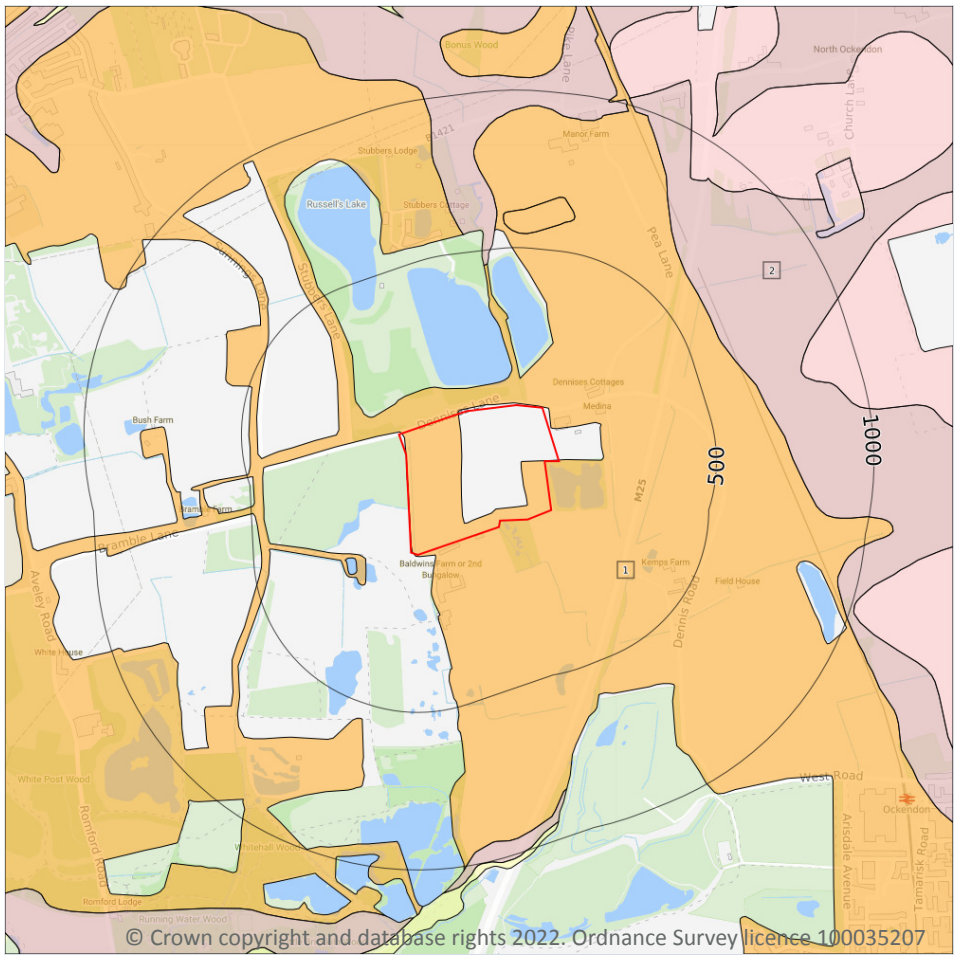
Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**Very High**	**Low**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m	2

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 83**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**LHGR-XSV**	**LYNCH HILL GRAVEL MEMBER**	**SAND AND GRAVEL**
2	452m N	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**Very High**	**High**

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

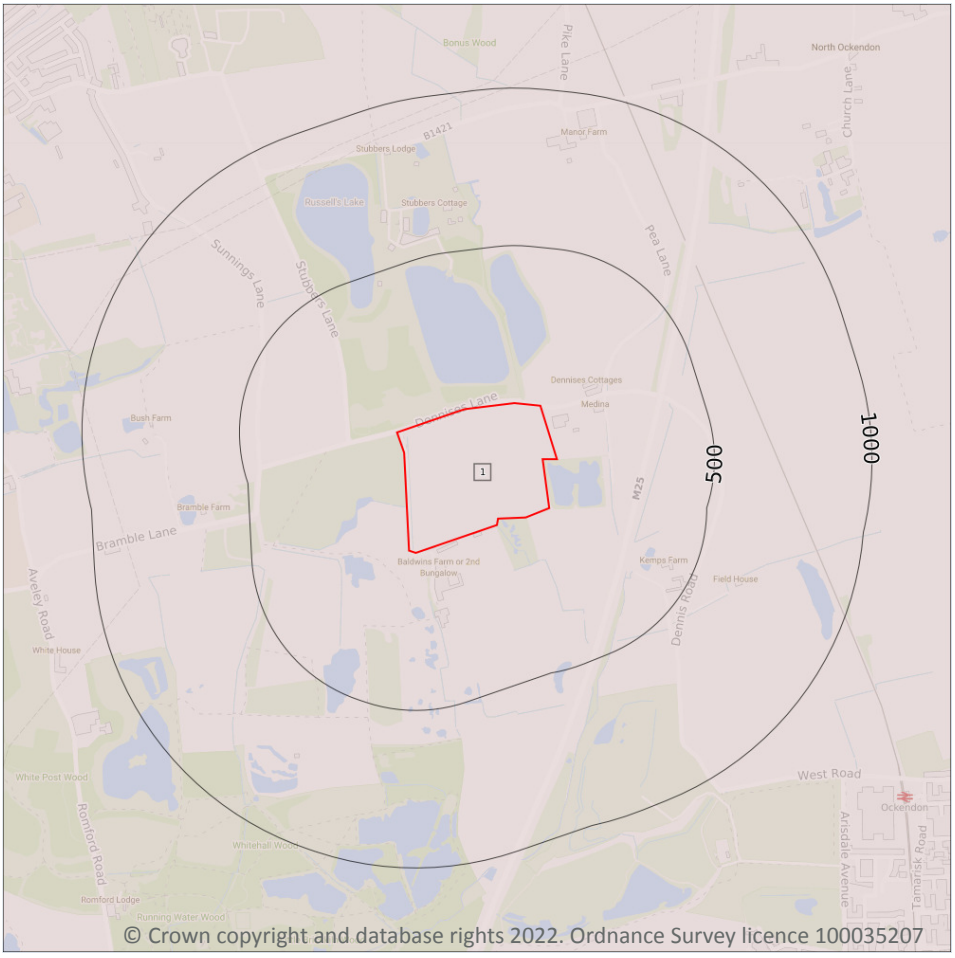
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	1

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 85**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**LC-XCZS**	**LONDON CLAY FORMATION - CLAY, SILT AND SAND**	**YPRESIAN**

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**Moderate**	**Very Low**

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes

Site Outline

Search buffers in metres (m)

Confidential

0 - 10m

10 - 30m

30m+

Unknown

16.1 BGS Boreholes

Records within 250m	10

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

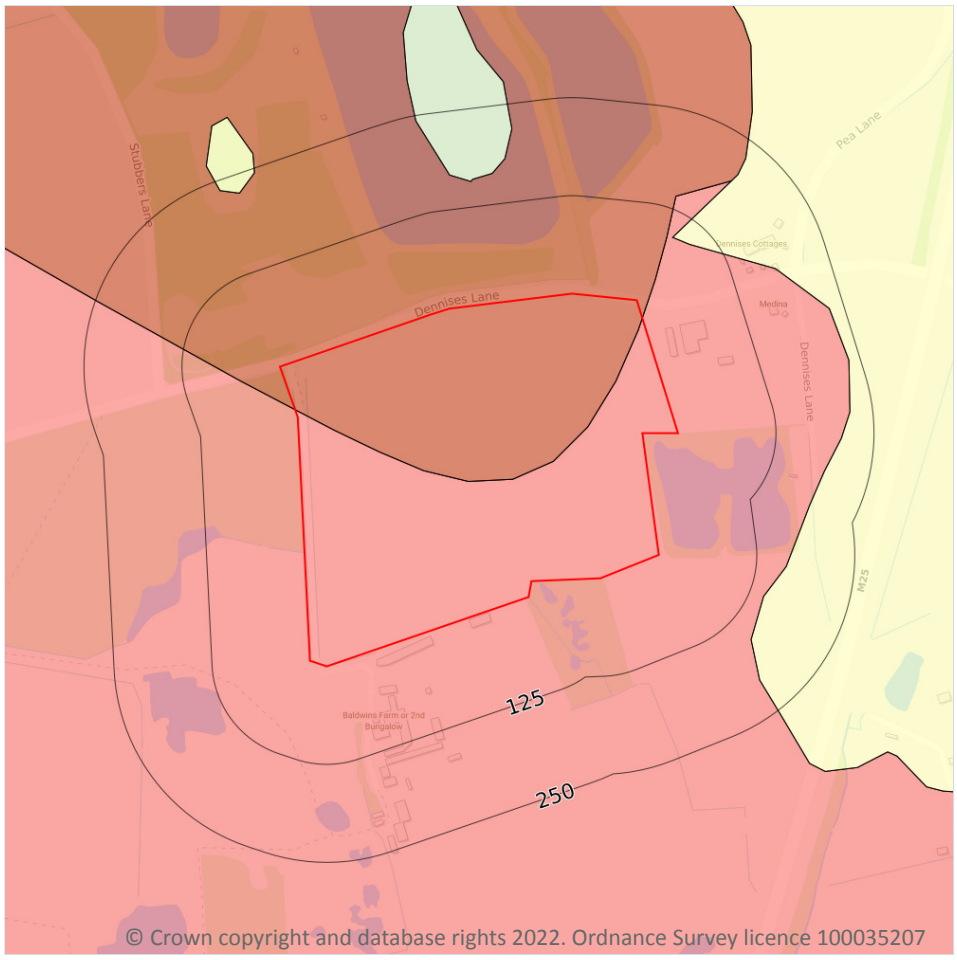
Features are displayed on the Boreholes map on **page 87**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	**On site**	**557800 183800**	**BALDWINS FARM UPMINSTER**	**7.0**	**N**	**792338**
2	43m N	557620 184110	LONDON BOROUGH OF HAVERING BH(12) BH277	5.49	N	792027
3	64m N	557800 184140	MANOR FARM NORTH OCKENDON 15	7.62	N	792137

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	78m NW	557300 184020	LONDON BOROUGH OF HAVERING BH(10) BH275	4.0	N	792025
5	98m N	557480 184130	LONDON BOROUGH OF HAVERING BH(11) BH276	4.0	N	792026
6	127m NE	557920 184160	MANOR FARM NORTH OCKENDON 6	8.53	N	792128
7	191m N	557780 184270	MANOR FARM NORTH OCKENDON 16	7.92	N	792138
8	210m N	557900 184270	MANOR FARM NORTH OCKENDON 17	4.57	N	792139
9	230m N	557630 184300	LONDON BOROUGH OF HAVERING BH(9) BH274	7.92	N	792024
10	246m E	558092 183684	M25 RAPID WIDENING GROUND INVESTIGATION SECTION 4 EBH169	10.45	N	18235350

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	2

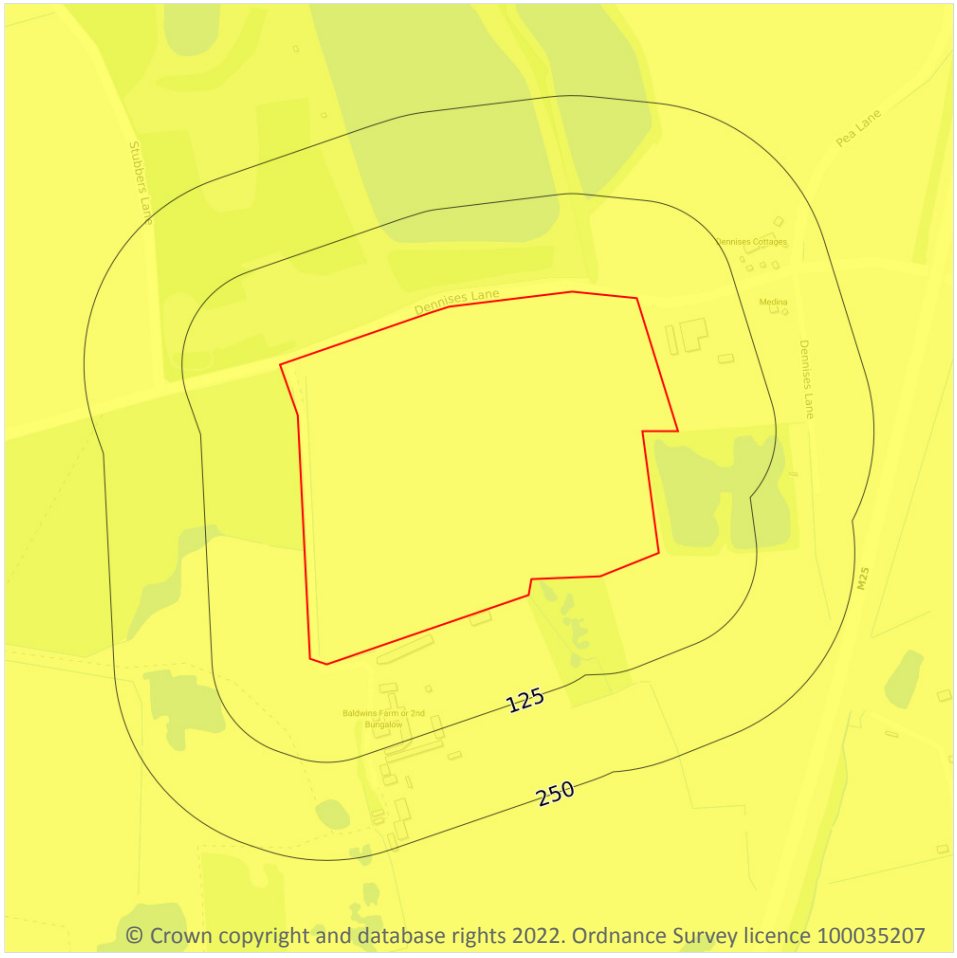
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 89**

Location	Hazard rating	Details
On site	**Moderate**	**Ground conditions predominantly high plasticity.**
On site	**High**	**Ground conditions predominantly very high plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	1

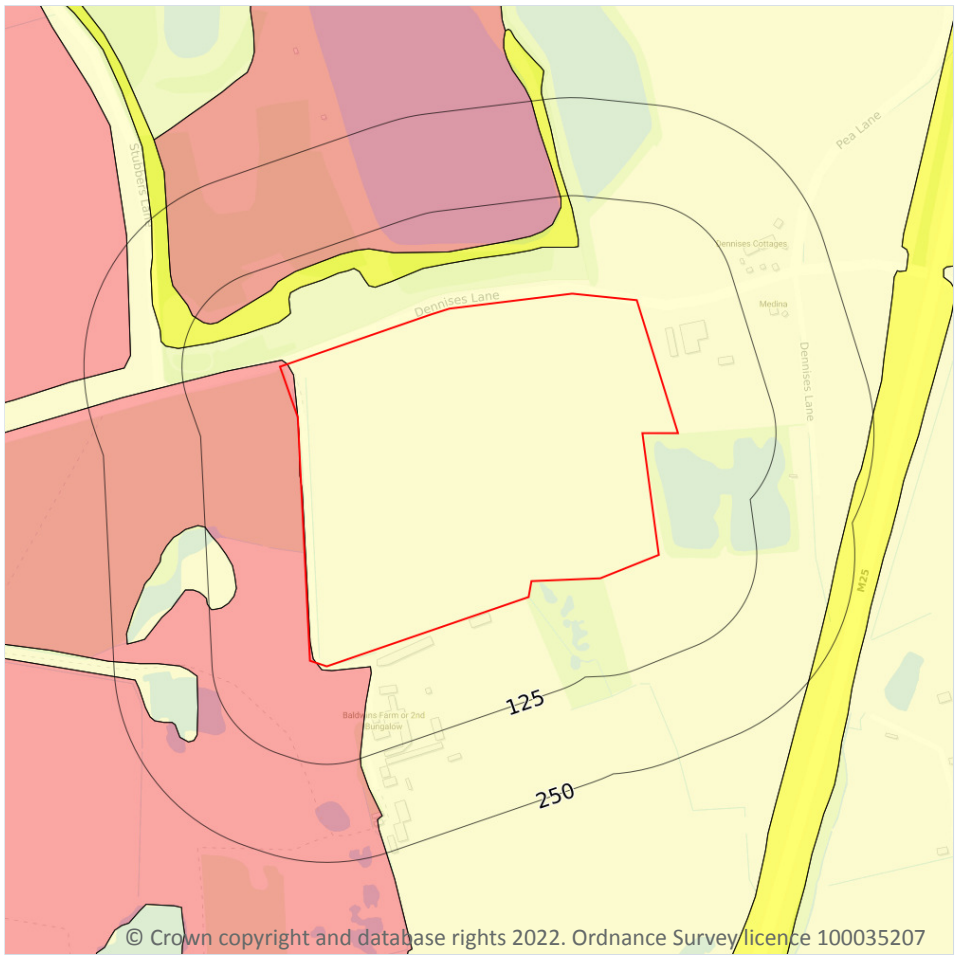
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 90**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	2

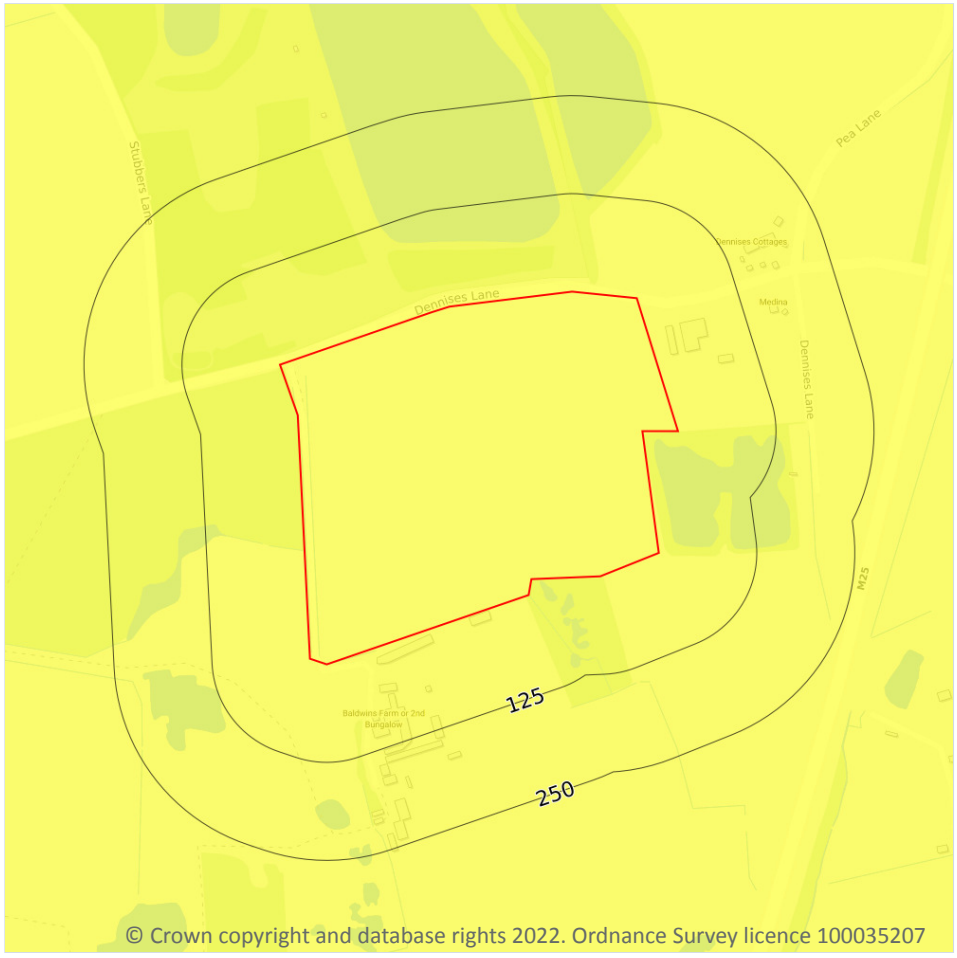
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 91**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Moderate**	**Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

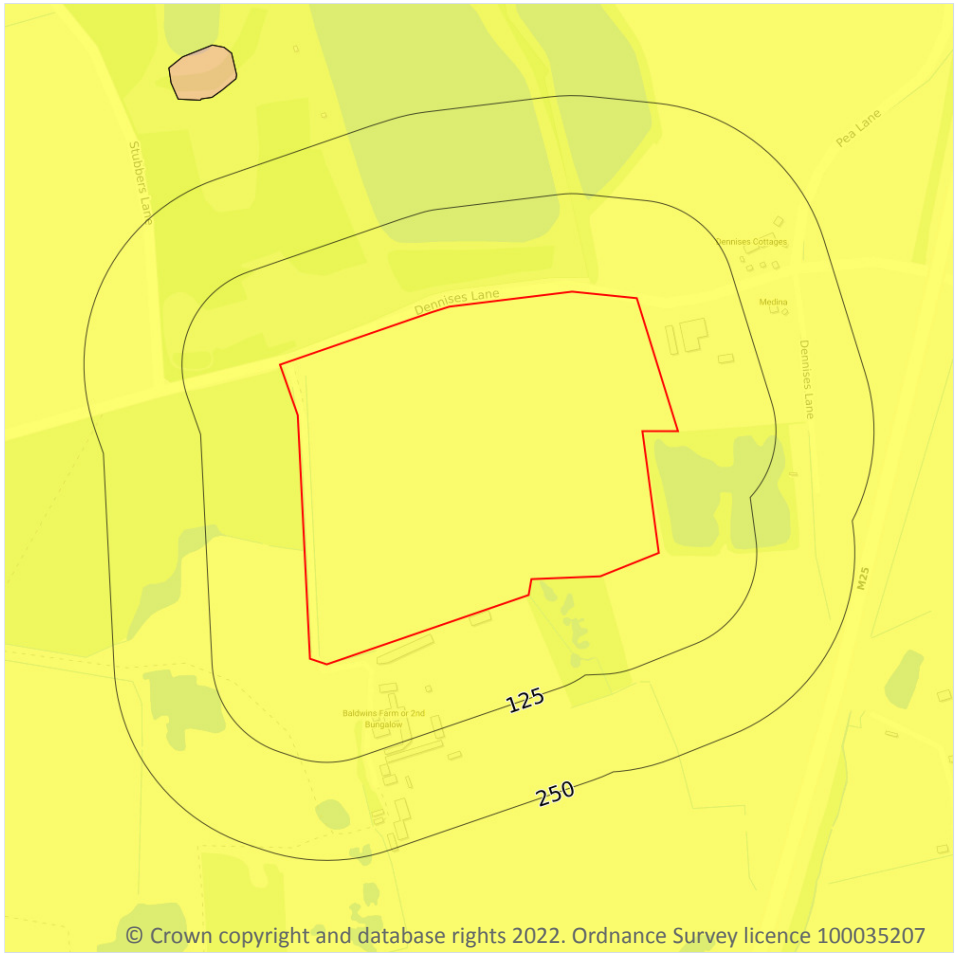
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 93**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

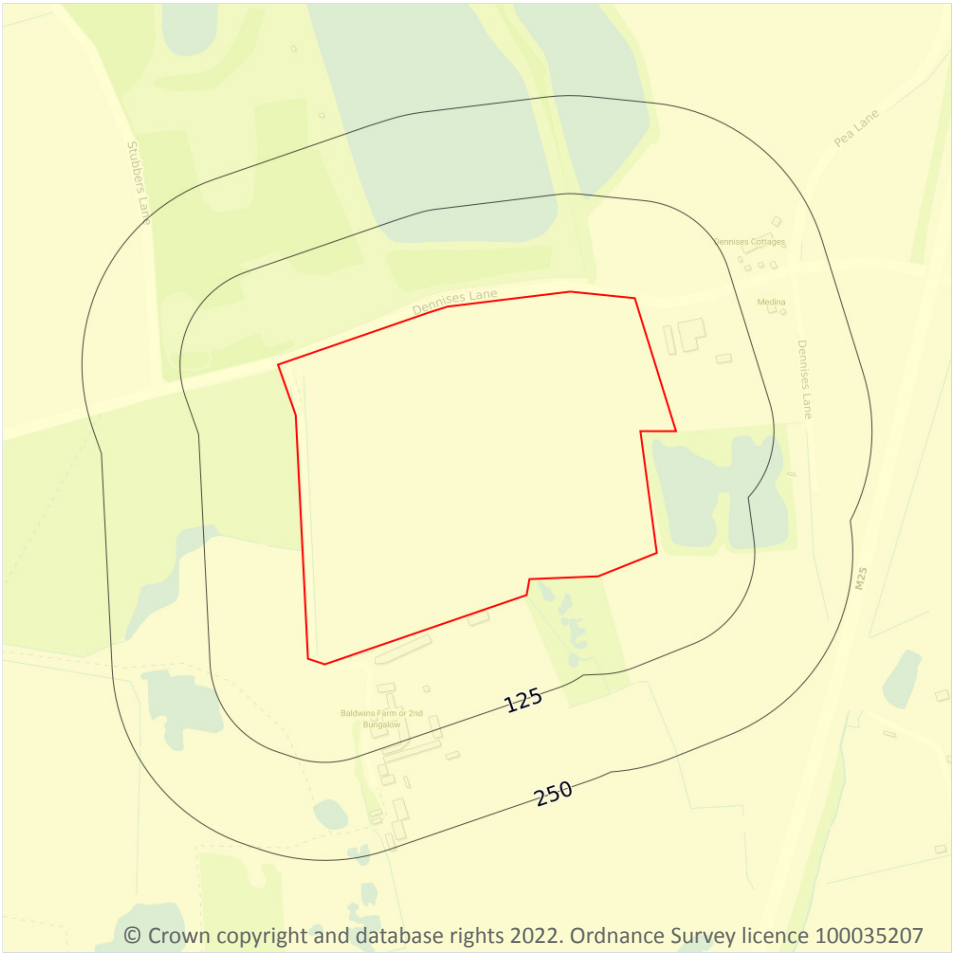
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 94**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

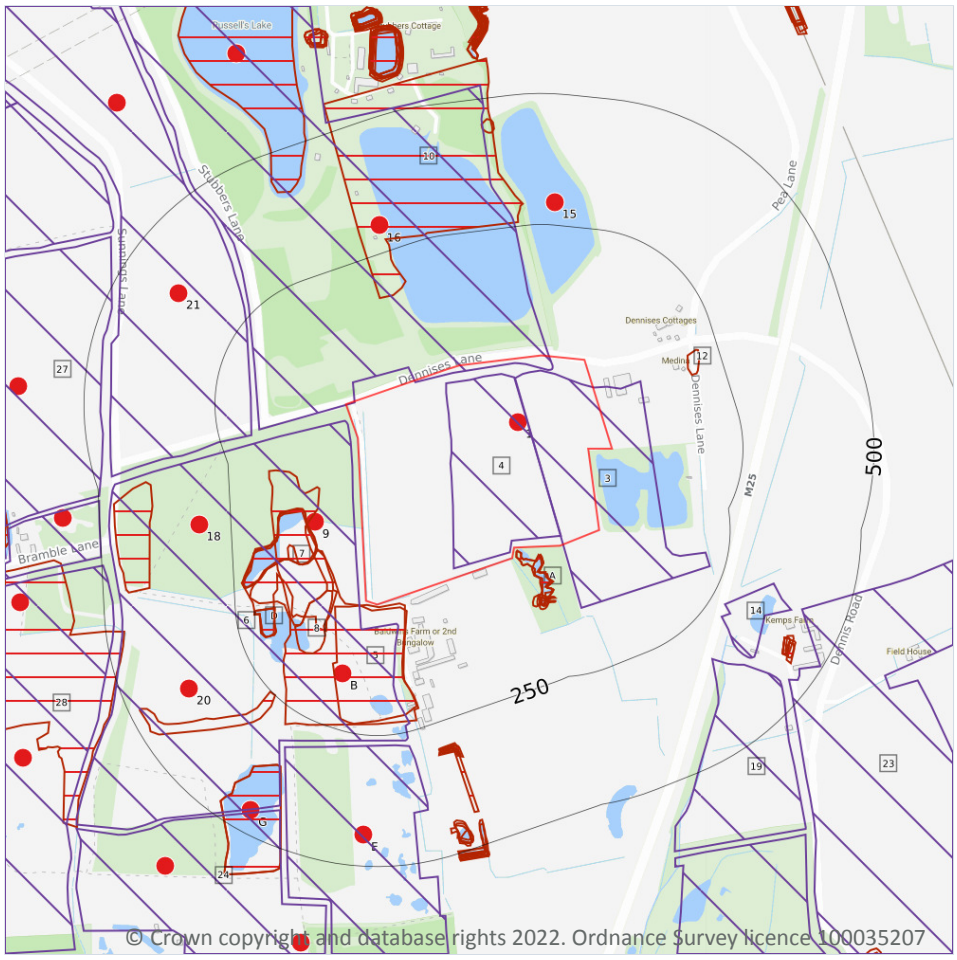
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 95**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	10

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 97**

ID	Location	Details	Description
1	**On site**	**Name: Baldwins Pit Address: SOUTH OCKENDON, Essex Commodity: Sand & Gravel Status: Ceased**	**Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority**
9	90m W	Name: Baldwins Pit Extension Address: SOUTH OCKENDEN, Essex Commodity: Sand & Gravel Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
B	145m S	Name: Baldwins Farm Pit Address: SOUTH OCKENDON, Essex Commodity: Sand & Gravel Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
15	294m N	Name: Stubbers Farm 2 Gravel Pit Address: Corbets Tey, UPMINSTER, Essex Commodity: Sand & Gravel Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
16	301m N	Name: Stubbers Farm Gravel Pit Address: Corbets Tey, UPMINSTER, Essex Commodity: Sand & Gravel Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

ID	Location	Details	Description
18	311m W	Name: Baldwins Pit Extension Address: SOUTH OCKENDEN, Essex Commodity: Sand & Gravel Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
20	376m SW	Name: Baldwins Pit Extension Address: SOUTH OCKENDEN, Essex Commodity: Sand & Gravel Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
21	383m NW	Name: Great Sunnings Pit Address: Corbets Tey, UPMINSTER, Essex Commodity: Sand & Gravel Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
E	440m S	Name: Baldwins Pit Extension Address: SOUTH OCKENDEN, Essex Commodity: Sand & Gravel Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
G	455m SW	Name: Baldwins Pit Address: SOUTH OCKENDON, Essex Commodity: Sand & Gravel Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	**17**

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 97**

ID	Location	Land Use	Year of mapping	Mapping scale
5	4m S	Unspecified Disused Workings	1987	1:10000
A	6m E	Ponds	1987	1:10000
A	6m E	Ponds	1974	1:10000
B	10m S	Sand and Gravel Pit	1974	1:10000
A	16m S	Ponds	1967	1:10560
7	54m W	Ponds	1967	1:10560
8	63m W	Gravel Pit	1954	1:10560
C	73m W	Pond	1954	1:10560
A	86m SE	Pond	1954	1:10560
A	86m SE	Pond	1938	1:10560
C	88m W	Pond	1974	1:10000
C	90m W	Pond	1987	1:10000
A	95m SE	Pond	1921	1:10560
10	167m N	Gravel Pit	1974	1:10000
D	175m W	Pond	1987	1:10000
D	175m W	Pond	1974	1:10000
12	184m E	Ponds	1866	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	**0**

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	13

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

Features are displayed on the Mining, ground workings and natural cavities map on **page 97**

ID	Location	Site Name	Mineral	Type	Planning Status	Planning Status Date
2	**On site**	**Stubbers Farm**	**Sand and gravel**	**Surface mineral working**	**Valid**	**23/5/72**
3	**On site**	**Freeman Shaw**	**Sand and gravel**	**Surface mineral working**	**Valid**	**15/4/80**
4	**On site**	**Freeman Shaw**	**Sand and gravel**	**Surface mineral working**	**Valid**	**15/4/80**
6	9m W	Baldwins Farm	Sand and gravel	Surface mineral working	Valid	23/12/76
11	181m W	Bush Farm	Sand and gravel	Surface mineral working	Refused	Not available
E	269m S	Baldwins Farm	Sand and gravel	Surface mineral working	Valid	23/12/76
14	279m SE	Kemps Farm	Sand and gravel	Surface mineral working	Refused	Not available
19	327m SE	Kemps Farm	Sand and gravel	Surface mineral working	Refused	Not available
23	416m E	Kemps Farm	Sand and gravel	Surface mineral working	Refused	Not available
24	432m S	Baldwins Farm	Sand and gravel	Surface mineral working	Valid	11/12/58, 27/10/58
27	467m W	Bush Farm	Sand and gravel	Surface mineral working	Valid	28/7/62
28	483m W	Hunts Hill Farm	Sand and gravel	Surface mineral working	Refused	Not available
K	499m W	Bush Farm	Sand and gravel	Surface mineral working	Application	Not available

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon

Site Outline

Search buffers in metres (m)

Greater than 30%

Between 10% and 30%

Between 5% and 10%

Between 3% and 5%

Between 1% and 3%

Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 104**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None****

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	10

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 mg/kg**
On site	**15 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 mg/kg**
On site	**15 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 mg/kg**
On site	**15 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 mg/kg**

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	39

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

Location	Arsenic (mg/kg)	Bioaccessible Arsenic (mg/kg)	Lead (mg/kg)	Bioaccessible Lead (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Tin (mg/kg)
On site	10	1.8	62	43	0.5	64	19	17	6
On site	10	1.8	67	46	0.5	67	19	16	6
On site	10	1.8	61	42	0.5	65	19	17	6
On site	10	1.8	58	40	0.5	63	18	17	6
On site	10	1.8	66	45	0.5	68	19	16	6
On site	10	1.8	59	41	0.5	64	18	17	6
On site	10	1.8	61	42	0.5	63	19	17	6
On site	10	1.8	66	45	0.5	67	19	16	6
On site	10	1.8	60	41	0.5	64	19	17	6
On site	10	1.8	59	41	0.4	65	18	17	6
On site	10	1.8	62	43	0.5	66	18	16	6
On site	10	1.8	54	37	0.5	62	18	18	6
On site	10	1.8	63	43	0.5	65	19	16	6
On site	11	1.9	62	43	0.5	60	20	18	7
On site	11	1.9	55	38	0.5	61	18	18	6
On site	11	1.9	63	43	0.5	62	19	17	7
On site	11	1.9	65	45	0.5	63	19	17	7
On site	11	1.9	59	41	0.5	62	19	17	6
On site	11	1.9	77	53	0.6	64	21	17	8
On site	11	1.9	76	52	0.6	62	21	17	8
On site	9	1.6	67	46	0.5	68	19	16	6
On site	9	1.6	66	45	0.5	68	19	16	6

Location	Arsenic (mg/kg)	Bioaccessible Arsenic (mg/kg)	Lead (mg/kg)	Bioaccessible Lead (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Tin (mg/kg)
On site	**9**	**1.6**	**68**	**47**	**0.5**	**69**	**19**	**16**	**7**
On site	**9**	**1.6**	**65**	**45**	**0.5**	**68**	**19**	**16**	**6**
On site	**9**	**1.6**	**63**	**43**	**0.5**	**69**	**18**	**16**	**6**
1m NW	10	1.8	61	42	0.5	64	19	16	6
1m SW	11	1.9	76	52	0.6	61	21	18	9
6m SW	11	1.9	68	47	0.5	60	20	18	8
7m SW	11	1.9	59	41	0.5	58	20	19	8
17m SW	11	1.9	58	40	0.5	58	20	19	8
18m NE	9	1.6	66	45	0.5	70	18	16	6
21m E	9	1.6	58	40	0.4	68	17	15	6
21m E	9	1.6	63	43	0.4	68	18	16	6
23m N	9	1.6	64	44	0.5	68	18	16	6
24m NE	9	1.6	69	47	0.5	71	19	16	7
28m S	11	1.9	56	38	0.5	59	19	19	7
35m N	9	1.6	59	41	0.5	66	17	16	6
45m E	9	1.6	58	40	0.4	66	18	16	6
48m NE	9	1.6	63	43	0.4	69	18	15	6

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	**0**

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-jan-2020/.

APPENDIX 08

EA Habitats and Conservation Screening Assessment

Nature and Heritage Conservation

Screening Report: Bespoke Waste

Reference	**EPR/LB3209FE/A001**
NGR	**TQ 57636 83872**
Buffer (m)	**228**
Date report produced	**20 May 2022**
Number of maps enclosed	**3**

The nature and heritage conservation sites and/or protected species and habitats identified in the table below must be considered in your application.

Nature and heritage conservation sites	Screening distance (m)	Further Information
Local Wildlife Sites (LWS) :	200	Appropriate Local Record Centre (LRC)
Stubber's Outdoor Pursuits Centre		

Protected Species	Screening distance (m)	Further Information
Protected Species - Code 2	up to 500m	Natural England Appropriate Local Record Centre (LRC)

Protected Habitats	Screening distance (m)	Further Information
Deciduous woodland	up to 50m	Natural England

Unfortunately we cannot provide you with the details of all protected species. This is because we either have not been given permission by the owner of the species data, or they have asked us not to identify the species as they are vulnerable. In these instances you must contact the relevant organisation listed above. A small administration charge may be incurred for this service.

Where protected species are present, a licence may be required from Natural England to handle the species or undertake the proposed works.

The relevant Local Records Centre must be contacted for information on the features within local wildlife sites. A small administration charge may also be incurred for this service.

Please note we have screened this application for protected and priority sites, habitats and species for which we have information. It is however your responsibility to comply with all environmental and planning legislation, this information does not imply that no other checks or permissions will be required.

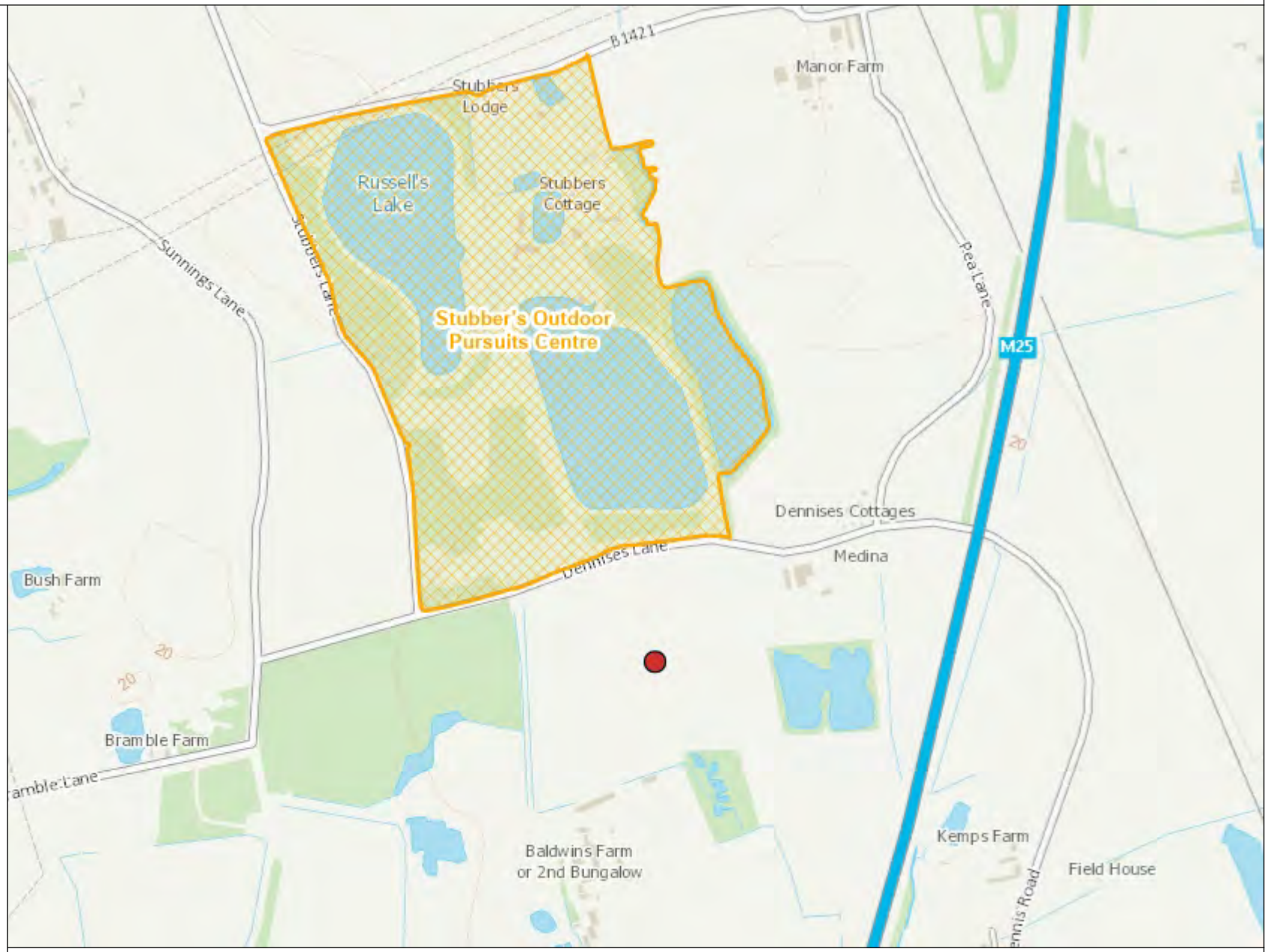
Please note the nature and heritage screening we have conducted as part of this report is subject to change as it is based on data we hold at the time it is generated. We cannot guarantee there will be no changes to our screening data between the date of this report and the submission of the permit application, which could result in the return of an application or requesting further information.

Local Wildlife Sites

Environment Agency

Legend

Local Wildlife Sites



1: 10,000

0 250

Metres

N W E S

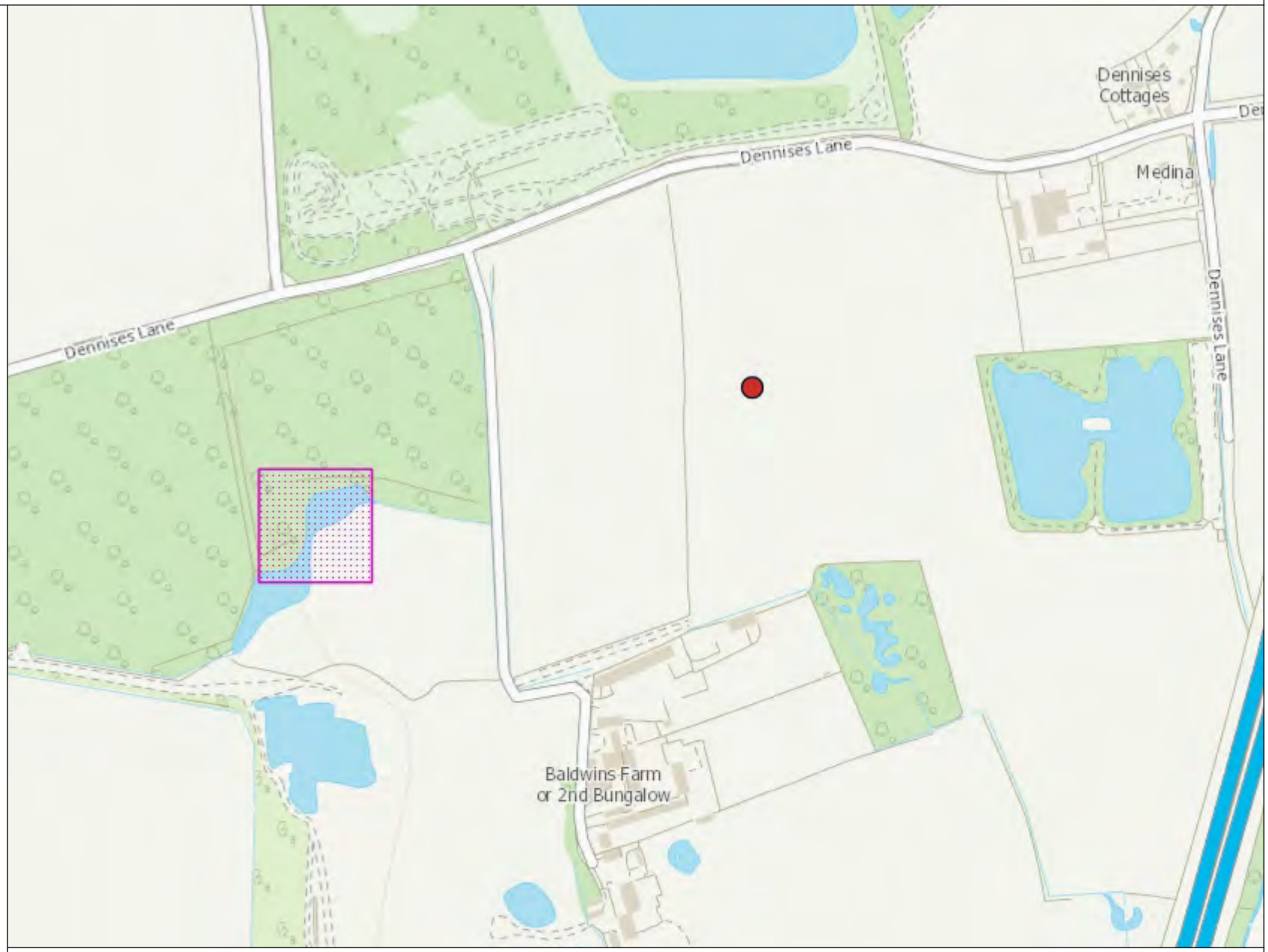
Protected Species

Environment Agency

Legend

Protected species screened for Env Permits - complete set

- Protected species, non fish
- Protected fish
- Protected fish migratory route



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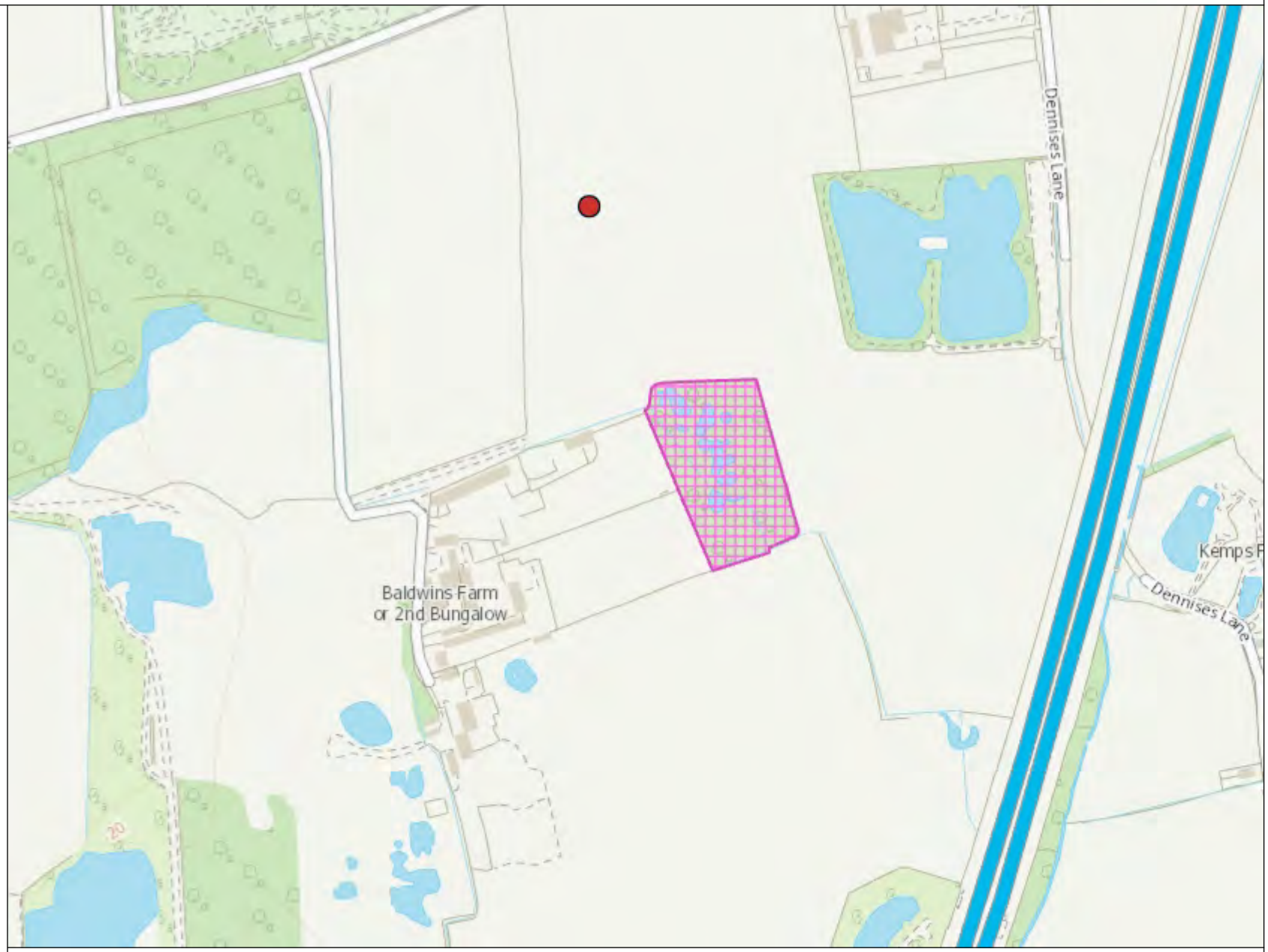
Protected Habitats

Environment Agency

Legend

Protected Habitats screened for Env Permits



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MEDINA FARM RESTORATION

Site Operating Techniques

Prepared for: Ingrebourne Valley Limited

Client Ref: 416.01526.00087

SLR Ref: 416.01526.00087
Version No: 1
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BASIS OF REPORT

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1.0 INTRODUCTION

1.1 Overview

Ingrebourne Valley Limited (IV) has instructed SLR Consulting Limited (SLR) to prepare a bespoke Environmental Permit (EP) application to authorise an inert waste landfill for the restoration of Medina Farm, Dennises Lane, South Ockendon, Essex RM14 2XB, hereafter referred to as 'the Site'.

This Site Operating Techniques forms part of the EP application and provides the following information:

- A summary of the operating times and staffing of the site.
- Details of the types of waste that can be deposited at the site, where they can be deposited in the site, and the procedures that must be followed for their acceptance.
- Details of the site preparation before and during filling.
- A description of how the waste is to be deposited.
- Details of the site infrastructure.
- An environmental nuisance risk assessment.
- Details of the measures that will be implemented to control environmental nuisance.
- Details of the records that are to be maintained.

1.2 The Project

The proposed development can be summarised as the importation of inert waste materials for the restoration of the Site by landfill.

Field A has been previously worked for mineral, was restored but now suffers poor drainage due to differential settlement while Field B contains approximately 200,000 tonnes of sand and gravel.

Field B will have the sand and gravel extracted and then be wholly restored using inert waste material imported to the Site. Restoration of Field A will primarily involve using material excavated from Field B (such as overburden, unsaleable mineral or basal clay) to regrade and address the differential levels across it. This will be supplemented with imported inert waste materials where required to achieve Field A's restoration levels.

In total approximately 420,000 tonnes of inert waste will be required to achieve the proposed restoration landform and return the fields to agricultural use. The proposed restoration landform seeks to achieve a shallow dome shape to ensure efficient drainage while maintaining ease of access for agricultural vehicles. Around the perimeter of the fields, drainage ditches will collect surface water runoff and lead to two attenuation ponds. One attenuation pond will be located in the south-eastern corner of the Site and the other in the south-western corner.

The proposed restoration is illustrated in the following drawings:

- Plan No. 1616/R/1 v3 Proposed Restoration

Prior to mineral extraction in Field B and supplementary deposits to Field A, the fields will be stripped of topsoil and subsoils separately. The topsoil and subsoil will be separately stored in bunds around the perimeter of the Site for replacement later in the final restoration of the Site. Following placement of inert waste materials, the Site will be restored using a minimum of 0.8m of subsoil and 0.4m of topsoil. It is anticipated that there will be shortfall of indigenous soils to achieve this, therefore retained indigenous soil materials will be supplemented with imported waste soil material.

The working of the Site during the operational phase is illustrated in Plan No. 1616/CO/1 Composite Operations Plan.

Up to 220,000 tonnes per annum (tpa) of waste will be accepted at the Site. It is anticipated that restoration of the Site will take 2 years. The proposed restoration of the Site is illustrated in drawing EP3 Engineering Schematic.

2.0 GENERAL CONSIDERATIONS

2.1 Hours of Operation

Working hours will be between 07:00 – 18:00 hours Monday – Friday, with no working on Saturdays, Sundays or Bank Holidays. No removal of material, acceptance of waste or operations will be conducted outside of these hours.

2.2 Staffing and Supervision

The aim of the Company is to provide a well-managed Site operated in accordance with the EP and all associated documents and in particular this Site Operating Plan, using technically competent and trained staff.

The Site management structure is shown in the diagram on the following page.

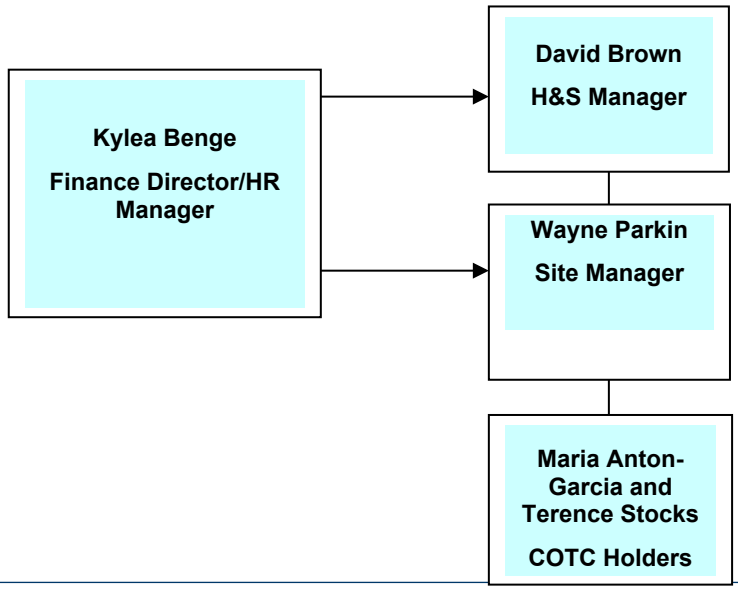
The Site will have a full complement of 5 staff, this may increase subject to operations to a maximum of 6 or 7 dependent on the site operations and requirements. During busy times and holidays, additional suitably qualified staff are available as back up. In addition, IVL's Health and Safety Manager provides health and safety support and human resources advice.

The Site Manager has the main responsibility for the day-to-day operation of the facility.

Maria Anton-Garcia and Terence Stocks, the company technical competent managers, will carry out the duties of the COTC holder.

Copies of the appropriate WAMITAB Certificates (for Technical Competence and Qualifying Experience) for the operation of open inert landfill sites are provided in Section 2, Appendix B of the application.

Figure 1
Project Management Structure



All the personnel will be familiar with, and understand the relevant aspects of the EP, the Site Operating Plan and its accompanying documentation, and the Company's Health and Safety Policy.

The Company has an environmental management system and is certified to ISO 14001. This will ensure that a continuing programme of environmental monitoring and improvements are incorporated into all aspects of the Site operations.

All existing and new personnel will undergo training in environmental awareness in relation to this new programme, and this will be updated on a regular basis in accordance with the principles involved in the ISO 14001 system.

All new personnel will undergo induction training and will be supervised by an appropriate senior member of staff in respect of the Environmental Permit, the Site Operating Plan and accompanying documentation, and the Company's Health and Safety Policy.

2.3 Changes in Technically Competent Persons

Information on any changes in the technically competent management of the Site will be submitted to the Environment Agency (EA) in writing within 5 working days of the change in management, along with evidence of the required technical competence.

Technically Competent Management and Technical Competence shall be as defined under Section 74 of the Environmental Protection Act 1990 and Regulations 4 and 5 of the 1994 Regulations.

2.4 Notification of Commencement, Cessation and Recommencement of Waste Handling Operations

2.4.1 Commencement of Permitted Waste Management Operations

The management will notify the EA of its intention to commence the acceptance of waste in accordance with the number of day's notice set out in the permit.

2.4.2 Cessation and Recommencement of Receiving Wastes

In the event that the Site ceases receiving waste either permanently or for longer than three months, the Company will advise the Agency in writing of the date of the cessation and of the planned date of recommencement. In the event that the Site recommences receiving waste sooner than the notified date, the Company will give the Agency at least five working day's notice in writing.

3.0 WASTE QUANTITIES AND TYPES OF WASTE

3.1 Waste Quantities

3.1.1 Maximum Capacity of Operation

The total quantity of waste that shall be deposited at the Site shall be limited by the pre-settlement levels.

3.1.2 Waste Input Rates and Time to Completion of Filling

The proposed waste quantities for acceptance at the site are shown in Table 1 below.

Table 1 Proposed Waste Input

Waste Types	Waste Input Rates
Inert waste as specified in Table 2	Shall not exceed 220,000 tonnes per year

All wastes coming into the site will be recorded at the weighbridge.

3.2 Permitted Waste

3.2.1 Restoration

Only waste materials suitable for the intended use of the restoration of the via inert landfill will be accepted at the site. The waste categories to be employed are detailed in Table 2 below.

Table 2 Waste Types for Landfill

EWC Code	Description	Exclusions
01	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS	
01 01	wastes from mineral excavation	
01 01 02	wastes from mineral non-metalliferous excavation	
01 04	wastes from physical and chemical processing of non-metalliferous minerals	
01 04 09	waste sand and clays	
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 01	concrete, bricks, tiles and ceramics	
17 01 01	concrete	Selected C & D waste only[(a)]
17 01 02	bricks	Selected C & D waste only[(a)]
17 01 03	tiles and ceramics	Selected C & D waste only[(a)]
17 01 07	mixtures of concrete, bricks, tiles and ceramics	Selected C & D waste only[(a)]
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding topsoil and peat, excluding soil and stones from contaminated sites

EWC Code	Description	Exclusions
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 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
19 12 05	glass	
19 12 09	minerals (such as sand and stones) from the treatment of waste aggregates that are otherwise naturally occurring minerals	Excluding fines from treatment of any non-hazardous waste or gypsum from recovered plasterboard.
19 12 12	crushed bricks, tiles, concrete and ceramics, including mixtures of minerals	Excludes metal from reinforced concrete and fines from treating any non-hazardous waste or gypsum from recovered plasterboard
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	Excluding topsoil and peat

(a) Selected C & D waste (construction and demolition waste): with low contents of other types of materials (like metals, plastics, organics, wood, rubber etc). The origin of the waste must be known.

No C & D waste from buildings polluted with dangerous substances

No C & D waste from buildings treated or painted with materials containing dangerous substances in significant amounts

Table 3 Waste Types for Restoration

EWC Code	Description	Exclusions
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	

EWC Code	Description	Exclusions
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding soil and stones from contaminated sites
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	

There is no intention to accept contaminated materials.

The waste acceptance criteria (WAC) that will apply to waste soils being accepted at the site for restoration purposes will be Landfill Directive inert WAC.

4.0 WASTE IDENTIFICATION AND RECEPTION

4.1 Waste Acceptance Procedure

The Waste Acceptance Procedure (WAP) will ensure that the site only accepts waste that is:

- Suitable for the activity;
- Is allowed by the permit; and
- Is appropriately considered by the environmental risk assessment.

4.2 Record Keeping Procedures

Records will be maintained of all waste transactions relating Medina Farm. Records will comprise the following.

4.2.1 Waste Transfer Notes

All waste accepted for disposal at the site will be accompanied by a waste transfer note (unless it is a multiple consignment) as required by the Duty of Care Regulations, which will provide the following details:

- waste description including appropriate waste classification code;
- waste origin;
- transferor and transferee; and

- signatures of transferor and transferee.

4.2.2 Records of Quantity Received

A register of the quantities and characteristics of waste accepted at the site will be maintained via written records kept at the head office including:

- date of delivery;
- waste quantity;
- waste description and classification code; and
- waste producer and/or carrier.

A record will also be maintained of all waste that is removed from the facility.

4.2.3 Waste Information Forms, Waste Rejection Forms and Correspondence

Copies of relevant paperwork and correspondence will be maintained at the Head Office.

4.2.4 Waste Characterisation and Analysis Records

Copies of all information relating to the characterisation and analysis of waste accepted at the site will be maintained as a digital record on IVL's Environmental Advisor's computer database.

4.2.5 Site Log/Diary

The foregoing records will be supplemented by the site log/diary which will be used to record further details relating to waste acceptance and rejection including communication with the Environment Agency.

5.0 SITE PREPARATION

The proposed phasing of filling of the site is detailed in planning permission and the associated application drawings.

5.1 Maintenance of Surface Water Drainage System

Any surface water drainage ditches, culverts etc. will be inspected monthly for signs of erosion, instability, accumulation of sediment or vegetation or blockages. In the event that any deterioration is observed remedial works will be carried out as soon as practicable.

6.0 WASTE DEPOSIT AND PLACEMENT

6.1 Phased Infilling

Prior to mineral extraction in Field B and supplementary deposits to Field A, the fields will be stripped of topsoil and subsoils separately. The topsoil and subsoil will be separately stored in bunds around the perimeter of the Site for replacement later in the final restoration of the Site. Following placement of inert waste materials, the Site will be restored using a minimum of 0.8m of subsoil and 0.4m of topsoil. It is anticipated that there will be shortfall of indigenous soils to achieve this, therefore retained indigenous soil materials will be supplemented with imported waste soil material.

The working of the Site during the operational phase is illustrated in Plan No. 1616/CO/1 Composite Operations Plan.

6.2 Aftercare Strategy

There will be a three year after care period during which remedial work would be undertaken on any areas that required it, e.g. due to settlement or poor drainage.

Annual aftercare meetings will be held with the Planning Authority to review progress on the Site to agree operations and management for the forthcoming year.

Monitoring of the site will be in accordance with the site closure plan.

7.0 SITE INFRASTRUCTURE

7.1 General

The infrastructure that will be present on Site within the EP boundary to support recycling and restoration activities will compromise of the following;

- Mobile dry crushing unit;
- Mobile dry screening unit;
- Wheel cleaner;
- Wheel spinner;
- Weighbridge, office and fuelling area;
- Messroom;
- Car park; and
- Existing office & weighbridge and existing buildings.

7.2 Site Access, Internal Haul Roads

Access to the Site is gained via an existing junction with Dennises Lane, an existing road located along with northern site boundary.

Waste will be delivered to Site in HGV's via the local road network. There will be a maximum of 64 movements (32 in, 32 out) on Site per day delivering inert waste. There will be a period in which both extraction and importation of reclamation material will be carried out which will increase daily average movements to 142 (71 in, 71 out).

Internal haul roads will be constructed from screened hardcore and will be lifted and re-used as the project progresses.

All vehicles entering the Site are required to report to the Site office.

7.3 Site Identification Board

A notice board is erected at the Site entrance. The notice board is constructed from durable materials and displays the following details:

- Name and address of the waste management facility;
- Statement that the Site is permitted by the Environment Agency;
- Name, address and telephone number of the permit holder;
- The Environment Agency's national numbers for general enquiries and emergencies;

- The emergency contact and telephone number of the licence holder;
- The opening hours of the Site;
- Permit reference number.

7.3.1 Maintenance

The notice board will be inspected on a weekly basis and checked for integrity and accuracy of the information. Repairs/alterations will be carried out as soon as possible after any defect is noted.

7.4 Site Setting and Fencing

Risk assessments will be carried out and appropriate measures will be taken to ensure that public safety and the safety of the company's assets are safeguarded.

A palisaded security compound will be erected for the storage of mobile plant and, when operations are taking place, security guards will be in attendance outside of normal working hours if necessary.

Once per week all boundary fencing will be inspected, and any necessary repairs put in hand. Any damage that exposes members of the public to significant risk or that allows unauthorised vehicular access to the Site will be made good with a temporary repair until a permanent repair can be made.

A note will be made in the Site Diary of when the inspections are carried out, and a record will be made of any damage discovered and the remedial action taken.

At the end of each working day the Site will be checked to ensure it is secure (i.e. all gates and buildings are locked).

All mobile plant will be parked securely at the end of each working day.

7.5 Site Office

The Site office will contain relevant documentation for the site operations e.g. a copy of the Environmental Permit and associated documents, Site plans, emergency procedures etc.

7.6 Fuel Storage

The only fuel to be stored on site will be stored within double bunded tanks.

7.7 Control of Mud and Debris – Wheel Cleaning

A wheel spinner and wheel cleaner will be located on Site, within the waste reception area, for use before vehicles leave the Site.

The Site will have dust control equipment available for use when required, including a waster bowser based on Site.

Regular daily checks will be made by the Site supervisor, or nominated Site employee, of the state of the surface of the Site roads.

7.8 Public and Private Utilities

There are no utilities crossing the Site.

7.9 Site Plant, Equipment and Vehicles

The main machinery employed on Site will be CAT D6s or similar bulldozers, articulated dump trucks and back-actors. Along with this, mobile screening and crushing plants will be located on Site in the recycling area.

A water bowser will be available on Site for dust control, which is pulled by a Ford tractor. A tractor mounted road brush is also available on Site for road-cleaning purposes as required.

7.10 Visitors

Unauthorised persons are not allowed on company premises.

Visitors must call at the Site office, identify themselves and state the nature of their business. Unless the caller is known he/she MUST NOT be allowed to find their destination unaccompanied.

7.11 Report of Thefts

Any staff must immediately inform the Site supervisor or nominee of any occurrence of:

- Breaking and entering of company premises;
- Vandalism;
- Theft from company premises;
- Any act or suspected act of dishonesty; and
- Stock or cash deficiencies.

8.0 ENVIRONMENTAL NUISANCE CONTROL

The Company has an Environmental Management System.

This system ensures that management techniques are instigated to ensure compliance with all planning permissions, Waste Management Licenses, Environmental Permits and other legal requirements. The company has committed itself to a programme of environmental improvements.

The following sections deal with particular potential environmental problems.

8.1 Control of Litter

As the Site will only be taking construction waste, there should not be a litter problem as the wastes are of a heavy nature, not capable of being windblown. Any unauthorised paper etc., delivered with a load would be placed in the skip provided at the tipping area, which would be sheeted.

8.2 Control of Odour

It is unlikely that there will be an odour problem from the construction material delivered to the Site.

8.3 Control of Dust

8.3.1 Prevention and Control of Releases of Dust, Fibres and Particulates

Dust, fibres and particulates may be found in the construction materials with a fines content and in soils. They may be generated during periods of dry weather in combination with windy conditions.

The focus of the dust management plan is to control dust generation and movement at source. The main sources of dust at the Site are likely to be from recycling of waste.

Dust may also arise from on-Site transportation on internal haul roads, infilling and contouring of waste and during the restoration phase on Site.

Dust impact risk from handling of materials and stockpiling is considered to be less significant.

A number of measures will be implemented and maintained throughout the operational life of the Site as listed below. The objective of these measures will be to prevent and minimise the release of airborne dusts, fibres and particulates arising from the permitted waste management operations in such quantities or concentrations that are likely to cause pollution of the environment or harm to human health.

8.3.2 Management Procedures

The Site Supervisor, or their nominee, will exercise day to day control on Site at all times. They will have particular responsibility for ensuring full compliance with the conditions attached to the permit. Specifically, they will assume control either personally or by delegation to suitably trained and responsible staff of:

- Vehicle movements;
- All loading, tipping and materials handling operations;
- Operation of dust suppression measures; and
- Inspection, cleaning and maintenance of all plant and equipment.

Staff at all levels will receive the necessary training and instruction in their duties relating to the control of all operations and the potential sources of dust emissions. Particular emphasis will be given to dealing with plant malfunctions and abnormal conditions. Site staff will inform the manager whenever visible dust emissions are observed or appear likely to occur, as a result of any Site operation.

If at any time dust emissions likely to cause a nuisance beyond the Site boundary are detected by the Site staff or any complaints relating to dust is received, the incident will be recorded in the Site Diary, and immediate action taken to identify the cause of the problem.

If the problem is related to a specific type of waste, then action will immediately be taken to suppress any aerial emissions by damping down or covering the waste with non-dusty materials.

The continuing effectiveness of this dust management scheme will be reviewed regularly.

8.3.3 Complaints Procedure

A complaints procedure will be established to ensure that any nuisance being caused to local residents is dealt with effectively. A register of complaints will be kept on site to record all concerns made either directly to the Site manager or via the regulatory authorities.

Each complaint will be investigated. The Site Manager will report the findings and the action taken to the Site Manager. The Minerals Planning Authority (and any other regulatory authority) will be advised in writing within two weeks of any dust complaint together with the findings of the investigation and any corrective action taken.

8.4 Noise Control

Due to the absence of noise sensitive properties in proximity to the Site noise from the Site is unlikely to be an issue.

8.5 Control of Pests and Vermin

The construction materials to be placed at the Site will not attract pests and vermin e.g. flies and birds. Nevertheless, the Site Manager will undertake regular inspection of the working areas and surrounding areas to check for signs of infestation, and if necessary, will instigate measures to control the infestation.

The results of these inspection will be recorded in the Site Diary.

8.6 Potentially Polluting Spillages and Leaks

8.6.1 Potentially Polluting Spillages and Leaks of Waste

Potentially polluting wastes will not be accepted at the site, therefore control measures and action plans are not considered necessary.

8.6.2 Potentially Polluting Spillages and Leaks of Raw Materials

Fuels and Oils

All fuels, oils and liquids used on the Site will be kept in a safe place which will be securely locked at the end of each working day.

The fuel storage tank is enclosed within a bund to catch any leakages or spills of fuels.

- The bund capacity will be at least 110% of the total capacity of the bowsers' maximum capacity.
- All pipes and gauges will be positioned within the bund wall.
- There will be no drainage outlets to allow the removal of trapped spillages by gravity drainage.
- Any liquid that accumulates within the bunded area will be removed by pumping and will be disposed of at a suitably licensed facility.
- Unconnected single-skinned containers or drums will be located within a bund, having a capacity of not less than 25% of the total capacity of all of the containers or 110% of the capacity of the largest container, whichever is the greater.

Spill kits will be kept on Site to deal with any minor spillages that might occur outside the bunded area. All staff on Site will be trained in the use of these kits.

Should a spillage occur on the construction site, the affected area will be excavated and removed for disposal at an appropriately licensed facility.

8.7 Fires on Site

No wastes will be burned on Site.

The types of waste which will be accepted at the Site are not likely to give rise to fires or heating, therefore no specific control measures or action plan are required.

Office and accommodation areas will have the necessary firefighting equipment to fight fires.

All mobile plant will carry a fire extinguisher and will be inspected and maintained in accordance with the plant maintenance schedule to mitigate against potential fires.

9.0 SITE RECORDS

9.1 Security of Records

The Company appreciate that accurate and reliable record keeping procedures are a vital part of a modern construction operation. All records that are required to be made under the conditions of the Permit and the Site Operating Plan will be maintained and kept secure from loss, damage or deterioration as detailed in the following sections.

9.2 Written Records

The following records and documents will be available for inspection at the site office:

- Visitors Book;
- Site Diary;
- Environmental Permit;
- Site Operating Plan;
- Site Monitoring Plan;
- Company Daily Landfill Inspection Reports;
- Copies of all Environment Agency visit or inspection reports;
- Company Safety Policy; and
- Emergency Procedures.

The following documentation will be available for inspection at the company's head office in Harlow:

- Daily Waste Input Forms;
- Waste Transfer and Acceptance Documentation – i.e. Duty of Care Transfer Notes, conveyance notes and weighbridge tickets;
- Site Environmental Monitoring Data reports;
- Random Waste Sampling Forms;
- Random Waste Sampling Analytical Results;
- Waste Information Forms;
- Unacceptable Waste Analysis Forms; and
- Rejected Waste Forms.

9.3 Digital Records

The following records will be maintained in digital format on the Company's environmental advisor's computer database, copies of which will be sent quarterly to the Company for storage on their computer system:

- Random waste sampling analysis records

Monitoring data will be sent to the EA in digital format by the Company's environmental advisor.

9.4 Availability of Records

All records which are required to be made under the conditions of the EP will be made available for immediate inspection when required by an authorised officer of the Environment Agency.

A noticeboard will be maintained in the office with up-to-date versions of the following prominently displayed:

- Environmental Permit with conditions;
- Plan of method and direction of working;
- Certificate of Employers Liability Insurance;
- Emergency Telephone Numbers;
- The Company's Conditions for Acceptance of Waste (Printed copies will be available for issue should these be required); and
- The Company's Site Safety Rules for customers/visitors (Printed copies will be available for issue should these be required);

Records of waste that are accepted at the Site, records of waste that are rejected and dispatched from the Site and Site diary records will be kept for a minimum period of two years.

Environmental Monitoring records will be kept until a certificate of completion is issued for the Site.

9.5 Recording Hazardous Waste Deposits

No hazardous waste will be deposited at the Site therefore this matter need not be addressed.

9.6 Records of Waste Movements

A record will be kept of each cargo of waste accepted. This record will include the following details:

- The nature of the waste i.e. Solid, liquid;
- Waste Type (see Table 2);
- Quantity – tonnes;
- Date received; and
- Origin of waste, in terms of place.

A summary record of the waste types accepted and removed from the Site will be made for each quarter of the financial year and will be submitted to the EA within one month following the end of the quarter. The format of the summary record will be agreed with the Agency.

9.7 Site Diary

A Site Diary will be maintained by the Site supervisor and will be kept secure. The Site Diary will be available for inspection when required by an authorised officer of the Environment Agency.

The diary will include a record of the following:

- Plant breakdowns and course of action to provide necessary replacement plant;
- Plant maintenance;
- Adverse weather conditions;

- Dust conditions;
- Noise conditions;
- Commencement of working or filling in a new area;
- Completion of working in specified area;
- Soil-stripping;
- Soil-replacement;
- Emergencies and actions taken;
- Unauthorised waste receipts and actions taken;
- Sampling or monitoring exercises;
- Site inspections by company staff, problems identified, and actions taken to resolve them; and
- Complaints received and actions taken.

9.8 Daily Inspection Checklist

To assist in the completion of the Site Diary, the Site supervisor will refer to the "Daily Inspection Check List". The daily inspection may consist of the following:

- All Site plant is operating and maintained according to schedule;
- Dust observations have been carried out;
- Any high environmental monitoring readings have been reported;
- The water bowser and tractor are in use for dust suppression if necessary;
- If litter is a problem;
- The surface water drainage system is available, and functioning should it be necessary at times of high rainfall;
- Fuel storage levels;
- Signs of leakage or spillage from the fuel store;
- Unacceptable waste deliveries -if so, ensure segregation, removal and reporting in Site Diary;
- The standard of haul roads and whether any repairs are required;
- Cleanliness of access road;
- Cleanliness of site office and surrounds;
- Conditions of signs and notice boards;
- Damage to fences and gates;
- Any fly tipping;
- Stability of slopes around the Site, sand faces, waste faces etc.;
- Odours;
- Signs of discoloration of surface water;
- Vandalism; and

- Completion of the Site Diary.

9.9 Reporting of Environmental Performance

The Company will prepare a review of the environmental monitoring data every year during the operational life of the site and during the post closure phase and will undertake a review of the Hydrogeological Risk Assessment every six years. The reports will be submitted to the EA at intervals required in the permit, or as otherwise agreed with the EA.

A completion report will be prepared at the end of the Site completion phase.

The report will include the following information:

- An analysis and review of the environmental monitoring results recorded for the Site, with an interpretation of the results against background and trigger levels.
- A review of the risk management systems provided for the Site.

9.10 COTC Holder Visits

The named COTC holder will visit Site at least twice/week or such other frequency as may be agreed with the EA. A visit report will be placed in the Site file for each visit.

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MEDINA FARM RESTORATION

Environmental Permit Application

2022 Hydrogeological Risk Assessment

Prepared for: Ingrebourne Valley

Client Ref: 416.01526.00087

SLR Ref: 416.01526.00087/HRA
Version No: 1
June 2022

BASIS OF REPORT

This document has been prepared by SLR Consulting Limited with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Ingrebourne Valley Ltd Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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TABLES

APPENDICES

DRAWINGS

1.0 INTRODUCTION

Ingrebourne Valley Limited (IV) has instructed SLR Consulting Limited (SLR) to prepare a bespoke Environmental Permit (EP) application to authorise an inert waste landfill for the restoration of Medina Farm, Dennises Lane, South Ockendon, Essex RM14 2XB, hereafter referred to as 'the Site'.

The Site has planning permission for the extraction of 200,000m^3 of sand and gravel, and its subsequent restoration using clean inert soils and topsoil. The Site received planning permission in November 2020 for the working of sand and gravels (planning ref no 19/0799/FUL) and subsequent restoration of both the quarry area and a formerly worked adjacent area using imported inert wastes (19/01800/FUL).

In total approximately 420,000 tonnes of inert waste will be required to achieve the proposed restoration landform and return the fields to agricultural use. Strict waste acceptance procedures will be implemented to ensure that only suitable inert wastes are accepted at the Site.

The Operations Plan of the Site is presented in Appendix 01 and shows the site layout and general direction of operation.

1.1 Site Location and Topography

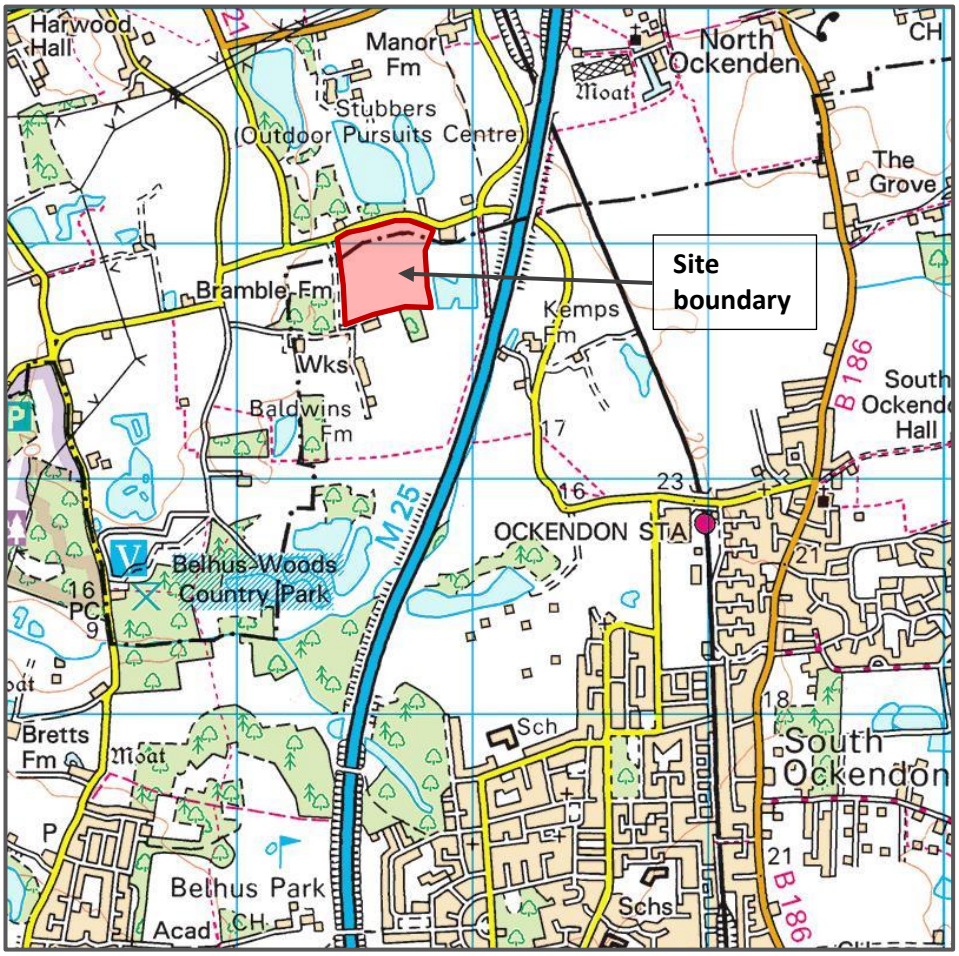
Medina Farm is located 2.7km to the north north-east of South Ockendon in Essex at grid reference TQ 57636 83872. It is approximately 17ha in size.

The site consists of two agricultural fields; Field A, a former gravel pit which has been poorly restored, and Field B, a target area for gravel extraction. The site is bounded to the north by Dennises Lane, beyond which is Stubber's Outdoor Pursuits Centre, a designated Local Wildlife Site, which includes three lakes. To the west, the site is bounded by an unnamed road and woodland/ scrub. To the south, the site is bounded by small industrial units, a copse and farmland associated with Baldwins Farm. To the east, the site is bounded by a lake, used as a fishery, a residential property and car breakers yard.

The topography of the site is generally flat, falling gently from a maximum of approximately 20m above ordnance datum (AOD) in the north-western corner to a minimum of 15mAOD on the eastern boundary.

The location of the Site is illustrated in Figure 1-1.

Figure 1-1
Location of Site



1.2 Objectives

This report presents the conceptual site model (CSM) developed for the Site and assesses the risk to the hydrogeological regime posed by the proposed restoration of the Site using inert waste material.

The objectives of the assessment are to demonstrate that the Site will be compliant with Schedule 22 (Groundwater Activities) of the Environmental Permitting Regulations 2016 (as amended) and the Inert Waste Guidance (2020). These Regulations require that certain substances (Hazardous Substances) are not discharged to groundwater such that they are discernible, and that the discharge of other substances (Non-Hazardous Pollutants) is limited *"so as to prevent pollution"*.

2.0 Conceptual Hydrogeological Site Model

The Site is in a low rainfall area with high potential evapotranspiration. Recharge to the underlying aquifer will be low and typically of the order of 100 to 150mm per annum. As the gravels within Field A have been worked, subsequently infilled with inert waste material and restored with a thin layer of soils. No details are available as to the nature of the materials previously accepted however they are likely to be of lower permeability than the gravels and therefore exhibit a lower rate of recharge.

Within the in-situ gravels the water table is typically high, ranging from 1 to 2.5 m below ground level across the Site. Groundwater flow across the area is in a predominantly south or south-easterly direction, following the regional topography which dips to the base of a valley in which the Running Water Brook flows.

Field A will be restored through initial removal of any covering soils followed by the emplacement of a 1m attenuation layer with a maximum permeability of $1x10^{-7}$m/s. Inert wastes will be emplaced over the attenuation layer to form the revised restoration contours. The site will be restored with a minimum of 1m of restoration soils.

Field B will require the working of the mineral below the water table followed by the restoration with inert wastes. Working of this field will be as follows:

- Field B will be worked dry until the water table is reached (average winter water level – 0.89m below ground).
- Trenches will then be dug around the perimeter of the field to a depth of approximately 3.2m BGL or upon contact with London Clay, whichever first.
- The trenches will be clay lined to prevent any inflows to the Site from groundwater during mineral extraction. The clay used will have a maximum permeability of 1×10^{-7} m/s (or equivalent).
- Subject to obtaining an abstraction licence and permit to discharge the Site will be dewatered via a sump in the base of the excavation and the water discharged to Pond 1 which will overflow into Pond 2. The collected waters will be allowed to infiltrate into the underlying strata, particularly from Pond 2 as it is connected to unworked gravels and may overflow from Pond 2 to the ditch to the south of the Site.
- In the event that water within the void of the Site is unsuitable for discharge to the ponds, for example due to poor water quality, cells will be formed within the Site so that water can be managed internally to the Site via pumping between cells so that mineral extraction and restoration can be undertaken in dry conditions. Dewatering and discharge will be regulated separately and a permit application and abstraction licence application for the Site have been submitted to the EA separately.
- Once all the gravel has been extracted from Field B, the clay liners will remain around the area. Field B will then be backfilled with inert materials and restored with 1.2m of sub-soils and topsoils. Medina Farm will then be restored back to good quality agricultural land with a final topographical height of 21m AOD.

The conceptual hydrogeological site model is based on the source-pathway-receptor linkages. The conceptual model is shown on Drawings HRA1 (EMP) and HRA2 – (Site cross-sections) and key elements of the hydrogeological model are discussed in further detail within the following sections below:

- aquifer characteristics;
- groundwater flow and quality;
- groundwater quality;
- licensed groundwater abstractions; and
- Source Protection Zones.

2.1 Waste Source

2.1.1 Site Design and Construction

The Site will be restored over a period of two years, as presented on the operations plan included in Appendix 01. Details of the proposed design are outlined below.

2.1.2 Basal and Sidewall Lining

The sidewall geological barrier around the perimeter of field B and the base of field A (overlying the existing made ground) will be constructed using low permeability indigenous overburden or imported waste materials from excavations where there is no suspicion of contamination. The basal geological barrier of field B will comprise in-situ London Clay.

The geological barrier will be a minimum thickness of 1m at a permeability no greater than 1 x 10^{-7} m/s.

2.1.3 Capping

Following placement of inert waste materials, the Site will be restored using a minimum of 0.8m of subsoil and 0.4m of topsoil. It is anticipated that there will be shortfall of indigenous soils to achieve this, therefore retained indigenous soil materials will be supplemented with imported waste soil material.

2.1.4 Waste Quality and Priority Contaminants

There is no confirmed waste stream for the Site. However, the Site will be restored using imported inert waste material. The inert waste source term has been assessed based on Inert WAC limits as outlined within section 2.1.2 of the Landfill Directive 2003/33/EC and reproduced in Table 2-1 and Table 2-2.

Table 2-1
Limit values for waste acceptable at Landfills for Inert Waste

Component	L/S = 2 l/kg (mg/kg dry substance)	L/S = 10 l/kg (mg/kg dry substance)
Arsenic	0.1	0.5
Barium	7	20
Cadmium	0.03	0.04
Chromium (Total)	0.2	0.5
Copper	0.9	2.0
Mercury	0.003	0.01
Molybdenum	0.3	0.5
Nickel	0.2	0.4
Lead	0.2	0.5
Antimony	0.02	0.06
Selenium	0.06	0.1
Zinc	2	4
Chloride	550	800
Fluoride	4	10
Sulphate	560*	1000*

Component	L/S = 2 l/kg (mg/kg dry substance)	L/S = 10 l/kg (mg/kg dry substance)
Phenol	0.5	1
DOC**	240	500
TDS***	2500	4000

* if the waste does not meet these values for sulphate, it may still be considered as complying with the acceptance criteria if the leaching does not exceed either of the following values: 1,500mg/l as C_0 at L/S = 0.1l/kg and 6000mg/kg at L/S = 10l/kg.

** If the waste does not meet these values for DOC at its own pH value, it may alternatively be tested at L/S = 10 l/kg and a pH between 7,5 and 8,0. The waste may be considered as complying with the acceptance criteria for DOC, if the result of this determination does not exceed 500 mg/kg.

*** The values for total dissolved solids (TDS) can be used alternatively to the values for sulphate and chloride.

Table 2-2
Limits for Total Content of Organic Contaminants

Parameter	Value (mg/kg)
TOC (total organic carbon)	30,000 (*)
BTEX (benzene, toluene, ethylbenzene and xylenes)	6.0
PCBs (polychlorinated biphenyls, 7 congeners)	1.0
Mineral oil (C10 to C40)	500
PAHs (polycyclic aromatic hydrocarbons)	100
* In the case of soils, a higher limit value may be admitted by the competent authority, provided the DOC value of 500 mg/kg is achieved at L/S = 10 l/kg, either at the soil's own pH or at a pH value between 7,5 and 8,0.	

Environment Agency guidance *'Testing for Disposal to Landfill*[1]*'* clarifies: *"While limits are set for these tests in the Council Decision annex, the Environmental Permitting Regulations, schedule 10 state that the L:S 10 l/kg test must be used."*. It is therefore proposed that the L:S 10l/kg WAC limits will be used for determining priority contaminants.

2.2 Pathways

2.2.1 Regional Geology

Soils and Superficial Deposits

The Cranfield Soilscapes online soil map viewer[2] indicates that the Site is underlain by 'Loamy soils with naturally high groundwater'. A site investigation undertaken in 2019 found topsoils to have a thickness of 0.3 to 0.4m, with greater thickness observed to overlie areas of made ground.

According to BGS online mapping[3] and confirmed from drilling of three groundwater monitoring boreholes, the superficial deposits present beneath Field B consist of the Lynch Hill Gravel Member. There are significant areas of made ground in the eastern part of the Site (Field A) and surrounding the western boundary of the Site.

Bedrock

The regional bedrock geology comprises London Clay and at depth the Lambeth Group, Thanet Formation and White Chalk sub-Group which outcrop approximately 3.7km to the south of the Site. The London Clay was lithologically described as "Firm-to-stiff, brown Clay" within the 2011 site investigation and is present at depth from 3.2m below ground level (BGL) and where proven to a depth of 4.5 - 8.5m BGL (when the boreholes were terminated).

The regional bedrock geology, based on BGS[4] mapping, is summarised in **Error! Reference source not found.**.

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[1] Environment Agency (March 2013). *Waste Sampling and Testing for Disposal to Landfill*. Ref. EBPRI 11507B Final
[2] Cranfield Soil and Agrifood Institute Soilscapes Online Soil Map Viewer (Accessed 19th May 2022) http://www.landis.org.uk/soilscapes/
[3] BGS Geoindex Superficial Deposits 1:50,000 Scale Mapping, available at: https://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed 19th May 2022)
[4] BGS Geoindex Bedrock Geology 1:50,000 Scale Mapping, available at: https://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed 19th May 2022).
Lithological descriptions and deposit thicknesses from the BGS Lexicon of Named Rock Units, available at: https://www.bgs.ac.uk/lexicon/ (Accessed 19th May 2022)

Table 2-3
Summary of Site Geology

Geological Strata	Lithological Description	Typical Thickness (m)
Lynch Hill Gravels	Brown sand and sub-angular to sub-rounded, fine-to-coarse gravels.	2.20 - 3.20
London Clay	Very stiff grey silty clay with bands of silt and sand.	Up to 150
Lambeth Group	Variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate.	Up to 39
Thanet Formation	Glauconite-coated, nodular flint at base, overlain by pale yellow-brown, fine-grained sand that can be clayey and glauconitic. Rare calcareous or siliceous sandstones.	0 to 30
White Chalk Sub-group	White Chalk with flints.	100+

2.2.2 Site-Specific Geology

Three new boreholes were drilled at the Site in November 2019[5] and with historic groundwater monitoring boreholes providing further geological detail. Their locations are displayed on Drawing HRA1, and the geological logs are included in Appendix 02.

The boreholes indicate that:

- There is limited grass covered topsoil overlying the Site and ranging in depth from 0.1 to 0.4m below ground level (BGL);
- A layer of gravelly clay lies beneath the topsoil down to a depth range from 0.6 to 1.1m BGL, with some cobbles and more sand to the north of the Field B;
- Beneath this lies the Lynch Hill Gravel Member, down to a depth range typically between 2 and 3.2m BGL;
- Under this is less than 0.5m of firm brown and grey clay, followed by stiff brown and grey clay identified as the London Clay Formation.

The Lynch Hill gravel is described as “Brown SAND and GRAVEL” in boreholes MF19_01 and MF19_02 and as “Brown SAND and subangular to subrounded fine to coarse GRAVEL” in BF01 in the north of the Field B (driller descriptions).

The depth and elevations of Lynch Hill Gravels encountered at each of the three boreholes are provided in Table 2-4.

[5]SI Drilling (November 2019) Medina Farm Boreholes MF19_01, MF1_02, MF19_03, SI Drilling Ref: Fm-HnR-3025-Rev E

Table 2-4
On-Site Depth and Elevations of Lynch Hill Gravels

Borehole ID	Easting	Northing	Top of Lynch Hill Gravels (m BGL)	Base of Lynch Hill Gravels (m BGL)	Thickness of Lynch Hill Gravels (m)	Top Elevation of London Clay (m AOD)
BF01	557518.1	183979.5	1.10	3.20	2.10	16.06
BF02	557879	183686	n/a	n/a	n/a	13.42
BF05	557289	183947	4.80	6.80	2.00	15.86
MF19_01	557420.3	183837.1	0.90	3.00	2.10	16.72
MF19_02	557512	183649.2	0.60	2.10	1.50	16.71
MF19_03	557838	183871	0.30	2.00	1.70	13.82

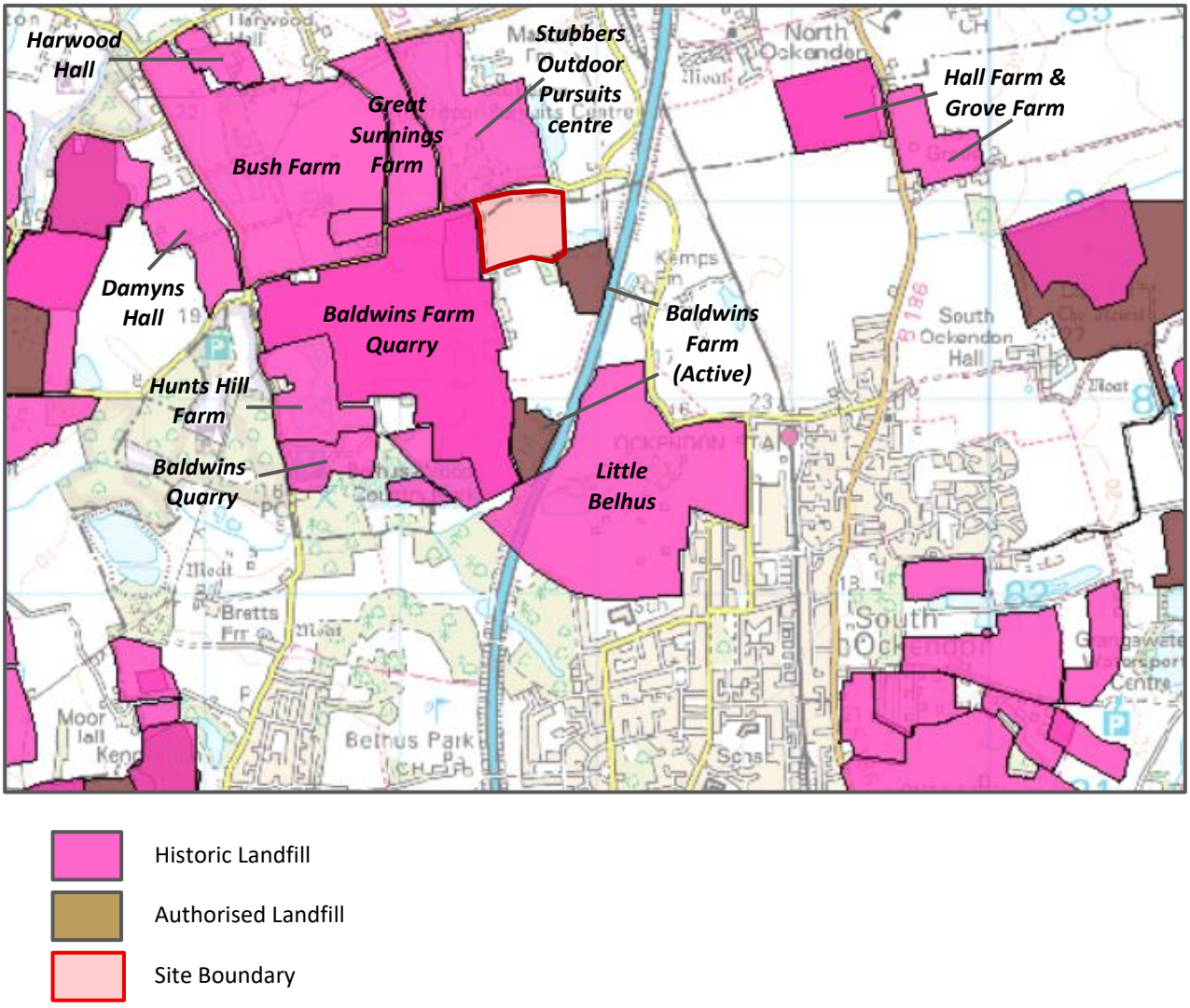
2.3 Landfill Sites

Extensive landfilling has taken place in the vicinity of the application site, primarily associated with quarrying of the superficial gravels with landfilling undertaken for backfilling of the quarry voids. The EA has confirmed that there are nine landfill sites recorded within a 2km radius of the application site.

The application site is surrounded on its northern and western boundaries by historic landfills including landfilling associated with Baldwins Farm Quarry, historically operated by Ingrebourne Valley. Although not shown on the EA mapping, the BGS mapping and a walkover survey indicate that the land in the eastern part of the Site (Field A) and immediate to the eastern boundary has also been landfilled.

A plan from the Environment Agency website showing the location of the landfilled areas is shown as Figure 2-1.

Figure 2-1
Landfill Sites within the Surrounding Area



The details of historic and active landfills within a 2km radius of the Site taken from the EA website are given in Table 2-5.

Table 2-5
Landfills within a 2km Radius of Site

Site Name	Operator	Distance (m) & Location	Start & Finish Date	Waste Type
Stubbers Outdoor Pursuits Centre	-	50 North	July 1979 – Feb 1989	Inert and Industrial
Baldwins Farm	Redland Aggregates	50 West	Dec 1950 – No finish date given	Inert, Industrial, Commercial and Household
Baldwins Farm Quarry	Redland Aggregates	50 West	Dec 1947 – Sept 1984	Industrial, Commercial and Household
Great Sunnings Farm	-	200 North-West	-	Inert, Industrial, Commercial, Household, Special* and Liquids/sludge
Little Belhus	Edwin Clark	450 South-East	Dec 1954 – Dec 1975	Industrial, Commercial, Household and Liquids/Sludge
Land adjacent to Bush Farm	-	500 North-West	Dec 1955 – Sept 1971	Inert, Commercial and Household
Bush Farm	-	650 North-West	July 1975 – Dec 1992	Inert, Industrial, Commercial, Household, Special* and Liquids/sludge
Hunts Hill Farm	-	950 South-West	Dec 1979 – Nov 1982	Inert, Industrial and Commercial
Baldwins Quarry	-	1200 South-West	Aug 1980 – Oct 1988	Inert
Damyns Hall	-	1350 West	Jan 1962 – Sept 1970	-
Harwood Hall	-	1500 North-West	Sept 1982 – Sept 1984	Industrial
Groves Farm	East Ham, West Ham & Ilford	1500 East	Dec 1959 – Dec 1978	Inert, Industrial and Household
Hall Farm	-	1500 East	Dec 1959 – Dec 1984	Inert, Commercial and Household
Baldwins Farm (Active)	Tarmac Aggregate Limited	Adjacent South-East	Active	Non-Biodegradable Wastes Permit: EA\EPR\BP3197ND/V003

Note: *Special = Waste that has hazardous properties and is defined in the Special Waste Regulations 1996. Such properties may be flammable, irritant, toxic, harmful, carcinogenic or corrosive.

2.3.1 Hydrogeology

A detailed description of the hydrogeology of the area was presented in the 2019 HIA and the following summary is based on the information presented in that report.

2.3.2 Recharge Mechanisms

The MetOffice climate summary (1991 – 2020) for Stanford Le Hope[6], located c.8km east of the Site, indicates that the average annual rainfall for the Site is 577.02mm per annum, as shown in Table 2-5.

Table 2-5
Average Monthly Rainfall at Stanford Le Hope (1991 - 2020)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
48.60	39.96	33.76	38.94	46.45	43.82	52.42	46.54	46.06	62.97	61.72	55.78	577.02

The Site is located in a low rainfall area with high potential evapotranspiration. Recharge to the underlying aquifer will be low and typically of the order of 100 to 150mm per annum. As the gravels within Field A have been worked and subsequently restored with a thin layer of soils, recharge to this section of the Site is likely to be lower than the adjacent Field B.

2.3.3 Aquifer Characteristics and Groundwater Vulnerability

Aquifer Characteristics

The EA classifies the Lynch Hill Gravels as a Secondary A Aquifer, described as:

> *"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"*

The underlying London Clay is classified as Unproductive Strata and the Lambeth Group and Thanet Sands are also Secondary A Aquifers. The underlying Chalk Subgroup is defined as a Principal Aquifer that is:

> *"layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale."*

A laboratory permeability test was undertaken on a single bulk sample of the Lynch Hill gravels from neighbouring Baldwins Farm Quarry[7]. The permeability test results recorded a coefficient of permeability of 4.1×10^{-4}m/sec.

2.3.4 Groundwater Levels and Flow

Groundwater level monitoring data has been provided by Ingrebourne Valley for nine boreholes installed within both made ground and the Lynch Hill gravels across the wider area. Monitoring data is available for the period December 2011 to March 2022 and is summarised within Table 2-6, with hydrographs for the period in Appendix 03.

[6] MetOffice Website http://www.metoffice.gov.uk/public/weather/climate/gcpsvg2yz (Accessed 19th May 2022)
[7] SLR Consulting Ltd, February 2019. Cockhide Farm Quarry Hydrogeological Impact Appraisal, report on behalf of Ingrebourne Valley Ltd. SLR Ref.: 427.01526.00019

Table 2-6
Water Level Elevations within the Lynch Hill Gravels and Made Ground

BHID	Screened Strata	BH Ground Elevation (m AOD)	Water Level Elevation (m AOD)			Range (m)	Avg. Water Depth (m BGL)
			Min.	Mean	Max.		
BF01	Lynch Hill Gravels (LHG)	19.26	17.33	18.04	18.90	1.57	1.22
BF02	Made Ground (MG)	17.82	14.41	14.99	15.61	1.20	2.82
BF04	MG to 3.0 then LHG	20.22	15.83	18.76	19.87	4.04	1.46
BF05	MG to 4.8m then LHG	20.66	19.39	20.10	21.24	1.85	2.56
BF06	MG to 1.6m then LHG	22.64	19.84	20.28	20.75	0.91	2.36
BF07	Made Ground	21.63	18.59	19.44	20.3	1.71	2.19
MF19_01	Lynch Hill Gravels	20.42	18.34	18.99	19.7	1.36	1.43
MF19_02	Lynch Hill Gravels	19.52	17.84	18.27	18.75	0.91	1.25
MF19_03	LHG banded with brown clay	16.58	13.99	14.71	15.91	1.92	1.87

The monitoring data indicate that groundwater levels have a typical seasonal variation of approximately 0.9 to 2 metres with higher ranges corresponding to particularly wet winters. A maximum elevation of 21.24m AOD was observed at BF05 (to the north-west of the Site) in March 2013 and a minimum of 13.99m AOD was observed at MF19_03 (along the eastern boundary) in September 2020.

The unsaturated zone ranges from 1 to 2.5m BGL across the Site. Groundwater flow across the area is in a predominantly south or south-easterly direction, following the regional topography which dips to the base of a valley in which the Running Water Brook flows. However, some of the boreholes are installed in isolated remnants of the Lynch Hill Gravels which are separated by areas of backfilled lower permeability waste materials, whilst others are installed solely within backfilled material. The hydraulic characteristics of this material are not well understood. Given the variability of ground conditions it is unlikely that a consistent water table and groundwater flow direction is present in the area. Given the general groundwater flow direction, any impact from the proposed landfill would be on either the natural sand and gravel to the south and south-east of the Site, either directly through the sidewall or indirectly through the reworked material under Field A, as indicated in Drawing HRA1 and Drawing HRA2. Flow is likely to follow local permeable routes and discharge into ditches adjacent to the landfilled areas.

The nearest monitoring boreholes to Site are BF01 located within he north of Field B, MF19_01 located on the western perimeter and MF19_02 located on the southern Perimeter, North of Baldwin's Farm. MF19_03 is located along the eastern edge of the poorly restored Field A.

2.3.5 Groundwater Quality

Groundwater quality monitoring at Medina Farm has been undertaken from boreholes BF01, BF02 and BF05 in the surrounding deposits between 2012 and 2022 and from three boreholes installed around the perimeter of the Site (MF19_01, MF19_02 and MF19_03) between 2020 and March 2022.

Based on the groundwater flow direction BF01, BF05 and MF19_01 are considered to be up-gradient boreholes whilst MF19_02, MF19_03 and BF02 are considered to be down-gradient.

As no landfilling has taken place within the western portion of the Site to date it is considered that MF19_02 is also reflective of background water quality however BF02 and MF19_03 are down-gradient of the previously landfilled area and are therefore considered to already be reflective of down-gradient groundwater.

For the purpose of this HRA monitoring data from BF01, BF05, MF19_01 and MF19_02 are considered to be reflective of background water quality.

Monitoring data have also been provided for three ponds located to the west of the Site (Ponds 1-3 as shown on Drawing HRA1), these are likely to comprise a mixture of surface water and groundwater and are potentially reflective of wider water quality.

Background Groundwater Quality

As outlined above background water quality can be represented by BF01, BF05, MF19_01 and MF19_02. The monitoring data for all WAC substances are presented in Table 2-7 and Table 2-8 and time-series graphs are included in Appendix 04.

Table 2-7
Background Groundwater Quality Monitoring Data – BF01 & BF05

Determinand (mg/l unless otherwise stated)	UK DWS (mg/l)	BF01					BF05				
		Detected	Count	Minimum	Mean	Maximum	Detected	Count	Minimum	Mean	Maximum
Arsenic	0.01	21	21	0.002	0.003	0.009	6	6	0.007	0.017	0.03
Barium	1.3	9	9	0.036	0.093	0.118	0	-	-	-	-
Cadmium	0.005	0	21	<0.00008	-	<0.00008	0	6	<0.00008	-	<0.00048
Chromium	0.05	1	21	<0.001	-	0.001	2	6	<0.001	-	<0.006
Copper	2	16	21	<0.0003	0.001	0.003	1	6	<0.0003	-	<0.0018
Mercury	0.001	3	9	<0.00001	-	0.00002	0	-	-	-	-
Nickel	0.02	21	21	0.009	0.019	0.028	6	6	0.013	0.018	0.024
Lead	0.01	6	21	<0.0002	-	0.001	3	6	<0.0002	0.0007	0.002
Zinc	-	21	21	0.001	0.004	0.009	5	6	<0.006	0.003	<0.006
Chloride	250	21	21	27.1	129	200	6	6	210	295	334
Fluoride	1.5	2	9	<0.5	-	2.83	0	-	-	-	-
Sulphate	250	21	21	47.5	183	264	2	6	<2	-	47.2
DOC	-	9	9	318	754	960	6	6	0.91	2.33	3.48
TDS	-	21	21	0.500	5.57	10.0	0	-	-	-	-

Table 2-8
Background Groundwater Quality Monitoring Data – MF19_01 & MF19_02

Determinand (mg/l unless otherwise stated)	UK DWS (mg/l)	MF19_01					MF19_02				
		Detected	Count	Minimum	Mean	Maximum	Detected	Count	Minimum	Mean	Maximum
Arsenic	0.01	27	27	0.001	0.006	0.013	27	27	0.001	0.003	0.005
Barium	1.3	27	27	0.112	0.244	0.312	27	27	0.058	0.1	0.185
Cadmium	0.005	0	27	<0.00008	-	<0.00008	1	27	<0.00008	-	0.0001
Chromium	0.05	7	27	<0.001	-	0.001	1	27	<0.001	-	0.001
Copper	2	10	27	<0.0003	-	0.006	27	27	0.0003	0.002	0.006
Mercury	0.001	0	27	<0.00001	-	<0.00001	1	27	<0.00001	-	0.00001
Nickel	0.02	27	27	0.0039	0.007	0.017	27	27	0.008	0.010	0.012
Lead	0.01	2	27	<0.0002	-	0.0004	4	27	<0.0002	-	0.0004
Zinc	-	26	27	<0.001	0.003	0.010	26	27	<0.001	0.003	0.006
Chloride	250	27	27	190	236	279	27	27	90.1	183	306
Fluoride	1.5	1	27	<0.5	-	0.947	16	27	<0.5	1	1.03
Sulphate	250	19	27	<2	84	338	27	27	30.3	99	434
DOC	-	19	26	<0.3	2.23	9.99	26	27	<0.3	2.93	6.82
TDS	-	27	27	1740	2102	2380	27	27	908	1263	2550

The background groundwater quality data indicate that the regional groundwater quality is poor with elevated concentrations of several determinands above their respective UK Drinking Water Standards (DWS) including chloride, sulphate, arsenic, and nickel.

The following is noted:

- Monitoring boreholes BF05, MF19-01 and BF01 all recorded concentrations arsenic in exceedance of the UK DWS (0.01 mg/l). A maximum background concentration of 0.03 mg/l was recorded in BF05. Since summer 2019, concentrations have generally stayed below the DWS with infrequent exceedances at MF19_01.
- Nickel shows elevated concentrations across the Site, slightly exceeding the UK DWS of 0.02 mg/l in BF01 & BF05 with maximum concentrations of 0.035 mg/l and 0.026 mg/l.
- Chloride exceeded DWS in all monitoring boreholes except BF01. BF01 & MF19_02 show a generally steady trend through time and BF05 levels of chloride are decreasing. However, there is a rise in chloride levels at MF19_01 through the monitoring period.
- The majority of sulphate concentrations within the up-gradient boreholes have been at or below the UK DWS of 250 mg/l. BF01 has shown a general decreasing trend over the monitoring period and is frequently recorded below 200 mg/l since winter 2019. Since Summer 2020, the DWS has been exceeded on three occasions within MF19_01 and MF19_02 with a maximum of 440 mg/l recorded; and
- During the recording period, there have been several organics recorded in background water quality. Most notably, benzene was recorded in MF19_01 at a maximum concentration of 25.2 ug/l.

Down-Gradient Groundwater Quality

As outlined above down-gradient groundwater quality can be represented by BF02 and MF19_03. The monitoring data for all WAC substances is presented in Table 2-9 and time-series graphs are included in Appendix 05.

The monitoring data indicate that:

- Generally, the down-gradient water quality is better that up-gradient with only one determinand exceeding the UK DWS.
- Sulphates have been significantly above the DWS at both BF02 & MF19_03. These are expected results given the proximity of various anthropogenic sources including made ground and landfill deposits.
- Trends of arsenic and sulphate suggest that the influence of historic landfills on groundwater quality may be declining.

Table 2-9
Down-Gradient Groundwater Quality Monitoring Data – BF02 & MF19_03

Determinand (mg/l unless otherwise stated)	UK DWS (mg/l)	BF02					MF19_03				
		Detected	Count	Minimum	Mean	Maximum	Detected	Count	Minimum	Mean	Maximum
Arsenic	0.01	20	20	0.002	0.004	0.006	8	9	<0.0005	0.001	0.002
Barium	1.3	8	8	0.042	0.054	0.07	9	9	0.065	0.075	0.086
Cadmium	0.005	0	20	<0.00008	4 x10-5	<0.00008	0	9	<0.00008	0.00004	<0.00008
Chromium	0.05	0	20	<0.001	0.0005	<0.001	0	9	<0.001	0.001	<0.001
Copper	2	6	20	<0.0003	0.0008	0.005	9	9	0.0006	0.001	0.002
Mercury	0.001	1	8	<0.00001	5.63 x10-6	0.00001	0	9	<0.00001	0.000005	<0.00001
Nickel	0.02	20	20	0.0008	0.002	0.006	9	9	0.0012	0.002	0.004
Lead	0.01	10	20	<0.0002	0.0003	0.001	1	9	<0.0002	0.0001	0.0003
Zinc	-	13	20	<0.001	0.004	0.018	7	9	<0.001	0.002	0.004
Chloride	250	20	20	8.2	47	83.5	9	9	15.9	41	177
Fluoride	1.5	0	8	<0.5	0.25	<0.5	0	9	<0.5	0	<0.5
Sulphate	250	20	20	57.6	144	380	9	9	200	258	374
DOC	-	18	20	<0.3	5.03	9.5	9	9	3.18	6.64	9.79
TDS	-	8	8	527	619	815	9	9	749	796	924

2.4 Receptors

2.4.1 Groundwater Abstractions and Source Protection Zones

The EA has confirmed that the proposed development is not located within a groundwater Source Protection Zone (SPZ) and there are no licensed abstractions within a 2km radius of the Site.

Thurrock Borough Council has indicated that they do not have any records of private water supplies within a 2km radius of the Site.

2.4.2 Receptor Locations for Modelling

The primary receptors assumed for this assessment are in accordance with those required by Schedule 22 (Groundwater Activities) of the Environmental Permitting Regulations, 2016, these are as follows:

- for Hazardous Substance the receptor is assumed to be the groundwater within the Lynch Hill Gravels outside of the sidewall geological barrier taking account of immediate dilution in the aquifer[8] but without any dispersion or attenuation in the aquifer pathway; and
- for Non-Hazardous Pollutants the receptor has been assumed to be the groundwater at the down-gradient site boundary (down-gradient boreholes in the Lynch Hill Gravels).

2.5 Priority Contaminants & Environmental Assessment Limits

To assess the risk posed from the Site, first Environmental Assessment Limits (EALs) must be calculated. These have been set for all relevant substances included in WAC testing based on the requirements of the Environmental Permitting Regulations 2016 (as amended) whereby no discernible release of Hazardous Substances is permitted, and the release of Non-Hazardous Pollutants is sufficiently limited as to avoid pollution. The EALs have therefore been set as follows:

- for Hazardous Substances, the EALs shall be the minimum reporting values (MRV's) as defined in the current EA HRA guidance[9] or maximum background concentration if higher[10] (but excluding borehole BF05 where the higher concentrations may not be representative of typical background concentrations); and
- for Non-Hazardous Pollutants the Model EALs have been set mid-way between mean background groundwater quality (based on combined groundwater quality from the background boreholes using data from January 2018 onwards) and respective DWS. It is noted that these Model EALs are very conservative for those substances where maximum background significantly exceeds DWS, such as nickel and sulphate, and should be used for comparison of risk assessment model results only. Compliance EALs (based on maximum background quality where it exceeds DWS) should be used for setting compliance limits.

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[8]Environment Agency (March 2017) *Groundwater Protection Technical Guidance*, available at: https://www.gov.uk/government/publications/groundwater-protection-technical-guidance/groundwater-protection-technical-guidance (Accessed 23rd September 2020)

[9] UK Government, *Hazardous Substances to Groundwater: Minimum Reporting Values* Guidance, Available at: https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values (Accessed 26/05/2022)

[10] Groundwater protection technical guidance - GOV.UK (www.gov.uk) (Accessed 16/6/22)

There is no confirmed waste stream for the Site, therefore IWAC limits have been used as an estimate of the worst-case leachate source likely to be present within the inert waste. In Table 2-10 below, IWAC limits converted to mg/l have been assessed against respective UK DWS and background groundwater quality to determine which substances pose the highest risk to the groundwater receptor for inorganic substances.

Table 2-10
Inorganic Inert Waste Quality Risk Factors

Substance	L/S = 10 l/kg (mg/kg dry substance)	Conversion to mg/l (L/S=10 value divided by 10)	Hazardous or Non-Hazardous	UK DWS (mg/l)	MRV / LOQ / Detection Limit	Max. background GW quality (*Exc. BF05*) (mg/l)	Average background GW quality (mg/l)	Proposed Model EAL	Risk Factor[1]
Arsenic	0.5	0.05	Haz	0.01	0.005[(b)]	0.0132	0.007	0.0132[(c)]	3.78
Barium	20	2	Non-Haz	1.30[(a)]	Non-Haz	0.312	0.14	0.72[(d)]	2.77
Cadmium	0.04	0.004	Non-Haz	0.005	Non-Haz	0.0001	0.00005	0.0025[(d)]	1.60
Chromium (Total)	0.5	0.05	Non-Haz	0.05	Non-Haz	0.001	0.0007	0.026[(d)]	1.92
Copper	2.0	0.2	Non-Haz	2.0	Non-Haz	0.006	0.001	1.0 [(d)]	0.2
Mercury	0.01	0.001	Haz	0.001	0.00001[(g)]	0.00002	0.00001	0.00002[(c)]	50
Nickel	0.4	0.04	Non-Haz	0.02	Non-Haz	0.035	0.013	0.0165[(d)]	2.42
Lead	0.5	0.05	Haz	0.01	0.0002[(b)]	0.00098	0.00027	0.00098[(c)]	51.02
Zinc [(f)]	4	0.4	Non-Haz	-	Non-Haz	0.010	0.002	-	-
Chloride	800	80	Non-Haz	250	Non-Haz	306	210	230[(d)]	0.35
Fluoride	10	1	Non-Haz	1.5	Non-Haz	2.83	0.46	0.98[(d)]	1.02
Sulphate	1000 (6000)	100 (600)	Non-Haz	250	Non-Haz	434	93.5	171.5[(d)]	3.49
DOC	500	50	N/A	-	-	-	-	-	-
TDS	4000	400	N/A	-	-	-	-	-	-

Note:

1) Risk factor calculated as assumed max waste concentration quality divided by proposed EAL
(**a**) No DWS therefore WHO Limit used.
(**b**) MRV based on Limit of Quantification (LoQ) from UK Technical Advisory Group (UKTAG) on the Water Framework Directive (September 2016): Technical Report in Groundwater Hazardous Substances [https://www.wfduk.org/resources/groundwater-hazardous-substances-standards]
(**c**) For hazardous substances, the EAL has been set whichever is greater between MRV or maximum background concentration (excluding BF05 which shows significantly elevated concentrations).
(**d**) EAL set as a worst case mid-way between average background groundwater quality and DWS, although could be set at max background of 434 mg/l
(**e**) EAL set as half of UK DWS
(**f**) Zinc does not have a DWS or a corresponding WHO standard, although there is a freshwater EQS there is no immediate surface water receptor therefore zinc is not considered as a potential priority contaminant
(**g**) MRV based on Hazardous Substances to Groundwater EA Guidance: [https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values]

Based on the risk factors as outlined in Table 2-10 the highest risk is posed by hazardous metals mercury, lead and arsenic, which all have a risk factor of 3 or more (when assessed against EAL).

The risk from most non-hazardous substances is significantly lower, with most substances recording a low risk factor of less than two. The three non-hazardous substances with the highest risk factors (sulphate, nickel and barium) have therefore been included in the modelling.

It is therefore proposed that the following substances are modelled:

- Non-Hazardous Pollutants: barium, nickel, sulphate
- Hazardous Substances: mercury, lead, arsenic

An assessment of organic substances is outlined below in Table 2-11. Risk factors have been derived for speciated substances by dividing the maximum leachable values of individual determinands by their respective MRV, unless mean background is greater than maximum leachable value in which case, the substance is considered to pose no risk to down-gradient water quality.

Maximum potential leachable concentrations have been estimated using the Environment Agency's remedial target worksheet using typical values and worst-case assumptions regarding the proportion of each speciated substance.

Table 2-11
Organics Results for Proposed Inert Waste Stream

Group	Speciated Substance	Max Solid Conc. (WAC Limit) (mg/kg)	Max Leachable Concentration (mg/l)	Haz / Non-Haz	Minimum Reporting Value (mg/l)	Background concentration (mg/l)		Risk Factor
						Average [5]	Maximum	
BTEX	Benzene	6.0	1.26 [a]	Hazardous	0.001 [1]	-	0.025	1260
	Toluene		0.464 [a]	Hazardous	0.004 [1]	-	<0.001	116
	Ethylbenzene		0.218 [a]	Hazardous	0.001 [1]	-	0.001	218
	Xylene		0.218 [a]	Hazardous	0.003 [1]	-	<0.002	72.67
PAHs	Acenaphthene	100	0.141 [b]	Hazardous	0.01 [3]	-	0.0015	14.1
	Acenaphthylene		0.397 [b]	Not specified	-	-	0.000048	8,271
	Anthracene		0.0339 [b]	Hazardous	0.00001 [2]	-	0.0001	3,390
	Benzo(a)anthracene		0.0129 [b]	Not specified	-	0.0001	0.00096	129
	Benzo(a)pyrene		0.00776 [b]	Hazardous	1×10^{-5} [2]	0.0002	0.0018	38.8
	Benzo(b)fluoranthene		0.00955 [b]	Hazardous	5×10^{-5} [2]	0.0002	0.0029	47.75
	Benzo(g,h,i) perylene		0.0024 [b]	Hazardous	5×10^{-5} [2]	0.0002	0.002	12
	Benzo(k)fluoranthene		0.00676 [b]	Hazardous	5×10^{-5} [2]	0.0001	0.001	67.6
	Chrysene		0.0182 [b]	Not specified	-	0.0001	0.001	182
	Dibenzo(a,h)anthracene		0.00537 [b]	Not specified	-	-	0.0002	26.85
	Fluoranthene		0.0549 [b]	Hazardous	0.01 [3]	0.0002	0.0017	32.29
	Fluorene		0.0724 [b]	Not specified	-	-	0.00024	301.67
	Indeno(1,2,3-cd) pyrene		0.0115 [b]	Hazardous	4×10^{-5} [2]	0.00013	0.0015	88.46
	Naphthalene		1.52 [b]	Non-Haz	-	0.000042	0.0002	36,191
	Phenanthrene		0.0436 [b]	Not specified	-	0.00005	0.0004	872
	Pyrene		0.0616 [b]	Not specified	-	0.0002	0.0017	3,080
Mineral Oil	Aliphatics >C10-C12					-	-	-

Group	Speciated Substance	Max Solid Conc. (WAC Limit) (mg/kg)	Max Leachable Concentration (mg/l)	Haz / Non-Haz	Minimum Reporting Value (mg/l)	Background concentration (mg/l)		Risk Factor
						Average [5]	Maximum	
C10 – C40	Aliphatics >C12-C16	500	Not assessed further as low risk (EA TPH Guidance 2009)			-	-	-
	Aliphatics >C16-C21					-	-	-
	Aliphatics >C21-C35					-	-	-
	Aromatics >C10-C12		1.99 [c]	Hazardous	0.009 [4]	-	-	221
	Aromatics >C12-C16		0.997 [c]	Hazardous	0.009 [4]	-	-	111
	Aromatics >C16-C21		Not assessed further as low risk (EA TPH Guidance 2009)			-	-	-
	Aromatics >C21-C35					-	-	-

Note: Risk factors have been calculated by dividing the maximum leachable values of individual determinands by average concentration recorded in background groundwater quality. If it has not been possible to derive average background concentration (<50% samples have detectable concentrations), then risk factor derived as background GWQ divided by respective MRV.

(a) BTEX – Speciated max leachable concentrations back calculated using remedial target worksheet based on typical porosity & bulk density of inert waste and substance specific Henry's Law and soil water partition coefficients (assuming any one speciated substance will provide no more than 33% of the Total BTEX (i.e. 2.0 mg/kg).

(b) PAH – Back calculated using remedial target worksheet based on typical porosity & bulk density of inert waste and substance specific Henry's Law and soil water partition coefficients (assuming any one speciated substance will provide no more than 20% of the Total PAH (i.e. 20 mg/kg).

(c) Mineral Oil – Back calculated using remedial target worksheet based on typical porosity & bulk density of inert waste and substance specific Henry's Law and soil water partition coefficients (assuming any one speciated substance will provide no more than 20% of the Total Mineral Oil (i.e. 100 mg/kg).

(1) MRV based on Hazardous Substances to Groundwater EA Guidance: [https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values].

(2) MRV based on Limit of Quantification (LoQ) from UK Technical Advisory Group (UKTAG) on the Water Framework Directive (September 2016): Technical Report in Groundwater Hazardous Substances [https://www.wfduk.org/resources/groundwater-hazardous-substances-standards].

(3) MRV based on detection limit for groundwater in site samples.

(4) MRV based on CL:AIRE (2017) Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies.

(5) Average background GW concentration has only been calculated when over 50% of samples returned detectable concentrations of substance.

It is proposed that a representative speciated BTEX, PAH and mineral oil are included within the assessment. The above assessment indicates that:

- Benzene should be included as a representative BTEX due to having the highest risk factor;
- Anthracene should be included as a representative PAH due to having the highest risk factor for a hazardous PAH; and
- Aromatics C10 – C12 should be included as a representative mineral oil due to having the highest risk factor.

The proposed EALs for these substances are the MRVs specified in Table 2-11 above.

In summary the following key determinands are assessed within the quantitative risk assessment:

Hazardous Substances:

- **Arsenic** – a hazardous metal, observed as elevated in waste streams relative to background water quality;
- **Lead** – a hazardous metal, observed as elevated in waste streams relative to background water quality;
- **Mercury** – a hazardous metal, observed as elevated in waste streams relative to background water quality;
- **Benzene** – an inorganic compound, included as a representative speciated BTEX;
- **Anthracene** – included as a representative hazardous speciatedPAH; and
- **Aromatics** >C10 - C12 – an aromatic solvent, included as a representative mineral oil.

Non-Hazardous Pollutants:

- **Barium** – an alkaline earth metal, observed as elevated in waste streams relative to background water quality;
- **Nickel** – a transitional metal, observed as elevated in waste streams relative to background water quality; and
- **Sulphate** – an anion with conservative geochemical properties.

2.6 Summary of Hydrogeological Site Conceptual Model

The Site's hydrogeological conceptual model is summarised in Table 2-12.

Table 2-12
Summary of Hydrogeological Site Conceptual Model

Linkage	Site Details
Source	Restoration of previously filled land (Field A) and the void created by extraction of Lynch Hill gravels (Filed B) with imported inert wastes. Given the nature of the waste streams no leachate collection system or artificial sealing liner is required. The waste placed within the void will comprise inert material only and will meet the IWAC limits as specified in guidance. Due to the nature of the underlying London Clay there is no requirement for an artificial basal geological barrier beneath Field B, although a barrier will be installed across the made ground present beneath Field A. The sidewalls around Field B will be constructed from indigenous and imported clay with a permeability equivalent to 1 metre at 1 x 10^{-7}m/s. Where considered necessary any imported clay will be subject to WAC testing to confirm it is inert. The upper sub soil and topsoil layers used for restoration will be primarily indigenous to the Site (or imported to make up shortfall).
Pathway	Any potential leachate generated by infiltration into the inert waste will migrate through the geological barrier into the underlying and adjacent groundwater. Degradation and/or attenuation of potential contaminants will take place within the geological barrier.
Receptor	Not considering the discharge of dewatering water, which will be the subject of separate abstraction and surface water discharge environmental permit applications, in order to comply with Schedule 22 (Groundwater Activities) of the Environmental Permitting Regulations, 2016, the following are considered appropriate receptors: • for Hazardous Substances the receptor is assumed to be the groundwater within the Lynch Hill Gravels adjacent to the Site, taking account of immediate dilution in the aquifer but without any dispersion or attenuation in the aquifer pathway; and • for Non-Hazardous Pollutants the receptor has been assumed to be the groundwater at the down-gradient Site boundary (down-gradient boreholes) within the Lynch Hill Gravels.
Compliance Points	For the purposes of defining receptors, the compliance points are taken to be at the down-gradient Site boundaries. It is noted that there may be other, physical receptors further away from the down-gradient Site boundary. Compliance with the Regulations at the points defined above will ensure that other receptors are adequately protected.

3.0 Hydrogeological Risk Assessment

3.1 Nature of the Hydrogeological Risk Assessment

As set out within current HRA technical guidance[11], the *"appropriate complexity of assessment for a site should be determined from the potential risks presented by the site, which are linked to the nature of potential hazards, the sensitivity of the surrounding environment, degree of uncertainty and likelihood of a risk being realised."*

The Site will accept inert waste, which is defined as follows;

- it does not undergo any significant physical, chemical or biological transformations;
- it does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health; and
- total leachability, pollutant content and the ecotoxicity of its leachate are insignificant and, in particular, do not endanger the quality of any surface water or groundwater.

Based on this definition of inert waste, the Site should not produce any leachate that could result in any significant discharge of Hazardous Substances or Non-Hazardous Pollutants throughout the lifecycle of the Site.

Therefore, with regard to this inert waste stream, the Site:

- presents a negligible risk to groundwater and surface water quality;
- falls outside the scope of the Environmental Permitting Regulations 2016 (Schedule 22 Groundwater Activities); and
- does not require environmental management systems (artificial sealing liner, leachate management or other engineering and management structures), or the consideration of the degradation of such systems.

However, notwithstanding the above, it is considered that a quantitative risk assessment is required given that the Environment Agency Landfills for inert waste online guidance[12] states that a quantitative risk assessment is likely to be necessary for inert waste where the receiving environment is particularly sensitive, for example on a principal aquifer or below the water table.

Given waste deposits will extend below the water table, it is considered appropriate to carry out a detailed quantitative assessment.

3.2 The Proposed Assessment Scenario

3.2.1 Lifecycle Phases

It is recognised that the HRA must assess the proposed development's compliance with the requirements of Schedule 22 of the Environmental Permitting Regulations 2016 (as amended), throughout the lifecycle of the landfill i.e. from the start of the operational phases until the point at which the waste no longer poses an unacceptable environmental risk.

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[11] EA and DEFRA (February 2016) *Landfill developments: groundwater risk assessment for leachate guidance*, Available at: https://www.gov.uk/guidance/landfill-developments-groundwater-risk-assessment-for-leachate (Accessed 22/07/2020)

[12] Environment Agency (30 January 2020) *Landfill Operators: Environmental Permits – Landfills for inert waste, https://www.gov.uk/guidance/landfill-operators-environmental-permits/landfills-for-inert-waste*

Based on the hydrogeological conceptual site model, as outlined within Section 2.0, the potential pathway for leachate to impact groundwater quality is advective migration through the engineered sidewall geological barrier to the adjacent sands and gravels.

3.2.2 Justification of Modelling Approach and Software

Detailed quantitative risk assessments are carried out in a quantitative manner using stochastic/probabilistic techniques to realise analytical solutions or mathematical solutions.

The HRA has been carried out using conservative, but realistic, assumptions regarding the source, pathways and receptors. Site specific data have been used wherever possible to parameterise the risk assessment. Using measured Site data reduces uncertainty in the risk assessment process.

ESI's RAM3 V3 software is considered the most appropriate model to provide an estimate of the potential risks associated with the landfill. The model has been run stochastically using the Crystal Ball add-in.

This software was used for the following reasons:

- it uses Monte Carlo (stochastic) techniques and so allows a probabilistic appreciation of the Site's performance;
- it provides a consistent approach to the estimation of hydrogeological risks in respect to waste and groundwater;
- it provides an audited and verified code that is widely accessible;
- it aids comprehensive reporting of input values, assumptions and results;
- it allows the estimation of the potential attenuation of contaminants through the attenuation layer . This was particularly important for the consideration of Hazardous Substances;
- it can simulate landfills located partly below the water table; and
- it allows the dilution and attenuation of Non-Hazardous Pollutants within the aquifer's saturated zone.

Throughout this assessment the acceptable probability of an undesirable outcome occurring is set at the 95%ile stochastic estimation, which is commonly selected as a reasonable worst case against which it is acceptable to make decisions, taking into account the assumptions and limitations of the modelling process.

3.2.3 Accidents and their Consequences

Details of accidental occurrences at the Site that could present a potential risk to groundwater quality adjacent to the Site are provided in Table 3-1 below:

Table 3-1
Qualitative Assessment of Accidents and Mitigation

Accidental Occurrence	Risk to Groundwater	Likelihood of Occurrence	Mitigation & Corrective Measures
Deposition of non-inert wastes.	Generation of leachate containing Hazardous Substances or Non-Hazardous Pollutants.	Low – due to the essential and technical precautions.	Any incorrectly accepted wastes will be immediately returned to the customer or moved to a suitable storage area prior to removal to a suitable site.

Accidental Occurrence	Risk to Groundwater	Likelihood of Occurrence	Mitigation & Corrective Measures
Spillage of fuels from storage tanks or vehicles.	Release of hydrocarbons (Hazardous Substances) into the ground and migration to groundwater.	Low – fuel stores will be bunded in accordance with Regulations. A traffic system and speed limit will be imposed at the Site to reduce both the risk of accidents and the likelihood of spillage occurring.	Any spillage will be cleaned up immediately and any resulting contaminated soils removed to a suitable installation.

With respect to the deposition of potentially contaminated wastes, it is considered that the risks and potential consequences of such accidents are extremely low for the following reasons:

- all waste deliveries will be pre-arranged and come from known sources to ensure no contaminated material is delivered;
- prior to acceptance at the Site, wastes will be characterised to demonstrate that the waste will not give rise to polluting leachate, prior to the acceptance of waste at the Site;
- verification and compliance testing will be undertaken as outlined within Ingrebourne Valley's Waste Acceptance Procedures to ensure the continued acceptability of the waste stream;
- visual inspection will be undertaken of every waste load deposited at the Site; and
- in the event of suspicion regarding the acceptability of the waste, quarantine procedures will be enforced.

In the unlikely event of contaminants from a rogue load being deposited at the Site, attenuation processes will occur within the waste body, and most organic Hazardous Substances are very likely to be degraded and retarded during migration through the surrounding inert wastes within the waste mass and the artificially emplaced geological barrier. Other processes such as volatilisation can also be expected for volatile and semi-volatile organic substances resulting in a mass loss of contaminant from the waste.

3.3 Numerical Modelling

3.3.1 Model Parameterisation

The nature of all of the input parameters used, together with the appropriate probability distributions used to describe them are presented in Appendix 06 RAM3 parameterisation.

Parameter values were determined from information directly measured at the Site wherever possible. If no Site data is found to be available, conservative parameter values were taken from authoritative sources or after previous SLR experience at similar sites.

3.3.2 Assessment Methodology

In order to represent worst case conditions and assess the most sensitive determinands, risk factors were used to choose suitable determinands which pose the greatest risk of causing either pollution to the aquifer or a derogation of groundwater quality. As detailed within Section 2.0, the following determinands have been modelled:

- **Hazardous Substances**: arsenic, lead, mercury, benzene, anthracene and aromatic C10 – C12;
- **Non-Hazardous Pollutants**: barium, nickel and sulphate.

As detailed in Section 3.2 above, the fate of Hazardous Substances and Non-Hazardous Pollutants has been considered using RAM3. The following assumptions are built into the models:

- the sidewall geological barrier is engineered to a thickness of 1m and a maximum permeability of $1x10^{-7}$ m/s, although given the clayey nature of the inert waste to be used for the geological barrier, the actual permeability is likely to be significantly lower i.e. allowing less contaminant migration;
- the source term has been set at single value concentrations based on the Inert WAC limit for the modelled organic substances and as a conservative worst case to allow for the possibility of rogue loads at 3 x IWAC for all modelled inorganic substances. In reality, most results will be well below IWAC, hence a more realistic approach would consider a range of concentrations rather than all waste being exactly at those limits;
- seepage of infiltration through the inert waste has been modelled at 75 mm/year. This is half of the effective rainfall for this area, which is considered a very conservative approach as given the clayey nature of the waste the actual infiltration is likely to be significantly less; and
- attenuation of Hazardous Substances has been included within the attenuation layer only; and
- a declining source term is used to represent the temporal change in leachate quality.

3.4 Assessment Results

The predicted discharge from the development has been assessed against EALs presented in Table 2-10 for inorganic substances and the MRVs presented in Table 2-11 for organic substances to determine whether the Site complies with the requirements of Schedule 22 (Groundwater Activities) of the Environmental Permitting Regulations 2016.

The RAM3 model results are presented in Appendix 07, and electronic versions of the models in Appendix 08.

3.4.1 Hazardous Substances

Hazardous Substances have been assessed against their respective EALs in down-gradient groundwater following immediate localised dilution but prior to any attenuation or dispersion. As a conservative worst case, EALs for hazardous substances have been assumed to be MRVs, even though there are significant background concentrations for many organics at the site above the specified MRVs. This is considered a worst case approach as it ensures that there will be no discharge of hazardous substances from the Site, even though the background groundwater quality will be significantly lower.

The model results summarised in Table 3-2 below indicate that predicted resultant concentrations are below EALs, even with a source term at single values of 3 x IWAC for arsenic, lead and mercury, and IWAC for Hazardous organics.

Table 3-2
Hazardous Substances – RAM3 95th Percentile Predicted Concentrations

Determinand (mg/l)	Max Background Concentration in Groundwater	MRV	Maximum Resultant Concentration (95th percentile)
Arsenic	0.0132	0.005	1.84×10^{-5}
Lead	0.00098	0.0002	2.61×10^{-6}
Mercury	0.00002	0.00001	3.61×10^{-7}
Anthracene	0.0001	0.00001	$<1 \times 10^{-10}$
Aromatic C10-C12	-	0.009	$<1 \times 10^{-10}$
Benzene	0.025	0.001	$<1 \times 10^{-10}$
Note: EALs as derived from Table 2-10.			

3.4.2 Non-Hazardous Pollutants

Non-Hazardous Pollutants have been assessed against their respective EALs in down-gradient groundwater following immediate localised dilution but prior to any attenuation or dispersion. The model results summarised in Table 3-3 below indicate that predicted resultant concentrations are below EALs / maximum background concentrations, even with a source term at single values of 600 mg/l for sulphate and 3 x IWAC for fluoride and nickel.

Table 3-3
Non-Hazardous Pollutants – Maximum Model Predicted Concentrations

Determinand (mg/l)	Max. Background Concentration in groundwater	Model EAL	Maximum Resultant Concentration (95th percentile)*
Barium	0.312	0.72	0.23
Nickel	0.035	0.0165	0.000084
Sulphate	434	171.5	50.98
Note: * resultant concentration excludes background groundwater therefore this reflects the contribution from the Site following dilution			

Table 3-2 and Table 3-3 demonstrate that the predicted resultant concentrations at the respective compliance points are lower than the appropriate EALs. It is therefore considered that the modelling has shown that the discharge of Hazardous Substances and Non-Hazardous Pollutants will be sufficiently limited so as to avoid pollution.

3.5 Assessment Conclusions

The modelling results demonstrate that the proposed importation of inert waste at Medina Farm will remain compliant with the Environmental Permitting Regulations 2016 (as amended) provided that the waste meets inert WAC limits, assuming that a 1m thick geological barrier is installed with a maximum permeability of 1 $x10^{-7}$ m/s.

3.6 Review of Technical Precautions

Essential and technical precautions are those measures required to ensure that the Site complies with Schedule 22 (Groundwater Activities) of the Environmental Permitting Regulations 2016 (as amended). Essential and technical precautions typically include both restrictions on waste types and the engineering and other environmental management measures. Given the proposed classification as inert waste, the Site will not require leachate management. However, the following essential and technical precautions are proposed:

- a basal and sidewall geological barrier of at least 1 metre thickness, with a maximum permeability of $1x10^{-7}$ m/s;
- all waste deliveries will be pre-arranged and come from known sources;
- all wastes will be subjected to stringent waste acceptance criteria and waste acceptance procedures;
- environmental monitoring, as specified in Section 4.0, will be undertaken.

3.7 Hydrogeological Completion Criteria

Due to the nature of the waste, it is concluded that the Site will be complete (that is, the Site no longer has the potential to cause damage to or deterioration of the environment and risk to human health) with respect to hydrogeology immediately after the completion of restoration works and/or definite closure of the Site.

4.0 Requisite Surveillance

The Environmental Permitting Regulations 2016 (as amended), require that "*requisite surveillance*" is undertaken where disposal of substances potentially giving rise to Hazardous Substances or Non-Hazardous Pollutants has been authorised by the EA. Therefore, environmental monitoring will be undertaken to provide assurance that the Site is not resulting in any detrimental effects on water quality.

4.1 Leachate Monitoring

WAC testing will be completed on selected wastes prior to deposition at the Site. There is no requirement for leachate monitoring.

4.2 Groundwater Monitoring

The monitoring of groundwater quality around the perimeter of the Site will be carried out using the existing network of monitoring boreholes. It is considered that BF01 may be lost as a result of site operations. If this were to occur, it would be replaced with an additional up-gradient borehole proposed along the northern boundary of the site, with the location agreed with the EA prior to installation.

In keeping with inert landfill guidance, it is proposed that ongoing groundwater level and quality monitoring is undertaken from at least one up-gradient and two down-gradient boreholes.

Groundwater level monitoring indicates that groundwater flow is in a broadly east or south-easterly direction across the Site. It is therefore proposed that the following boreholes are used for groundwater quality monitoring purposes going forward:

- Up-gradient: **BF01**, **MF19_01**
- Cross-gradient: **MF19_02**
- Down-gradient: **BF02**, **MF19_03**

Whilst BF05 has been included within the report to typify background groundwater it is noted that this is installed within made ground and was therefore excluded as a background borehole in setting the EALs. This borehole is not therefore considered to be representative of groundwater quality in the Lynch Hill Gravels and has been excluded from the ongoing monitoring schedule. It is also noted that MF19_02 was included as a background borehole in the HRA, however once landfilling commences it is considered to be cross-gradient.

The proposed monitoring schedule is outlined in Table 4-1 below, and monitoring locations are shown on Drawing HRA1. The proposed schedule is based on current EA landfill monitoring guidance and the results of this HRA.

The respective monitoring boreholes are based on the understanding of the hydrogeological regime of the Site and recorded groundwater elevation data.

Table 4-1
Proposed Groundwater Monitoring Schedule

Groundwater Monitoring Locations	Monitoring Frequency	Measurement and Analytical Suite
Up-gradient: BF01 MF19_01	Monthly	Groundwater elevation (m BGL), Chloride, ammoniacal nitrogen, pH, electrical conductivity, temperature, DO, REDOX, and suspended solids
Cross-gradient: MF19_02	Quarterly	Total alkalinity, magnesium, potassium, sulphate, calcium, sodium, chromium (VI), copper, iron, lead, nickel, zinc, manganese, selenium, cyanide, BOD, COD
Down-gradient: BF02 MF19_03	Annual for the first 6 years… then every 2 years	Hazardous Substances, including: Arsenic (III) and (V), Mercury, speciated PAH, BTEX, , TPH and Mineral Oil

4.3 Control Levels and Compliance Limits

The HRA has demonstrated that the Site will limit the release of both Hazardous Substances and Non-Hazardous Pollutants. However, it is appropriate to set appropriate control levels and compliance limits for suitable representative determinands. Due to the presence of elevated hazardous organic substances in the background groundwater it not considered appropriate to set compliance limits for these.

Compliance limits are therefore proposed for the following substances as priority determinands with the highest risk factors:

- Sulphate
- Arsenic
- Nickel

The proposed interim control levels and compliance limits are outlined in Table 4-2.

Due to the presence of all three substances at elevated concentrations within the background groundwater the proposed control levels and compliance limits have been set taking into account the background quality.

Control levels have been set as:

- Hazardous Substances – Groundwater regulations prohibit the entry of hazardous substances into groundwater. It is not practicable to derive control levels for hazardous substances in groundwater that can be measured by analytical methods;
- Non-Hazardous Pollutants – Control levels for non-hazardous pollutants are set at midway between the predicted 95%ile resultant concentration and the EAL or at mean concentration plus two standard deviations (if greater than the midway concentration).

Compliance limits have been set as follows:

- Hazardous Substances – Set at the EAL as outlined in Table 2-11
- Non-Hazardous Pollutants – Set at the Compliance EAL for the substance based on maximum background concentration.

Table 4-2
Proposed Interim Control Levels and Compliance Limits

Boreholes	Determinand	Hazardous / Non-hazardous	Proposed Control Level (mg/l)	Proposed Compliance Limit (mg/l)
BF02	Arsenic	Hazardous	-	0.0132(1)
MF19_03	Nickel	Non-Hazardous	0.0065(3)	0.035(2)
	Sulphate		362 (3)	434(2)
Notes:	(1) Maximum background (excl BF05 which shows significantly elevated concentrations) (2) Compliance limit derived from maximum background concentration. (3) Control level derived from mean + 2 standard deviations (as taken from monitoring data for BH02 and MF19_03)			

6.0 Conclusions

6.1 Compliance with Schedule 10 of the Environmental Permitting Regulations, 2016

The results of this risk assessment have established the following:

- the proposed operation will only accept inert waste streams, therefore there is no significant contaminant source and leachate management is not required;
- a basal and sidewall geological barrier with a minimum thickness of 1 metre and a maximum permeability of 1 x 10^{-7} m/s will be provided;
- the modelling undertaken has demonstrated that the proposed waste deposit will not result in the release of Hazardous Substances, and the release of Non-Hazardous Pollutants will be sufficiently limited as to avoid pollution of the Lynch Hill Gravels aquifer;
- essential and technical precautions have been outlined;
- requisite surveillance, which includes the monitoring of groundwater around the Site has been detailed to ensure the installation remains in compliance with the Environmental Permitting Regulations 2016 (as amended).
- control levels /compliance limits have been set in order to ensure the adequate protection of ground and surface water resources; and
- the Site should comply with the relevant requirements of the Schedule 10 of the Environmental Permit Regulations 2016 (as amended).

6.2 Compliance with Schedule 22 of the Environmental Permitting Regulations 2016

The results of this risk assessment have established the following:

- the proposed development poses a potential hazard to ground and surface water quality. Consequently, it falls within the scope of Schedule 22 (Groundwater Activities) of the Environmental Permitting Regulations 2016 (as amended);
- this assessment has outlined the CSM ;
- the proposed and installed technical precautions will prevent the discernible discharge of Hazardous Substances to groundwater throughout the Site's lifecycle;
- the proposed technical precautions will limit the introduction of Non-Hazardous Pollutants into groundwater so as to avoid pollution throughout the Site's lifecycle; and
- the following essential and technical precautions have been identified as part of the HRA:
    - the wastes to be accepted to the Site will meet inert WAC limits;
    - a risk-based programme of groundwater monitoring and the implementation of control levels and compliance limits have been outlined.

The Site therefore complies with the relevant requirements of the Schedule 22 (Groundwater Activities) of the Environmental Permitting Regulations 2016 (as amended).

APPENDICES

APPENDIX 01

Composite Operations Plan

DENNISES LANE

Route of underground gas pipelines

Bund B1 Topsoil 4,860 m³

Local authority boundary

5m standoff to gas pipeline corridor

Bund A1 Topsoil 3m high 7,290 m³

Car park

Access from Dennises Lane via existing track

Office / messroom with cycle lean-to

Hardcore surface

Inspection area & manual jet wash facility

RECEIVING AREA

Ticket office & weighbridge with security lighting

Lighting arc (15m throw, 120° spread)

Wheel spinner & wheel cleaner

FIELD A (Reclamation works & restoration)

FIELD B (Mineral extraction & restoration)

Bund A2 Topsoil 3m high 12,960 m³

Track

Drain

General direction of operations

Bund A3 Topsoil 3m high 7,800 m³

Bund B2 Topsoil 3m high 12,150 m³

MEDINA

Pond

Mast (telecommunication)

Track

Route of underground gas pipelines

Application boundary (red line)

Public Footpath (Thurrock FP1)

Pond

Path (um)

Lake

DENNIS ROAD

M25

17.4m

Mast (telecommunication)

N

Bunds A1, A2, B1 & B2

3m

4m 4m 4m

Bund A3

3m

4m 22m 4m

ILLUSTRATIVE BUND CROSS SECTIONS
Scale - 1:500

FREEMAN'S SHAW

Ponds

Issues

Silos

1st Bungalow

BALDWINS FARM

2nd Bungalow

Baldwins Farm Cottage

Pond

Issues

Public Footpath (Thurrock FP1)

FB

Pond

KEMPS FARM

FB

16.8m

Kemps Cottage

Pond

17.4m

Darnyls Road

Mast

0m 50m 100m

Version / amendment: **1616/CO/1 v3**

D.K. Symes Associates

Composite Operations Plan

Scale - **1:2,500** (at A3)

Date - **20-10-2017**

Plan No. **1616/CO/1**

APPENDIX 02

Borehole Logs

SI DRILLING
Cable Percussion Ltd

Borehole No
BF01
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 27/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.10			Grass over TOPSOIL with cobbles
								Brown SAND with cobbles and CLAY traces
					1.10			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					3.20			Firm brown CLAY
					3.60			Stiff grey CLAY
					4.00			End of Borehole at 4.00 m

Remarks: Standpipe installed. Water added to assist boring from 1.10m - 3.20m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF02
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 27/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.10			Grass over TOPSOIL
								Brown sandy CLAY with low cobble content, concrete and brick (MADE GROUND)
					1.80			Brown sandy CLAY with low cobble content, waste, wood and brick (MADE GROUN)
					4.40			Firm brown CLAY
					4.80			Stiff grey CLAY
					5.10			End of Borehole at 5.10 m

Remarks: Standpipe installed.

SI DRILLING
Cable Percussion Ltd

Borehole No
BF03
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 27/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.20			Grass over TOPSOIL with low cobble content and fill traces
								Brown SAND and subangular to subrounded fine to coarse GRAVEL with traces of brown clay
					2.80			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					3.20			Firm brown CLAY
					3.60			Firm grey CLAY
					3.80			End of Borehole at 3.80 m

Remarks: Standpipe installed.

SI DRILLING
Cable Percussion Ltd

Borehole No
BF04
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 25/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Grass over TOPSOIL with low cobble content
					0.80			Dark grey sandy CLAY with low cobble content and traces of brick and concrete (MADE GROUND)
					3.00			Soft brown sandy CLAY with low cobble contrent
					4.40			Firm brown CLAY
					4.80			Stiff grey CLAY
					5.10			End of Borehole at 5.10 m

Remarks: Standpipe installed.

SI DRILLING
Cable Percussion Ltd

Borehole No
BF05
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 26/10/2011	Logged By

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.10			Grass over TOPSOIL with cobbles
								Dark brown sandy CLAY with cobbles, brick, concrete MADE GROUND
					1.80			Dark brown oily WASTE
					4.80			Dark brown oily SAND and GRAVEL
					6.80			Firm brown CLAY
					7.20			Stiff grey CLAY
					7.50			End of Borehole at 7.50 m

Remarks: Standpipe installed

SI DRILLING
Cable Percussion Ltd

Borehole No
BF06
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 26/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.20			Grass over TOPSOIL with low cobble content
								Brown sandy CLAY with low cobble content and brick and concrete traces (MADE GROUND)
					1.60			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					7.20			Firm brown CLAY
					7.50			Stiff grey CLAY
					7.80			End of Borehole at 7.80 m

Remarks: Standpipe installed. Water added to assist boring from 3.00m - 4.60m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF07
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 25/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.20			Grass over TOPSOIL with low cobble content
								Brown SAND and subangular to subrounded fine to coarse GRAVEL (MADE GROUND)
					1.00			Dark brown sandy silty CLAY with waste (MADE GROUND)
					2.50			Soft brown sandy gravelly CLAY/clayey SAND with traces of waste (MADE GROUND)
					7.60			Firm brown CLAY
					8.10			Stiff grey CLAY
					8.50			End of Borehole at 8.50 m

Remarks: Standpipe installed. Water added to assist boring from 2.50m - 7.60m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF08
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 25/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Grass over TOPSOIL with brown sandy gravel and traces of brick and concrete
					1.00			Brown SAND and subangular to subrounded medium GRAVEL with brown clay lenses
					3.60			Firm to stiff brown CLAY
					4.10			Stiff grey CLAY
					4.50			End of Borehole at 4.50 m

Remarks: Standpipe installed. Water added to assist boring from 1.50m - 3.00m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF09
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 26/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.10			Grass over TOPSOIL with low cobble content
								Brown sandy CLAY with low cobble content of brick and concrete (MADE GROUND)
					1.30			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					3.20			Firm brown CLAY
					3.50			Stiff grey CLAY
					3.80			End of Borehole at 3.80 m

Remarks: Standpipe installed. Water added to assist boring from 1.30m - 2.50m

SI DRILLING
Cable Percussion Ltd

Borehole No
BF10
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 28/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Grass over TOPSOIL with sand and gravel and clay traces
					1.30			Brown SAND and subangular to subrounded fine to coarse GRAVEL
					3.00			Dark grey SAND and subangular to subrounded fine to coarse GRAVEL (oily)
					5.70			Firm brown CLAY
					6.00			Stiff grey CLAY
					6.30			End of Borehole at 6.30 m

Remarks: Standpipe installed.

SI DRILLING
Cable Percussion Ltd

Borehole No
BF11
Sheet 1 of 1

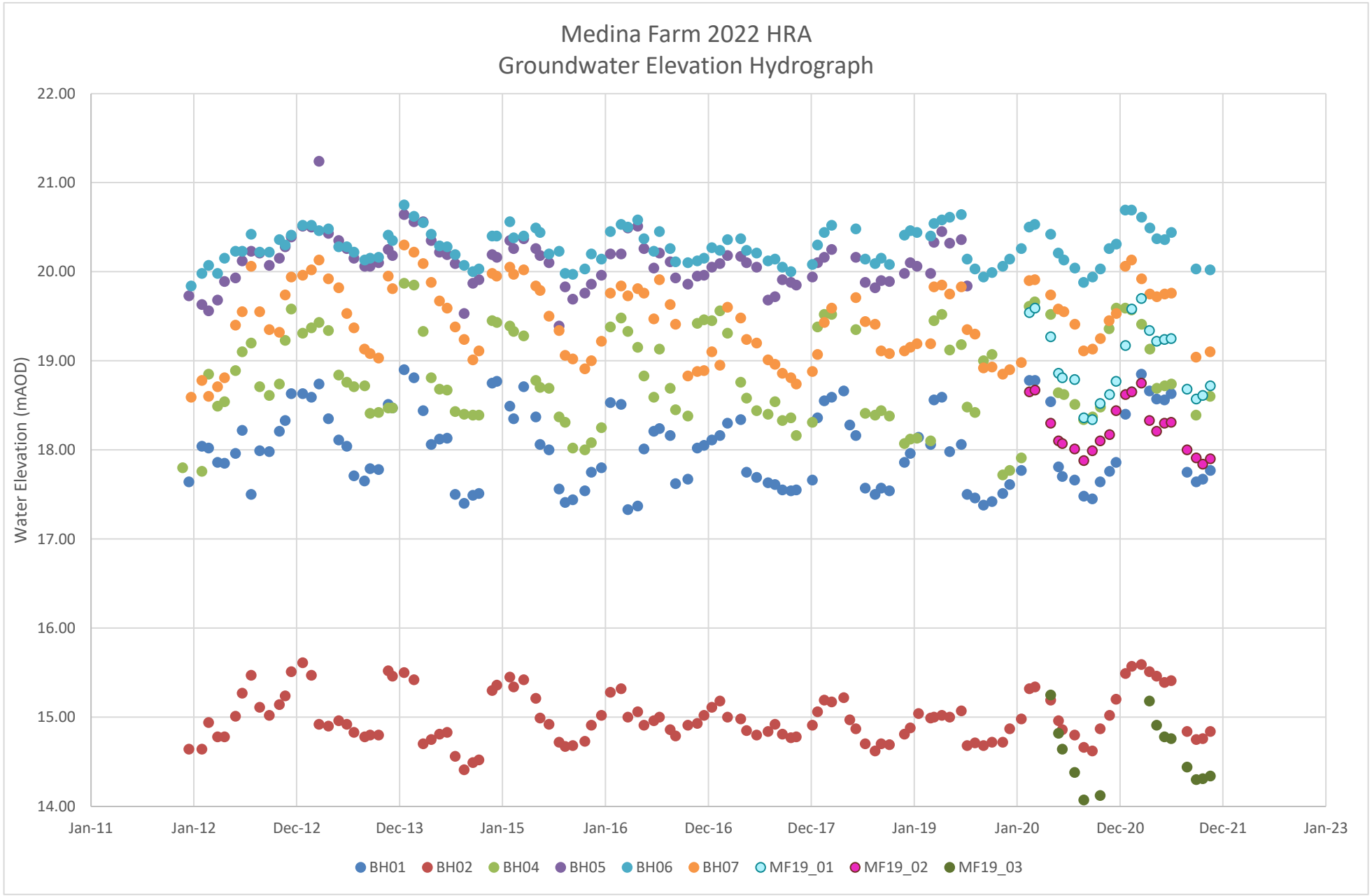
Project Name	Project No.	Co-ords: -	Hole Type
Baldwins Farm	11-507		Cable
Location:		Level: -	Scale 1:50
Client:		Dates: 28/10/2011	Logged By OW

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Grass over TOPSOIL with sand and brick fill (MADE GROUND)
					0.80			Waste with wood, brick, concrete and some brown clay traces (oily) (MADE GROUND)
					3.20			Firm brown CLAY
					3.60			Stiff grey CLAY
					3.80			End of Borehole at 3.80 m

Remarks: Standpipe installed.

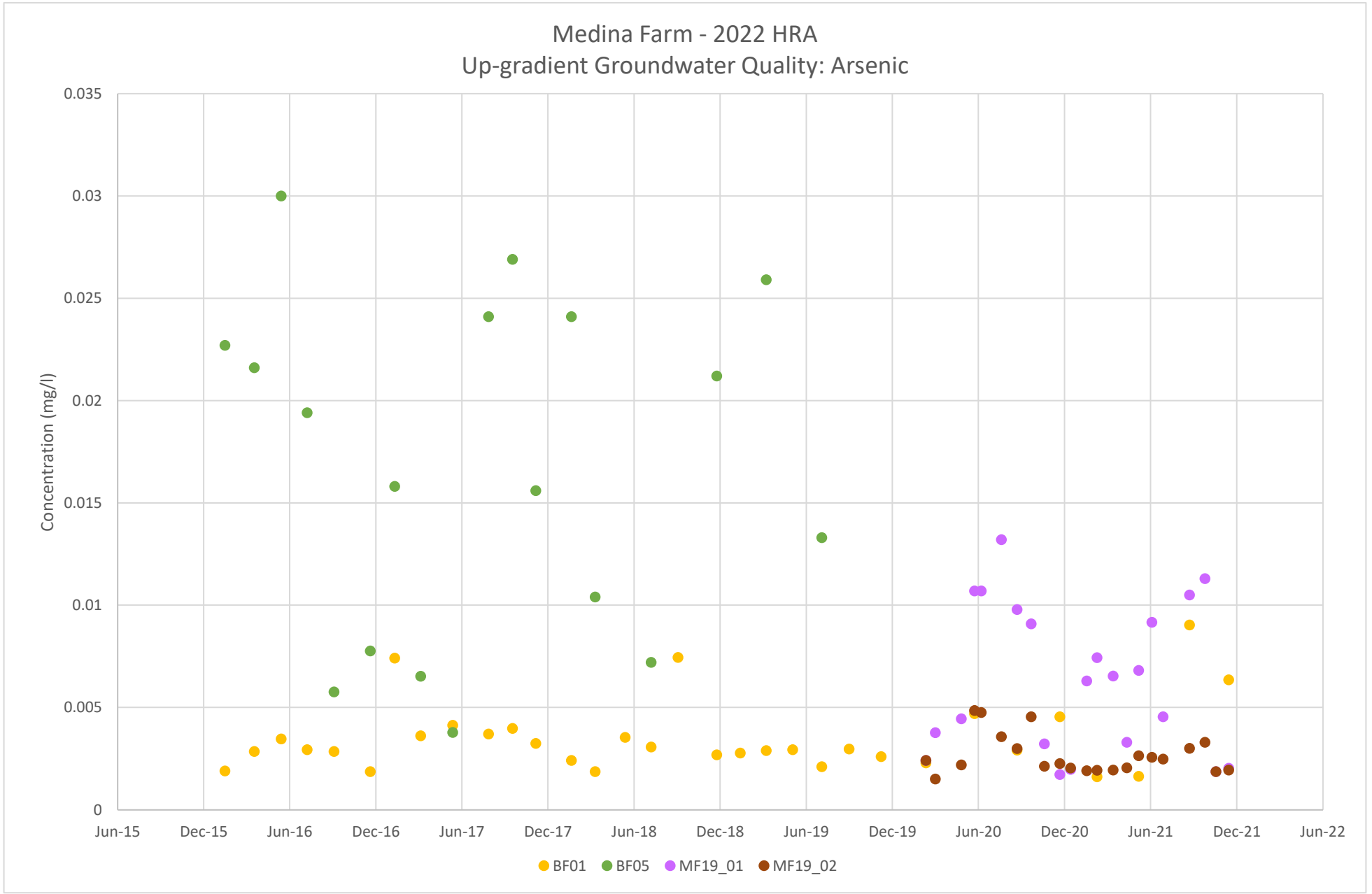
APPENDIX 03

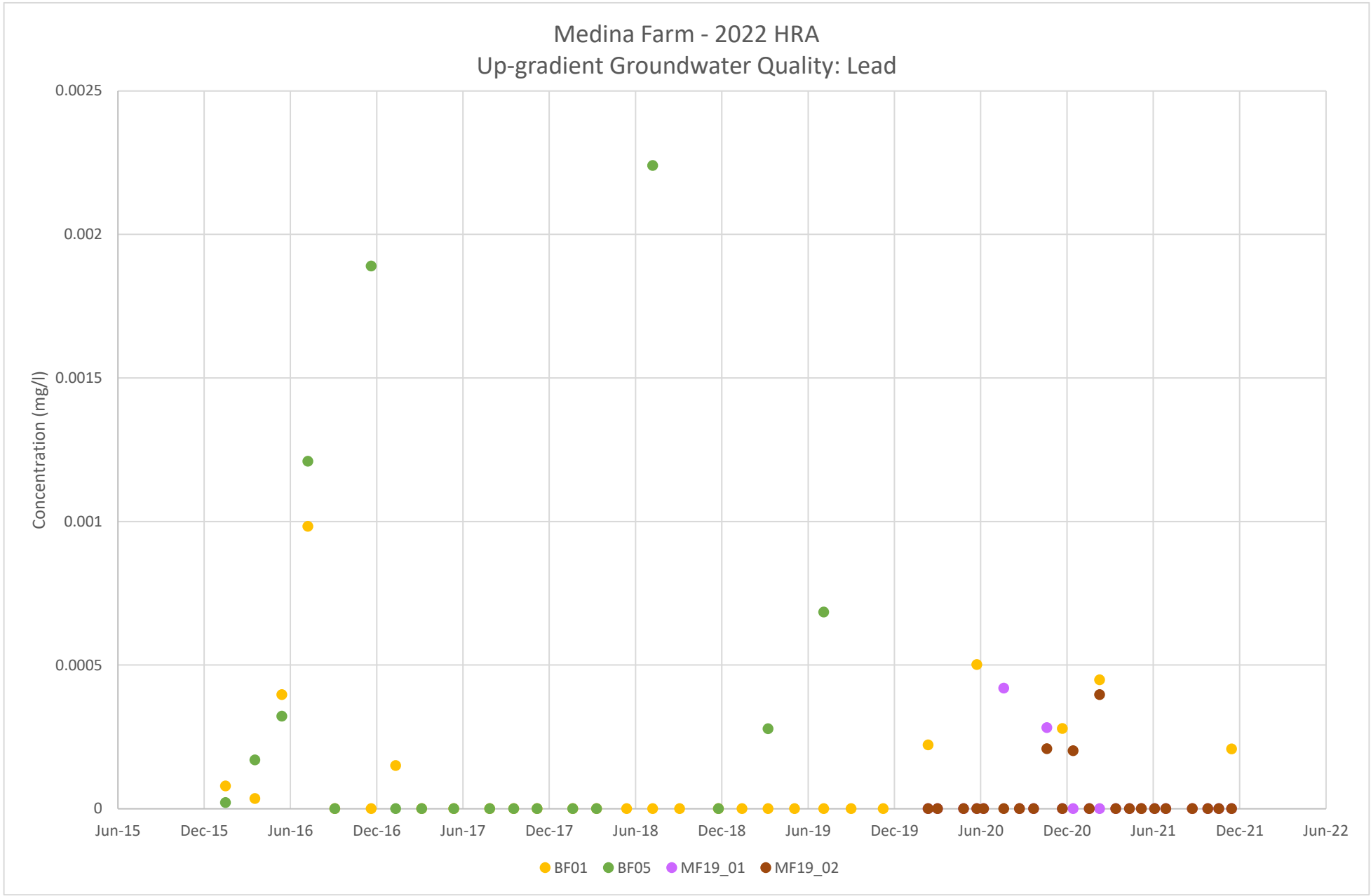
Groundwater Level Hydrograph


Medina Farm 2022 HRA
Groundwater Elevation Hydrograph
Water Elevation (mAOD)
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
14.00
Jan-11
Jan-12
Dec-12
Dec-13
Jan-15
Jan-16
Dec-16
Dec-17
Jan-19
Jan-20
Dec-20
Dec-21
Jan-23
BH01
BH02
BH04
BH05
BH06
BH07
MF19_01
MF19_02
MF19_03

APPENDIX 04

Background Groundwater Quality Time-Series Graphs


Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Arsenic
Concentration (mg/l)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02


Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Lead
Concentration (mg/l)
0.0025
0.002
0.0015
0.001
0.0005
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
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Jun-22
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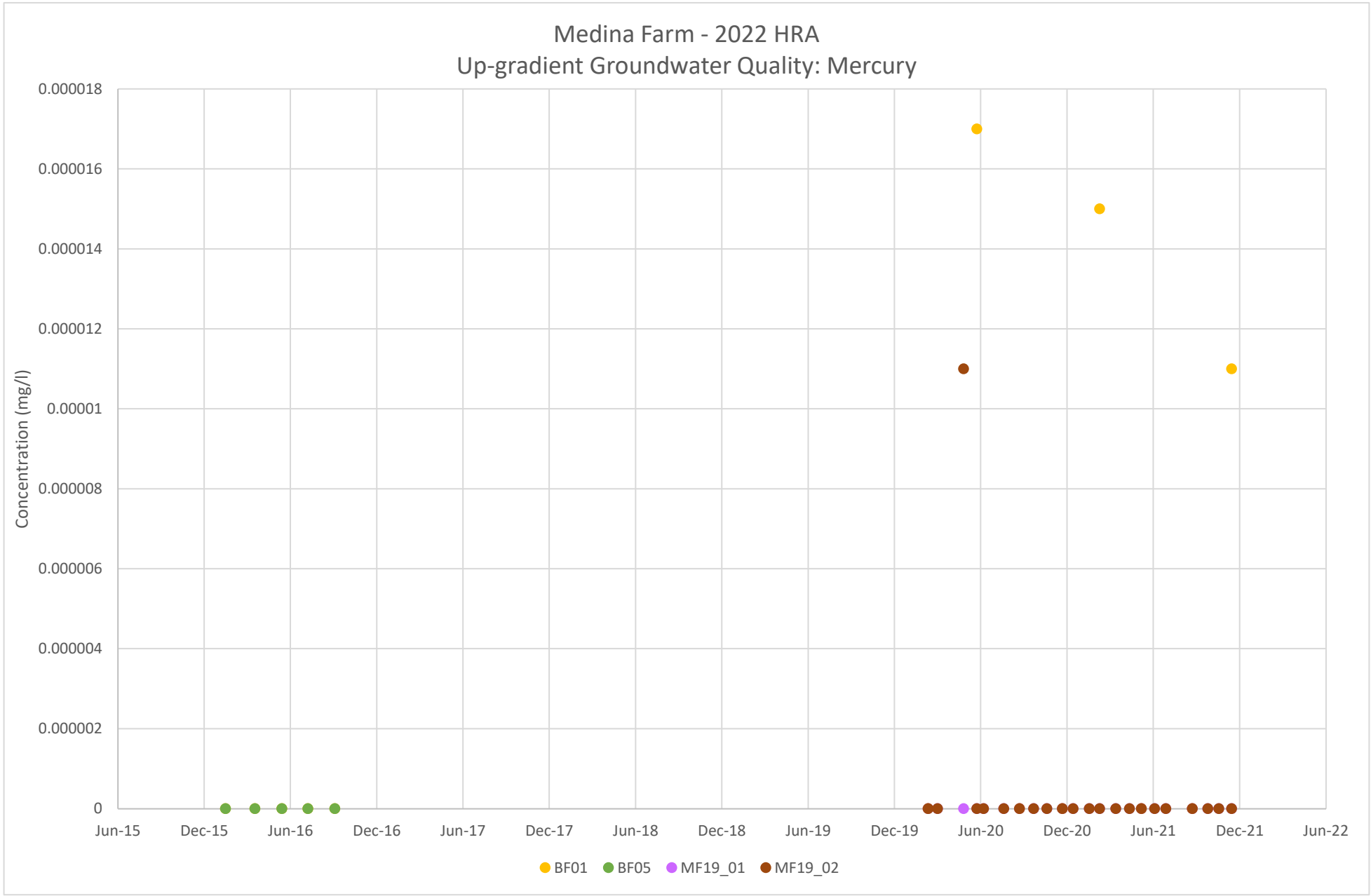
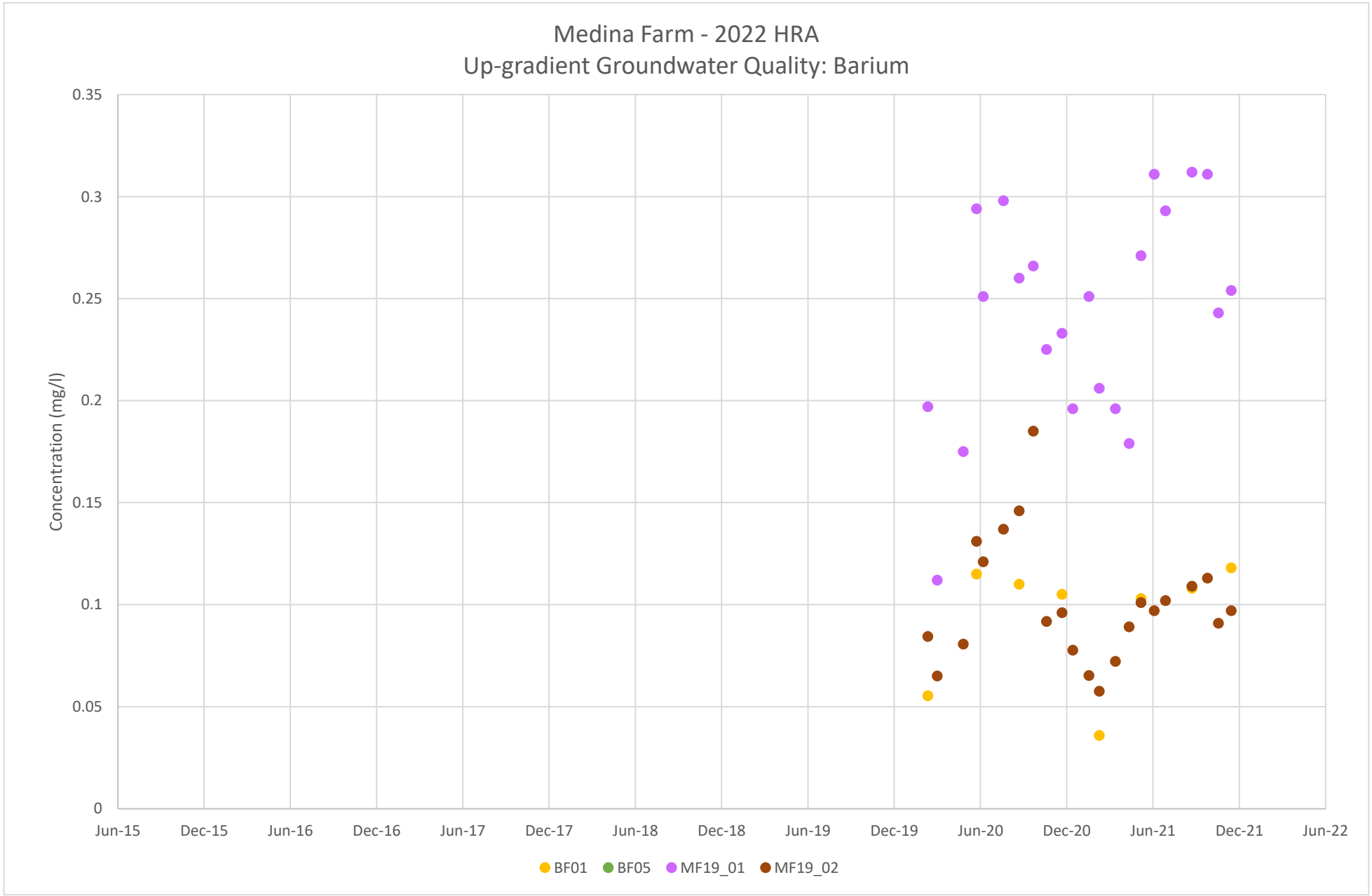
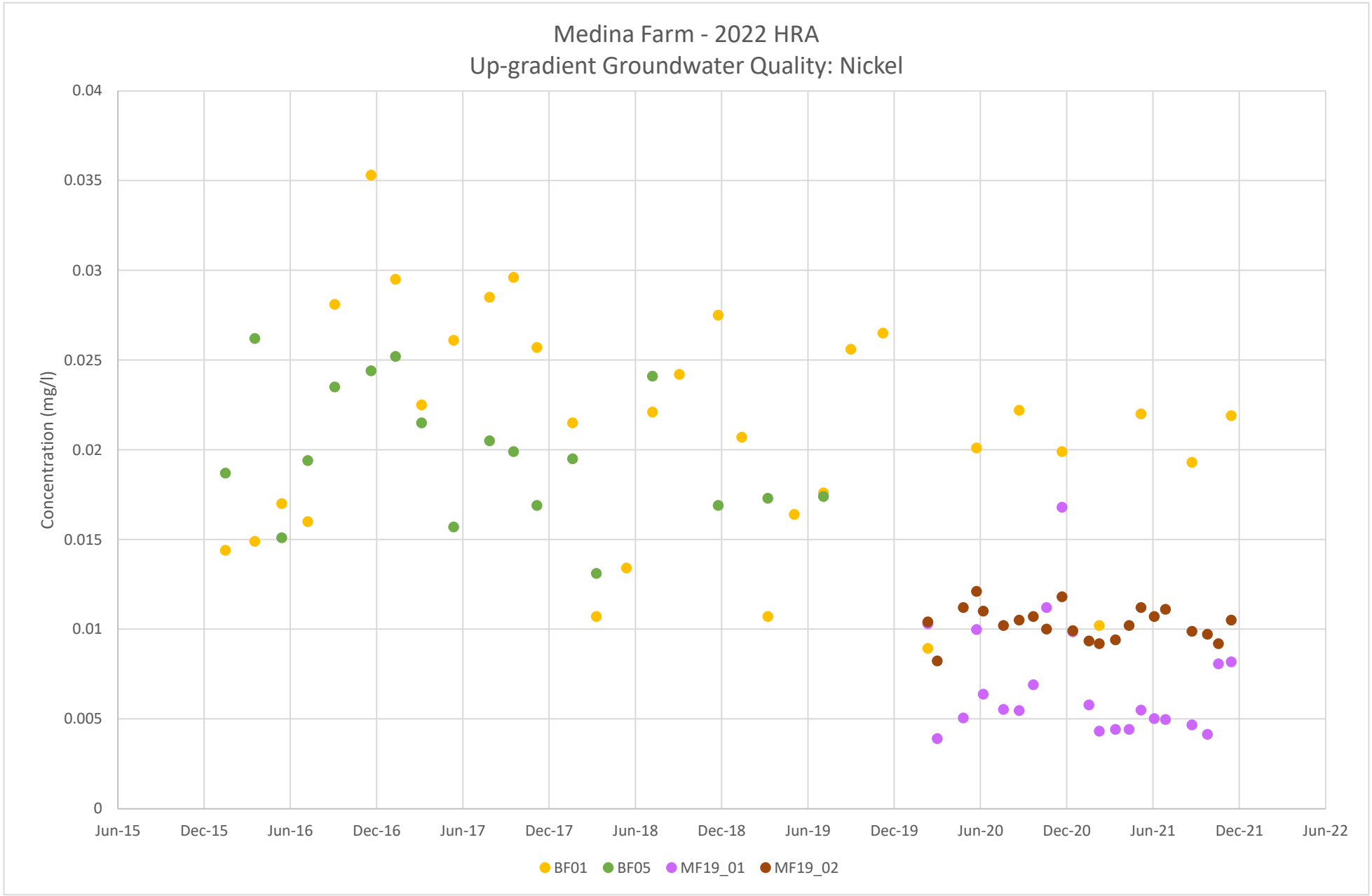
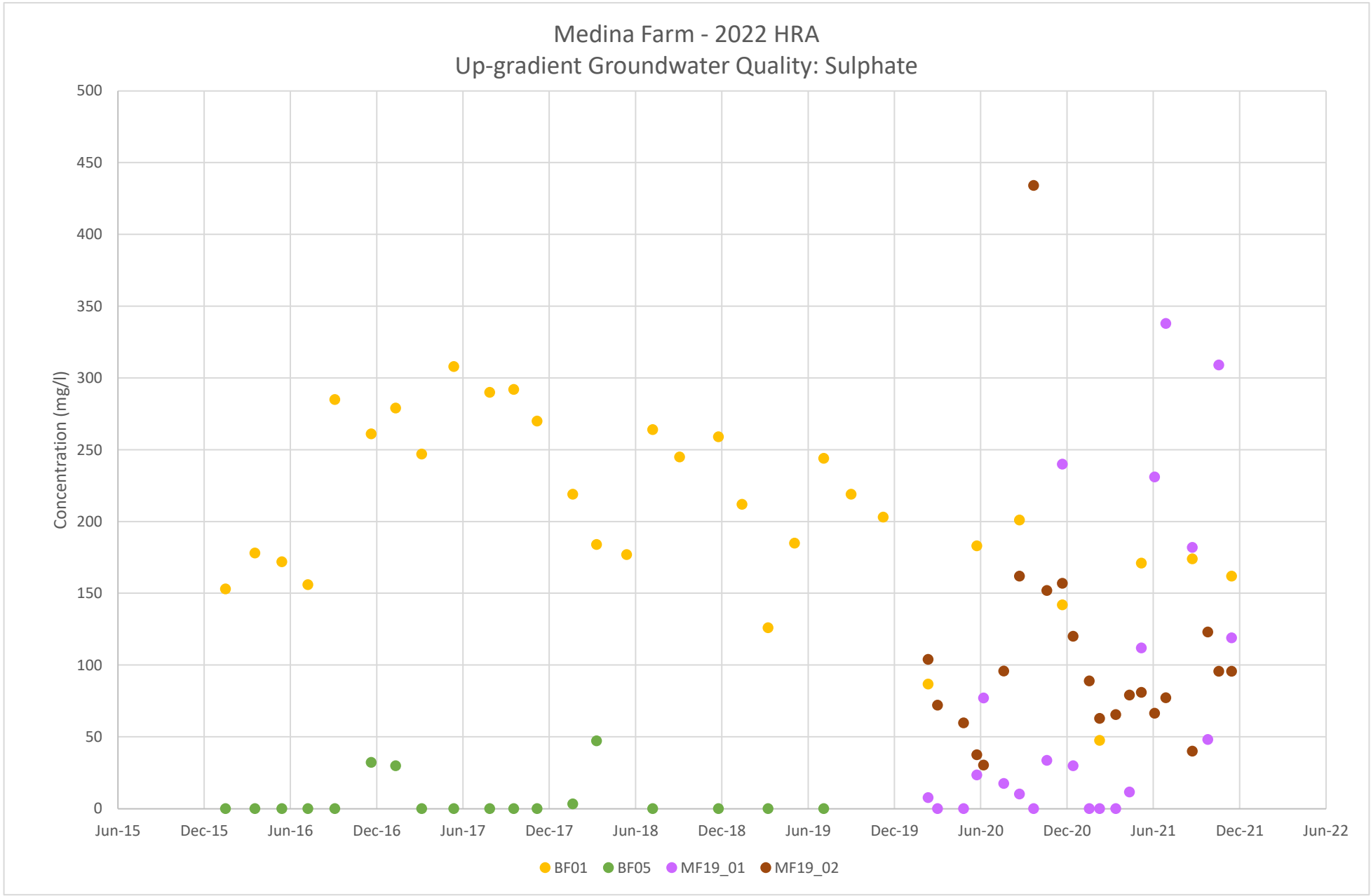
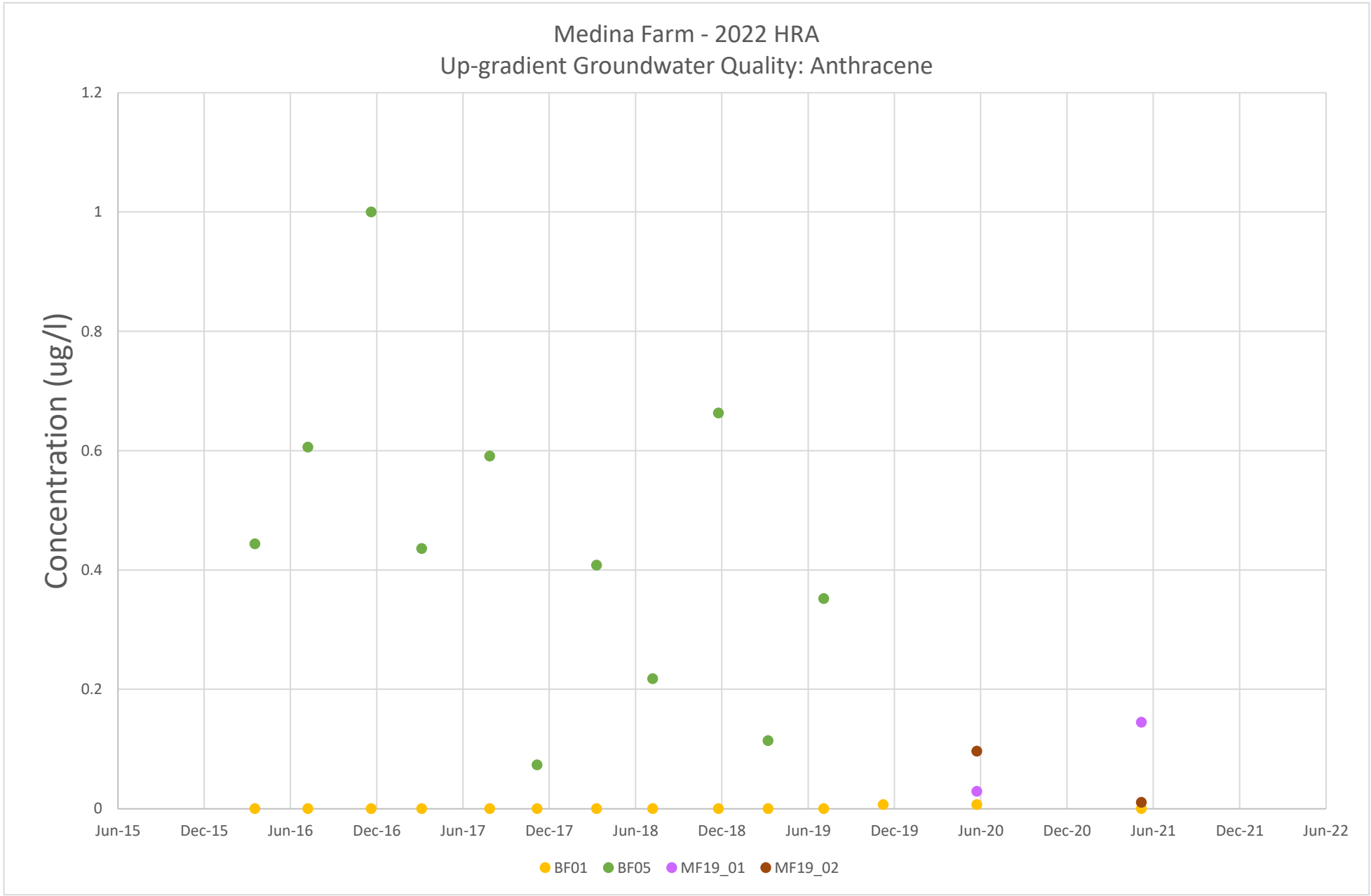
BF05
MF19_01
MF19_02

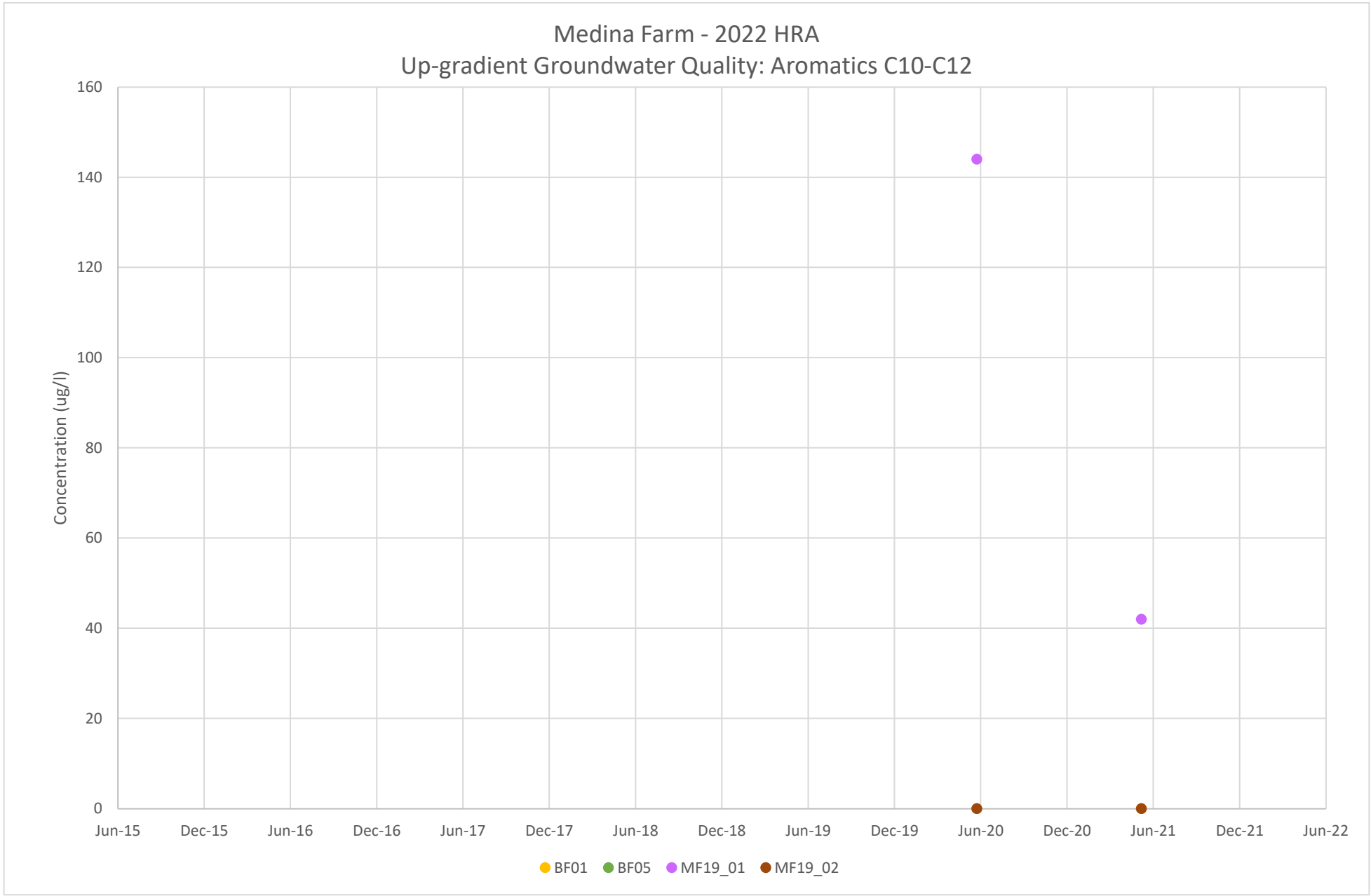

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Mercury
Concentration (mg/l)
0.000018
0.000016
0.000014
0.000012
0.00001
0.000008
0.000006
0.000004
0.000002
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

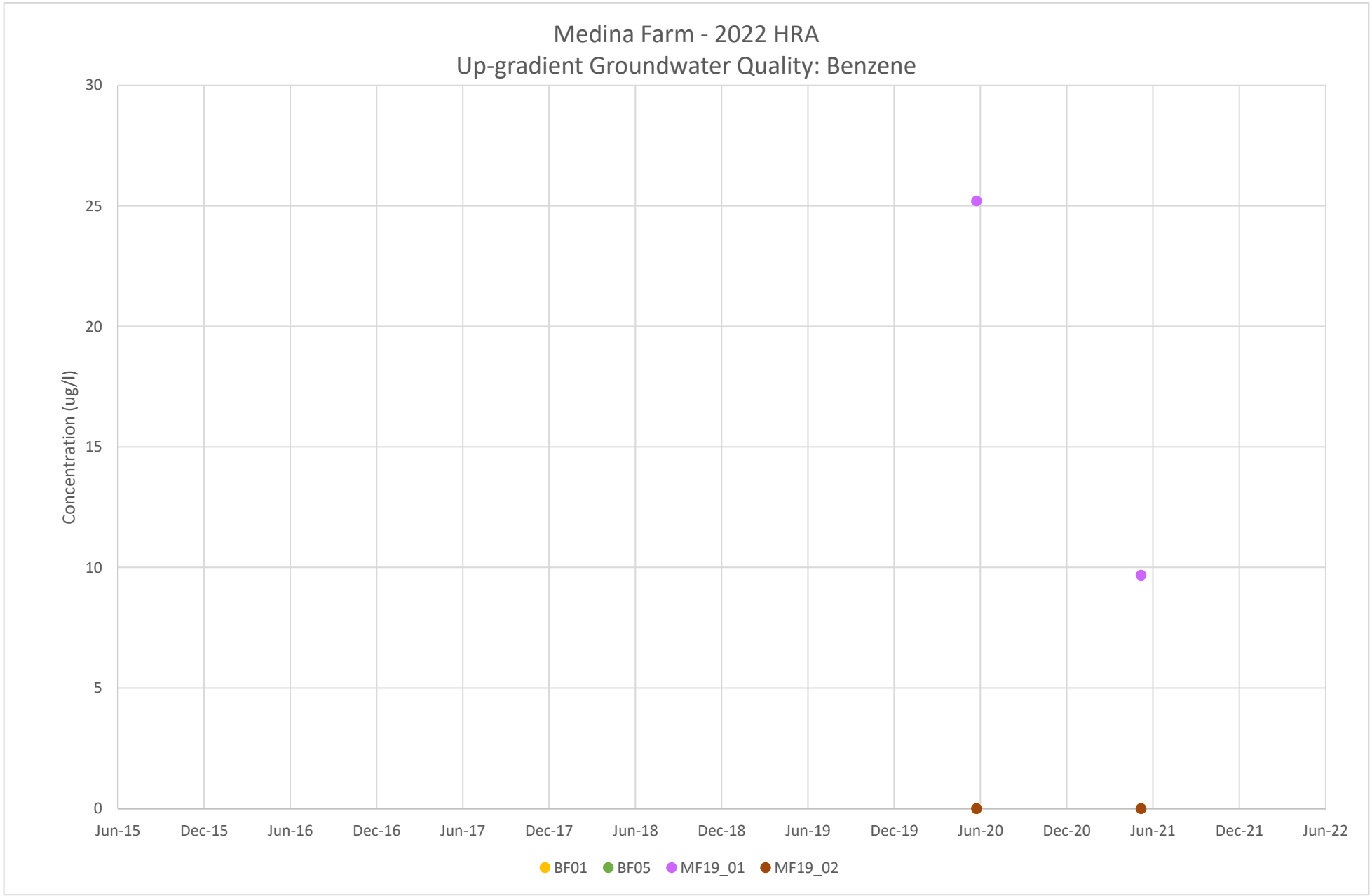

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Barium
Concentration (mg/l)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02


Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Nickel
Concentration (mg/l)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02


Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Sulphate
Concentration (mg/l)
500
450
400
350
300
250
200
150
100
50
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

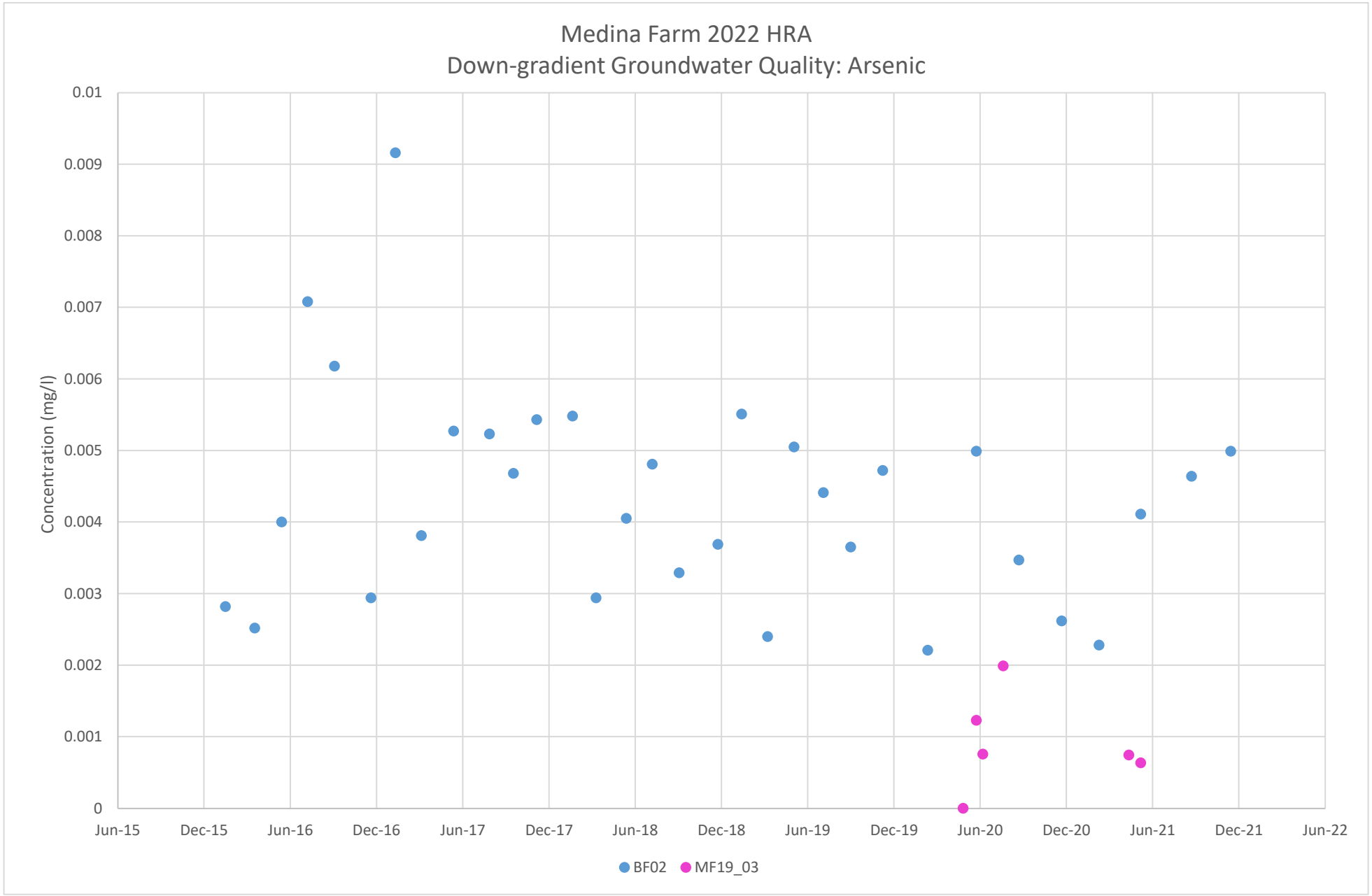

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Anthracene
Concentration (ug/l)
1.2
1
0.8
0.6
0.4
0.2
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

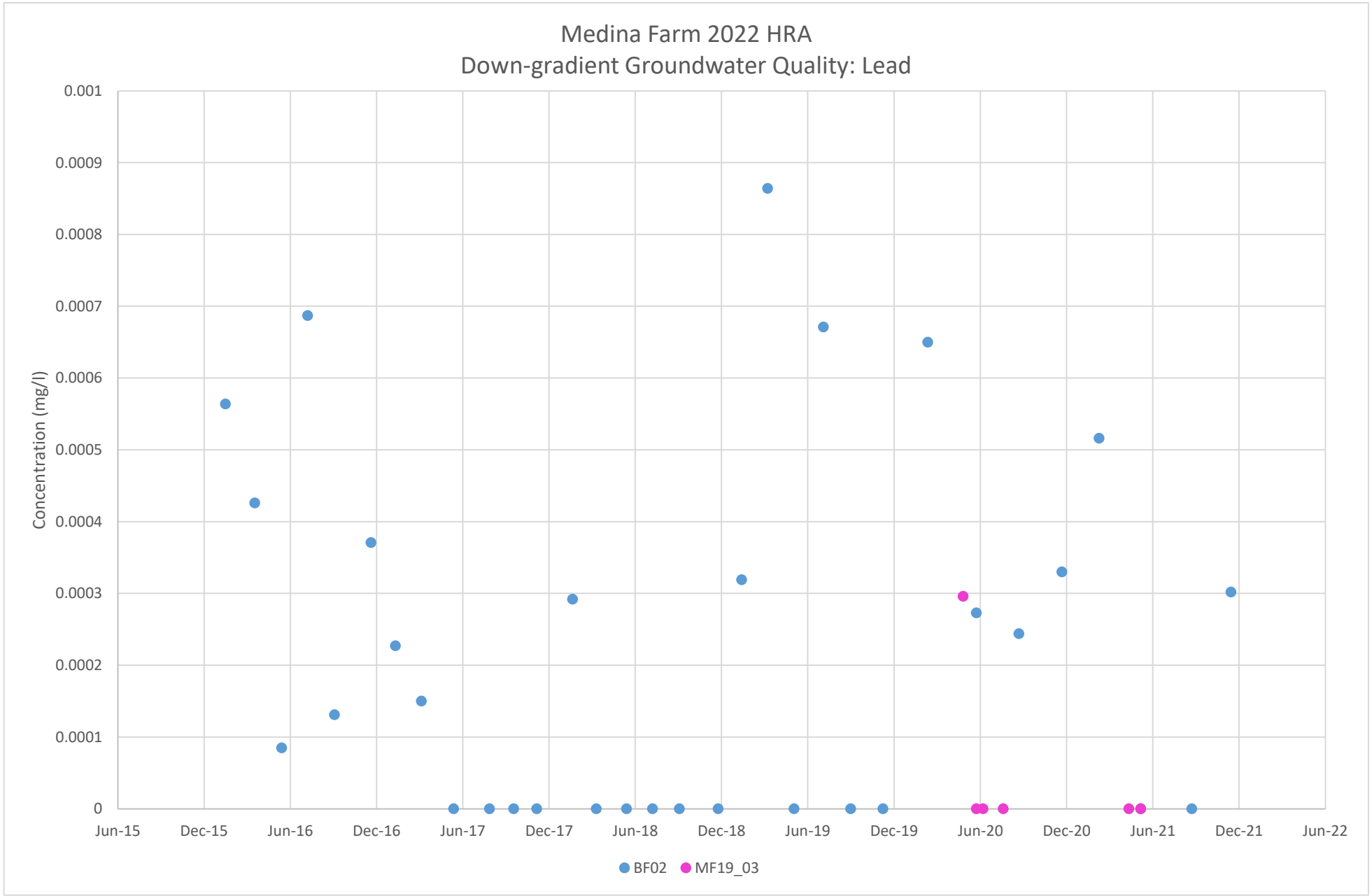

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Aromatics C10-C12
Concentration (ug/l)
160
140
120
100
80
60
40
20
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

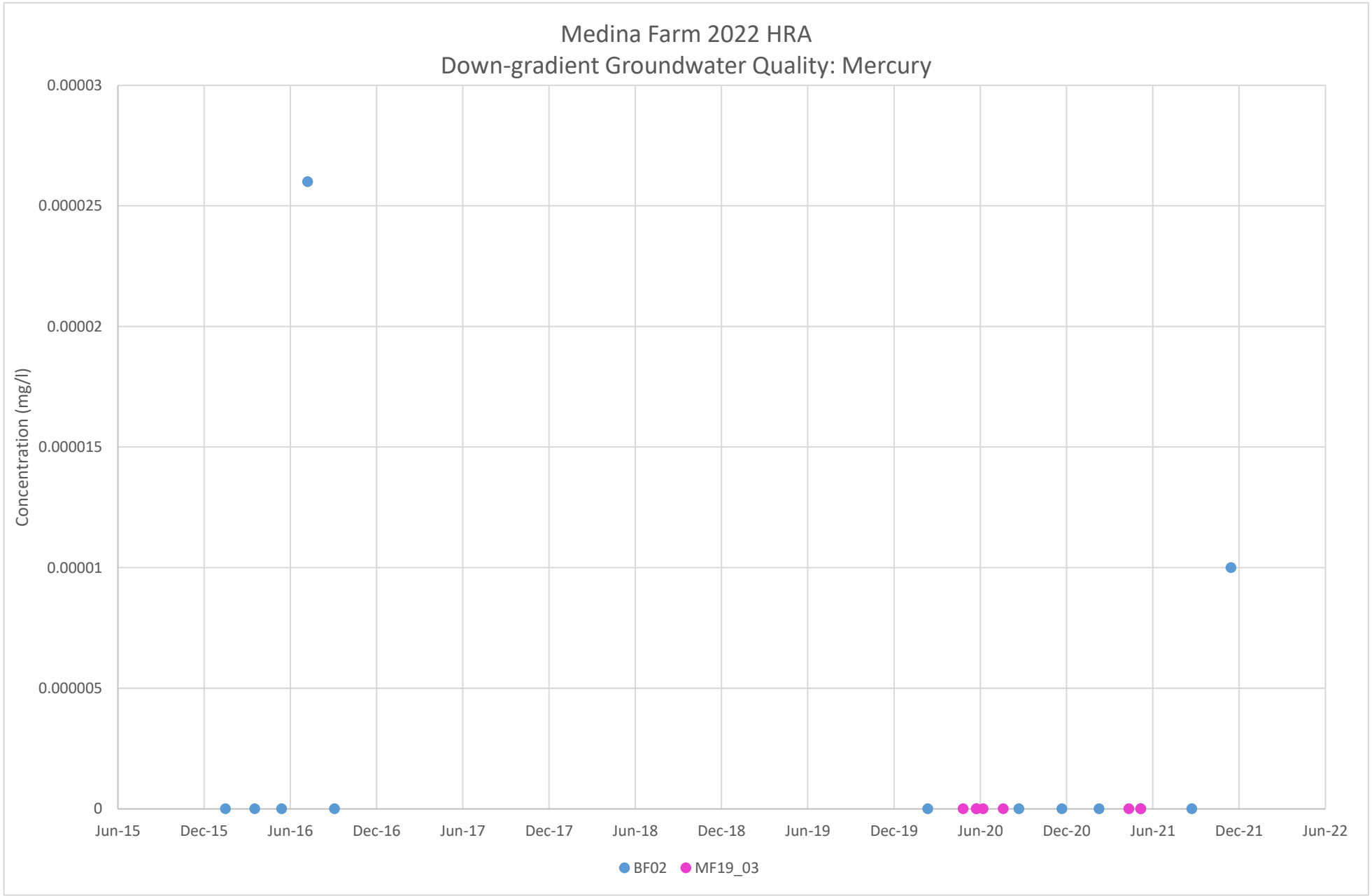

Medina Farm - 2022 HRA
Up-gradient Groundwater Quality: Benzene
Concentration (ug/l)
30
25
20
15
10
5
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF01
BF05
MF19_01
MF19_02

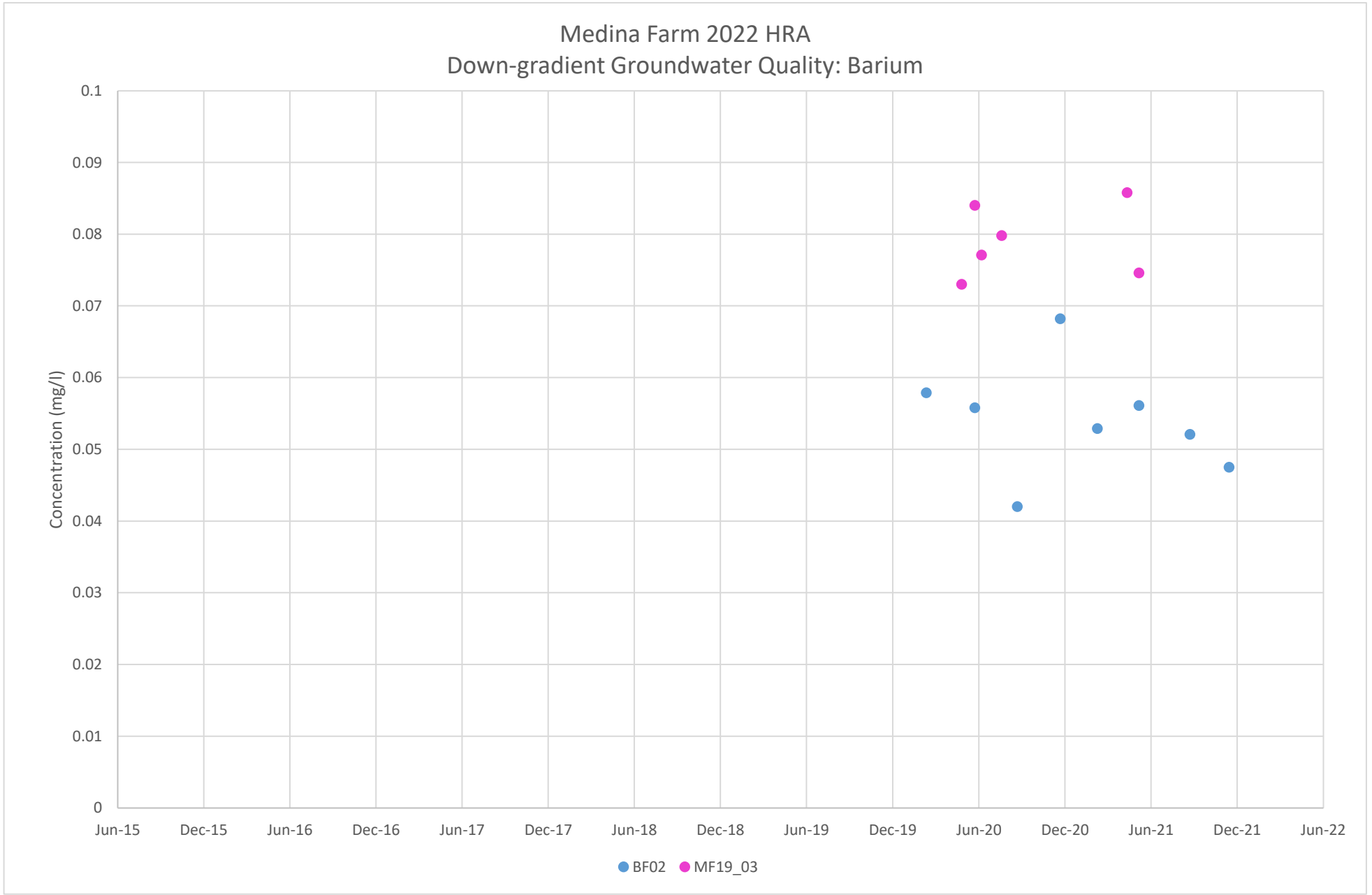
APPENDIX 05

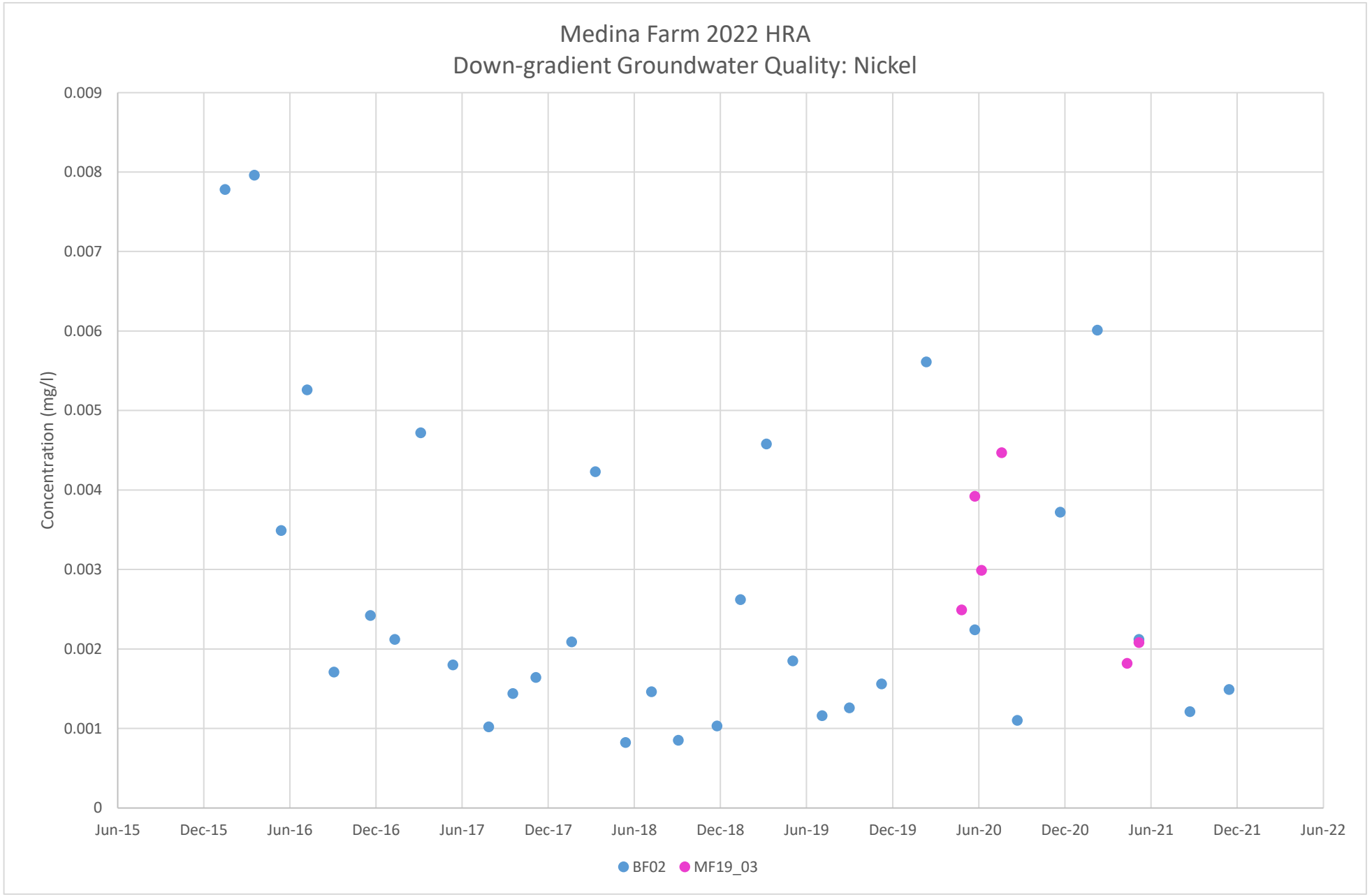
Down-gradient Groundwater Quality Time-Series Graphs

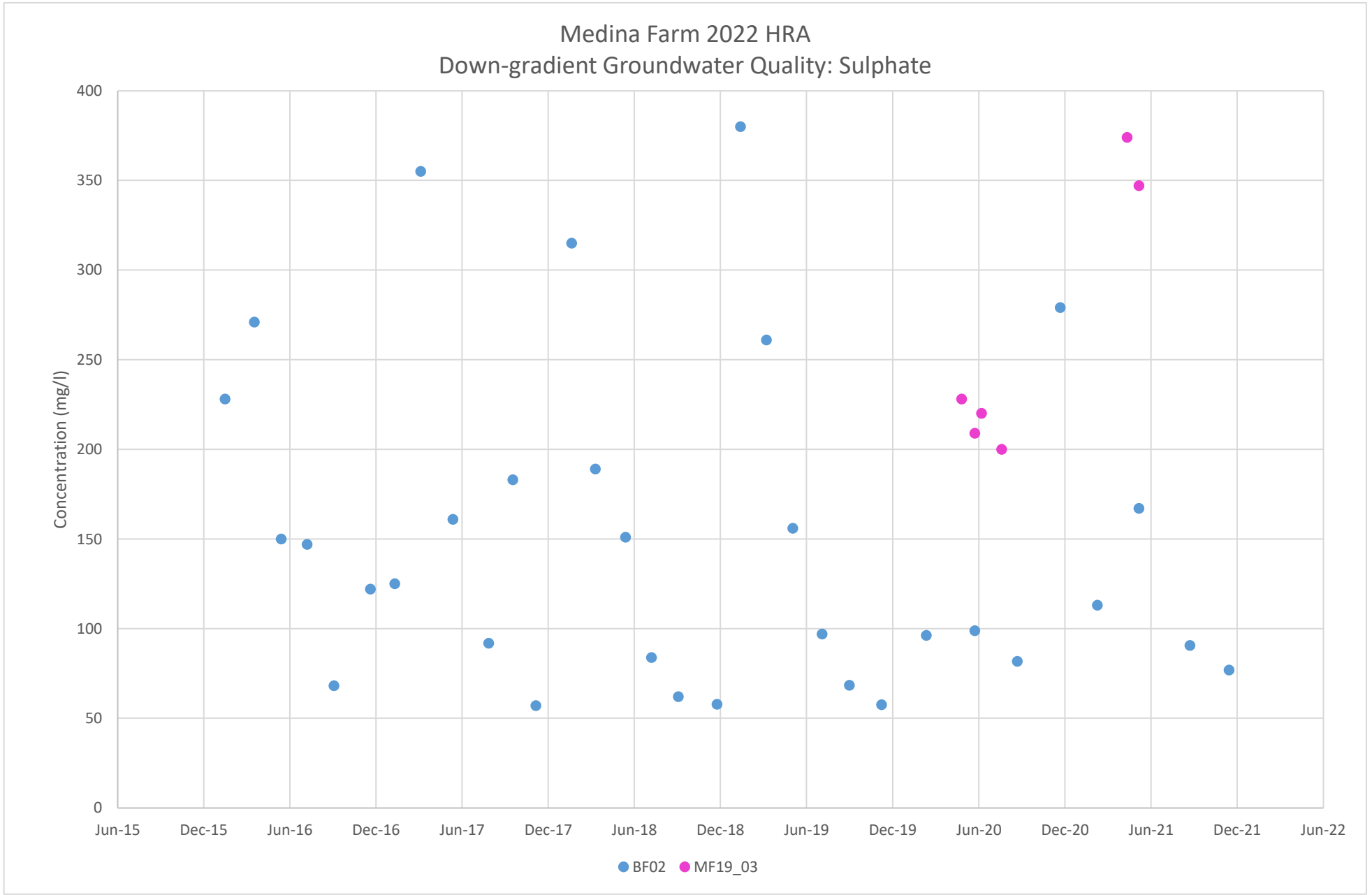

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Arsenic
Concentration (mg/l)
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

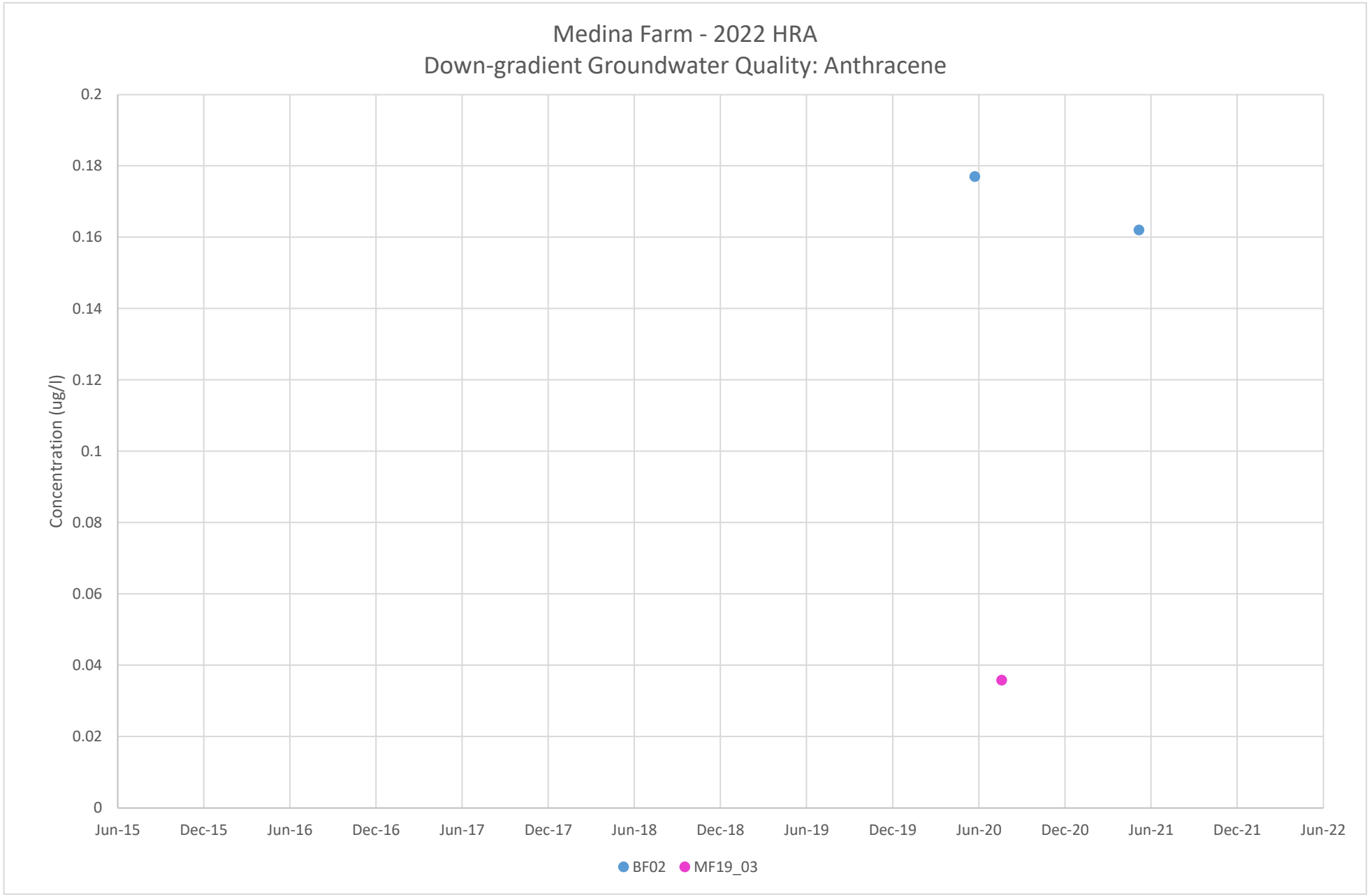

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Lead
Concentration (mg/l)
0.001
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

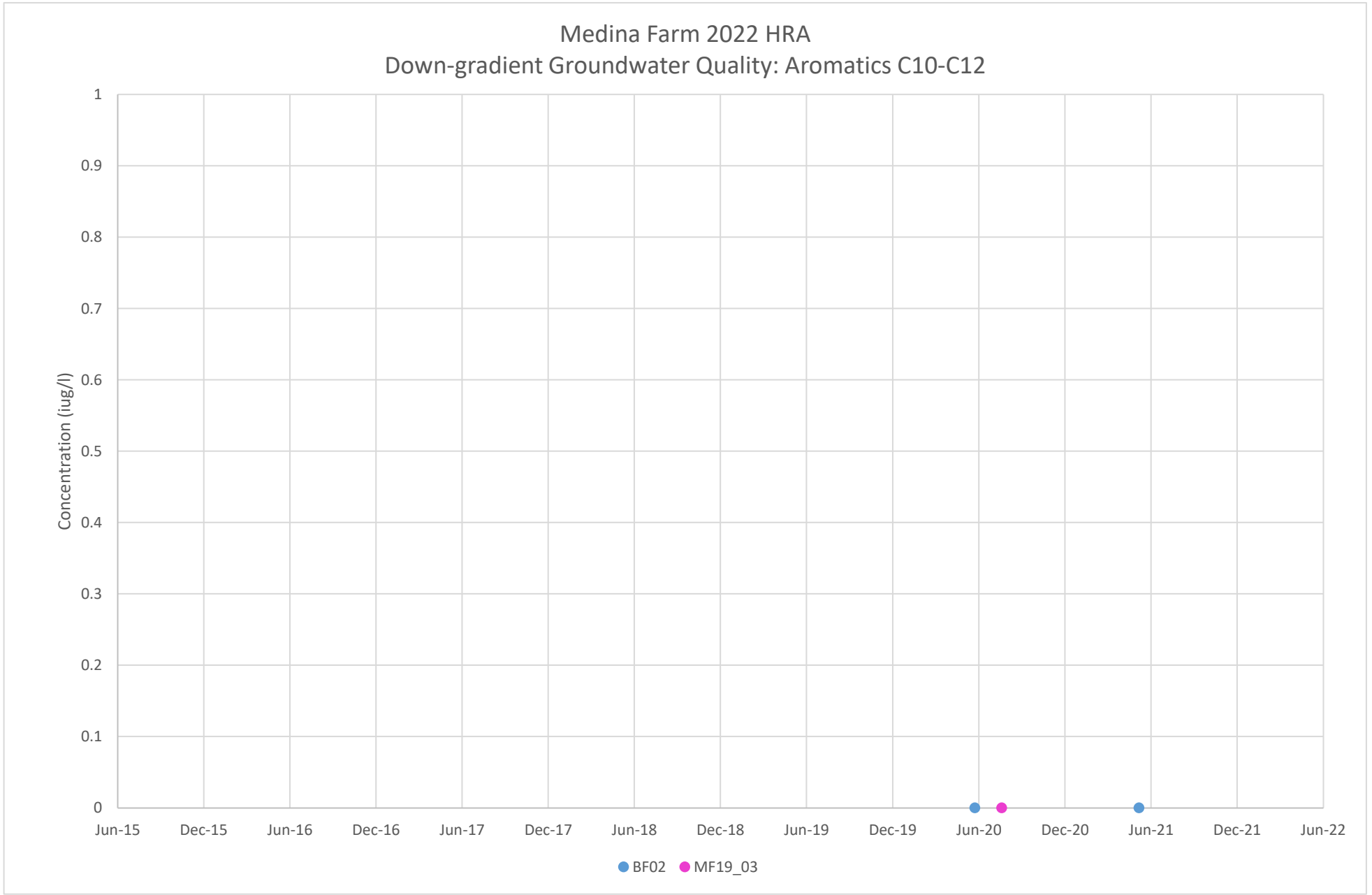

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Mercury
Concentration (mg/l)
0.00003
0.000025
0.00002
0.000015
0.00001
0.000005
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

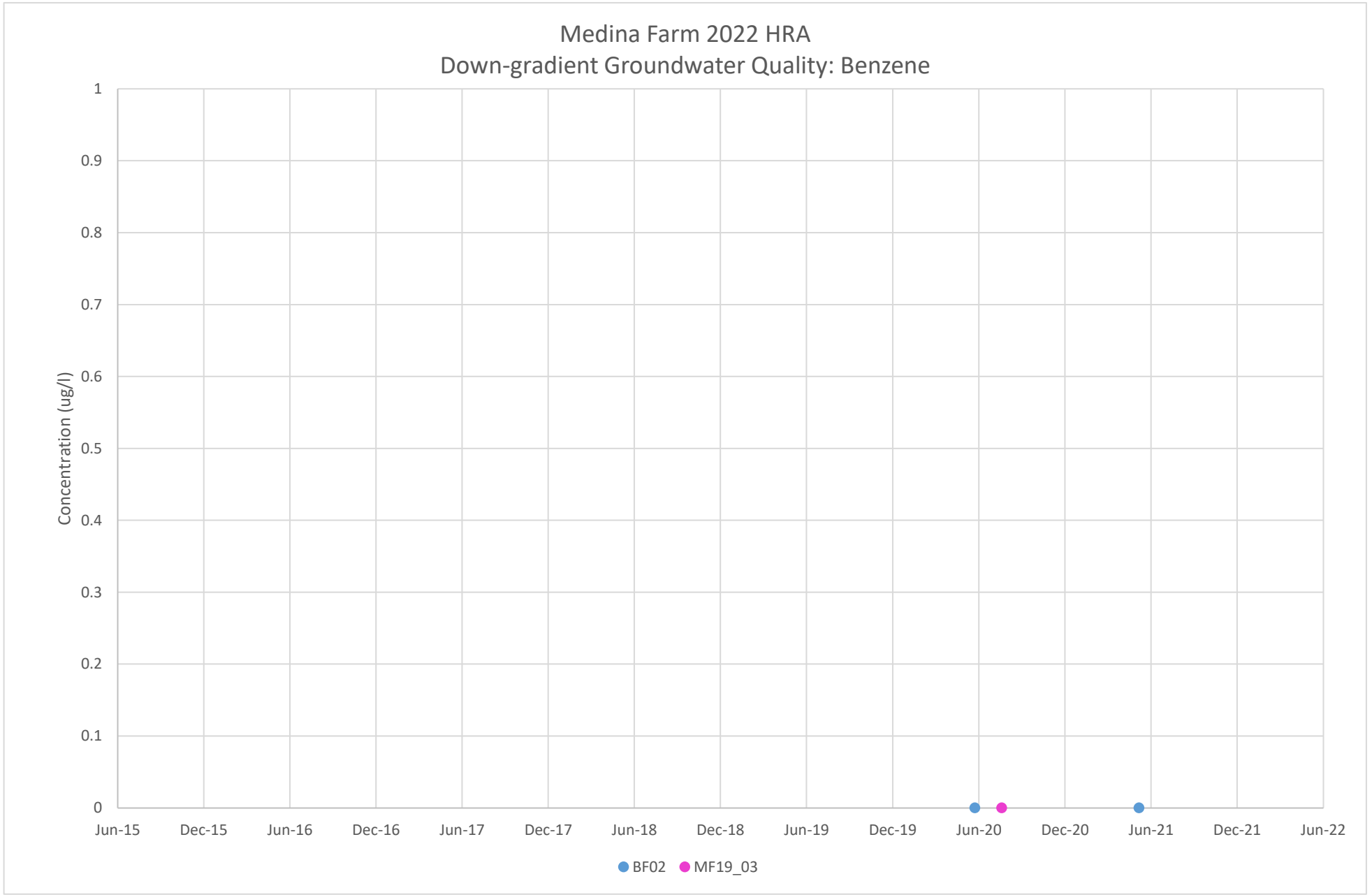

Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Barium
Concentration (mg/l)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03


Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Nickel
Concentration (mg/l)
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03


Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Sulphate
Concentration (mg/l)
400
350
300
250
200
150
100
50
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03


Medina Farm - 2022 HRA
Down-gradient Groundwater Quality: Anthracene
Concentration (ug/l)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03


Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Aromatics C10-C12
Concentration (iug/l)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03


Medina Farm 2022 HRA
Down-gradient Groundwater Quality: Benzene
Concentration (ug/l)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Dec-20
Jun-21
Dec-21
Jun-22
BF02
MF19_03

APPENDIX 06

RAM3 Model Parameterisation

Appendix 06: RAM 3 Parameterisation Table

Table 1
Site Layout Source

Item	Value/Description	Source of Data
Infiltration rate (mm/year)	75 ± 7.5 Normal	Based on 50% infiltration of the typical recharge expected for the underlying aquifer section 2.1.2.
Inert waste length (m)	370 Single Value	Based on proposed operational boundary
Inert waste width (m)	470 Single Value	Based on proposed operational boundary
Inert waste area (m^2)	173,900 Single Value	Cap area of infilled area
Inert waste volume (m^2)	608,650 Single Value	Estimated volume of restored waste.
Infiltration Rate (m^3/s)	$4.14x10^{-4}$ Single Value	Calculated.
Final Waste Thickness (m)	Min: 2 Max: 5 Uniform	Estimated maximum thickness of restoration above base assuming a basal elevation of 16m AOD and ground level of 18 – 21m AOD
Waste Porosity	0.3 Single Value	Typical values for cohesive inert waste
Waste water-filled Porosity	0.05 Single Value	
Waste dry bulk density (kg/m^3)	1,500 Single Value	
Waste FoC	0.01 Single Value	

Table 2
Contaminant Source

Item	Value/Description	Source of Data
Arsenic (mg/l)	0.15 Single	Derived in mg/l from 3x Inert WAC Limits outlined in mg/kg within the Landfill Directive council decision annex 2003/33/EC
Barium (mg/l)	6 Single	
Mercury (mg/l)	0.003 Single	
Lead (mg/l)	0.15 Single	
Nickel (mg/l)	0.12 Single	
Sulphate (mg/l)	600 Single	Sulphate may still be considered as complying with the acceptance criteria if the leaching does not exceed either of the following values: 1,500mg/l as C0 at L/S = 0.1l/kg and 6000mg/kg at L/S = 10l/kg.
Anthracene (mg/kg)	20 Single	Assumes 20% of the total PAH WAC limit of 100mg/kg is Benzo(a)pyrene
Benzene (mg/kg)	2 Single	Assumes 33% of the total BTEX WAC limit of 6mg/kg is benzene
Aromatic C10 - C12 (mg/kg)	100 Single	Assumes 20% of the Total Mineral Oil (C10 – C40) WAC limit of 500 mg/kg in Aromatic C10 – C12

Table 3
Contaminant Source – Geochemical properties

Item	Value/Description	Source of Data
Free Water Diffusion Coefficient (m^2/s)		
Arsenic	3.52×10^{-10}	https://www.dgtresearch.com/diffusion-coefficients/

Item	Value/Description	Source of Data
Barium	8.47 x10^{-10}	Buffle et.al[1]
Mercury	3.01 x10^{-9}	Supplementary information for the derivation of SGV for mercury, Science Report SC050021
Nickel	7.05 x10^{-10}	Salmon P. S., Howells W. S., Mills R. The dynamics of water molecules in ionic solution: J. Phys. C: Solid State. Phys., 1987, 20, 5727-5747.
Lead	9.45 x10^{-10}	Buffle et.al
Sulphate	1.07 x10^{-9}	Buffle et. al
Anthracene (m^2/s)	5.67 x10^{-10}	Gustafson, Kurt E., "Molecular Diffusion Coefficients for Polycyclic Aromatic Hydrocarbons in Air and Water" (1993). Dissertations, Theses, and Masters Projects. Paper 1539617664.
Benzene (m^2/s)	6.64 x10^{-10}	EA Compilation of Data for Priority Organic pollutants[2]
Aromatic C10-C12 (m^2/s)	5.16 x10^{-10}	Naphthalene used as representative of the Aromatic C10-C12 band
Contaminant Solubility (mg/l)		
Anthracene (mg/l)	0.045	EA Compilation of Data for Priority Organic pollutants[3]
Benzene (mg/l)	1,780	
Aromatic C10-C12 (mg/l)	25	CL:AIRE Petroleum Hydrocarbons in Groundwater[4]
Henry's Law Constant		

[1] Buffle, Zhang & Startchev (2007) *Metal flux and dynamic specification at (bio)interfaces. Part I: Critical evaluation and compilation of physico-chemical parameters for complexes with simple ligands and fluvic/humic substances*

[2] Environment Agency (Nov 2008) *Compilation of Data for priority organic pollutants for derivation of soil guideline values*, Ref: SC050021/SR7

[3] Environment Agency (Nov 2008) *Compilation of Data for priority organic pollutants for derivation of soil guideline values*, Ref: SC050021/SR7

[4] CL:AIRE (2017) *Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies*

Item	Value/Description	Source of Data
Anthracene	0.0016	EA 2003 Review of Fate and Transport of Selected Contaminants[5]
Benzene	0.182	
Aromatic C10-C12	0.0174	

Table 4
Hydrogeological units – Engineered Geological Barrier

Item	Value/Description	Source of Data
Engineered Lining System (1m Clay EBS)		
Thickness (m)	1m Single	Minimum sidewall thickness as per CQA plan
Hydraulic Conductivity (m/sec)	$1x10^{-7}$ Single	Based on minimum requirements for inert landfill
Moisture Content/ Effective Porosity (fraction)	Min: 0.34 Max: 0.61 Uniform	ConSim helpfile range for silts and clays
Longitudinal Dispersivity (m)	0.1 Single	10% of pathway length (liner thickness)
Bulk Density (kg/l) Uniform Distribution	Min: 1.8 Max: 2.2 Uniform	Typical range for clay as confirmed from testing of site won material and from nearby sites
Fraction of organic Carbon (fraction)	Min: 0.01 Max: 0.1 Uniform	ConSim suggested input parameter for a clay.
Hydraulic Gradient m/m	0.04 Single	Maximum potential head across sidewall of site, given the effective infiltration in the waste of 75mm/year. Q = K x i x A Where: Q = Infiltration in = seepage out of sidewall (calculated) K = max conductivity (1×10^{-7} m/s)

[5] Environment Agency (2003) *Review of Fate and Transport of Selected Contaminants in the Soil Environment*, Technical Report: P5-079/TR1

Item	Value/Description	Source of Data
		I = Hydraulic Gradient
Engineered Geological Barrier – Retardation Coefficient (Kd)		
Arsenic (l/kg)	Min: 25 Max: 250 Uniform	LandSim default range
Barium (l/kg)	Min: 0.60 Max: 17.0 Uniform	Consim helpfile
Mercury (l/kg)	Min: 450 Max: 3,835 Uniform	LandSim suggested input parameters
Nickel (l/kg)	Min: 20 Max: 800 Uniform	LandSim default
Lead (kd) (l/kg)	Min: 27 Max: 270,000 Uniform	LandSim default
Sulphate (l/kg)	0 Single	
Partition Coefficient (Koc)		
Anthracene (l/kg)	2600 Single	EA Compilation of Data for Priority Organic pollutants[6]
Benzene (l/kg)	67.61 Single	
Aromatic C10-C12 (l/kg)	2500 Single	CL:AIRE Petroleum Hydrocarbons in Groundwater[7]
Engineered Geological Barrier – Half Life		
Anthracene (years)	Min: 0.55 Max: 5	Anaerobic range as worst case from Howard et.al (1991) Handbook of

[6] Environment Agency (Nov 2008) *Compilation of Data for priority organic pollutants for derivation of soil guideline values*, Ref: SC050021/SR7

[7] CL:AIRE (2017) *Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies*

Item	Value/Description	Source of Data
Benzene (years)	Min: 0.31 Max: 2 Uniform	Environmental Degradation Rates
Aromatic C10-C12 (years)	Min: 0.3 Max: 0.9 Uniform	Noble P., Morgan P. (2002) *The Effects of Contaminant Concentration on the Potential for Natural Attenuation*, EA R&D technical Report P2-228/TR
All other inorganics	-	Assumes no degradation

Table 5
Aquifer Flow - Lateral flow within the Lynch Hill Gravels

Item	Value/Description	Source of Data
Hydraulic Conductivity (m^2/s)	Min: 0.00001 Mean: 0.00041 Max: 0.001	Typical range from desk study most likely based on laboratory testing of in-situ sands and gravels.
Mixing Zone Thickness (m)	Min: 0.5 Max: 2.2 Uniform	Saturated Aquifer thickness of Lynch Hill gravels based on monitoring data.
Pathway Porosity (fraction)	Min: 0.15 Max: 0.22 Uniform	Typical range for silty sandy gravels from ConSim help files.
Density (kg/m^3)	Min: 1500 Max: 2000 Uniform	Typical range for sand & gravel.
Hydraulic Gradient	0.00587 Single Value	Gradient as calculated based on average groundwater elevation between BF01 and BF02.
Aquifer pathway (m)	450 Single Value	Measured width from SW to NE corners based on perpendicular to GW flow direction.
Fraction of organic Carbon (fraction)	Min: 0.00049 Max: 0.0012 Uniform	Wang et.al (2013). A practical measurement strategy to estimate nonlinear chlorinated solvent sorption in low FoC sediments, Groundwater Monitoring and Remediation 33(1) pp. 87 – 96.
Lynch Hill Gravels Aquifer – Retardation Coefficient		
Barium (l/kg)	Min: 0.60	ConSim Helpfile range (unspecified material)

Item	Value/Description	Source of Data
	Max: 17.0 Uniform	
Nickel (l/kg)	Min: 20 Max: 800 Uniform	LandSim default range.
Sulphate (l/kg)	0 Single Value	LandSim default range.
Hazardous substances	0 Single Value	Retardation of Hazardous substances not included in modelling as worst case.

APPENDIX 07

RAM3 Model Results

BREAKTHROUGH Probabilistic Results **1000**
Monte Carlo iterations

Pollutant Linkage: Inert Waste, Attenuation Barrier, Lynch Hill Gravels, DG Borehole
95 th Percentile Concentrations in mg/L in DG Borehole

EALs (mg/l)	0.0165	0.72	171.5	0.005	0.0002	0.00001
Max Conc. (mg/l)	9.27E-05	0.19	53.13	1.79E-05	3.24E-06	3.22E-07

Time(years)	Nickel	Barium	Sulphate	Arsenic	Lead	Mercury
10	0	0.026	53.13	0	0	0
20	0	0.19	1.22	7.94E-34	0	0
40	2.57E-28	0.14	0.00028	5.27E-18	0	0
60	2.09E-19	0.11	5.82E-08	8.08E-13	0	0
80	7.14E-15	0.090	1.13E-11	2.69E-10	0	0
100	3.41E-12	0.079	2.16E-15	7.78E-09	0	0
120	1.94E-10	0.070	4.12E-19	6.32E-08	0	0
140	3.29E-09	0.062	7.84E-23	2.66E-07	0	0
160	2.64E-08	0.054	1.49E-26	7.18E-07	0	0
180	1.29E-07	0.049	2.82E-30	1.41E-06	0	0
200	4.45E-07	0.044	5.35E-34	2.59E-06	0	0
250	3.32E-06	0.033	0	6.51E-06	0	5.65E-38
300	1.21E-05	0.023	0	1.10E-05	0	2.78E-32
350	2.63E-05	0.015	0	1.39E-05	0	3.10E-28
400	4.41E-05	0.010	0	1.57E-05	0	3.25E-25
450	6.14E-05	0.0066	0	1.73E-05	0	7.07E-23
500	7.82E-05	0.0042	0	1.79E-05	0	4.41E-21
600	8.12E-05	0.0017	0	1.75E-05	2.21E-38	2.26E-18
700	9.27E-05	0.00068	0	1.60E-05	3.14E-33	2.06E-16
800	8.86E-05	0.00027	0	1.44E-05	2.22E-29	5.88E-15
900	8.39E-05	0.00011	0	1.31E-05	2.14E-26	8.19E-14
1000	8.36E-05	4.53E-05	0	1.24E-05	5.10E-24	6.62E-13
1250	8.15E-05	4.67E-06	0	1.07E-05	8.76E-20	2.59E-11
1500	7.33E-05	5.03E-07	0	9.14E-06	5.26E-17	2.93E-10
1750	6.87E-05	5.38E-08	0	8.26E-06	4.85E-15	1.42E-09
2000	6.52E-05	5.77E-09	0	7.50E-06	1.39E-13	4.40E-09
2250	5.95E-05	6.71E-10	0	6.76E-06	1.85E-12	9.97E-09
2500	5.32E-05	7.69E-11	0	6.11E-06	1.43E-11	1.88E-08
2750	5.13E-05	8.71E-12	0	5.46E-06	7.46E-11	3.23E-08
3000	4.82E-05	1.02E-12	0	4.92E-06	3.06E-10	4.96E-08
3250	4.42E-05	1.21E-13	0	4.39E-06	9.24E-10	6.77E-08
3500	4.13E-05	1.42E-14	0	3.99E-06	2.39E-09	9.01E-08
3750	3.89E-05	1.70E-15	0	3.53E-06	5.45E-09	1.14E-07
4000	3.71E-05	2.08E-16	0	3.10E-06	1.11E-08	1.39E-07
4250	3.50E-05	2.69E-17	0	2.68E-06	2.06E-08	1.61E-07
4500	3.37E-05	3.44E-18	0	2.34E-06	3.55E-08	1.80E-07
5000	3.12E-05	5.55E-20	0	1.73E-06	8.76E-08	2.18E-07
5500	2.91E-05	9.02E-22	0	1.29E-06	1.74E-07	2.50E-07
6000	2.74E-05	1.35E-23	0	9.40E-07	3.16E-07	2.82E-07
6500	2.54E-05	2.03E-25	0	6.81E-07	5.10E-07	2.93E-07
7000	2.45E-05	3.08E-27	0	5.06E-07	5.68E-07	3.04E-07
7500	2.32E-05	4.71E-29	0	3.66E-07	7.44E-07	3.20E-07
8000	2.19E-05	7.25E-31	0	2.70E-07	5.46E-07	3.22E-07
8500	2.09E-05	1.19E-32	0	1.97E-07	7.47E-07	3.13E-07
9000	1.94E-05	1.96E-34	0	1.41E-07	9.12E-07	3.10E-07
9500	1.83E-05	3.25E-36	0	1.01E-07	1.15E-06	3.10E-07
10000	1.70E-05	5.40E-38	0	7.24E-08	1.32E-06	3.05E-07
11000	1.49E-05	0	0	3.75E-08	1.92E-06	2.93E-07
12000	1.31E-05	0	0	1.92E-08	2.03E-06	2.65E-07
13000	1.13E-05	0	0	9.81E-09	2.34E-06	2.44E-07
14000	9.49E-06	0	0	5.19E-09	2.60E-06	2.25E-07
15000	8.04E-06	0	0	2.76E-09	2.89E-06	2.18E-07
16000	6.70E-06	0	0	1.47E-09	3.24E-06	2.08E-07
17000	5.67E-06	0	0	7.73E-10	3.17E-06	2.00E-07
18000	4.75E-06	0	0	3.99E-10	3.05E-06	1.91E-07
19000	3.92E-06	0	0	2.14E-10	2.74E-06	1.87E-07
20000	3.20E-06	0	0	1.11E-10	2.79E-06	1.77E-07

Pollutant Linkage: Inert Waste, Attenuation Barrier, Lynch Hill Gravels, DG Borehole

5 th Percentile Remedial Target Concentrations in mg/L in Inert Waste

Time(years)	Species1 **Nickel**	Species2 **Barium**	Species3 **Sulphate**	Species4 **Arsenic**	Species5 **Lead**	Species6 **Mercury**
10	1E+40	130.75	1936	1E+40	1E+40	1E+40
20	1E+40	22.08	84468	3.5368E+28	1E+40	1E+40
40	1.029E+24	29.46	362167206	7.36625E+12	1E+40	1E+40
60	1.85114E+15	38.70	1.76386E+12	56683918.76	1E+40	1E+40
80	88481793960	47.74	9.03888E+15	185336	1E+40	1E+40
100	248627446.2	53.94	4.75092E+19	6423	1E+40	1E+40
120	5318537	61.82	2.49354E+23	742.03	1E+40	1E+40
140	377185	69.58	1.31148E+27	177.05	1E+40	1E+40
160	55834	79.46	6.90974E+30	66.59	1E+40	1E+40
180	13074	88.76	3.64578E+34	32.41	1E+40	1E+40
200	4209	98.36	1.92352E+38	18.47	1E+40	1E+40
250	521.38	130.40	1E+40	7.00	1E+40	3.37578E+29
300	161.67	186.63	1E+40	4.44	1E+40	6.96814E+23
350	67.16	280.51	1E+40	3.54	1E+40	6.32597E+19
400	44.65	423.23	1E+40	3.16	1E+40	7.50101E+16
450	31.47	653.93	1E+40	2.89	1.00E+40	4.20854E+14
500	25.12	1025	1E+40	2.76	1.00E+40	5.84051E+12
600	24.01	2543	1E+40	2.83	9.19E+32	9876153459
700	20.90	6230	1E+40	3.13	7.27E+27	108215381.5
800	22.29	15518	1E+40	3.48	1.12E+24	3790923
900	23.41	38045	1E+40	3.81	1.25E+21	287147
1000	23.40	92460	1E+40	4.01	5.54E+18	37223
1250	24.23	922212	1E+40	4.66	3.29E+14	1123
1500	26.72	8360780	1E+40	5.44	5.13E+11	101.91
1750	28.16	80070956	1E+40	6.03	5.29E+09	19.31
2000	30.26	721787673	1E+40	6.67	177384345	6.75
2250	33.16	6403814896	1E+40	7.39	12989752	2.94
2500	36.73	54756645061	1E+40	8.16	1660598	1.52
2750	38.59	4.8729E+11	1E+40	9.14	346374	0.91
3000	40.94	4.19232E+12	1E+40	10.14	95354	0.60
3250	44.54	3.30206E+13	1E+40	11.37	29886	0.43
3500	47.79	2.84575E+14	1E+40	12.46	10934	0.33
3750	50.78	2.44786E+15	1E+40	14.15	4623	0.25
4000	53.26	1.96677E+16	1E+40	16.12	2197	0.21
4250	56.36	1.51193E+17	1E+40	18.64	1150	0.18
4500	58.57	1.23748E+18	1E+40	21.30	651.70	0.17
5000	63.27	7.32762E+19	1E+40	28.26	253.23	0.14
5500	67.85	4.46823E+21	1E+40	38.28	167.42	0.12
6000	71.87	2.82893E+23	1E+40	52.69	94.14	0.10
6500	77.79	1.80269E+25	1E+40	72.30	58.46	0.10
7000	80.77	1.13985E+27	1E+40	98.67	40.01	0.10
7500	85.11	7.15878E+28	1E+40	135.84	38.78	0.093
8000	90.22	4.46941E+30	1E+40	183.51	36.38	0.092
8500	94.45	2.83988E+32	1E+40	254.24	38.76	0.092
9000	101.75	1.80176E+34	1E+40	351.56	30.71	0.10
9500	108.38	1.13835E+36	1E+40	494.37	25.42	0.10
10000	115.92	7.16492E+37	1E+40	683.02	20.05	0.10
11000	132.30	1E+40	1E+40	1308	15.48	0.10
12000	150.76	1E+40	1E+40	2591	13.59	0.11
13000	174.00	1E+40	1E+40	5085	12.61	0.12
14000	207.23	1E+40	1E+40	9491	11.24	0.13
15000	246.15	1E+40	1E+40	17497	10.06	0.14
16000	294.99	1E+40	1E+40	33347	8.94	0.14
17000	346.26	1E+40	1E+40	63866	8.86	0.15
18000	416.10	1E+40	1E+40	119724	9.66	0.16
19000	503.90	1E+40	1E+40	231460	9.94	0.16
20000	618.02	1E+40	1E+40	449670	10.62	0.17

Compared with source concentrations in mg/L

1.200E-01	6.000E+00	6.000E+02	1.000E-02	1.500E-01	3.000E-03

Pollutant Linkage: Inert Waste, Attenuation Barrier, Lynch Hill Gravels, DG Borehole

5 th Percentile Dilution Factor

1.238E+00

Pollutant Linkage: Inert Waste, Attenuation Barrier, Lynch Hill Gravels, DG Borehole

5 th Percentile Attenuation Factor

Time(years)	Species1	Species2	Species3	Species4	Species5	Species6
	Nickel	**Barium**	**Sulphate**	**Arsenic**	**Lead**	**Mercury**
10	1.000E+40	1.032E+02	7.566E+00	1.000E+40	1.000E+40	1.000E+40
20	1.000E+40	1.238E+01	3.001E+02	6.025E+30	1.000E+40	1.000E+40
40	4.198E+25	2.009E+01	1.203E+06	9.319E+14	1.000E+40	1.000E+40
60	7.553E+16	2.911E+01	5.928E+09	6.138E+09	1.000E+40	1.000E+40
80	3.610E+12	3.897E+01	3.055E+13	1.857E+07	1.000E+40	1.000E+40
100	1.014E+10	4.846E+01	1.597E+17	6.441E+05	1.000E+40	1.000E+40
120	2.170E+08	5.819E+01	8.397E+20	7.469E+04	1.000E+40	1.000E+40
140	1.471E+07	6.791E+01	4.424E+24	1.711E+04	1.000E+40	1.000E+40
160	2.039E+06	7.760E+01	2.333E+28	5.964E+03	1.000E+40	1.000E+40
180	4.536E+05	8.743E+01	1.231E+32	2.739E+03	1.000E+40	1.000E+40
200	1.402E+05	9.712E+01	6.498E+35	1.522E+03	1.000E+40	1.000E+40
250	1.848E+04	1.220E+02	1.000E+40	5.908E+02	1.000E+40	2.874E+34
300	5.249E+03	1.572E+02	1.000E+40	3.556E+02	1.000E+40	5.933E+28
350	2.290E+03	2.190E+02	1.000E+40	2.730E+02	1.000E+40	5.386E+24
400	1.300E+03	3.205E+02	1.000E+40	2.419E+02	1.000E+40	5.180E+21
450	8.764E+02	4.812E+02	1.000E+40	2.373E+02	1.000E+40	2.395E+19
500	6.649E+02	7.363E+02	1.000E+40	2.535E+02	1.000E+40	3.315E+17
600	5.639E+02	1.766E+03	1.000E+40	3.004E+02	1.224E+36	5.651E+14
700	5.809E+02	4.304E+03	1.000E+40	3.404E+02	9.687E+30	6.229E+12
800	6.070E+02	1.055E+04	1.000E+40	3.909E+02	1.495E+27	2.192E+11
900	5.985E+02	2.592E+04	1.000E+40	4.362E+02	1.665E+24	1.666E+10
1000	6.501E+02	6.356E+04	1.000E+40	4.862E+02	7.380E+21	2.166E+09
1250	7.435E+02	5.917E+05	1.000E+40	6.023E+02	4.564E+17	5.875E+07
1500	8.230E+02	5.400E+06	1.000E+40	7.192E+02	7.718E+14	5.669E+06
1750	9.127E+02	4.800E+07	1.000E+40	8.399E+02	8.602E+12	1.121E+06
2000	1.016E+03	4.197E+08	1.000E+40	9.584E+02	3.053E+11	3.452E+05
2250	1.125E+03	3.667E+09	1.000E+40	1.077E+03	2.338E+10	1.425E+05
2500	1.253E+03	3.191E+10	1.000E+40	1.197E+03	3.059E+09	7.201E+04
2750	1.371E+03	2.719E+11	1.000E+40	1.316E+03	5.901E+08	4.210E+04
3000	1.487E+03	2.295E+12	1.000E+40	1.436E+03	1.521E+08	2.742E+04
3250	1.613E+03	1.922E+13	1.000E+40	1.556E+03	4.896E+07	1.940E+04
3500	1.731E+03	1.599E+14	1.000E+40	1.676E+03	1.875E+07	1.463E+04
3750	1.851E+03	1.323E+15	1.000E+40	1.800E+03	8.245E+06	1.160E+04
4000	1.968E+03	1.089E+16	1.000E+40	1.940E+03	4.056E+06	9.583E+03
4250	2.087E+03	8.917E+16	1.000E+40	2.128E+03	2.187E+06	8.218E+03
4500	2.214E+03	7.273E+17	1.000E+40	2.359E+03	1.273E+06	7.221E+03
5000	2.457E+03	4.786E+19	1.000E+40	2.970E+03	5.171E+05	5.916E+03
5500	2.696E+03	3.110E+21	1.000E+40	3.832E+03	2.766E+05	5.177E+03
6000	2.941E+03	2.000E+23	1.000E+40	5.031E+03	1.526E+05	4.754E+03
6500	3.182E+03	1.274E+25	1.000E+40	6.692E+03	9.386E+04	4.530E+03
7000	3.422E+03	8.057E+26	1.000E+40	8.998E+03	6.568E+04	4.438E+03
7500	3.663E+03	5.060E+28	1.000E+40	1.218E+04	6.004E+04	4.451E+03
8000	3.899E+03	3.159E+30	1.000E+40	1.658E+04	8.834E+04	4.621E+03
8500	4.150E+03	1.962E+32	1.000E+40	2.265E+04	8.353E+04	4.869E+03
9000	4.395E+03	1.213E+34	1.000E+40	3.103E+04	7.097E+04	5.111E+03
9500	4.629E+03	7.466E+35	1.000E+40	4.261E+04	5.918E+04	5.384E+03
10000	4.872E+03	4.578E+37	1.000E+40	5.860E+04	5.611E+04	5.628E+03
11000	5.375E+03	1.000E+40	1.000E+40	1.112E+05	3.971E+04	6.137E+03
12000	5.900E+03	1.000E+40	1.000E+40	2.117E+05	3.312E+04	6.668E+03
13000	6.554E+03	1.000E+40	1.000E+40	4.033E+05	2.739E+04	7.239E+03
14000	7.495E+03	1.000E+40	1.000E+40	7.685E+05	2.340E+04	7.767E+03
15000	8.658E+03	1.000E+40	1.000E+40	1.464E+06	1.982E+04	8.297E+03
16000	1.014E+04	1.000E+40	1.000E+40	2.786E+06	1.859E+04	8.814E+03
17000	1.198E+04	1.000E+40	1.000E+40	5.297E+06	1.824E+04	9.342E+03
18000	1.425E+04	1.000E+40	1.000E+40	1.006E+07	1.803E+04	9.871E+03
19000	1.705E+04	1.000E+40	1.000E+40	1.908E+07	1.799E+04	1.040E+04
20000	2.049E+04	1.000E+40	1.000E+40	3.615E+07	1.907E+04	1.094E+04

BREAKTHROUGH Probabilistic Results **1000**

Site Name: "Medina Farm 2022 HRA" **Monte Carlo iterations**

Level3

Pollutant Linkage: Inert Waste, Clay barrier, Lynch Hill Gravels, Down-gradient BH

95 th Percentile Concentrations in mg/L in Down-gradient BH

Compared with EAL target concentration in mg/L

EALs	0.00001	0.001	0.009
	Species1	Species2	Species3
Time(years)	**Anthracene**	**Benzene**	**Aromatic C10 - C12**
10	0.00E+00	0.00E+00	0.00E+00
20	0.00E+00	0.00E+00	0.00E+00
40	0.00E+00	0.00E+00	0.00E+00
60	0.00E+00	0.00E+00	0.00E+00
80	0.00E+00	0.00E+00	0.00E+00
100	0.00E+00	0.00E+00	0.00E+00
120	0.00E+00	0.00E+00	0.00E+00
140	0.00E+00	0.00E+00	0.00E+00
160	0.00E+00	0.00E+00	0.00E+00
180	0.00E+00	0.00E+00	0.00E+00
200	0.00E+00	0.00E+00	0.00E+00
250	0.00E+00	0.00E+00	0.00E+00
300	0.00E+00	0.00E+00	0.00E+00
350	0.00E+00	0.00E+00	0.00E+00
400	0.00E+00	0.00E+00	0.00E+00
450	0.00E+00	0.00E+00	0.00E+00
500	0.00E+00	0.00E+00	0.00E+00
600	0.00E+00	0.00E+00	0.00E+00
700	0.00E+00	0.00E+00	0.00E+00
800	0.00E+00	0.00E+00	0.00E+00
900	0.00E+00	0.00E+00	0.00E+00
1000	0.00E+00	0.00E+00	0.00E+00
1250	0.00E+00	0.00E+00	0.00E+00
1500	0.00E+00	0.00E+00	0.00E+00
1750	0.00E+00	0.00E+00	0.00E+00
2000	0.00E+00	0.00E+00	0.00E+00
2250	0.00E+00	0.00E+00	0.00E+00
2500	0.00E+00	0.00E+00	0.00E+00
2750	0.00E+00	0.00E+00	0.00E+00
3000	0.00E+00	0.00E+00	0.00E+00
3250	0.00E+00	0.00E+00	0.00E+00
3500	0.00E+00	0.00E+00	0.00E+00
3750	0.00E+00	0.00E+00	0.00E+00
4000	0.00E+00	0.00E+00	0.00E+00
4250	0.00E+00	0.00E+00	0.00E+00
4500	0.00E+00	0.00E+00	0.00E+00
5000	0.00E+00	0.00E+00	0.00E+00
5500	0.00E+00	0.00E+00	0.00E+00
6000	0.00E+00	0.00E+00	0.00E+00
6500	0.00E+00	0.00E+00	0.00E+00
7000	0.00E+00	0.00E+00	0.00E+00
7500	0.00E+00	0.00E+00	0.00E+00
8000	0.00E+00	0.00E+00	0.00E+00
8500	0.00E+00	0.00E+00	0.00E+00
9000	0.00E+00	0.00E+00	0.00E+00
9500	0.00E+00	0.00E+00	0.00E+00
10000	0.00E+00	0.00E+00	0.00E+00
11000	0.00E+00	0.00E+00	0.00E+00
12000	0.00E+00	0.00E+00	0.00E+00
13000	0.00E+00	0.00E+00	0.00E+00
14000	0.00E+00	0.00E+00	0.00E+00
15000	0.00E+00	0.00E+00	0.00E+00
16000	0.00E+00	0.00E+00	0.00E+00
17000	0.00E+00	0.00E+00	0.00E+00
18000	0.00E+00	0.00E+00	0.00E+00
19000	0.00E+00	0.00E+00	0.00E+00
20000	0.00E+00	0.00E+00	0.00E+00

Pollutant Linkage: Inert Waste, Clay barrier, Lynch Hill Gravels, Down-gradient BH

5 th Percentile Remedial Target Concentrations in mg/kg in Inert Waste

Time(years)	Species1	Species2	Species3
	Anthracene	**Benzene**	**Aromatic C10 - C12**
10	1.000E+40	1.000E+40	1.000E+40
20	1.000E+40	1.000E+40	1.000E+40
40	1.000E+40	1.000E+40	1.000E+40
60	1.000E+40	1.000E+40	1.000E+40
80	1.000E+40	1.000E+40	1.000E+40
100	1.000E+40	1.000E+40	1.000E+40
120	1.000E+40	1.000E+40	1.000E+40
140	1.000E+40	1.000E+40	1.000E+40
160	1.000E+40	1.000E+40	1.000E+40
180	1.000E+40	1.000E+40	1.000E+40
200	1.000E+40	1.000E+40	1.000E+40
250	1.000E+40	1.000E+40	1.000E+40
300	1.000E+40	1.000E+40	1.000E+40
350	1.000E+40	1.000E+40	1.000E+40
400	1.000E+40	1.000E+40	1.000E+40
450	1.000E+40	1.000E+40	1.000E+40
500	1.000E+40	1.000E+40	1.000E+40
600	1.000E+40	1.000E+40	1.000E+40
700	1.000E+40	1.000E+40	1.000E+40
800	1.000E+40	1.000E+40	1.000E+40
900	1.000E+40	1.000E+40	1.000E+40
1000	1.000E+40	1.000E+40	1.000E+40
1250	1.000E+40	1.000E+40	1.000E+40
1500	1.000E+40	1.000E+40	1.000E+40
1750	1.000E+40	1.000E+40	1.000E+40
2000	1.000E+40	1.000E+40	1.000E+40
2250	1.000E+40	1.000E+40	1.000E+40
2500	1.000E+40	1.000E+40	1.000E+40
2750	1.000E+40	1.000E+40	1.000E+40
3000	1.000E+40	1.000E+40	1.000E+40
3250	1.000E+40	1.000E+40	1.000E+40
3500	1.000E+40	1.000E+40	1.000E+40
3750	1.000E+40	1.000E+40	1.000E+40
4000	1.000E+40	1.000E+40	1.000E+40
4250	1.000E+40	1.000E+40	1.000E+40
4500	1.000E+40	1.000E+40	1.000E+40
5000	1.000E+40	1.000E+40	1.000E+40
5500	1.000E+40	1.000E+40	1.000E+40
6000	1.000E+40	1.000E+40	1.000E+40
6500	1.000E+40	1.000E+40	1.000E+40
7000	1.000E+40	1.000E+40	1.000E+40
7500	1.000E+40	1.000E+40	1.000E+40
8000	1.000E+40	1.000E+40	1.000E+40
8500	1.000E+40	1.000E+40	1.000E+40
9000	1.000E+40	1.000E+40	1.000E+40
9500	1.000E+40	1.000E+40	1.000E+40
10000	1.000E+40	1.000E+40	1.000E+40
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13000	1.000E+40	1.000E+40	1.000E+40
14000	1.000E+40	1.000E+40	1.000E+40
15000	1.000E+40	1.000E+40	1.000E+40
16000	1.000E+40	1.000E+40	1.000E+40
17000	1.000E+40	1.000E+40	1.000E+40
18000	1.000E+40	1.000E+40	1.000E+40
19000	1.000E+40	1.000E+40	1.000E+40
20000	1.000E+40	1.000E+40	1.000E+40

Compared with source concentrations in mg/kg

2.000E+01	2.000E+00	1.000E+02

Pollutant Linkage: Inert Waste, Clay barrier, Lynch Hill Gravels, Down-gradient BH

5 th Percentile Dilution Factor

1.247E+00

Pollutant Linkage: Inert Waste, Clay barrier, Lynch Hill Gravels, Down-gradient BH

5 th Percentile Attenuation Factor

Time(years)	Species1	Species2	Species3
	Anthracene	**Benzene**	**Aromatic C10 - C12**
10	1.000E+40	1.000E+40	1.000E+40
20	1.000E+40	1.000E+40	1.000E+40
40	1.000E+40	1.000E+40	1.000E+40
60	1.000E+40	1.000E+40	1.000E+40
80	1.000E+40	1.000E+40	1.000E+40
100	1.000E+40	1.000E+40	1.000E+40
120	1.000E+40	1.000E+40	1.000E+40
140	1.000E+40	1.000E+40	1.000E+40
160	1.000E+40	1.000E+40	1.000E+40
180	1.000E+40	1.000E+40	1.000E+40
200	1.000E+40	1.000E+40	1.000E+40
250	1.000E+40	1.000E+40	1.000E+40
300	1.000E+40	1.000E+40	1.000E+40
350	1.000E+40	1.000E+40	1.000E+40
400	1.000E+40	1.000E+40	1.000E+40
450	1.000E+40	1.000E+40	1.000E+40
500	1.000E+40	1.000E+40	1.000E+40
600	1.000E+40	1.000E+40	1.000E+40
700	1.000E+40	1.000E+40	1.000E+40
800	1.000E+40	1.000E+40	1.000E+40
900	1.000E+40	1.000E+40	1.000E+40
1000	1.000E+40	1.000E+40	1.000E+40
1250	1.000E+40	1.000E+40	1.000E+40
1500	1.000E+40	1.000E+40	1.000E+40
1750	1.000E+40	1.000E+40	1.000E+40
2000	1.000E+40	1.000E+40	1.000E+40
2250	1.000E+40	1.000E+40	1.000E+40
2500	1.000E+40	1.000E+40	1.000E+40
2750	1.000E+40	1.000E+40	1.000E+40
3000	1.000E+40	1.000E+40	1.000E+40
3250	1.000E+40	1.000E+40	1.000E+40
3500	1.000E+40	1.000E+40	1.000E+40
3750	1.000E+40	1.000E+40	1.000E+40
4000	1.000E+40	1.000E+40	1.000E+40
4250	1.000E+40	1.000E+40	1.000E+40
4500	1.000E+40	1.000E+40	1.000E+40
5000	1.000E+40	1.000E+40	1.000E+40
5500	1.000E+40	1.000E+40	1.000E+40
6000	1.000E+40	1.000E+40	1.000E+40
6500	1.000E+40	1.000E+40	1.000E+40
7000	1.000E+40	1.000E+40	1.000E+40
7500	1.000E+40	1.000E+40	1.000E+40
8000	1.000E+40	1.000E+40	1.000E+40
8500	1.000E+40	1.000E+40	1.000E+40
9000	1.000E+40	1.000E+40	1.000E+40
9500	1.000E+40	1.000E+40	1.000E+40
10000	1.000E+40	1.000E+40	1.000E+40
11000	1.000E+40	1.000E+40	1.000E+40
12000	1.000E+40	1.000E+40	1.000E+40
13000	1.000E+40	1.000E+40	1.000E+40
14000	1.000E+40	1.000E+40	1.000E+40
15000	1.000E+40	1.000E+40	1.000E+40
16000	1.000E+40	1.000E+40	1.000E+40
17000	1.000E+40	1.000E+40	1.000E+40
18000	1.000E+40	1.000E+40	1.000E+40
19000	1.000E+40	1.000E+40	1.000E+40
20000	1.000E+40	1.000E+40	1.000E+40

APPENDIX 08

Electronic Copies of Models

DRAWINGS

DRAWING HRA-1

Groundwater Monitoring Plan

556800 557000 557200 557400 557600 557800 558000

184000 183800 183600

Cottages

DENNISES LANE

Medina

N

BF01

BF05

DENNISES LANE

SUNNINGS LANE

Field B (Mineral Extraction and Restoration)

Field A (Reclamation Works and Restoration)

MF19-01

MF19-03

BF06

POND3

MF19-02

BF02

POND1

Baldwins Farm or 2nd Bungalow

BF04

BF07

POND2

0 200 400

Metres

NOTES

1. Superficial & Artificial Geology data obtained via BGS WMS. British Geological Survey ©NERC. All Rights Reserved.

LEGEND

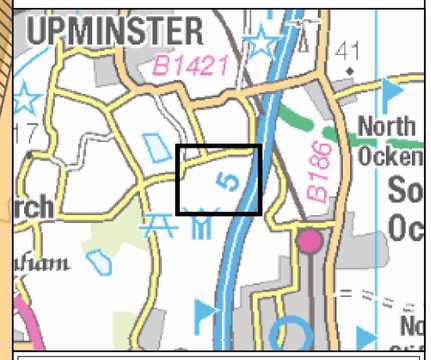
- Site Boundary
- Monitoring Locations (Boreholes and Ponds)
- Discharge Route
- Swale
- Field
- Pond
- Infiltration Pond

Superficial Geology

- Lynch Hill Gravel Member - Sand and Gravel

Artificial Geology

- Infilled Ground - Artificial Deposit
- Made Ground (Undivided) - Artificial Deposit
- Worked Ground (Undivided) - Void



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MEDINA FARM

HYDROLOGY & HYDROGEOLOGY

GROUNDWATER & SURFACE WATER MONITORING AND DRAINAGE

FIGURE 1

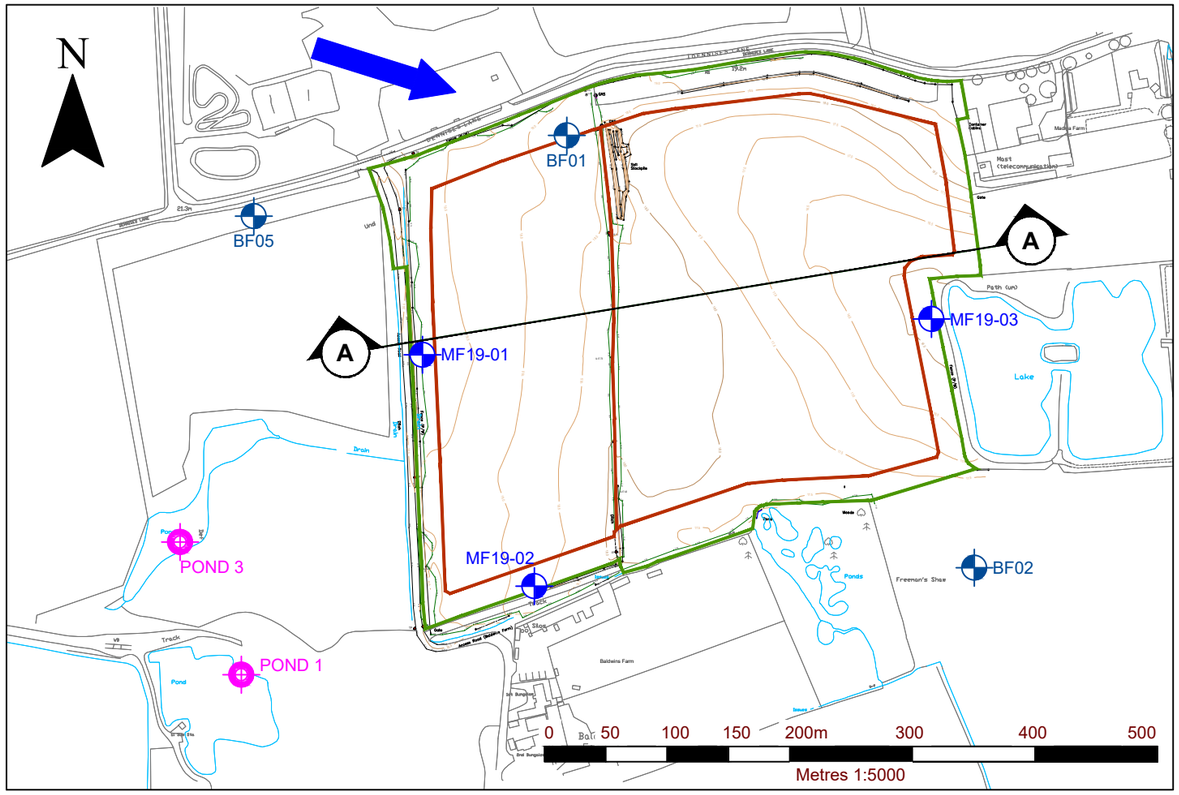
Scale 1:4,000 @ A3

Date JUNE 2022

01526.00087.0001.0 Groundwater & Surface Water Monitoring and Drainage

DRAWING HRA-2

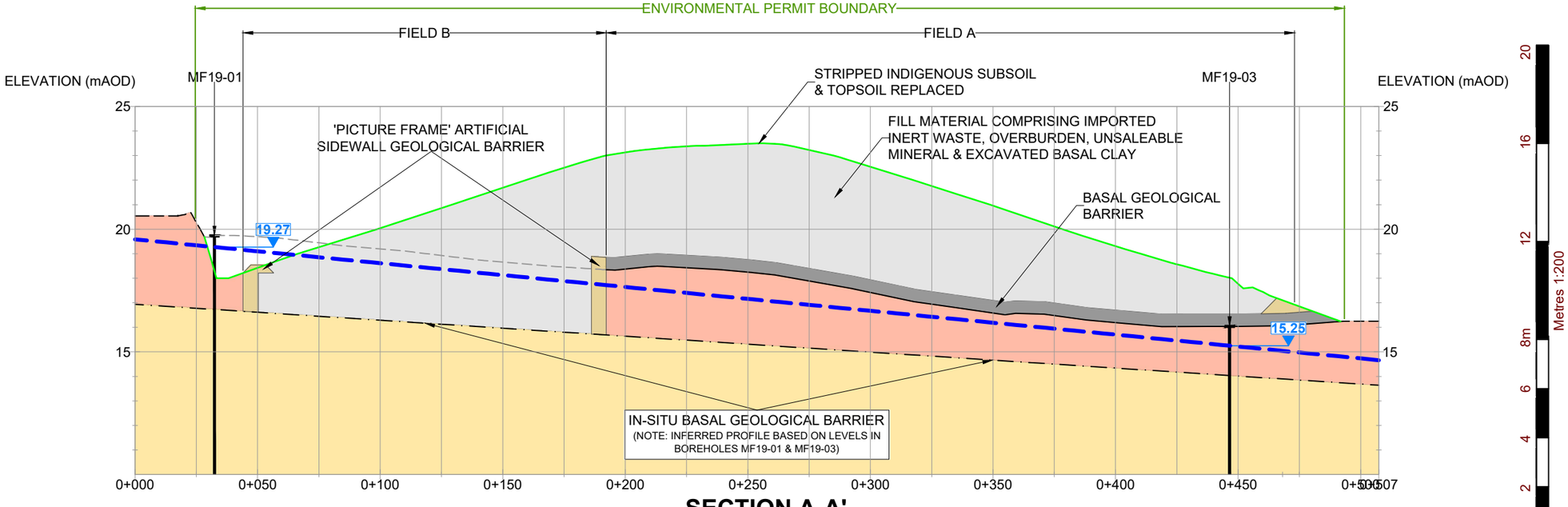
Hydrogeological Cross Section



PLAN

SCALE 1:5000

BOREHOLE REF:	HYDRAULIC LOCATION	GROUNDWATER ELEVATION (mAOD) 29/04/20	25/08/20	15/04/21	01/07/21	17/11/21
MF19_01	Up-gradient	19.27	18.36	19.34	19.25	18.72
BF01	Up-gradient	18.54	17.48	18.66	18.63	17.77
MF19_02	Up-gradient	18.30	17.88	18.33	18.31	17.90
MF19_03	Down-gradient	15.25	14.07	15.18	14.76	14.34
BF02	Down-gradient	15.19	14.66	15.51	15.41	14.84



SECTION A-A'

HORIZONTAL SCALE 1:2000
VERTICAL SCALE 1:200

0 20 40 60 80m 120 160 200
Metres 1:2000

LEGEND - PLAN

- ENVIRONMENTAL PERMIT BOUNDARY
- HISTORIC GROUNDWATER MONITORING BOREHOLE
- NEW GROUNDWATER MONITORING BOREHOLE
- SURFACE WATER MONITORING POINT
- INFERRED GROUNDWATER FLOW DIRECTION

LEGEND - PLAN

- TOPOGRAPHIC SURVEY LEVEL PROFILE
- PROPOSED RESTORATION LEVEL PROFILE
- GROUNDWATER LEVEL PROFILE - mAOD (29.04.2020)
- 83.71 WATER LEVEL - mAOD (28.10.2021)
- FILL MATERIAL COMPRISING IMPORTED INERT WASTE, OVERBURDEN, UNSALEABLE MINERAL & EXCAVATED BASAL CLAY
- BASAL GEOLOGICAL BARRIER
- SIDEWALL ARTIFICAL GEOLOGICAL BARRIER
- IN-SITU BASAL GEOLOGICAL BARRIER
- EXISTING GROUND / MADE GROUND

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MEDINA FARM

ENVIRONMENTAL PERMIT APPLICATION

2022 HYDROGEOLOGICAL RISK ASSESSMENT

HRA2

Scale: AS SHOWN @ A3
Date: JUNE 2022

01526.00087.13.HRA2.0_2022_HRA.dwg

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MEDINA FARM RESTORATION

Environmental Permit Application

Non-Technical Summary

Prepared for: Ingrebourne Valley Limited
Client Ref: 416.01526.00087

SLR Ref: 416.01526.00087/NTS
Version No: 1
January 2023

BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Ingrebourne Valley Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment

CONTENTS

DOCUMENT REFERENCES

APPENDICES

Appendix A: Copy of Planning Consents
Appendix B: Pre-Application Response
Appendix C: Waste Lists

DRAWINGS

EP1 Site Location Plan

EP2 Environmental Permit Boundary

EP3 Engineering Schematic

EP4 Environmental Site Setting

EP5 Monitoring Point Plan

Composite Operations Plan

Plan No. 1616/R/1 v3 Proposed Restoration

DOCUMENT VERSION

Table 1 Version Control

Issue	Date	Description of Changes
1.0	January 2023	Original

1.0 INTRODUCTION

Ingrebourne Valley Limited (IV) has instructed SLR Consulting Limited (SLR) to prepare a bespoke Environmental Permit (EP) application to authorise an inert waste landfill for the restoration of Medina Farm, Dennises Lane, South Ockendon, Essex RM14 2XB, hereafter referred to as 'the Site'.

Environment Agency (EA) application forms require the submission of a Non-Technical Summary (NTS) which includes an explanation of what is being applied for, a summary of the regulated facility and a summary of the key technical standards and control measures.

This report comprises the NTS for the application.

In addition to this NTS, this environmental permit application comprises the following documents:

- Application Forms (A, B2, B4 and F1);
- Drawings;
- Amenity and Accidents Environmental Risk Assessment;
- Hydrogeological Risk Assessment;
- Environmental Site Setting and Design;
- Dust Management Plan;
- Stability Risk Assessment;
- Operating Techniques & Waste Acceptance Procedures.

1.1 Site Location and Setting

Medina Farm is located 2.7km to the north north-east of South Ockendon in Essex at grid reference TQ 57636 83872. It is approximately 17ha in size.

The site consists of two agricultural fields; Field A, a former gravel pit which has been poorly restored, and Field B, a target area for gravel extraction. The site is bounded to the north by Dennises Lane, beyond which is Stubber's Outdoor Pursuits Centre, a designated Local Wildlife Site, which includes three lakes. To the west, the site is bounded by an unnamed road and woodland/ scrub. To the south, the site is bounded by small industrial units, a copse and farmland associated with Baldwins Farm. To the east, the site is bounded by a lake, used as a fishery, a residential property and car breakers yard.

The topography of the site is generally flat, falling gently from a maximum of approximately 20m above ordnance datum (AOD) in the north-western corner to a minimum of 15mAOD on the eastern boundary.

The location of Medina Farm is illustrated on Drawing EP1. The Site Layout is illustrated in Drawing EP2 whilst the working scheme is illustrated in the Composite Operations Plan.

1.2 Planning Status

The site lies across two local authority boundaries; Thurrock Council to the south and Havering Council to the north. Two relevant planning permissions have been granted from each Thurrock and Havering Council as summarised in Table 2.

Table 2 – Planning Permissions

Planning permission ref.	Authority	Description	Date
19/01800/FUL	Thurrock	Engineering works to improve drainage and re-restore previously worked land	30th November 2020
19/01799/FUL	Thurrock	Extraction of minerals and reclamation material and importation of inert materials, ancillary plant and buildings with restoration back to agriculture.	30th November 2020
P1866.19	Havering	Engineering works to improve drainage and re-restore previously worked land	10th January 2023
P1865.19	Havering	Extraction of minerals and reclamation material and importation of inert materials, ancillary plant and buildings with restoration back to agriculture.	10th January 2023

A copy of the planning consents are included in Appendix A.

1.3 Pre-Application Discussions with the Environment Agency

Basic pre-application advice was obtained from the Environment Agency (EA) on the 20th of May 2022. A copy of the EA's advice is enclosed as Appendix B.

2.0 PROPOSED DEVELOPMENT

The proposed development can be summarised as the importation of inert waste materials for the restoration of the Site by landfill.

Field A has been previously worked for mineral, was restored but now suffers poor drainage due to differential settlement while Field B contains approximately 200,000 tonnes of sand and gravel.

Field B will have the sand and gravel extracted and then be wholly restored using inert waste material imported to the Site. Restoration of Field A will primarily involve using material excavated from Field B (such as overburden, unsaleable mineral or basal clay) to regrade and address the differential levels across it. This will be supplemented with imported inert waste materials where required to achieve Field A's restoration levels.

In total approximately 420,000 tonnes of inert waste will be required to achieve the proposed restoration landform and return the fields to agricultural use. The proposed restoration landform seeks to achieve a shallow dome shape to ensure efficient drainage while maintaining ease of access for agricultural vehicles. Around the perimeter of the fields, drainage ditches will collect surface water runoff and lead to two attenuation ponds. One attenuation pond will be located in the south-eastern corner of the Site and the other in the south-western corner.

The proposed restoration is illustrated in the following drawings:

- Plan No. 1616/R/1 v3 Proposed Restoration

Prior to mineral extraction in Field B and supplementary deposits to Field A, the fields will be stripped of topsoil and subsoils separately. The topsoil and subsoil will be separately stored in bunds around the perimeter of the

Site for replacement later in the final restoration of the Site. Following placement of inert waste materials, the Site will be restored using a minimum of 0.8m of site-derived subsoil and 0.4m of site-derived topsoil.

The working of the Site during the operational phase is illustrated in Plan No. 1616/CO/1 Composite Operations Plan.

Up to 220,000 tonnes per annum (tpa) of waste will be accepted at the Site. It is anticipated that restoration of the Site will take 2 years.

2.1 Specified Waste Management Activities

The waste management activities that will be carried out at the site, under the conditions of the permit, as specified in Annex I of the Waste Framework Directive are detailed below:

2.1.1 Landfill

D1: Deposit into or onto land

3.0 KEY TECHNICAL STANDARDS AND CONTROL MEASURES

3.1 Site Engineering & Groundwater Management

3.1.1 Field B

Due to a high groundwater level observed across the site, it is proposed that Field B is restored using a 'picture framing' approach to enable dewatering and landfilling of the area in dry conditions. During the mineral extraction phase, a perimeter trench will be dug and filled with low permeability clay. This combined with the low permeability London Clay underlying the base of the Site will form a geological barrier around the base and sidewalls of the excavation area to enable dewatering and contain inert waste to be deposited to restore the void.

The sidewall geological barrier will be constructed using low permeability indigenous overburden or imported waste materials from excavations where there is no suspicion of contamination. The basal geological barrier will comprise in-situ London Clay.

The geological barrier will be a minimum thickness of 1m at a permeability no greater than 1×10^{-7} m/s.

The Field will be dewatered via a sump in the base of the excavation and the water discharged to Pond 1 to the southwest of the Site. Applications for the necessary water abstraction (transfer) licence and surface water discharge environmental permit will be made separately. In the event that water within the void of the Site is unsuitable for abstraction and discharge, for example due to poor water quality, cells will be formed within the Site so that water can be managed internally to the Site via pumping between cells so that mineral extraction and restoration can be undertaken in dry conditions.

3.1.2 Field A

There will be no excavation of Field A. Following stripping of topsoil and subsoil, a basal and sidewall geological barrier will be confirmed or installed. Assuming an in-situ barrier cannot be confirmed, a basal and sidewall geological barrier will be constructed using suitable low permeability indigenous overburden or imported waste materials from excavations where there is no suspicion of contamination.

The geological barrier will be a minimum thickness of 1m at a permeability no greater than 1×10^{-7} m/s.

3.1.3 Environmental Monitoring

A comprehensive programme of environmental monitoring will be undertaken at Medina Farm prior to, during and following completion of the restoration.

The environmental monitoring can be summarised as follows:

- Groundwater level and quality (from a number of monitoring boreholes that have been installed);
- Gas from perimeter and in-waste boreholes.

Compliance limits have been identified for key parameters based on historic data. In the event that a compliance limit is exceeded, notification, investigation and action will be undertaken in liaison with the EA.

The proposed monitoring schedule is detailed within the Environmental Site Setting and Design document.

Daily monitoring will also be undertaken in accordance with IV's Environmental Management System for amenity issues such as noise and dust.

3.1.4 Waste Acceptance

Strict waste acceptance procedures will be implemented to ensure that only suitable inert wastes are accepted at the Site. These procedures identify actions and procedures to be taken:

- prior to accepting waste at the Site, including source checking of the waste characterisation data provided by the waste producer;
- during waste delivery to ensure that the wastes are as described, and as permitted within the Environmental Permit;
- if waste not permitted by the Environmental Permit is delivered to Site.

The waste acceptance procedures to be employed at the Site are detailed further within the Operating Techniques and Waste Acceptance Procedure document.

3.1.5 Waste Types

The types of waste that will be accepted at the Site for recovery comprise construction, demolition and excavation wastes.

A full list of wastes proposed for acceptance classified in accordance with the European Waste Catalogue is included as Appendix C.

4.0 CONCLUSION

The overall conclusion from the studies undertaken as part of this application is that there will not be a significant environmental impact as a result of the inert landfill operations proposed at Medina Farm.

Ingrebourne Valley is fully committed to ensuring the highest standards are met and will undertake its activities in a manner consistent with best practices and the company environmental policies.

APPENDIX A

Copy of Planning Consents

thurrock.gov.uk

Development Management, Civic Offices, New Road,
Grays, Essex, RM17 6SL

TOWN AND COUNTRY PLANNING ACT 1990
(as amended) Town and Country Planning
(Development Management Procedure) (England) Order 2010

Applicant:	Ingrebourne Valley Ltd	Application Ref:	19/01800/FUL
Agent:	Mr Douglas Symes D.K. Symes Associates 39 Main Road Middleton Cheney Banbury, Oxon OX17 2ND United Kingdom	Date Accepted:	20th January 2020
		Date of Decision:	30th November 2020

Grant of Full Planning Permission

Development at: Medina Farm Dennises Lane Upminster Essex RM14 2XB

Proposal: Engineering works to improve drainage and re-restore previously worked land.

Planning permission is granted in accordance with the approved plans and specifications and subject to the condition(s) set out below:

TIME LIMIT - COMMENCEMENT

1. The development to which this permission relates must be commenced no later than five years from the date of this permission. Written notification of the date of commencement shall be sent to the local planning authority within seven days of such commencement.

   Reason: To comply with Section 91(1) of The Town & Country Planning Act 1990 as amended by Section 51 of the Planning and Compulsory Purchase Act 2004.

   ACCORDANCE WITH PLANS

2. The development hereby permitted shall be carried out in accordance with the plans, particulars and specifications submitted and hereby approved:

   - Location Plan- Drawing No. 1616/L v2, dated 28/11/2019;
   - Application Plan (2)- Thurrock Engineering Works- Drawing No. 1616/A/2 v2, dated 28/11/2019;
   - Application Plan (4)- Havering Engineering Works- Drawing No. 1616/A/4 v1, dated 28/11/2019;
   - Composite Operations Plan – Drawing No. 1616/CO/1 v5, dated 28/11/2019;
   - Illustrative Cross Section - Drainage Scheme- Drawing No. 1616/CS/1 v1, dated 28/06/2018;
   - Proposed Fencing Details- Drawing No. 1616/FD/1 v2, dated 28/11/2019;

- Proposed Restoration- Drawing No. 1616/R1 v4, dated 28/11/2019.

Reason: For the avoidance of doubt and to ensure that the development is carried out in accordance with the details as approved with regard to policies PMD1 and PMD2 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

TIME LIMIT - OPERATIONS

3. The development hereby permitted shall be limited to a period of 4 years, from the notified date of commencement, by which time all operations shall have ceased and the site restored in accordance with Drawing No. 1616/R1 v4 and Drawing No. 1616/FD/1 v5.

Reason: In order to comply with the terms of the submitted application and to ensure the reclamation and restoration of the site at the earliest opportunity in compliance with local and national planning policies for minerals.

TEMPORARY PLANT ETC.

4. Any buildings, plant or machinery used in connection with the development hereby permitted shall be removed from the site when no longer required for the purpose for which built, erected or installed and in any case not later than 4 years from the date of notified commencement.

Reason: In order to comply with the terms of the submitted application and to ensure the reclamation and restoration of the site at the earliest opportunity in compliance with local and national planning policies for minerals.

TEMPORARY CESSATION OF WORKS

5. In the event that operations are terminated or suspended for a period in excess of 12 months, the excavated area and all other disturbed land shall be restored in accordance with a restoration scheme that has been submitted to and approved in writing by the local planning authority. The approved restoration scheme shall be completed within 12 months of the date on which the local planning authority notified the operator in writing that operations had been terminated or suspended for 12 months.

Reason: To ensure the satisfactory restoration of this Green Belt site in the event that operations are suspended in accordance with policies PMD1 and PMD2 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

INERT MATERIAL

6. Only inert material shall be used on the eastern field for the purposes of infilling and restoration.

Reason: To prevent the possible contamination of the groundwater and to protect the amenities of neighbouring properties in accordance with Policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

NO STORAGE OR STOCKPILING

7. With the exception of environmental bunds specifically identified on the approved

plans, no storage of materials or stockpiling shall take place on any part of the site.

Reason: In order to protect the visual amenities of the surrounding area in accordance with policies PMD1 and PMD2 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

OPERATING HOURS

8. Except in emergencies, when the local planning authority shall be notified as soon as possible, operations authorised by this permission shall only be undertaken during the following times:
   a) 07:00 hours to 18:00 hours Monday to Friday; and
   b) no other times including Saturdays, Sundays, Bank or Public Holidays.

   Reason: In the interests of protecting local amenity in accordance with policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

HYDROLOGICAL MONITORING

9. No development shall take place until an updated hydrological monitoring and mitigation plan has been submitted to and approved in writing by the local planning authority. This plan shall seek to mitigate for any adverse hydrological and water quality impacts, if they arise, during the development, and mitigation shall include measures to suspend operations authorised by this permission, until such impacts are resolved.

   Reason: To avoid pollution of the water environment and to minimise flood risk in accordance with policies PMD1 and PMD15 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

ACCORDANCE WITH SURFACE WATER DRAINAGE STRATEGY

10. The development hereby permitted shall be undertaken in accordance with the submitted Surface Water Drainage Strategy dated April 2020.

    Reason: To avoid pollution of the water environment and to minimise flood risk in accordance with policies PMD1 and PMD15 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

RETENTION OF TOPSOIL

11. All topsoil, subsoil indigenous to the site and soil making material imported shall be retained on the site and used in the restoration herby permitted.

    Reason: To ensure the retention of material on site to achieve satisfactory restoration.

TOPSOIL HANDLING

12. No topsoil or subsoil shall be stripped or handled unless it is in a dry and friable condition and no movement of soils shall take place when the moisture content of the upper level of the soil is equal to, or greater than, that at which the soil becomes plastic; or when there are pools of water on the soil surface.

    Reason: To ensure the retention of material on site to achieve satisfactory

restoration.

BUNDS

13. No development shall take place until details and a programme for the forming, planting and maintenance of soil storage bunds around the site has been submitted to and approved in writing by the local planning authority. The development shall be implemented in accordance with the approved details.

Reason: To ensure the retention of material on site to achieve satisfactory restoration and in the interests of visual amenity in accordance with policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

TOPSOIL STRIPPING

14. No stripping or handling of topsoil or subsoil shall take place until a scheme of soil movement and scheme of machine movements for the stripping and replacement of soils has been submitted to and approved in writing by the local planning authority. The scheme shall be submitted at least three months prior to the commencement of soil stripping and shall clearly identify the origin, intermediate and final location of soils for use in agricultural restoration together with details of quantities, depths and areas involved. The development shall be implemented in accordance with the approved scheme.

Reason: To ensure the retention of material on site to achieve satisfactory restoration

NOTICE OF SOIL STRIPPING

15. The operator shall notify the local planning authority for minerals and waste at least five working days in advance of the intention to start stripping soils from any part of the site.

Reason: To enable the local planning authority to monitor activity at the site and to ensure compliance with this planning permission.

NOTICE OF FINAL TOPSOIL PLACEMENT

16. The operator shall notify the local planning authority at least five working days in advance of the commencement of the final subsoil and topsoil placement to allow a site inspection to take place.

Reason: To enable the local planning authority to monitor activity at the site and to ensure compliance with this planning permission.

RESTORATION MATERIAL

17. The uppermost 0.5m of the infill material shall be free from rubble and stones greater than 150mm in diameter and shall be both graded with the final tipping levels hereby approved and ripped using appropriate machinery. The infill material shall be covered with a minimum of 0.8m of even depth subsoil and 0.4m of topsoil in the correct sequence. The finished surface shall be left free from rubble and stones greater than 100mm in diameter which would otherwise hinder cultivation.

Reason: To assist in the restoration of the site to a beneficial after use

FINAL LANDFORM

18. Final landform and surface restoration levels shall accord with the landform, and contours shown on Drawing No. 1616/R1 v4. The restored site shall also include components as depicted on Drawing No. 1616/FD/1 v2.

Reason: To minimise the impact upon the landscape and ensure proper restoration of the site in accordance with the approved plans and in accordance with policies PMD1, CSTP29, CSTP23 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

AFTERCARE SCHEME

19. No infilling shall take place until an aftercare scheme detailing the steps that are necessary to bring the land to the required standard for agricultural use has been submitted to, and approved in writing by, the local planning authority prior to commencement of infilling.

Reason: To ensure proper restoration of the site in accordance with the approved plans and in accordance with policies PMD1, CSTP29, CSTP23 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

NOISE LEVELS

20. Noise levels from operations undertaken in association with the development hereby permitted shall not exceed 55dB(A)LAeq, 1h (free field) when measured at the noise sensitive properties defined in the submitted Noise Assessment. Noise levels shall be monitored at three monthly intervals from the date of the commencement of development at the aforementioned noise sensitive properties to demonstrate compliance with the above acceptable level.

Reason: In the interests of amenity and to accord with policy PMD1, of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

NOISE MITIGATION

21. The development hereby permitted shall be undertaken in accordance with the noise monitoring and control measures outlined within the submitted Noise Assessment, dated December 2019.

Reason: In the interests of amenity and to accord with policy PMD1, of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

AIR QUALITY

22. The development hereby permitted shall be undertaken in accordance with the control measures outlined within the submitted Air Quality Assessment, dated 28th March 2019.

Reason: In the interests of amenity and to accord with policy PMD1, of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

EXTERNAL LIGHTING

23. No development shall take place until a scheme for the lighting of external areas of the development, including the access roads and working areas but excluding vehicle lights, has been submitted to and approved in writing by the local planning authority for minerals and waste. The scheme of lighting shall include details of the extent of illumination together with precise details of the height, location and design of the lights together with proposed hours.

Reason: In the interests of amenity and to accord with policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

PD ALLOWANCES

24. Notwithstanding the provisions of the Town and Country Planning (General Permitted Development) (England) Order 2015 (or any order revoking and re-enacting that Order with or without modification) no building, structure, fixed plant or machinery, except as detailed in the development details hereby approved or otherwise approved pursuant to conditions, shall be erected, extended, installed or replaced on the site without the prior approval or express planning permission of the local planning authority

Reason: In the interests of visual amenity and to accord with policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

LANDSCAPING SCHEME

25. A landscape scheme containing details of the replacement hedge, enhancements to the existing hedges and ecological enhancement measures, including a timetable for implementation shall be submitted and approved by the local planning authority prior to the cessation of works. The landscaping scheme shall be implemented in accordance with the approved details.

Reason: To ensure that the proposed development is satisfactorily integrated with its surroundings and provides opportunities for new landscaping and habitat creation in accordance with policies PMD1, PMD2 and PMD7 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

ATTENUATION PONDS

26. Details of the design of the attenuation ponds including habitat enhancement measures and a timetable for implementation shall be submitted to and approved by the local planning authority prior to the cessation of works. The attenuation ponds shall be formed in accordance with the approved details.

Reason: To ensure that the proposed development is satisfactorily integrated with its surroundings and provides opportunities for new landscaping and habitat creation in accordance with policies PMD1, PMD2 and PMD7 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

ECOLOGICAL CLERK OF WORKS

27. A suitably qualified ecological clerk of works will supervise key stages of the works including initial site clearance.

Reason: In order to protect the ecological interests on the site in accordance with policy PMD7 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

Reasons for Granting Consent:

In granting consent the Council has taken into account all relevant planning considerations and matters arising from comments from statutory consultees and public representations.

Policies that were taken into consideration when determining this application:

CSSP4 - Sustainable Green Belt
CSSP5 - Sustainable Greengrid
CSTP14 - Transport in the Thurrock Urban Area: Purfleet to Tilbury
CSTP15 - Transport in Greater Thurrock
CSTP16 - National and Regional Transport Networks
CSTP18 - Green Infrastructure
CSTP19 - Biodiversity
CSTP21 - Productive Land
CSTP24 - Heritage Assets and the Historic Environment
CSTP25 - Addressing Climate Change
CSTP27 - Management and Reduction of Flood Risk
CSTP29 - Waste Storage
CSTP31 - Provision of Minerals
CSTP32 - Safeguarding Mineral Resources
PMD1 - Minimising Pollution and Impacts on Amenity
PMD2 - Design and Layout
PMD4 - Historic Environment
PMD6 - Development in the Green Belt
PMD7 - Biodiversity and Development
PMD8 - Parking Standards
PMD9 - Road Network Hierarchy
PMD10 - Transport Assessments and Travel Plans
PMD15 - Flood Risk Assessment

Assistant Director Planning, Transport And Public Protection Date: 30th November 2020

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BUILDING CONTROL

You have been granted Planning permission for your project, but what next?

You may need to complete your project in line with the Building Regulations. Building control is the process which checks that this is carried out and that your finished project is safe, sound and energy efficient.

Who needs building control and why?

We will work with you to ensure you meet regulations and on competition of works, we will issue a completion certificate which you will need when you come to sell your home. If you are not sure if you need Building Regulations approval then please contact us on the details below.

Website: https://www.thurrock.gov.uk/buildingcontrol
E-mail: Building.control@Thurrock.gov.uk
Phone: 01375 652655

LABC

thurrock.gov.uk

Development Management, Civic Offices, New Road,
Grays, Essex, RM17 6SL

TOWN AND COUNTRY PLANNING ACT 1990
(as amended) Town and Country Planning
(Development Management Procedure) (England) Order 2010

Applicant:	Ingrebourne Valley Ltd	Application Ref:	19/01799/FUL
Agent:	Mr Douglas Symes D.K. Symes Associates 39 Main Road Middleton Cheney Banbury, Oxon OX17 2ND United Kingdom	Date Accepted:	20th January 2020
		Date of Decision:	30th November 2020

Grant of Full Planning Permission

Development at: Medina Farm Dennises Lane Upminster Essex RM14 2XB

Proposal: Extraction of minerals and reclamation material and importation of inert materials, ancillary plant and buildings with restoration back to agriculture.

Planning permission is granted in accordance with the approved plans and specifications and subject to the condition(s) set out below:

TIME LIMIT - COMMENCEMENT

1. The development to which this permission relates must be commenced no later than five years from the date of this permission. Written notification of the date of commencement shall be sent to the Local Planning Authority for waste and minerals within seven days of such commencement

   Reason: To comply with Section 91(1) of The Town & Country Planning Act 1990 as amended by Section 51 of the Planning and Compulsory Purchase Act 2004.

   ACCORDANCE WITH PLANS

2. The development hereby permitted shall be carried out in accordance with the plans, particulars and specifications submitted and hereby approved:

   - Location Plan- Drawing No. 1616/L v2, dated 28/11/2019;
   - Application Plan (1) - Thurrock Mineral Extraction - Drawing No.1616/A/1 v5, dated 17/01/20;
   - Composite Operations Plan – Drawing No. 1616/CO/1 v5, dated 28/11/2019;
   - Illustrative Cross Section - Drainage Scheme- Drawing No. 1616/CS/1 v1, dated 28/06/2018;
   - Proposed Fencing Details- Drawing No. 1616/FD/1 v2, dated 28/11/2019;

- Proposed Restoration- Drawing No. 1616/R1 v4, dated 28/11/2019.

Reason: For the avoidance of doubt and to ensure that the development is carried out in accordance with the details as approved with regard to policies PMD1 and PMD2 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

TIME LIMIT - OPERATIONS

3. The development hereby permitted shall be limited to a period of 4 years, from the notified date of commencement, by which time all operations shall have ceased and the site restored in accordance with Drawing No. 1616/R1 v4 and Drawing No. 1616/FD/1 v5.

Reason: In order to comply with the terms of the submitted application and to ensure the reclamation and restoration of the site at the earliest opportunity in compliance with local and national planning policies for minerals.

TEMPORARY PLANT ETC.

4. Any buildings, plant or machinery used in connection with the development hereby permitted shall be removed from the site when no longer required for the purpose for which built, erected or installed and in any case not later than 4 years from the date of notified commencement.

Reason: In order to comply with the terms of the submitted application and to ensure the reclamation and restoration of the site at the earliest opportunity in compliance with local and national planning policies for minerals.

TEMPORARY CESSATION OF WORKS

5. In the event that operations are terminated or suspended for a period in excess of 12 months, the excavated area and all other disturbed land shall be restored in accordance with a restoration scheme that has been submitted to and approved in writing by the local planning authority. The approved restoration scheme shall be completed within 12 months of the date on which the local planning authority notified the operator in writing that operations had been terminated or suspended for 12 months.

Reason: To ensure the satisfactory restoration of this Green Belt site in the event that operations are suspended in accordance with policies PMD1 and PMD2 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

MAXIMUM EXPORT & IMPORT OF MATERIAL

6. The export of mineral from the site shall not exceed 200,000 tonnes during the life of the development hereby permitted. No more than 420,000 tonnes of infill material shall be imported into the site during the life of the development hereby permitted.

Reason: In order to comply with the terms of the submitted application and to ensure that the impacts of the development are within the assessed parameters.

IMPORTS OF INERT MATERIAL ONLY

7. Only inert waste material, as defined within the Landfill (England and Wales) Regulations 2002, shall be imported into the site for the purposes of infilling and restoration.

Reason: To prevent the possible contamination of the groundwater and to protect the amenities of neighbouring properties in accordance with Policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

RECORDS OF EXPORTS & IMPORTS

8. From the date of commencement, the operator shall maintain records of its monthly output of mineral from the site and imports of inert waste into the site. Such records shall be made available to the local planning authority upon request, within 14 days.

Reason: To enable the local planning authority to monitor activity at the site and to ensure compliance with this planning permission.

NO STORAGE OR STOCKPILING

9. With the exception of environmental bunds specifically identified on the approved plans, no storage of materials or stockpiling shall take place on any part of the site.

Reason: In order to protect the visual amenities of the surrounding area in accordance with policies PMD1 and PMD2 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

HGV MOVEMENTS

10. The total number of heavy goods vehicle (HGV) movements in and out of the site associated with the development shall not exceed 130 movements in and 130 movements out per day in conjunction with the Pinches and Aherns Compound Area. Cumulative HGV movements of these sites shall not exceed 230 movements through the Launders Lane junction.

Reason: In the interests of highway safety and protecting local amenity, in accordance with policies PMD1, PMD9 and PMD11 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

HGV ROUTING

11. HGVs travelling to and from the site shall abide by the following routing plan; A13/A1306/Launders Lane/Warwick Lane/Bramble Lane/Den nises Lane. HGVs associated with the development are not permitted to deviate from this approved route.

Reason: For the avoidance of doubt and in the interests of highway safety and protecting local amenity, in accordance with policies PMD1, PMD9 and PMD11 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

RECORDS OF HGV MOVEMENTS

12. A written record shall be maintained at the site office of all movements in and out of the site by HGVs. Such records shall contain the vehicle's weight, registration number and the time and date of the movement and shall be made available to the

local planning authority for minerals and waste, upon request, within 14 days.

Reason: To enable the local planning authority to monitor activity at the site and to ensure compliance with this planning permission.

OPERATING HOURS

13 Except in emergencies, when the local planning shall be notified as soon as possible, operations authorised by this permission shall only be undertaken during the following times:
a) 07:00 hours to 18:00 hours Monday to Friday; and
b) no other times including Saturdays, Sundays, Bank or Public Holidays.

Reason: In the interests of protecting local amenity in accordance with policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

ARCHAEOLOGY

14. No development or preliminary groundworks can commence until a programme of archaeological trial trenching has been secured and undertaken in accordance with a written scheme of investigation which has been submitted by the applicant and approved by the planning authority.

15 A mitigation strategy detailing the excavation / preservation strategy shall be submitted to the local planning authority following the completion of this work.

16 No development or preliminary groundworks can commence on those areas containing archaeological deposits until the satisfactory completion of fieldwork, as detailed in the mitigation strategy, and which has been signed off by the local planning authority through its historic environment advisors.

17 The applicant will submit to the local planning authority a post-excavation assessment (to be submitted within three months of the completion of fieldwork, unless otherwise agreed in advance with the local planning authority). This will result in the completion of post-excavation analysis, preparation of a full site archive and report ready for deposition at the local museum, and submission of a publication report.

Reason for condition nos 14-17: To ensure that investigation and recording of any remains takes place prior to commencement of development, to ensure that the archaeological history of the site is recorded and to ensure appropriate assessment of the archaeological implications of the development and the subsequent mitigation of adverse impacts in accordance with Policy PMD4 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

CONTAMINATION

18. The development hereby permitted may not commence until a monitoring and maintenance plan in respect of contamination, including a timetable of monitoring and submission of reports to the local planning authority, has been submitted to, and approved in writing by, the local planning authority. Reports as specified in the approved plan, including details of any necessary contingency action arising from the monitoring, shall be submitted to, and approved in writing by, the local planning authority.

Reason: To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other offsite receptors in accordance with policy PMD1 of the adopted Thurrock Core Strategy and Policies for the Management of Development (2015).

19 If, during development, contamination not previously identified is found to be present at site then no further development (unless otherwise agreed in writing with the local planning authority) shall be carried out until a remediation strategy detailing how this contamination will be dealt with has been submitted to and approved in writing by the local planning authority. The remediation strategy shall be implemented as approved.

Reason: To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other offsite receptors in accordance with policy PMD1 of the adopted Thurrock Core Strategy and Policies for the Management of Development (2015).

20 No infiltration of surface water drainage into the ground at this site is permitted other than with written consent of the local planning authority. The development shall be carried out in accordance with the approved details.

Reason: To protect the water environment in accordance with policy PMD1 of the adopted Thurrock Core Strategy and Policies for the Management of Development (2015).

21 A scheme for managing any borehole installed for the investigation of soils, groundwater or geotechnical purposes shall be submitted to and approved in writing by the local planning authority. The scheme shall provide details of how redundant boreholes are to be decommissioned and how any boreholes that need to be retained, post-development, for monitoring purposes will be secured, protected and inspected. The scheme as approved shall be implemented prior to the operation of any part of the permitted development.

Reason: To ensure that redundant boreholes are safe and secure, and do not cause groundwater pollution or loss of water supplies in accordance with policy PMD1 of the adopted Thurrock Core Strategy and Policies for the Management of Development (2015).

SURFACE WATER DRAINAGE

22. The development hereby permitted shall be undertaken in accordance with the water drainage strategy outlined in the Surface Water Drainage Strategy, dated April 2020. Prior to the development of the site:
a) details of the sufficient storage and half drain time on site shall be updated to reflect a 1 in 1 Greenfield runoff rate for storm events up to and including the 1 in 100 -year plus 40% allowance for climate change. Alternatively, if restricting to the 1 in 1-year greenfield rate approach is not possible discharge rates can be limited to a range of equivalent greenfield discharge rates (1 in1, 1 in 30 and 1 in 100 inclusive climate change allowance) with provision of long-term storage;

b) details of treatment to all surface water runoff in line with chapter 26 of CIRA SuDS manual C753 shall be submitted and approved in writing by the local planning authority; and

c) a surface routing plan detailing the surface water runoff route and treatment to prevent pollution shall be submitted to and approved by the local planning authority.

Reason: To ensure the incorporation of an appropriate drainage scheme and to avoid pollution of the water environment and to minimise flood risk in accordance with policies PMD1 and PMD15 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

HYDROLOGICAL MONITORING

23. No development shall take place until an updated hydrological monitoring and mitigation plan has been submitted to and approved in writing by the local planning authority for minerals and waste. This plan shall seek to mitigate for any adverse hydrological and water quality impacts, if they arise, during the development, and mitigation shall include measures to suspend operations authorised by this permission, until such impacts are resolved.

Reason: To avoid pollution of the water environment and to minimise flood risk in accordance with policies PMD1 and PMD15 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

ACCORDANCE WITH SURFACE WATER DRAINAGE STRATEGY

24. The development hereby permitted shall be undertaken in accordance with the submitted Surface Water Drainage Strategy dated April 2020.

Reason: To avoid pollution of the water environment and to minimise flood risk in accordance with policies PMD1 and PMD15 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

RETENTION OF TOPSOIL

25. All topsoil, subsoil indigenous to the site and soil making material imported shall be retained on the site and used in the restoration herby permitted

Reason: To ensure the retention of material on site to achieve satisfactory restoration.

TOPSOIL HANDLING

26 No topsoil or subsoil shall be stripped or handled unless it is in a dry and friable condition and no movement of soils shall take place when the moisture content of the upper level of the soil is equal to, or greater than, that at which the soil becomes plastic; or when there are pools of water on the soil surface.

Reason: To ensure the retention of material on site to achieve satisfactory restoration.

27 No excavation shall take place nor shall any of the site be traversed by heavy vehicles or machinery for any purpose or operation (except for the purpose of stripping that part or stacking of topsoil in that part) unless all available topsoil and subsoil has been stripped from that part of the site and stored in accordance with

the approved details.

Reason: To ensure the retention of material on site to achieve satisfactory restoration.

BUNDS

28. No development shall take place until details and a programme for the forming, planting and maintenance of soil storage bunds around the site has been submitted to and approved in writing by the local planning authority. The development shall be implemented in accordance with the approved details.

Reason: To ensure the retention of material on site to achieve satisfactory restoration and in the interests of visual amenity in accordance with policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

TOPSOIL STRIPPING

29. No stripping or handling of topsoil or subsoil shall take place until a scheme of soil movement and scheme of machine movements for the stripping and replacement of soils has been submitted to and approved in writing by the local planning authority. The scheme shall be submitted at least three months prior to the commencement of soil stripping and shall clearly identify the origin, intermediate and final location of soils for use in agricultural restoration together with details of quantities, depths and areas involved. The development shall be implemented in accordance with the approved scheme.

Reason: To ensure the retention of material on site to achieve satisfactory restoration.

NOTICE OF SOIL STRIPPING

30. The operator shall notify the local planning authority for minerals and waste at least five working days in advance of the intention to start stripping soils from any part of the site.

Reason: To enable the local planning authority to monitor activity at the site and to ensure compliance with this planning permission.

31 NOTICE OF FINAL TOPSOIL PLACEMENT

31. The operator shall notify the local planning authority at least five working days in advance of the commencement of the final subsoil and topsoil placement to allow a site inspection to take place.

Reason: To enable the local planning authority to monitor activity at the site and to ensure compliance with this planning permission.

RESTORATION MATERIAL

32. The uppermost 0.5m of the infill material shall be free from rubble and stones greater than 150mm in diameter and shall be both graded with the final tipping levels hereby approved and ripped using appropriate machinery. The infill material shall be covered with a minimum of 0.8m of even depth subsoil and 0.4m of topsoil in the correct sequence. The finished surface shall be left free from rubble and stones greater than 100mm in diameter which would otherwise hinder cultivation.

Reason: To assist in the restoration of the site to a beneficial after use.

FINAL LANDFORM

33. Final landform and surface restoration levels shall accord with the landform, and contours shown on Drawing No. 1616/R1 v4. The restored site shall also include components as depicted on Drawing No. 1616/FD/1 v2. Notwithstanding the detail shown on drawing no. 1616/FD/1 v2 the hardcore-surfaced compound area shall be removed from the site on cessation of all operations.

Reason: To minimise the impact upon the landscape and ensure proper restoration of the site in accordance with the approved plans and in accordance with policies PMD1, CSTP29, CSTP23 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

AFTERCARE SCHEME

34. No infilling shall take place until an aftercare scheme detailing the steps that are necessary to bring the land to the required standard for agricultural use has been submitted to, and approved in writing by, the local planning authority prior to commencement of infilling.

Reason: To ensure proper restoration of the site in accordance with the approved plans and in accordance with policies PMD1, CSTP29, CSTP23 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

WHEEL WASHING

35. No development shall take place until vehicle cleansing facilities to prevent mud being deposited onto the public highway during operations have been provided on site in accordance with details to be first submitted to and approved in writing by the local planning authority.

Reason: In the interests of highway safety and to accord with policy PMD1, of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

NEW ACCESS

36. No development shall take place until details of the construction of the new access (located on the western boundary of the site) have been submitted and approved by the local planning authority.

Reason: In the interests of highway safety and to accord with policy PMD1, of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

VISIBILITY SPLAYS

37. The proposals shall provide a 2.4m by 215m visibility splay to the left of the proposed access and a 2.4 by 94m visibility splay to the right of the proposed access (as shown on Drawing No. IT1682/TA/02 of the submitted Transport Assessment dated October 2019). No development shall take place until a scheme to achieve the aforementioned, outlining measures necessary to facilitate the

visibility splays, together with aids proposed to enhance safety has been submitted to and approved in writing by the local planning authority. The visibility splays shall be provided and maintained in accordance with the approved scheme for the duration of the development hereby permitted.

Reason: In the interests of highway safety and to accord with policy PMD1, of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

NOISE LEVELS

38. Noise levels from operations undertaken in association with the development hereby permitted shall not exceed 55dB(A)LAeq, 1h (free field) when measured at the noise sensitive properties defined in the submitted Noise Assessment. Noise levels shall be monitored at three monthly intervals from the date of the commencement of development at the aforementioned noise sensitive properties to demonstrate compliance with the above acceptable level.

Reason: In the interests of amenity and to accord with policy PMD1, of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

NOISE MITIGATION

39. The development hereby permitted shall be undertaken in accordance with the noise monitoring and control measures outlined within the submitted Noise Assessment, dated December 2019.

Reason: In the interests of amenity and to accord with policy PMD1, of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

AIR QUALITY

40. The development hereby permitted shall be undertaken in accordance with the control measures outlined within the submitted Air Quality Assessment, dated 28th March 2019.

Reason: In the interests of amenity and to accord with policy PMD1, of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

EXTERNAL LIGHTING

41. No development shall take place until a scheme for the lighting of external areas of the development, including the access roads and working areas but excluding vehicle lights, has been submitted to and approved in writing by the local planning authority for minerals and waste. The scheme of lighting shall include details of the extent of illumination together with precise details of the height, location and design of the lights together with proposed hours.

Reason: In the interests of amenity and to accord with policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

extent of illumination together with precise details of the height, location and design of the lights together with proposed hours.

PD ALLOWANCES

42. Notwithstanding the provisions of the Town and Country Planning (General Permitted Development) (England) Order 2015 (or any order revoking and re-enacting that Order with or without modification) no building, structure, fixed plant or machinery, except as detailed in the development details hereby approved or otherwise approved pursuant to conditions, shall be erected, extended, installed or replaced on the site without the prior approval or express planning permission of the local planning authority.

Reason: In the interests of visual amenity and to accord with policy PMD1 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

LANDSCAPING SCHEME

43. A landscape scheme containing details of the replacement hedge, enhancements to the existing hedges and ecological enhancement measures, including a timetable for implementation shall be submitted and approved by the local planning authority prior to the cessation of works. The landscaping scheme shall be implemented in accordance with the approved details.

Reason: To ensure that the proposed development is satisfactorily integrated with its surroundings and provides opportunities for new landscaping and habitat creation in accordance with policies PMD1, PMD2 and PMD7 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

ATTENUATION PONDS

44. Details of the design of the attenuation ponds including habitat enhancement measures and a timetable for implementation shall be submitted to and approved by the local planning authority prior to the cessation of works. The attenuation ponds shall be formed in accordance with the approved details.

Reason: To ensure that the proposed development is satisfactorily integrated with its surroundings and provides opportunities for new landscaping and habitat creation in accordance with policies PMD1, PMD2 and PMD7 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

ECOLOGICAL CLERK OF WORKS

45. A suitably qualified ecological clerk of works will supervise key stages of the works including initial site clearance.

Reason: In order to protect the ecological interests on the site in accordance with policy PMD7 of the adopted Thurrock LDF Core Strategy and Policies for the Management of Development (2015).

Reasons for Granting Consent:

In granting consent the Council has taken into account all relevant planning considerations and matters arising from comments from statutory consultees and public representations.

Policies that were taken into consideration when determining this application:

OSDP1 - Promoting Sustainable Growth and Regeneration in Thurrock
CSSP2 - Sustainable Employment Growth
CSSP3 - Sustainable Infrastructure
CSSP4 - Sustainable Green Belt
CSSP5 - Sustainable Greengrid
CSTP14 - Transport in the Thurrock Urban Area: Purfleet to Tilbury
CSTP15 - Transport in Greater Thurrock
CSTP16 - National and Regional Transport Networks
CSTP18 - Green Infrastructure
CSTP19 - Biodiversity
CSTP21 - Productive Land
CSTP24 - Heritage Assets and the Historic Environment
CSTP25 - Addressing Climate Change
CSTP27 - Management and Reduction of Flood Risk
CSTP31 - Provision of Minerals
CSTP32 - Safeguarding Mineral Resources
PMD1 - Minimising Pollution and Impacts on Amenity
PMD2 - Design and Layout
PMD4 - Historic Environment
PMD6 - Development in the Green Belt
PMD7 - Biodiversity and Development
PMD8 - Parking Standards
PMD9 - Road Network Hierarchy
PMD10 - Transport Assessments and Travel Plans
PMD15 - Flood Risk Assessment

Assistant Director Planning,
Transport And Public Protection

Date: 30th November 2020

thurrock.gov.uk

BUILDING CONTROL

You have been granted Planning permission for your project, but what next?

You may need to complete your project in line with the Building Regulations. Building control is the process which checks that this is carried out and that your finished project is safe, sound and energy efficient.

Who needs building control and why?

We will work with you to ensure you meet regulations and on competition of works, we will issue a completion certificate which you will need when you come to sell your home. If you are not sure if you need Building Regulations approval then please contact us on the details below.

Website: https://www.thurrock.gov.uk/buildingcontrol
E-mail: Building.control@Thurrock.gov.uk
Phone: 01375 652655

LABC

LONDON BOROUGH OF HAVERING

TOWN AND COUNTRY PLANNING ACT 1990

AGENT

Dan Walker
David L Walker Limited
Albion House
89 Station Road
Eckington, Sheffield
SHEFFIEL

APPLICANT

Ingrebourne Valley Ltd
Cecil House
Harlow Common
Harlow, Essex
CM17 9HY

APPLICATION NO: P1865.19

In pursuance of their powers as Local Planning Authority, the Council have considered your application and have decided to **GRANT PLANNING PERMISSION** for the following development :

Proposal: Extraction of minerals and reclamation material and importation of inert materials, ancillary plant and buildings with restoration back to agriculture

Location: Medina Farm
Dennises Lane
South Ockendon
Essex

The above decision is based on the details in drawing(s):

1616/A/1 v4; 1616/A/2 v2; 1616/A/3 v1; 1616/A/4 v1; 1616/CO/1 v5; 1616/CS/1 v1; 1616/FD/1 v2; 1616/R/1 v4

Supporting Statement by D. K Symes Associated dated December 2019

subject to compliance with the following condition(s):

Note to Applicants:
Please take the time to read the conditions stated below carefully. Some may require you to seek the Council's approval prior to works beginning on site. The approval process can take a further 8 weeks from the date of submission and you are advised to incorporate this into your timetable.

Please also check the informatives below to verify whether the scheme is liable for the Mayoral Community Infrastructure Levy. If the scheme is liable, ***you are required to give notice of commencement in advance*** *so that a Demand Notice can be sent to you or any other person(s) that*

has/have assumed liability. The Levy is payable within 60 days of commencement. ***If you are intending to claim self-build, social housing or charitable exemption, you must do this before development commences otherwise any exemption request will be disqualified.***

1 The development to which this permission relates must be commenced not later than three years from the date of this permission.

Reason:-

To comply with the requirements of Section 91 of the Town and Country Planning Act 1990 (as amended by Section 51 of the Planning and Compulsory Purchase Act 2004).

2 The development hereby permitted shall be carried out in complete accordance with the plans, particulars and specifications submitted and hereby approved (as per page one of the decision notice).

Reason: The Local Planning Authority consider it essential that the whole of the development is carried out and that no departure whatsoever is made from the details approved, since the development would not necessarily be acceptable if partly carried out or carried out differently in any degree from the details submitted.

3 The development hereby permitted shall be limited to a period of 48 months, from the notified date of commencement, by which time all operations shall have ceased and the site restored in accordance with the approved scheme and subject to an aftercare period of five years.

Reason: To ensure that the development is carried out in accordance with the submitted details, to minimise the duration of disturbance, ensure restoration within a timely manner.

4 Any buildings, plant, machinery, foundation, hard standing, roadway, structure or erection in the nature of plant or machinery used in connection with the development hereby permitted shall be removed from the site when no longer required for the purpose for which built, erected or installed and in any case not later than 48 months from the date of notified commencement.

Reason: To enable the planning authority to adequately control the development, to ensure that the land is restored to a condition capable of beneficial use.

5 In the event that operations are terminated or suspended for a period in excess of six months, the excavated area and other operational land shall be restored in accordance with a restoration scheme as approved in writing by the Local Planning Authority within six months of the expiry of the six month period to be advised by the Local Planning Authority for minerals and waste.

Reason: To enable the planning authority to adequately control the development, to ensure that the land is restored to a condition capable of beneficial use in the event of suspension.

6 No more than 200,000 tonnes of mineral shall be exported during the life of the development.

Furthermore, no more than 250,000 cubic metres of infill material shall be imported during the life of the development.

Reason: To ensure the development is carried out in accordance with the submitted details, to minimise the harm to the environment.

7 Only inert waste material, as defined within the Landfill (England and Wales) Regulations 2002 and as defined in the Supporting Statement, dated December 2019, submitted with the planning application, shall be imported to the site for the purposes of infilling and restoration.

Reason: To ensure that material with no beneficial use to the site is not processed on site, that the site use does not develop beyond that assessed, that waste materials outside of the aforementioned would raise alternate and additional environmental concerns

8 From the date of commencement the operator shall maintain records of their monthly output and imports and such records shall be made available to the Local Planning Authority for minerals and waste, upon request, within 14 days.

Reason: To allow the planning authority to adequately monitor activity at the site and to comply with policies W1 and W4 of the Joint Waste Development Plan.

9 Vehicle Movements - The total number of heavy goods vehicle movements associated with the development hereby permitted shall not exceed the following limits:

142 movements (71 arrivals and 71 departures) per day Monday to Friday

No vehicle movements shall take place outside the hours of operation authorised under Condition 11 and/or on Saturdays, Sundays and Public and Bank Holidays.

Reason: In the interests of highway safety, safeguarding local amenity.

10 A written record shall be maintained at the site office of all movements in and out of the site by heavy goods vehicles. Such records shall contain the vehicles' weight, registration number and the time and date of the movement and shall be made available to the Local Planning Authority for minerals and waste, upon request, within 14 days.

Reason: To allow the planning authority to adequately monitor activity at the site and to comply with policy W5 of the Joint Waste Development Plan.

11 Except in emergencies, operations authorised by this permission shall only be undertaken during the following times:

07:00 hours to 18:00 hours Monday to Friday

And at no other times including Saturdays, Sundays, Bank or Public Holidays.

Reason: In the interests of limiting the effects on local amenity, to control the impacts of the development.

12 No demolition or development shall take place until a stage 1 written scheme of investigation (WSI) has been submitted to and approved by the local planning authority in writing. For land that is included within the WSI, no demolition or development shall take place other than in accordance with the agreed WSI, and the programme and methodology of site evaluation and the nomination of a competent person(s) or organisation to undertake the agreed works.

If heritage assets of archaeological interest are identified by stage 1 then for those parts of the sites which have archaeological interest a stage 2 WSI shall be submitted to and approved by the local planning authority in writing. For land that is included within the stage 2 WSI, no demolition/development shall take place other than in accordance with the agreed stage 2 WSI which shall include:

A. The statement of significance and research objectives, the programme and methodology of site investigation and recording and the nomination of a competent person(s) or organisation to undertake the agreed works

B. Where appropriate, details of programmes for delivering related positive public benefit.

C. The programme for post-investigation assessment and subsequent analysis, publication & dissemination and deposition of resulting material. This part of the condition shall not be discharged until these elements have been fulfilled in accordance with the programme set out in the stage 2 WSI.

Reason: Insufficient information has been supplied with the application in relation to the above matters. The planning authority wishes to secure the provision of archaeological investigation and the subsequent recording of the remains prior to development (including historic buildings recording), in accordance with policy W5 of the Joint Waste Development.

13 The development hereby permitted may not commence until a monitoring and maintenance plan in respect of contamination, including a timetable of monitoring and submission of reports to the Local Planning Authority, has been submitted to and approved in writing by the Local Planning Authority for waste and minerals, Reports as specified in the approved plan, including details of any necessary contingency action arising from the monitoring, shall be submitted to, and approved in writing by, the Local Planning Authority.

Reason: To ensure the site does not pose any further risk to human health or the water environment by managing any ongoing contamination issues and completing all necessary long-term remediation measures.

14 If, during development, contamination not previously identified is found to be present at site then no further development (unless otherwise agreed in writing with the local planning authority) shall be carried out until a remediation strategy detailing how this contamination will be dealt with has been submitted to and approved in writing by the local planning authority. The remediation strategy shall be implemented as approved.

Reason: To ensure that any previously unidentified contamination found at the site is investigated and satisfactorily addressed in order to protect those engaged in construction and occupation of the development from potential contamination.

15 A scheme for managing any borehole installed for the investigation of soils, groundwater or geotechnical purposes shall be submitted to and approved in writing by the local planning authority. The scheme shall provide details of how redundant boreholes are to be decommissioned and how any boreholes that need to be retained, post-development, for monitoring purposes will be secured, protected and inspected. The scheme as approved shall be implemented prior to the operation of any part of the permitted development

Reason: To ensure that redundant boreholes are safe and secure, and do not cause groundwater pollution or loss of water supplies.

16 No infiltration of surface water drainage into the ground at this site is permitted other than with the express written consent of the Local Planning Authority for minerals and waste, which may be given for those parts of the site where it has been demonstrated that there is no resultant unacceptable risk to controlled waters. The development shall be carried out in accordance with the approval details.

Reason: Infiltrations SuDs such as soakaways through contaminated soils are unacceptable as contaminants can remobilise and cause groundwater pollution. This restriction is in line with good practice,

17 All topsoil and subsoil indigenous to the site shall be retained on the site and used as part of the approved restoration scheme.

Reason: To prevent the loss of soil, ensure that material imported is minimised.

18 No topsoil or subsoil shall be stripped or handled unless it is a dry and friable condition and no movement of soils shall take place during the months of November to March (inclusive); when the moisture content of the upper level of the soil is equal to or greater than at which the soil becomes plastic; and when there are pools of water on the soil surface.

Reason: To minimise soil compaction and structural damage, to assist in the final restoration.

19 No stripping or handling of topsoil or subsoil shall take place until a scheme of soil movement and scheme of machine movements for the stripping and replacement of soils has been submitted to and approved in writing by the Local Planning Authority for minerals and waste. The scheme shall be submitted at least three months prior to the expected commencement of soil stripping; and clearly identify the origin, intermediate and final location of soils for use in agricultural restoration together with details of quantities, depths and areas involved. The development shall be implemented in accordance with the approved scheme.

Reason: To ensure the retention of existing soils on the site for restoration purposes, to minimise the potential damage to soils, to minimise the impact of the development on the

locality.

20 No excavation shall take place nor shall any of the site be traversed by heavy vehicles or machinery for any purpose or operation (except for the purpose of stripping that part or stacking of topsoil in that part) unless all available topsoil and subsoil has been stripped from that part of the site and stored in accordance with the approved details.

Reason: To minimise soil compaction and structural damage, to assist in the final restoration.

21 The uppermost 0.5m of the infill material shall be free from rubble and stones greater than 150mm in diameter and shall be both graded with the final tipping levels hereby approved and ripped using appropriate machinery. The infill material shall be covered with a minimum of 0.8m of even depth subsoil and 0.4m of top soil in the correct sequence. The finished surface shall be left free from rubble and stones greater than 100mm in diameter which would otherwise hinder cultivation.

Reason: To ensure that the site is properly restored, can effectively be brought into a beneficial restoration use.

22 Final Landform - Final landform and surface restoration levels shall accord with the landform, and contours shown on the approved restoration plan number 1616/R/1/v4 dated 28-11-2019.

Reason: To ensure proper restoration of the site.

23 An aftercare scheme detailing the steps that are necessary to bring the land to the required standard for agricultural use shall be submitted to and approved in writing by the Local Planning Authority for minerals and waste prior to commencement of infilling. The submitted Scheme shall:
a)Provide an outline strategy in accordance with paragraph 57 of the Planning Practice Guidance for the five year aftercare period. This shall broadly outline the steps to be carried out in the aftercare period and their timing within the overall programme.
b)Provide for a detailed annual programme, in accordance with paragraph 58 of the Planning Practice Guidance to be submitted to the planning authority not later than two months prior to the annual Aftercare meeting.
c)Unless the Local Planning Authority for minerals and waste approve in writing with the person or persons responsible for undertaking the Aftercare steps that there shall be lesser steps or a different timing between steps, the Aftercare shall be carried out in accordance with the submitted Scheme.

Reason: To ensure the satisfactory restoration of the site for agriculture.

24 No development shall take place until a scheme has been submitted to and approved in writing by the Local Planning Authority making provision for an Operations Method Statement to control the potential adverse impacts of the development on the amenity of the public, nearby occupiers and the environment. The Operations Method Statement shall include details of:
a) parking of vehicles of site personnel and visitors;
b) storage of plant and materials;

c) dust management controls;
d) measures for minimising the impact of noise and ,if appropriate, vibration arising from construction activities;
e) predicted noise and, if appropriate, vibration levels for construction using methodologies and at points agreed with the Local Planning Authority;
f) scheme for monitoring noise and if appropriate, vibration levels using methodologies and at points agreed with the Local Planning Authorities;
g) siting and design of temporary buildings;
h) scheme for security fencing/hoardings, depicting a readily visible 24-hour contact number for queries or emergencies;
i) details of disposal of waste arising from the construction programme, including final disposal points. The burning of waste on the site at any time is specifically precluded.

The development shall be carried out in accordance with the approved scheme and statement.

Reason: Insufficient information has been supplied with the application in relation to the proposed construction methodology. Submission of details prior to commencement will ensure that the method of construction protects residential amenity.

25 The proposals shall provide a 2.4 by 90 metre forward visibility and 2.4 by 90 metre visibility splay on either side of the proposed access, set back to the boundary of the public footway. No development shall take place until a scheme to achieve the aforementioned, outlining measures necessary to facilitate the visibility splays, together with aids proposed to enhance safety has been submitted to and approved in writing by the local planning authority for minerals and waste. The visibility splays shall be provided and maintained in accordance with the approved scheme for the duration of the development hereby permitted.

Reason: Insufficient information has been supplied with the application in relation to how the required visibility splays would be achieved. Submission of details prior to commencement will ensure that appropriate visibility is achieved in the interests of highway safety and the amenity of the surrounding area.

26 Before the development hereby permitted is first commenced, vehicle cleansing facilities to prevent mud being deposited onto the public highway during construction works shall be provided on site in accordance with details to be first submitted to and approved in writing by the Local Planning Authority. The approved facilities shall be retained thereafter and used at relevant entrances to the site throughout the duration of the extraction and restoration works. If mud or other debris originating from the site is deposited in the public highway, all on-site operations shall cease until it has been removed. The submission will provide;

a) A plan showing where vehicles will be parked within the site to be inspected for mud and debris and cleaned if required. The plan should show where construction traffic will access and exit the site from the public highway.

b) A description of how the parking area will be surfaced, drained and cleaned to prevent mud, debris and muddy water being tracked onto the public highway;

c) A description of how vehicles will be checked before leaving the site - this applies to the

vehicle wheels, the underside of vehicles, mud flaps and wheel arches.

d) A description of how vehicles will be cleaned.

e) A description of how dirty/muddy water be dealt with after being washing off the vehicles.

f) A description of any contingency plan to be used in the event of a break-down of the wheel washing arrangements.

Reason: Insufficient information has been supplied with the application in relation to wheel washing facilities. Submission of details prior to commencement will ensure that the facilities provided prevent materials from the site being deposited on the adjoining public highway, in the interests of highway safety and the amenity of the surrounding area.

27 Noise levels from operations undertaken in association with the development hereby permitted, except those deemed temporary, shall not exceed 55dB(A)LAeq, 1h (free field) when measured at the noise sensitive properties defined in the submitted Noise Assessment. Noise levels shall be monitored at three monthly intervals from the date of the commencement of development at the aforementioned noise sensitive properties to demonstrate compliance with the above acceptable level. The results of the monitoring shall include LA90 and LAeq noise levels, the prevailing weather conditions, details and calibration of the equipment used for measurement and comments on other sources of noise which affect the noise climate. The monitoring shall be carried out for at least two separate durations during the working day and the results shall be submitted to the Local Planning Authority for minerals and waste within one month of the monitoring being carried out. The frequency of monitoring shall not be reduced, unless otherwise approved in writing by the Local Planning Authority for minerals and waste. In the event of an identified exceedance in noise levels, a mitigation strategy shall be submitted to the Local Planning Authority for minerals and waste in writing for approval outlining the measures which will be taken to reduce noise levels within the acceptable parameters. The recommended mitigation measure and monitoring techniques stated in section 6 of the noise report shall be carried out during site restoration activities.

Reason: In the interests of public amenity, ensuring that the development does not result in significant environmental impacts

28 No external lighting shall be erected or installed until a scheme for any such lighting has been submitted to and approved in writing by the Local Planning Authority for minerals and waste. Any such scheme shall include details of the extent of illumination together with precise details of the height, location and design of the lights together with proposed hours of operation. The installation of any external lighting shall be undertaken in accordance with the approved scheme.

Reason: In the interests of public amenity, ensuring that the development does not result in significant environmental impacts.

29 Permitted Development) (England) Order 2015 (or any order revoking and re-enacting that

Order with or without modification) no building, structure, fixed plant or machinery, except as detailed in the development details hereby approved or otherwise approved pursuant to conditions, shall be erected, extended, installed or replaced on the site without the prior approval or express planning permission of the Local Planning Authority for minerals and waste.

Reason: To enable the planning authority to adequately control any future development on-site, assess potential accumulation and minimise potential impacts on the local area and landscape.

INFORMATIVE(S)

1 The Applicant is advised that planning approval does not constitute approval for changes to the public highway. Highway Authority approval will only be given after suitable details have been submitted, considered and agreed. Any proposals which involve building over the public highway as managed by the London Borough of Havering, will require a licence and the applicant must contact StreetCare, Traffic & Engineering on 01708 433750 to commence the Submission/ Licence Approval process.

The developer, their representatives and contractors are advised that this does not discharge the requirements under the New Roads and Street Works Act 1991 and the Traffic Management Act 2004. Formal notifications and approval will be needed for any highway works (including temporary works) required during the construction of the development.

The developer is advised that if construction materials are proposed to be kept on the highway during construction works then they will need to apply for a license from the Council.

2 The proposed inert landfilling activity will require an Environmental Permit under the Environmental Permitting Regulations 2010 (as amended) from the Environment Agency. The applicant is advised to contact the Environment Agency to discuss the permitting requirements and any issues that are likely to be raised during this process.

3 Due to the presence of National Grid apparatus in proximity to the application site, the applicant is advised to contact National Grid before any works are carried out to ensure that the aforementioned apparatus is not affected by the development.

4 The planning obligations recommended in this report have been subject to the statutory tests set out in Regulation 122 of the Community Infrastructure Levy Regulations 2010 and the obligations are considered to have satisfied the following criteria:
a)Necessary to make the development acceptable in planning terms;
b)Directly related to the development; and
c)Fairly and reasonably related in scale and kind to the development.

5 Written schemes of investigation will need to be prepared and implemented by a suitably qualified professionally accredited archaeological practice in accordance with Historic England's Guidelines for Archaeological Projects in Greater London. This condition is exempt from deemed discharged under schedule 6 of The Town and Country Planning (Development Management Procedure) (England) Order 2015.

6 Statement Required by Article 35(2) of the Town and Country Planning (Development Management) Order 2015: No significant problems were identified during the consideration of

the application, and therefore it has been determined in accordance with paragraph 38 of the National Planning Policy Framework 2021.

Date: 10th January 2023

Helen Oakerbee
Assistant Director Planning

London Borough of Havering
Town Hall, Main Road
Romford RM1 3BB

IMPORTANT - attention is drawn to the notes overleaf

NOTES IN CONNECTION WITH APPROVAL OF APPLICATIONS SUBJECT TO CONDITIONS OR REFUSAL OF APPLICATIONS FOR PLANNING PERMISSION

1. If the applicant is aggrieved by the decision of the local planning authority to refuse permission or to grant permission or approval subject to conditions, an appeal may be made to the First Secretary of State at the Department for Communities and Local Government in accordance with Section 78 of the Town and Country Planning Act 1990 within six months of the date of this notice. However, if an enforcement notice is subsequently served relating to the same or substantially similar land and development and you want to appeal you must do so within 28 days of the service of the enforcement notice, or within 6 months of the date of this notice, whichever period expires earlier.

   Appeals must be made on a form which is obtainable from the Planning Inspectorate, Customer Support Unit, Temple Quay House. 2 The Square. Temple Quay. Bristol BS1 6PN or from the Planning Inspectorate's web site,
   https://www.gov.uk/appeal-planning-inspectorate

2. When submitting the completed appeal form to the Planning Inspectorate, a copy should be sent to Planning, London Borough of Havering, Town Hall, Main Road, Romford, RM1 3BB. The First Secretary of State has power to allow a longer period for the giving of a notice of appeal but will not normally be prepared to exercise these powers unless there are special circumstances which excuse the delay in giving notice of appeal. The First Secretary of State is not required to entertain an appeal if it appears that permission for the proposed development could not have been granted by the local planning authority, or could not have been so granted otherwise than subject to the conditions imposed by them, having regard to the statutory requirements to the provisions of the development order, and to any directions given under the order. Where the decision of the local planning authority is based upon a direction from the First Secretary; it is not the practise to refuse to accept appeals solely because of this direction.

3. If permission to develop land is refused or granted subject to conditions, whether by the local planning authority or by the First Secretary of State and the owner of the land claims that the land has become incapable of reasonable beneficial use in its existing state and cannot be rendered capable of reasonably beneficial use by the carrying out of any development which has been or would be permitted, a purchase notice may be served on the London Borough of Havering requiring the council to purchase the land in accordance with the provision of Part VI of the Town and Country Planning Act 1990.

4. In certain circumstances, a claim may be made against the local planning authority for compensation where there has been an appeal or where an application has been referred to the First Secretary, and where planning permission is refused or granted subject to conditions. The circumstances in which such compensation is payable are set out in section 114 of the Town and Country Planning Act 1990.

5. The statutory requirements are those set out in section 79(6) of the Town and Country Planning Act 1990, namely Sections 70, 71 and 72(1) of the Act.

   You are reminded that Building Regulations approval may also be required for these works. You must contact the Building Control Manager or Building Inspector to confirm if permission is required.

   Note: Following a change in government legislation a fee is now required for the request for Submission of details pursuant to discharge of conditions in order to comply with the Town and Country Planning (Fees for Applications and Deemed Applications) (Amendment) (England) Regulations, which came into force from 06/04/2008. A fee of £116 per request (or £34 where the related permission was for extending or altering a dwellinghouse) will be required.

(Notes Region 25)

LONDON BOROUGH OF HAVERING

TOWN AND COUNTRY PLANNING ACT 1990

AGENT

Dan Walker
Albion House
89 Station Road
Eckington, Sheffield,
S21 4FW

APPLICANT

Ingrebourne Valley Ltd
Cecil House
Harlow Common
Harlow, Essex
CM17 9HY

APPLICATION NO: P1866.19

In pursuance of their powers as Local Planning Authority, the Council have considered your application and have decided to **GRANT PLANNING PERMISSION** for the following development :

Proposal: Engineering works to improve drainage and re-restore previously worked land

Location: Medina Farm
Dennises Lane
South Ockendon
Essex

The above decision is based on the details in drawing(s):

1616/A/3 v1

1616/A/2 v2

1616/A/4 v1

1616/A/1 v4

1616/R/1 v4

1616/CS/1 v1

1616/FD/1 v2

1616/CO/1 v5

Supporting Statement by D. K Symes Associated dated December 2019

subject to compliance with the following condition(s):

Note to Applicants:
Please take the time to read the conditions stated below carefully. Some may require you to seek the Council's approval prior to works beginning on site. The approval process can take a further 8 weeks from the date of submission and you are advised to incorporate this into your timetable.

Please also check the informatives below to verify whether the scheme is liable for the Mayoral Community Infrastructure Levy. If the scheme is liable, ***you are required to give notice of commencement in advance*** *so that a Demand Notice can be sent to you or any other person(s) that has/have assumed liability. The Levy is payable within 60 days of commencement.* ***If you are intending to claim self-build, social housing or charitable exemption, you must do this before development commences otherwise any exemption request will be disqualified.***

1 The development to which this permission relates must be commenced no later than three years from the date of this permission. In this regard:
a)Written notification of the commencement date shall be sent to the Local Planning Authority for waste
and minerals within seven days of commencement.

Reason: To comply with the requirements of Section 91 of the Town and Country Planning Act 1990 (as amended by Section 51 of the Planning and Compulsory Purchase Act 2004).

2 The development hereby permitted shall be carried out in complete accordance with the plans, particulars and specifications submitted and hereby approved (as per page one of the decision notice).

Reason: The Local Planning Authority consider it essential that the whole of the development is carried out and that no departure whatsoever is made from the details approved, since the development would not necessarily be acceptable if partly carried out or carried out differently in any degree from the details submitted. Also, in order that the development accords with policy DC61 of the Development Control Policies Development Plan Document.

3 The development hereby permitted shall be limited to a period of 48 months, from the notified date of commencement, by which time all operations shall have ceased and the site restored in accordance with the approved scheme.

Reason: To ensure that the development is carried out in accordance with the submitted details, to minimise the duration of disturbance, ensure restoration within a timely manner in compliance with local and national planning policies for minerals

4 Any buildings, plant, machinery, foundation, hard standing, roadway, structure or erection in the nature of plant or machinery used in connection with the development hereby permitted shall be removed from the site when no longer required for the purpose for which built, erected or installed and in any case not later than 48 months from the date of notified commencement.

Reason: To enable the planning authority to adequately control the development, to ensure that the land is restored to a condition capable of beneficial use.

5 In the event that operations are terminated or suspended for a period in excess of six months, the excavated area and other operational land shall be restored in accordance with a restoration scheme as approved in writing by the Local Planning Authority within six months of the expiry of the six month period to be advised by the Local Planning Authority for minerals and waste.

Reason: To enable the planning authority to adequately control the development, to ensure that the land is restored to a condition capable of beneficial use in the event of suspension

6 A suitably qualified ecological clerk of works will supervise key stages of the works including initial site clearance.

Reason: To protect and enhance biodiversity on the site.

7 Prior to the commencement of the development, the applicant shall submit for the written approval of the Local Planning Authority full details of dust mitigation measures that will be implemented to protect air quality. The use hereby permitted shall not commence until the approved measures have been shown to be implemented to the satisfaction of the Local Planning Authority in writing.

Reason: To protect the health of employees on the site and users of neighbouring land and to comply with the national air quality objectives within the designated Air Quality Management Area.

8 Only inert material, as defined within the Landfill (England and Wales) Regulations 2002 and as defined in the Supporting Statement, dated December 2019, submitted with the planning application, shall be used on the site for the purposes of infilling and restoration.

Reason: To ensure that material with no beneficial use to the site is not processed on site, that the site use does not develop beyond that assessed, that waste materials outside of the aforementioned would raise alternate and additional environmental concerns.

9 Except in emergencies, operations authorised by this permission shall only be undertaken during the following times:

07:00 hours to 18:00 hours Monday to Friday

And at no other times including Saturdays, Sundays, Bank or Public Holidays.

Reason: In the interests of limiting the effects on local amenity, to control the impacts of the development.

Retention of Soils - All topsoil and subsoil indigenous to the site shall be retained on the site and used as part of the approved restoration scheme.

Reason: To prevent the loss of soil, ensure that material imported is minimised.

10 All topsoil and subsoil indigenous to the site shall be retained on the site and used as part of the approved restoration scheme.

Reason: To prevent the loss of soil, ensure that material imported is minimised.

11 No topsoil or subsoil shall be stripped or handled unless it is a dry and friable condition and no movement of soils shall take place during the months of November to March (inclusive); when the moisture content of the upper level of the soil is equal to or greater than at which the soil becomes plastic; and when there are pools of water on the soil surface.

Reason: To minimise soil compaction and structural damage, to assist in the final restoration.

12 No stripping or handling of topsoil or subsoil shall take place until a scheme of soil movement and scheme of machine movements for the stripping and replacement of soils has been submitted to and approved in writing by the Local Planning Authority for minerals and waste. The scheme shall be submitted at least three months prior to the expected commencement of soil stripping; and clearly identify the origin, intermediate and final location of soils for use in agricultural restoration together with details of quantities, depths and areas involved. The development shall be implemented in accordance with the approved scheme.

Reason: To ensure the retention of existing soils on the site for restoration purposes, to minimise the potential damage to soils, to minimise the impact of the development on the locality.

13 The uppermost 0.5m of the infill material shall be free from rubble and stones greater than 150mm in diameter and shall be both graded with the final tipping levels hereby approved and ripped using appropriate machinery. The infill material shall be covered with a minimum of 0.8m of even depth subsoil and 0.4m of top soil in the correct sequence. The finished surface shall be left free from rubble and stones greater than 100mm in diameter which would otherwise hinder cultivation.

Reason: To ensure that the site is properly restored, can effectively be brought into a beneficial restoration use.

14 Final landform and surface restoration levels shall accord with the landform, and contours shown on the approved restoration plan numbers 1616/R/1/v4 and 1616/R/1 dated 28-11-2019.

Reason: To ensure proper restoration of the site.

15 An aftercare scheme detailing the steps that are necessary to bring the land to the required standard for agricultural use shall be submitted to and approved in writing by the Local Planning Authority for minerals and waste prior to commencement of infilling.

Reason: To ensure the satisfactory restoration of the site for agriculture.

16 No development shall take place until a scheme has been submitted to and approved in writing by the Local Planning Authority making provision for an Operations Method Statement to control the potential adverse impacts of the development on the amenity of the public, nearby occupiers and the environment. The Operations Method Statement shall include details of:
a) parking of vehicles of site personnel and visitors;
b) storage of plant and materials;
c) dust management controls;
d) measures for minimising the impact of noise and ,if appropriate, vibration arising from construction activities;
e) predicted noise and, if appropriate, vibration levels for construction using methodologies and at points agreed with the Local Planning Authority;
f) scheme for monitoring noise and if appropriate, vibration levels using methodologies and at points agreed with the Local Planning Authorities;
g) siting and design of temporary buildings;
h) scheme for security fencing/hoardings, depicting a readily visible 24-hour contact number for queries or emergencies;
i) details of disposal of waste arising from the construction programme, including final disposal points. The burning of waste on the site at any time is specifically precluded.

The development shall be carried out in accordance with the approved scheme and statement.

Reason: Insufficient information has been supplied with the application in relation to the proposed construction methodology. Submission of details prior to commencement will ensure that the method of construction protects residential amenity.

17 The proposals shall provide a 2.4 by 90 metre forward visibility and 2.4 by 90 metre visibility splay on either side of the proposed access, set back to the boundary of the public footway. No development shall take place until a scheme to achieve the aforementioned, outlining measures necessary to facilitate the visibility splays, together with aids proposed to enhance safety has been submitted to and approved in writing by the local planning authority for minerals and waste. The visibility splays shall be provided and maintained in accordance with the approved scheme for the duration of the development hereby permitted.

Reason: Insufficient information has been supplied with the application in relation to how the required visibility splays would be achieved. Submission of details prior to commencement will ensure that appropriate visibility is achieved in the interests of highway safety and the amenity of the surrounding area.

18 Before the development hereby permitted is first commenced, vehicle cleansing facilities to prevent mud being deposited onto the public highway during construction works shall be provided on site in accordance with details to be first submitted to and approved in writing by the Local Planning Authority. The approved facilities shall be retained thereafter and used at relevant entrances to the site throughout the duration of the extraction and restoration works. If mud or other debris originating from the site is deposited in the public highway, all on-site

operations shall cease until it has been removed. The submission will provide;

a) A plan showing where vehicles will be parked within the site to be inspected for mud and debris and cleaned if required. The plan should show where construction traffic will access and exit the site from the public highway.

b) A description of how the parking area will be surfaced, drained and cleaned to prevent mud, debris and muddy water being tracked onto the public highway;

c) A description of how vehicles will be checked before leaving the site - this applies to the vehicle wheels, the underside of vehicles, mud flaps and wheel arches.

d) A description of how vehicles will be cleaned.

e) A description of how dirty/muddy water be dealt with after being washing off the vehicles.

f) A description of any contingency plan to be used in the event of a break-down of the wheel washing arrangements.

Reason: Insufficient information has been supplied with the application in relation to wheel washing facilities. Submission of details prior to commencement will ensure that the facilities provided prevent materials from the site being deposited on the adjoining public highway, in the interests of highway safety and the amenity of the surrounding area.

19 Noise levels from operations undertaken in association with the development hereby permitted, except those deemed temporary, shall not exceed 55dB(A)LAeq, 1h (free field) when measured at the noise sensitive properties defined in the submitted Noise Assessment. Noise levels shall be monitored at three monthly intervals from the date of the commencement of development at the aforementioned noise sensitive properties to demonstrate compliance with the above acceptable level. The results of the monitoring shall include LA90 and LAeq noise levels, the prevailing weather conditions, details and calibration of the equipment used for measurement and comments on other sources of noise which affect the noise climate. The monitoring shall be carried out for at least two separate durations during the working day and the results shall be submitted to the Local Planning Authority for minerals and waste within one month of the monitoring being carried out. The frequency of monitoring shall not be reduced, unless otherwise approved in writing by the Local Planning Authority for minerals and waste. In the event of an identified exceedance in noise levels, a mitigation strategy shall be submitted to the Local Planning Authority for minerals and waste in writing for approval outlining the measures which will be taken to reduce noise levels within the acceptable parameters. The recommended mitigation measure and monitoring techniques stated in section 6 of the noise report shall be carried out during site restoration activities.

Reason: In the interests of public amenity, ensuring that the development does not result in significant environmental impacts.

20 No external lighting shall be erected or installed until a scheme for any such lighting has been submitted to and approved in writing by the Local Planning Authority for minerals and waste. Any such scheme shall include details of the extent of illumination together with precise details

of the height, location and design of the lights together with proposed hours of operation. The installation of any external lighting shall be undertaken in accordance with the approved scheme.

Reason: In the interests of public amenity, ensuring that the development does not result in significant environmental impacts.

21 Notwithstanding the provisions of the Town and Country Planning (General Permitted Development) (England) Order 2015 (or any order revoking and re-enacting that Order with or without modification) no building, structure, fixed plant or machinery, except as detailed in the development details hereby approved or otherwise approved pursuant to conditions, shall be erected, extended, installed or replaced on the site without the prior approval or express planning permission of the Local Planning Authority for minerals and waste.

Reason: To enable the planning authority to adequately control any future development on-site, assess potential accumulation and minimise potential impacts on the local area and landscape.

INFORMATIVE(S)

1 Statement Required by Article 35(2) of the Town and Country Planning (Development Management) Order 2015: No significant problems were identified during the consideration of the application, and therefore it has been determined in accordance with paragraph 38 of the National Planning Policy Framework 2021.

2 The Applicant is advised that planning approval does not constitute approval for changes to the public highway. Highway Authority approval will only be given after suitable details have been submitted, considered and agreed. Any proposals which involve building over the public highway as managed by the London Borough of Havering, will require a licence and the applicant must contact StreetCare, Traffic & Engineering on 01708 433750 to commence the Submission/ Licence Approval process.

The developer, their representatives and contractors are advised that this does not discharge the requirements under the New Roads and Street Works Act 1991 and the Traffic Management Act 2004. Formal notifications and approval will be needed for any highway works (including temporary works) required during the construction of the development.

The developer is advised that if construction materials are proposed to be kept on the highway during construction works then they will need to apply for a license from the Council.

3 The proposed inert landfilling activity will require an Environmental Permit under the Environmental Permitting Regulations 2010 (as amended) from the Environment Agency. The applicant is advised to contact the Environment Agency to discuss the permitting requirements and any issues that are likely to be raised during this process.

4 Due to the presence of National Grid apparatus in proximity to the application site, the applicant is advised to contact National Grid before any works are carried out to ensure that the aforementioned apparatus is not affected by the development.

Date: 10th January 2023

Helen Oakerbee
Assistant Director Planning

London Borough of Havering
Town Hall, Main Road
Romford RM1 3BB

IMPORTANT - attention is drawn to the notes overleaf

NOTES IN CONNECTION WITH APPROVAL OF APPLICATIONS SUBJECT TO CONDITIONS OR REFUSAL OF APPLICATIONS FOR PLANNING PERMISSION

1. If the applicant is aggrieved by the decision of the local planning authority to refuse permission or to grant permission or approval subject to conditions, an appeal may be made to the First Secretary of State at the Department for Communities and Local Government in accordance with Section 78 of the Town and Country Planning Act 1990 within six months of the date of this notice. However, if an enforcement notice is subsequently served relating to the same or substantially similar land and development and you want to appeal you must do so within 28 days of the service of the enforcement notice, or within 6 months of the date of this notice, whichever period expires earlier.

   Appeals must be made on a form which is obtainable from the Planning Inspectorate, Customer Support Unit, Temple Quay House. 2 The Square. Temple Quay. Bristol BS1 6PN or from the Planning Inspectorate's web site,
   https://www.gov.uk/appeal-planning-inspectorate

2. When submitting the completed appeal form to the Planning Inspectorate, a copy should be sent to Planning, London Borough of Havering, Town Hall, Main Road, Romford, RM1 3BB. The First Secretary of State has power to allow a longer period for the giving of a notice of appeal but will not normally be prepared to exercise these powers unless there are special circumstances which excuse the delay in giving notice of appeal. The First Secretary of State is not required to entertain an appeal if it appears that permission for the proposed development could not have been granted by the local planning authority, or could not have been so granted otherwise than subject to the conditions imposed by them, having regard to the statutory requirements to the provisions of the development order, and to any directions given under the order. Where the decision of the local planning authority is based upon a direction from the First Secretary; it is not the practise to refuse to accept appeals solely because of this direction.

3. If permission to develop land is refused or granted subject to conditions, whether by the local planning authority or by the First Secretary of State and the owner of the land claims that the land has become incapable of reasonable beneficial use in its existing state and cannot be rendered capable of reasonably beneficial use by the carrying out of any development which has been or would be permitted, a purchase notice may be served on the London Borough of Havering requiring the council to purchase the land in accordance with the provision of Part VI of the Town and Country Planning Act 1990.

4. In certain circumstances, a claim may be made against the local planning authority for compensation where there has been an appeal or where an application has been referred to the First Secretary, and where planning permission is refused or granted subject to conditions. The circumstances in which such compensation is payable are set out in section 114 of the Town and Country Planning Act 1990.

5. The statutory requirements are those set out in section 79(6) of the Town and Country Planning Act 1990, namely Sections 70, 71 and 72(1) of the Act.

   You are reminded that Building Regulations approval may also be required for these works. You must contact the Building Control Manager or Building Inspector to confirm if permission is required.

   Note: Following a change in government legislation a fee is now required for the request for Submission of details pursuant to discharge of conditions in order to comply with the Town and Country Planning (Fees for Applications and Deemed Applications) (Amendment) (England) Regulations, which came into force from 06/04/2008. A fee of £116 per request (or £34 where the related permission was for extending or altering a dwellinghouse) will be required.

(Notes Region 25)

APPENDIX B

Pre-Application Correspondence

Waste basic generic pre-application advice

Check if you need an environmental permit

If you are unsure whether your activity requires an environmental permit or what kind of permit you require, you should read our guidance on whether you need an environmental permit.

How do I apply for a new permit?

To apply for a new permit, you must complete the relevant forms and provide the required supporting information.

For some operations you can apply for a standard rules environmental permit. These have fixed conditions and are only suitable for a limited number of activities and locations. For all other activities and locations you need to apply for a bespoke permit.

Standard rules

- Apply for a new standard rules online
- Or you can apply using the forms. You must complete application form A, B1 and F1. You should read the guidance notes that accompany each form.

Application forms and guidance for a new standard rules permit.

Please download the application forms and open with an Adobe Acrobat Reader. You may not be able to complete the form using other pdf readers, such as the one built into your internet browser.

You need to email the completed forms, along with supporting documentation, to psc@environment-agency.gov.uk

Bespoke permit

- Apply for a bespoke permit online
- Or you can apply using the forms. You must complete application forms A, B2, B4 and F1. You should read the guidance notes that accompany each form.

Application forms and guidance for a bespoke permit application.

You should download the application forms and open with an Adobe Acrobat Reader. You may not be able to complete the form using other pdf readers, such as the one built into your internet browser.

You need to email the completed forms, along with supporting documentation, to psc@environment-agency.gov.uk

How do I change, transfer or cancel my permit?

If you already have a permit, and want to change (vary) it, transfer it to another person or business, or surrender it, you must provide the correct forms and supporting information.

Changing (varying) your permit

If you want to change something in your permit or add something to it, you must apply for a variation.

To make an administrative change only to your permit you must complete application form C0.5.

To change (vary) a standard rules permit you must complete application forms A, C1 and F1.

To change (vary) a bespoke permit, you must complete application forms A, C2, C4 and F1.

Forms and guidance to change (vary) your environmental permit

Transferring your permit to somebody else

To transfer your permit, you must complete application forms A, D2 and F1.

Forms and guidance to transfer your environmental permit

Cancelling (surrendering) your permit

To cancel (surrender) all or part of your permit you must complete application forms A, E2 and F1

Forms and guidance to cancel (surrender) your environmental permit

Declaration (in Part F1)

Please ensure the Declaration section is completed by each “relevant person”.

- For an application from an individual, a relevant person is the person to be named on the permit.
- For an application from more than one individual, each person who is applying for their name to be on the permit must complete the declaration – you will have to complete a separate copy of the declaration page for each additional individual.

- In the case of a company a relevant person must be an active director/company secretary as listed on Companies House.
- For a limited liability partnership, the declaration must be completed by a partner.
- For a charity, a relevant person is a key post holder: chair, chief executive, director or trustee.

Further information on who should complete the declaration can be found in section 5 of the guidance notes for the F1 application form.

How much will my permit cost?

Before applying, you should read our Environmental permitting charges guidance. This sets out how to calculate your fee and when certain charges apply.

There are fixed baseline charges for new applications.

Variations to permits and surrender applications are charged at a percentage of the baseline charge.

Transfer (and part transfer) applications are charged at a fixed rate.

Application fees are discounted for new applications with multiple activities and for bulk transfers. Full details are listed in the charging guidance.

Baseline charge

You can find a full list of waste activity charges in table 1.16 in the tables of charges in the Environmental permitting charging scheme. The baseline charge for an application covers the work the Environment Agency carries out each time they determine a typical permit application.

Standard Rules charges

All waste standard rules have the same baseline charges:

- £3,926 (for activities that require a Fire Prevention Plan)
- £2,641 (for activities that do not require a Fire Prevention Plan)

The activity description in the table of charges tells you whether a Fire Prevention Plan is required.

Bespoke permit charges

Baseline bespoke charges are set by activity. These are listed in sections 1.16.5 – 1.16.19 of the charging scheme.

Some bespoke activities require a Fire Prevention Plan or Odour Management Plan or both. Where these are required the cost of the assessment is included in the baseline charge.

Add-on charges

You may have to pay an add-on assessment charge for the assessment of plans, for example a dust management plan.

If we need to carry out additional assessments, for example a habitats assessment, we may charge extra for this work.

You must pay the add-on charge when applying for a new permit or if you need to submit a new plan when applying for a permit variation.

In some cases the costs of assessing these plans is included in the baseline application charge. The activity description in table 1 in the tables of charges will say if this is the case.

The plans and assessments are listed in table 1.19 in the tables of charges in the charging scheme.

For waste site, the most commonly required additional management plan assessment charges are:

Odour management plan - £1,246

Fire Prevention Plan - £1,241

Emissions (dust) management plan – £1,241

Noise and vibration management plan - £1,246

Waste recovery plan (deposit for recovery sites only) - £1,231

Habitats assessment

For certain protected sites we need to carry out a habitats assessment. For these sites we charge a fixed fee of £779.

This is an assessment of the risks to one or more of these sites, a:

- European Site within the meaning of the Conservation of Habitats and Species Regulations 2017
- site referred to in the National Planning Policy Framework 2018 as requiring the same assessment as a European Site
- site of special scientific interest within the meaning of the Wildlife and Countryside Act 1981

- marine conservation zone within the meaning of the Marine and Coastal Access Act 2009

Before making your application, you should check if your site is located within the relevant screening distance of a designated site. If so, you need to assess the risk to the site(s) from your activity and you will need to pay the additional charge to cover the assessment of the risk.

To help you identify relevant sites, you can ask us to complete a Nature and Heritage Conservation Screening assessment for you, using the online pre-application service. The screening assessment service is free of charge.

If you are applying for a variation and emissions or impacts are increasing as a result of that change then, depending on the location of the facility, you may need to assess how the changes will affect habitat sites.

Subsistence

If we grant a permit, you will need to pay an annual subsistence fee to cover the ongoing costs of regulating the permit. The subsistence charges are in listed in the tables of charges in Part 3 of the charging scheme.

Sites of High Public Interest (SHPI)

If your site is designated as a SHPI additional fees and a different charging process apply. Additional information on SHPI is included in section 2.5 of the Environmental Permitting Charges Guidance.

- An application for a SHPI is subject to a newspaper advertising fee of £500.
- The number of hours it takes to determine the application will be calculated at £100 per hour (commonly referred to as a 'time and materials' charge). If this is higher than the standard application fee listed in the Charging Scheme, the additional fee component will be charged – please see section 2.5 of the Environmental Permitting Charges Guidance.

Supporting documents

You need to supply supporting documents with your application. The online guidance and application form guidance explain what documents you need to provide. Depending on the type of application, you might not be required to provide all of the documents listed below.

If you do not provide the correct supporting information this may delay the processing your application.

We will check your application to make sure it is complete. We refer to these checks as 'duly making'. This is to ensure we have enough information to start to determine your permit application. We will contact you if information is missing.

If we cannot progress your application past this stage for any reason, we will return it and refund the application charge minus 20% to cover our costs to that point.

We will not charge this if we return an application after having done very little work – for example, because it contained obvious errors or omissions.

The amount we will keep is capped at £1,500.

Once we have duly made an application we will start to determine it. This is when we do our technical checks. We may need to ask you for further information or additional documents at this stage.

Non-Technical Summary

For new bespoke permit and most variation applications you need to send us a simple explanation of your proposed activities (or in the case of a variation, what changes you propose to make). This should include a summary of your operations and a summary of the key technical standards and control measures arising from your risk assessment.

As a guide, this summary document should be no more than one to two pages in length.

Site plan

New waste applications require a site plan. It is also required when you propose to increase or reduce your site boundary.

The plan must clearly show the full site boundary in a single unbroken line. For standard rules permits, the boundary must be in green.

Your plan should clearly mark the site layout, infrastructure and drainage arrangements.

If possible, try to include local features, such as roads or landmarks, this helps identify the site location in the surrounding area.

Site plans are not required for applications relating to mobile plant.

Environmental Management System

For new bespoke permit applications and transfer applications you must send a summary of your environmental management system (EMS). An update to your EMS may also be required for some variation applications. You should follow the guidance on developing a management system.

Your EMS should include a plan for dealing with any incidents or events that could result in pollution. This should follow our guidance on producing an accident

prevention and management plan. If applying for a variation, you may need to update this plan to incorporate the proposed changes.

A copy of your ISO 14001 certificate (or equivalent) is not sufficient on its own. You need to provide a summary of the site-specific management system.

Environmental Risk Assessment

For new applications or when you make changes, you must consider the environmental risk posed by your proposals. This must take the form of an environmental risk assessment which should follow the methodology set out in risk assessments for your environmental permit.

You should read our guide to risk assessments for specific activities and consider using our assessment tool to evaluate your environmental risk. Our assessment tool will inform you when more detailed modelling is required.

You should check if your site is located in a flood risk zone. If the site is in a flood zone, you should assess the risk of pollution in the event of a flood.

Depending on the outcome of your initial environmental assessment, you may be required to undertake detailed modelling of your environmental risk.

Technical Description

For new bespoke permit applications, you will need to provide details of the technical standards you will follow (or in the case of a variation, the standards that apply to the changes you propose to make). Full details of what you need to provide and what standards you should follow are included in section 3a of the guidance for Part B4 application form.

As well as the guidance on risk assessments, management systems and controlling emissions, there is specific technical guidance for some regulated industry sectors. For waste permits, this includes additional guidance on:

- Landspreading
- Mining waste
- Chemical waste
- Healthcare waste
- Non-hazardous and inert waste

Your technical description should include plans showing the layout of your site. The technical assessment should also include details of your operating techniques and the infrastructure you are using to minimise the risk of pollution, including any details of secondary containment used (such as bunds) and how this meets any relevant standards. Please see the pollution prevention guidance for additional advice.

If you are varying your permit, you should detail any existing operating techniques (as listed in table S1.2 of your permit) that are subject to change by the application being made and demonstrate how they will meet any relevant technical standards.

Waste codes

For new bespoke permit applications and variations to change the types of waste accepted at your site, you need to provide a list of waste codes from the European Waste Catalogue. You should follow the waste classification technical guidance to decide what waste code your waste should be classified under.

For standard rules permits, the list of waste codes is fixed. If you apply for a standard rules permit, you need to check that it covers all the waste codes that you need to accept for your activity.

Amenity management plans

You must read our guidance on how to control and monitor emissions for your environmental permit.

This includes guidance on controlling pollution from odour, dust, noise, pests and other 'fugitive emissions' (emissions without set emission limits).

For standard rules permits, separate amenity management plans are not required as the risks have been assessed as part of the generic risk assessment for each rules set.

For bespoke permit applications, you may be required to produce standalone amenity management plans to demonstrate how you will control and monitor emissions. The guidance sets out which activities require amenity management plans.

Your amenity management plan will be assessed as part of your application. You may need to pay an additional charge for the assessment. Further information on this is included in the 'How much will my permit cost' section above.

This also applies to variations which may lead to an increase in emissions as a result of the changes being proposed.

We have included additional notes below on specific considerations for noise impact assessments below.

Risks from Noise and Vibration, Industrial and Commercial Sound and Noise Management Plans

If your risk assessment shows your operation is likely to cause pollution from noise or vibration beyond your site boundary you must provide a noise impact assessment

(NIA) based on BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'.

Where your assessment has used calculations or modelling to predict sound pressure levels at receptors, you must follow our guidance on the presentation of your acoustic data: Noise impact assessments involving calculations or modelling.

Your NIA must be accompanied by a Noise Management Plan (NMP) based on the results of your NIA.

If you are unsure whether you need to produce a NIA or NMP, we can complete a screening check to check if you are likely to need one. The noise screening is available as part of our enhanced service. You should apply for the enhanced service using the online pre-application form.

We are aware that applicants are not always sure what to provide, and this can cause delays in getting your permit determined. We have produced supplementary advice on completing your NIA and a NMP template to help you get your application right first time. For sectors where we know noise is a common issue, we will provide these documents as part of the basic pre-application response. If you haven't received them but would like a copy, please request them in a follow-up enquiry.

Fire Prevention Plan (FPP)

If you store combustible waste at your site, you need to provide an FPP. You must follow our guidance on Fire Prevention Plans. This tells you what to include in your FPP and the fire prevention measures you must put in place. We have also produced a Fire Prevention Plan template to help you prepare your plan.

If you are varying your permit and this will lead to an increased fire risk then a new or updated plan will be required.

If you are surrendering (ceasing to operate on) part of your site, or you are transferring part of your site to another operator, then a new or updated plan may be required.

Climate Change Risk Assessment

For new bespoke applications you will need to complete the screening questions in part B2 of the application form. Depending on your answers, you may need to submit a climate change risk assessment. Part B2 guidance provides more information on this.

Technical Competence

If your activities include waste management you must meet legal operator and competence requirements. You will need to send in evidence of appropriate

technical competence for the proposed activities (or in the case of variations, the proposed changes). You will need to include valid certificates or other acceptable evidence.

If you are supplying WAMITAB certificates as evidence of your technical competency, you need to provide both the original award certificate and a current certificate of continuing competence (if the validity of your original award has expired).

If you are applying for a new site and are relying on the 'grace' period at the permit application stage, you need to provide confirmation of your registration for the relevant technical competence award for your activity. This should be written confirmation from a registered learning centre.

Grace periods are not applicable to transfer and variation applications. You need to meet the full technical competence requirements at the time of applying to transfer or vary your permit.

Site condition report

For new bespoke permits or variations to increase the area of your facility you should send us a site condition report which covers the area that will be covered by the permit. This should be in line with our guidance H5 Site condition report – guidance and templates.

This needs to include a conceptual site model and identify any relevant hazardous substances on site. Quantitative baseline soil and groundwater monitoring data on the condition of the site should be included or a justification on why this is not required should be provided. You should also consider if you need to undertake soil gas monitoring.

If you choose not to take baseline data, this may make it more difficult to demonstrate you have not caused pollution at the site when you apply to surrender the site.

Further Support

Basic advice follow-up questions

If you have questions that are not answered by the document or in the guidance linked from it, you can ask a basic advice follow-up question.

In your follow-up question, you need to include:

- your name
- contact telephone number

- your pre-application reference number (provided in the email accompanying this advice)

You should check your basic follow-up question falls within the scope of basic advice, as listed below. When sending your follow-up question, please summarise your application proposal along with your specific questions.

We can provide free basic advice on:

- the standard rules set which is relevant for your activities, or the type of permit you need if there are no relevant standard rules
- checks on whether your activity meets the criteria for a standard rules permit (we can check your eligibility for a rules set, but you need to decide whether you can meet the conditions)
- heritage and nature conservation screening
- the correct application forms to use
- what guidance you must follow
- information about risk assessments you may need to do to accompany your application
- the correct application charge (in rare cases, complex charging advice may require enhanced pre-application).

Please email your follow-up question to preapplicationservice@environment-agency.gov.uk and we will contact you.

If your question does not fall within the scope of free basic advice we will explain why. You may need to apply for chargeable enhanced pre-application advice.

Enhanced pre-application advice

If you want technical advice on your activity you can apply for our enhanced pre-application service. This a chargeable service. Further details of the service are provided in section 2.3 of our charging guidance.

This enhanced service could include advice on:

- the type of permit you need
- complex modelling
- preparing risk assessments
- parallel tracking for complex permits with planning applications
- monitoring requirements (including baseline)
- what guidance you must follow before you submit your application

Once the Environment Agency receive your request for enhanced pre application they will assess if this is something they are able to provide at this time. Please note:

the Environment Agency cannot currently attend site visits or face to face meetings or provide a review of your application prior to submission.

You can apply for enhanced pre-application advice using our pre-application request form.

Submitting an application

Please submit your application by email or, if applicable, by using the online form as detailed in the 'How do I apply for a new permit?' section above. Any applications submitted by post may be delayed as our offices are not yet fully operational following the Covid-19 lockdown.

Application Timescales

Our current queues are large and we are taking longer than usual to allocate work for initial assessment, known as duly making. The table below shows our estimated queue times by application type. Please note, this is based on our average times and some applications may be picked up before or after the timescales listed below.

Application type	**Estimated time to allocation (updated May 22)**
New standard rules	23-27 weeks
New Bespoke	34-38 weeks
Admin variation	25-29 weeks
Minor variation	21-25 weeks
Normal variation	37-41 weeks
Substantial variation	36-40 weeks
Transfer	26-30 weeks
Surrender	25-29 weeks

Once an application is duly made, the amount of time taken to determine your application will vary. It will be impacted by factors such as:

- The quality of the application
- The complexity of the application
- Whether an application is of high public interest
- Whether the application includes novel technologies or techniques
- Whether the determination requires input from others, both internal and external to the Environment Agency
- Whether modelling and/or monitoring and assessment is required, for example Air Quality modelling and assessment

The Permitting Officer determining your application will be able to keep you updated with the progress of your application.

Nature and Heritage Conservation

Screening Report: Bespoke Waste

Reference	**EPR/LB3209FE/A001**
NGR	**TQ 57636 83872**
Buffer (m)	**228**
Date report produced	**20 May 2022**
Number of maps enclosed	**3**

The nature and heritage conservation sites and/or protected species and habitats identified in the table below must be considered in your application.

Nature and heritage conservation sites	Screening distance (m)	Further Information
Local Wildlife Sites (LWS) :	200	Appropriate Local Record Centre (LRC)
Stubber's Outdoor Pursuits Centre		

Protected Species	Screening distance (m)	Further Information
Protected Species - Code 2	up to 500m	Natural England Appropriate Local Record Centre (LRC)

Protected Habitats	Screening distance (m)	Further Information
Deciduous woodland	up to 50m	Natural England

Unfortunately we cannot provide you with the details of all protected species. This is because we either have not been given permission by the owner of the species data, or they have asked us not to identify the species as they are vulnerable. In these instances you must contact the relevant organisation listed above. A small administration charge may be incurred for this service.

Where protected species are present, a licence may be required from Natural England to handle the species or undertake the proposed works.

The relevant Local Records Centre must be contacted for information on the features within local wildlife sites. A small administration charge may also be incurred for this service.

Please note we have screened this application for protected and priority sites, habitats and species for which we have information. It is however your responsibility to comply with all environmental and planning legislation, this information does not imply that no other checks or permissions will be required.

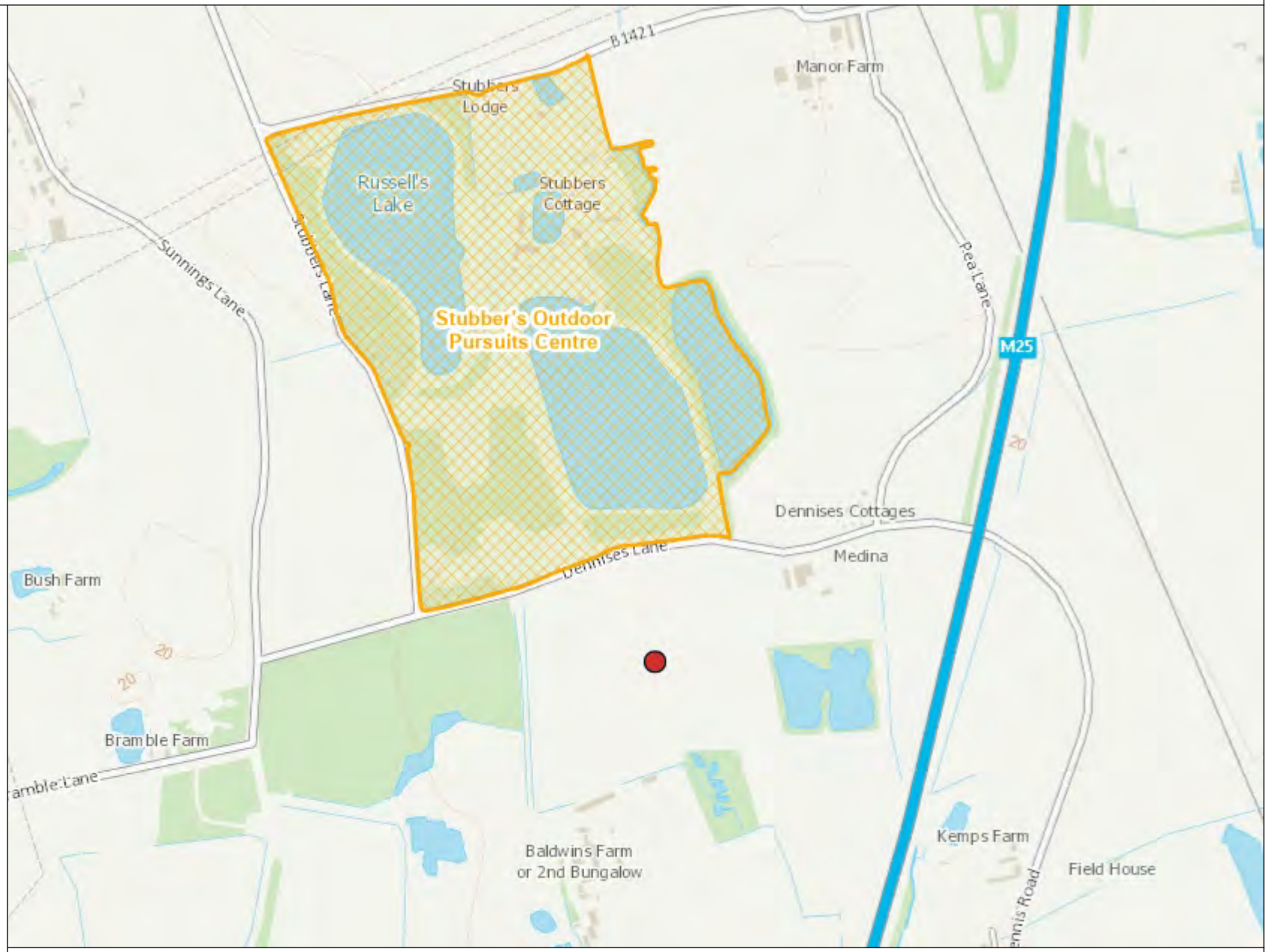
Please note the nature and heritage screening we have conducted as part of this report is subject to change as it is based on data we hold at the time it is generated. We cannot guarantee there will be no changes to our screening data between the date of this report and the submission of the permit application, which could result in the return of an application or requesting further information.

Local Wildlife Sites

Environment Agency

Legend

Local Wildlife Sites



1: 10,000

0 250

Metres

N W E S

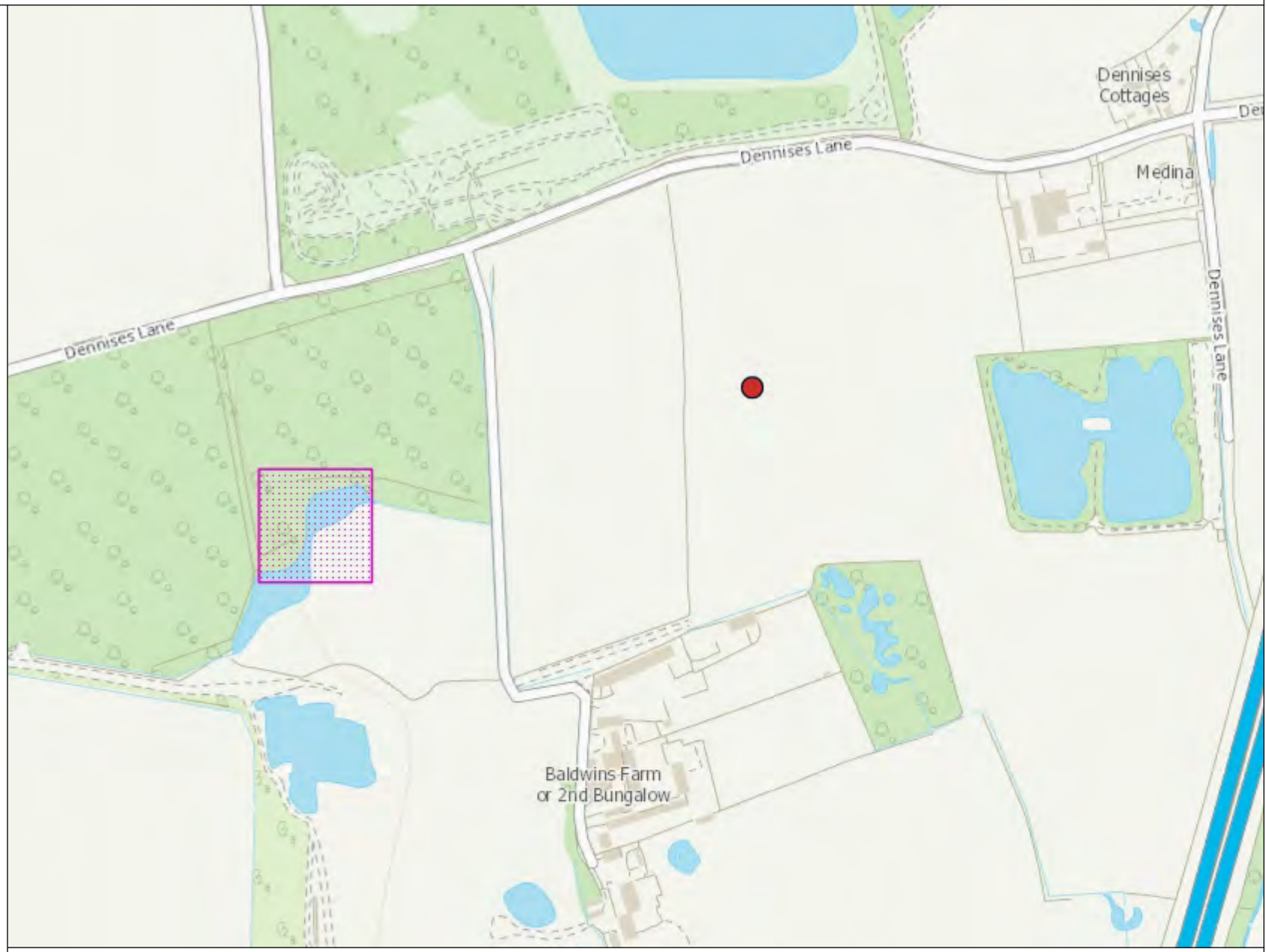
Protected Species

Environment Agency

Legend

Protected species screened for Env Permits - complete set

- Protected species, non fish
- Protected fish
- Protected fish migratory route



1: 5,000

0 125

Metres

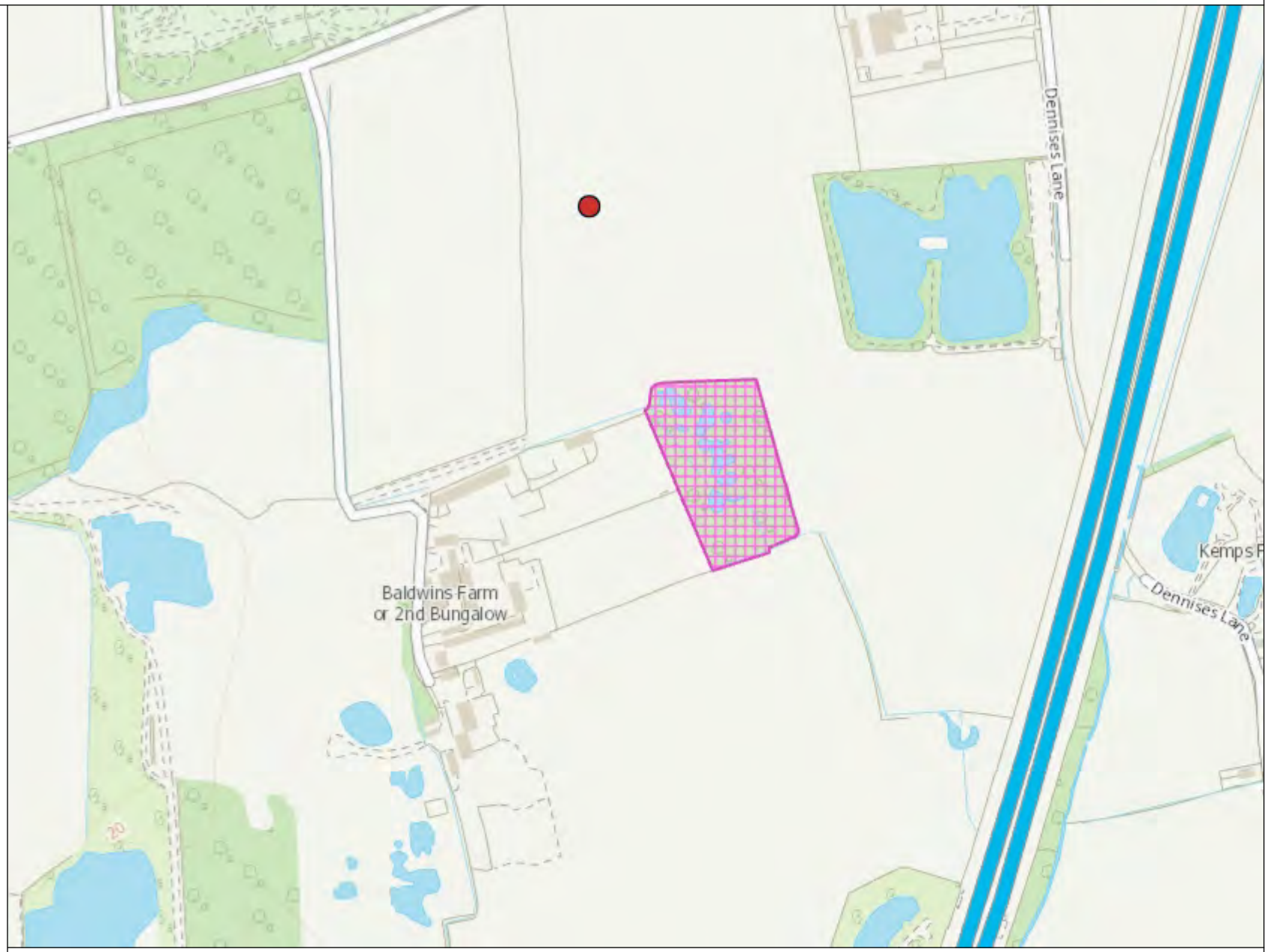
N W E S

Protected Habitats

Environment Agency

Legend

Protected Habitats screened for Env Permits



1: 5,000

0 125

Metres

N
W E
S

APPENDIX C

Waste Lists

Waste Types for Landfill

EWC Code	Description	Exclusions
01	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS	
01 01	wastes from mineral excavation	
01 01 02	wastes from mineral non-metalliferous excavation	
01 04	wastes from physical and chemical processing of non-metalliferous minerals	
01 04 08	waste gravel and crushed rocks other than those containing dangerous substances	
01 04 09	waste sand and clays	
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 01	concrete, bricks, tiles and ceramics	
17 01 01	concrete	Selected C & D waste only[(a)]
17 01 02	bricks	Selected C & D waste only[(a)]
17 01 03	tiles and ceramics	Selected C & D waste only[(a)]
17 01 07	mixtures of concrete, bricks, tiles and ceramics	Selected C & D waste only[(a)]
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding topsoil and peat, excluding soil and stones from contaminated sites
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 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	

EWC Code	Description	Exclusions
19 12 09	minerals (such as sand and stones) from the treatment of waste aggregates that are otherwise naturally occurring minerals	Excluding fines from treatment of any non-hazardous waste or gypsum from recovered plasterboard.
19 12 12	crushed bricks, tiles, concrete and ceramics, including mixtures of minerals	Excludes metal from reinforced concrete and fines from treating any non-hazardous waste or gypsum from recovered plasterboard
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	Excluding topsoil and peat

(a) Selected C & D waste (construction and demolition waste): with low contents of other types of materials (like metals, plastics, organics, wood, rubber etc). The origin of the waste must be known.
No C & D waste from buildings polluted with dangerous substances
No C & D waste from buildings treated or painted with materials containing dangerous substances in significant amounts

Waste Types for Restoration

EWC Code	Description	Exclusions
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding soil and stones from contaminated sites
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	

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T: + 353 (0)1 296 4667

France

GRENOBLE
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Technically Competent Manager Details

Technically Competent Manager 1

Title	Ms
First name	Maria
Last name	Anton-Garcia
Date of birth	2nd May 1964
Phone number	01279 216395
Mobile number	07977 298 106
Email	MariaAnton-Garcia@ingrebournevalley.co.uk

Permit number	Site Name	Site address	Post code	Comments
EA/EPR/HB3400HQ/T001	Ayletts Farm Quarry	Ayletts Farm Quarry Landfill Gerpins Lane Upminster	RM14 2XR	Operational but not accepting waste
EPR/DB3102UX/A001	Orsett Quarry	Buckingham Hill Lane Linford	SS17 0PP	Operational Accepting waste
EPR/AB3105HD	Denham Park Farm Land fill	Denham Green Buckinghamshire	UB9 5DL	Operational Accepting waste
EPR/FB3507SP/A001	Wennington Quarry	Wennington Quarry New Road Rainham	RM13 9ED	Operational Accepting waste
EPR/FB3109XB/A001	Newport Quarry	Chalk Farm Lane, Newport, Saffron Walden	CB11 3TE	Operational but not accepting waste
EPR/GB3909GB/A001	Cockhide Farm Quarry	Bramble Lane, South Ockendon	RM14 2XB	Operational but not accepting waste
Environmental Permit Application	Medina Farm	Dennises Lane, South Ockendon, Essex	RM14 2XB	Environmental Permit Application

Technically Competent Manager 2

Title	Mr
First name	Terence
Last name	Stocks
Date of birth	23rd March 1992
Phone number	01279 216396
Mobile number	07970 000 176
Email	TerenceStocks@ingrebournevalley.co.uk

Permit number	Site Name	Site Address	Post code	Comments
EPR/GP3733DZ/V003	Tilbury Ash Disposal site	Station Road East Tilbury	RM18 8QR	Operational Accepting waste
EPR/CB3201MY/A001	Elton Estate Agricultural Resevoir	Land Off A605 Warmington Peterborough	PE8 6SN	Operational but not accepting waste
AP3232LL (& Variation Notice DP3837UZ)	Marks Warren Landfill	Whalebone Lane North	RM6 6RB	Closure and Surrender Application
EPR/DP3794ER	Spring Farm Landfill	Launders Lane Rainham	RM13 9GF	Surrender Application
MP3435KP/V006	Elsenham Landfill	Hall Road Henham	CM22 6DJ	Operational Accepting waste
EPR/JB3503HT/A001	Harmondsworth	Holloway Close	UB7 0AE	Environmental Permit application
Environmental Permit Application	Medina Farm	Dennises Lane, South Ockendon Essex	RM14 2XB	Environmental Permit Application

INGREBOURNE VALLEY LIMITED

ENVIRONMENTAL MANAGEMENT SYSTEM SUMMARY

Ingrebourne Valley Limited are committed to the use of an Environmental Management System in order that they can minimise their impact on the environment and, where possible, leave a site in a better condition than when it was purchased or otherwise taken over.

To this end, they have put in place an Environmental Management System in accordance with the ISO 14001 international standard. Although the basis of the System has an Environmental Management Manual to cover all Sites, each location has its own site-specific Manual to allow for the variation between sites.

Pages 2 and 3 of this summary have been extracted from the Company Manual (Sections 1.2 and 1.3) with the purpose of demonstrating that all requirements of ISO 14001 have been addressed.

If necessary, a full copy of the Manual can be provided on request.

Environmental Policy

The Company has an Environmental Policy, which is reproduced in the Environmental Management System Manual.

Planning

When the Company takes over a new site where it wishes to implement the Environmental Management System, it first assesses the Environmental Aspects and Legal Requirements, in particular the conditions laid down in the Planning and Landfill Permit documentation. An initial Environmental Audit is carried out by an Independent Consultant, assisting with the identification of Significant Environmental Aspects. The Company then sets Objectives and Targets to deal with the issues identified.

Implementation and Operation

All other requirements of ISO 14001 (as specified in the Company core Manual) are then considered. This will include items such as: training of staff that will be running the site; communication between local residents, the Regulatory Authorities, site staff and Company Management; site documentation and record-keeping; the practicalities of meeting Objectives and Targets set for the site; how the site will be run in order to keep within Statutory Legislation and Conditions set by the Regulatory Authorities; and how site staff will deal with all kinds of emergency – Health, Safety and Environmental.

Checking and Corrective Action

The Company ensures that all legally required monitoring, as specified in the Permit, is scheduled to be carried out by a competent person. Subsequent Environmental Management System Audits will identify any Non-conformances and suggest Corrective and Preventive Actions that can be taken to minimise future Non-conformances. These Audits are carried out at least annually, by an Independent Consultant and accompanied by Company Management. The results of these Audits are used as a basis for the Management Review.

Management Review

An Environmental Management System Review Meeting is held at least annually. This will usually include the presence of the General Manager, Technical Supervisor, Hydrogeological Consultant and Environmental Management Consultant. The aim is to: review progress with Objectives and Targets; ensure that Corrective and Preventive Action Requests have been satisfactorily completed; assess effectiveness of the Environmental Management System; ensure that the necessary staff and resources are made available to effectively deal with the issues identified; review trends and identify potential cost-savings; consider complaints, incidents and concerns from other interested parties; and review imminent legal and other changes that may impact on Company operations.

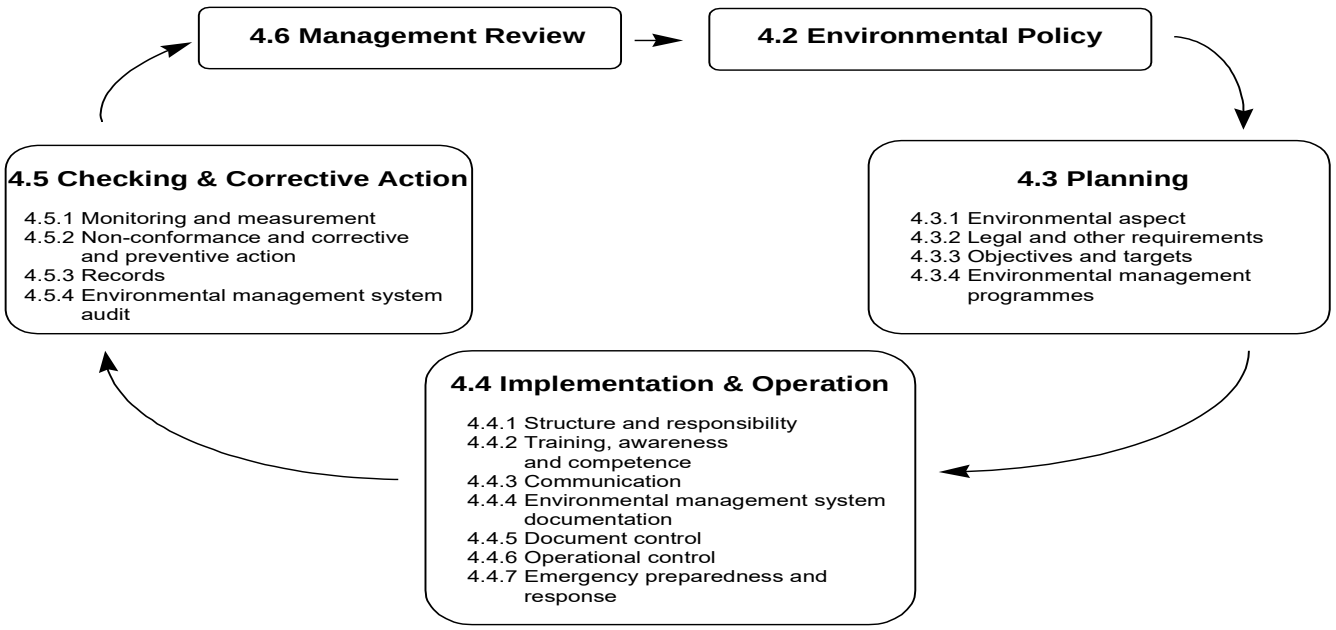
INGREBOURNE VALLEY LIMITED

ENVIRONMENTAL MANAGEMENT SYSTEM SUMMARY

1.2 SYSTEM DESCRIPTION, MANUAL STRUCTURE & MANAGEMENT STRUCTURE

System Description

The systems and procedures documented in this manual follow the requirements of the ISO 14001:1996 standard as shown below:



Manual Structure

The Manual is written in accordance with ISO 14001:1996 and establishes the Company commitment to environmental management systems. The Site Environmental Manual is set out in five Sections. Procedures within these Sections may be amended as appropriate to ensure that the Manual continues to relate to the changing needs of the Company and the market it serves.

Section 1 Environmental Management System: Outlines the Environmental Management System (EMS) for the Company as a whole.

Section 2 Company Environmental Management: Defines Company 'objectives and targets', the 'environmental management programmes' to achieve them and the procedure for 'management review'. Included here are descriptions of the 'roles and responsibilities' of all Company employees and 'suppliers and contractors'.

Section 3 Environmental Procedures: Details the Environmental Management System 'procedures' required by the Company.

Section 4 Site Environmental Management: Defines site-specific environmental management issues that relate to the activities, products and services for environmental control within the EMS.

Section 5 Operational Control Procedures: Defines site-specific operational control procedures to ensure conformance with the EMS and site activities.

Management Structure

The Company family tree is reproduced in the Health and Safety Document.

INGREBOURNE VALLEY LIMITED

ENVIRONMENTAL MANAGEMENT SYSTEM SUMMARY

1.3 MANAGEMENT SYSTEM DOCUMENTATION

The following describes the core elements of the EMS, their interaction with the Standard and provides direction to related documentation.

ISO 14001 Clause	Core Elements of Company System and Interaction
4.2 Environmental Policy	1.1 Company Environmental Policy Statement
4.3.1 Environmental Aspects	3.1 Environmental Aspects (procedure & blank forms) 4.2 Completed Aspects 1 Form 4.3 Completed Aspects 2 Form
4.3.2 Legal & other requirements	3.2 Legal & Other Requirements (procedure & blank forms) 4.4 Completed Legal 1 Form 4.5 Completed Legal 2 Form
4.3.3 Objectives & targets	2.1 Completed Objectives & Targets Form 3.3 Environmental Objectives & Targets (procedure & blank form)
4.3.4 Environmental management programme	2.2 Completed Management Programmes Form 3.4 Environmental Management Programmes (procedure & blank form)
4.4.1 Structure & responsibility	1.2 System Description, Manual Structure & Management Structure 2.4 Roles & Responsibilities
4.4.2 Training, awareness & competence	3.5 Training, Awareness & Competence (procedure & blank form)
4.4.3 Communication	3.6 Communication - External & Internal (procedure & blank form) 4.1 Site Description
4.4.4 Environmental management system documentation	1.2 System Description, Manual Structure & Management Structure 1.3 Management System Documentation 1.4 Related Company Management Documentation 1.5 Scope of Company System, Manual Administration and Revisions
4.4.5 Document control	3.7 Document Control (procedure)
4.4.6 Operational control	3.8 Operational Control - Suppliers & Contractors (procedure) 5 Operational Control Procedures
4.4.7 Emergency preparedness & response	3.9 Emergency Preparedness & Response (procedure & blank form)
4.5.1 Monitoring and measurement	3.10 Monitoring & Measurement (procedure)
4.5.2 Non-conformance & corrective & preventive action	3.11 Non-conformance & Corrective & Preventive Action (procedure & blank form)
4.5.3 Records	3.12 Records (procedure)
4.5.4 Environmental management system audit	3.13 Environmental Management System Audit (procedure & blank form)
4.6 Management review	2.3 Management Review

Waste Types for Landfill

EWC Code	Description	Exclusions
01	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS	
01 01	wastes from mineral excavation	
01 01 02	wastes from mineral non-metalliferous excavation	
01 04	wastes from physical and chemical processing of non-metalliferous minerals	
01 04 08	waste gravel and crushed rocks other than those containing dangerous substances	
01 04 09	waste sand and clays	
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 01	concrete, bricks, tiles and ceramics	
17 01 01	concrete	Selected C & D waste only[(a)]
17 01 02	bricks	Selected C & D waste only[(a)]
17 01 03	tiles and ceramics	Selected C & D waste only[(a)]
17 01 07	mixtures of concrete, bricks, tiles and ceramics	Selected C & D waste only[(a)]
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding topsoil and peat, excluding soil and stones from contaminated sites
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 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
19 12 09	minerals (such as sand and stones) from the treatment of waste aggregates that are otherwise naturally occurring minerals	Excluding fines from treatment of any non-hazardous waste or gypsum from recovered plasterboard.

EWC Code	Description	Exclusions
19 12 12	crushed bricks, tiles, concrete and ceramics, including mixtures of minerals	Excludes metal from reinforced concrete and fines from treating any non-hazardous waste or gypsum from recovered plasterboard
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	Excluding topsoil and peat

(a) Selected C & D waste (construction and demolition waste): with low contents of other types of materials (like metals, plastics, organics, wood, rubber etc). The origin of the waste must be known.
No C & D waste from buildings polluted with dangerous substances
No C & D waste from buildings treated or painted with materials containing dangerous substances in significant amounts

Waste Types for Restoration

EWC Code	Description	Exclusions
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	
17 05 04	soil and stones	Excluding soil and stones from contaminated sites
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	garden and park wastes (including cemetery waste)	
20 02 02	soil and stones	

DENNISES LANE
MS
19.2m
Route of underground gas pipelines
Local authority boundary
Bund B1 Topsoil
5m standoff to gas pipeline corridor
Bund A1 Topsoil 3m high
Car park
Access from Dennises Lane via existing track
Office / messroom with cycle lean-to
Hardcore surface
Inspection area & manual jet wash facility
RECEIVING AREA
Ticket office & weighbridge with security lighting
Lighting arc (15m throw, 120° spread)
Existing ETL
FIELD A
(Reclamation works & restoration)
Bund A2 Topsoil 3m high
FIELD B
(Mineral extraction & restoration)
Wheel spinner & wheel cleaner
Track
Drain
General direction of operations
Bund A3 Topsoil 3m high
Existing ETL
Bund B2 Topsoil 3m high
Issues
Silos
Ponds
FREEMAN'S SHAW
BALDWINS FARM
1st Bungalow
2nd Bungalow
Baldwins Farm Cottage
Pond
Issues
MEDINA
Pond
Mast (telecommunication)
Route of underground gas pipelines
Track
Mast (telecommunication)
Combined application boundary (red line)
Public Footpath (Thurrock FP1)
Pond
Path (um)
Lake
DENNIS ROAD
M25
17.4m
Mast (telecommunication)
N
Bunds A1, A2, B1 & B2
3m
4m 4m 4m
Bund A3
3m
4m 22m 4m
ILLUSTRATIVE BUND CROSS SECTIONS
Scale - 1:500
Public Footpath (Thurrock FP1)
Issues
FB
Pond
KEMPS FARM
FB
16.8m
Kemps Cottage
Pond
17.4m
Mast
Darnyns Road
0m 50m 100m

Version / amendment: **1616/CO/1 v5**

D.K. Symes Associates

Composite Operations Plan

Scale - **1:2,500** (at A3)

Date - **28-11-2019**

Plan No. **1616/CO/1**

Medina Farm

Environmental Permit Application

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- Appendix 04: Background Groundwater Quality Time-series graphs
- Appendix 05: Down-gradient Groundwater Quality Time series Graphs
- Appendix 06: Surface Water Quality Time-series graphs
- Appendix 07: RAM3 model Parameterisation Table
- Appendix 08: RAM3 Model Results
- Appendix 09: Electronic Copy of Model
    - Drawing HRA-1 Groundwater Monitoring Plan
    - Drawing HRA-2 Hydrogeological Cross Section

Section 6 – Environmental Site Setting and Design

- Appendix 01: Borehole Logs
- Appendix 02: Groundwater Level Hydrograph
- Appendix 03: Background Groundwater Quality Time-Series Graphs
- Appendix 04: Down-Gradient Groundwater Quality Time-Series Graphs
- Appendix 05: Surface Water Quality Time-Series Graphs
- Appendix 06: Gas Monitoring Data

Section 7 – Dust Management Plan

- Appendix 01: Accepted Waste Types
- Appendix 02: Dust Event Form
- Appendix 03: Dust Complaint Form
    - Drawing 001 Dust Emissions Management Plan

Section 8 – Stability Risk Assessment

- Appendix 01: Engineering Schematic
- Appendix 02: Stability Analysis Outputs

Section 10 - Operating Techniques & Waste Acceptance Procedures

CIWM

Continuing Competence Certificate

This certificate confirms that

Terence Stocks

Has met the relevant requirements of the Continuing Competence scheme for the following award(s) which will remain current for two years from 03/08/2022

LIN Landfill - Inert Waste

Expiry Date: 03/08/2024

Verification date: 28/07/2022

Authorised:

Professional Services Director

Learner ID: 27466

Certificate No.: 5203842

Date of Issue: 03/08/2022

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

Scan code on reverse to authenticate that this is a genuine paper

wamitab

Qualification Title:

WAMITAB Level 4 Diploma in Waste Management Operations : Managing Landfill - Non Hazardous Waste (QCF) - 4MLNH

Qualification Accreditation Number:

600/0329/7

This Certificate is awarded to

Maria Anton-Garcia

Awarded: 03/12/2014

Serial No:15547/4MLNH/1

Authorised

Ray Burberry
Qualifications Manager, WAMITAB

00069978

Credit certificate

This certificate determines credit awarded to:

Maria Anton-Garcia

Units gained:

		Credit Value	Credit Level
K6009711	Manage physical resources	3	4
M6009712	Manage the environmental impact of work activities	5	4
K6021423	Procedural compliance	6	4
M6021424	Manage and maintain effective systems for responding to emergencies	19	4
T6009601	Provide leadership and direction for own area of responsibility	5	4
F6021444	Prepare landfill sites for the acceptance of non hazardous waste	16	3
R6021609	Manage the reception of non hazardous waste	7	4
A6021670	Manage the movement, sorting and storage of waste	7	3
L6021897	Manage site operations for the disposal of non hazardous waste to landfill sites	13	4
F1013860	Control maintenance and other engineering operations		
U1051769	Monitor procedures to control risks to health and safety (Employment NTO Unit B)		
J1013861	Control improvements to waste management operations		

Awarded: 03/12/2014

Serial No.: 15547/MSCE8/1

Authorised

Ray Burberry
Qualifications Manager, WAMITAB

Regulated by Ofqual

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

Llywodraeth Cymru
Welsh Government

The qualifications regulators logos on this certificate indicate that the qualification is accredited only for England, Wales and Northern Ireland.

00069977

Certificate No. OCC66618

Operator Competence Certificate

Title:

Inert Landfills (Open) (4MLIO6)

This Certificate is awarded to

Terence James Stocks

Awarded: 22/02/2016

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.

00104659

Credit certificate
This certificate determines credit awarded to:
Terence James Stocks

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
T6021618	Manage the reception of inert waste	6	3
A6021670	Manage the movement, sorting and storage of waste	7	3
H6021677	Manage site operations for the disposal of inert waste to landfill sites	11	4
M6021441	Prepare landfill sites for the acceptance of inert waste	12	3

Awarded: 22/02/2016

Serial No.: 27466/HSS3/1

Authorised

Ray Burberry
Qualifications Manager, 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.

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CIWM

Continuing Competence Certificate

This certificate confirms that

Maria Anton-Garcia

Has met the relevant requirements of the Continuing Competence scheme for the following award(s) which will remain current for two years from 05/09/2022

LIN Landfill - Inert Waste

Expiry Date: 05/09/2024

Verification date: 26/08/2022

Authorised:

Professional Services Director

Learner ID: 106135

Certificate No.: 5206001

Date of Issue: 05/09/2022

CIWM Chief Executive Officer

The Chartered Institution of Wastes Management

Scan code on reverse to authenticate that this is a genuine paper

Certificate No. OCC5400

Operator Competence Certificate

Qualification Title:

Managing Landfill - Non Hazardous Waste - 4MLNH

This Certificate is awarded to

Maria Anton-Garcia

Awarded: 03/12/2014

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.

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