

Flood Risk Assessment & Drainage Strategy

7270 – Proposed Commercial Development

Lindley Moor Road

Huddersfield

Prepared For

Frank Marshall Estates

Report: 7270-HJCE-ZZ-XX-RP-3000

Date: 04.2023

Document Revisions

Revision	Date	Written by	Checked by
1	04.2023	D.Moffat	M.Holloway

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1. Introduction

- 1.1. This Flood Risk Assessment (FRA) has been produced by Holloway Jennings on behalf of Frank Marshall Estates. It supports the planning application for the proposed development at Lindley Moor Road, Huddersfield. The proposal will comprise the demolition/clearance of the site and redevelopment as four new units with mixed uses with associated infrastructure. For clarity in this report, the development shall be referred to as ‘the site’.
- 1.2. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) 2021 and the associated Planning Practice Guidance.
- 1.3. The key site details are below.
- | | |
|------------------------------|-----------------------------------|
| - Site Name | Former Wappy Springs Public House |
| - Location | Lindley Moor Road |
| - Grid Reference | SE 10367 18774 |
| - Postcode (nearest) | HD3 3TD |
| - Site Area (hectares) | 0.70 |
| - Development Type | Commercial |
| - Flood Zone | Flood Zone 1 |
| - NPPF Vulnerability | Less vulnerable |
| - Surface Water Flood Risk | Low |
| - Lead Local Flood Authority | Kirklees Council |
| - Local Planning Authority | Kirklees Council |
- 1.4. The site is within Flood Zone 1. As the site area is less than one hectare and within Flood Zone 1 other sources of flooding need not be considered.
- 1.5. This report is a FRA and, therefore, deals with environmental issues only in as much as they are impacted by flooding. The report is the property of Holloway Jennings Consulting Engineers (HJCE) and is produced for the exclusive use of the client, Frank Marshall Estates. The contents may not be made use of by any third party without the express written consent of HJCE. Without such consent HJCE can accept no responsibility to any third party. By receiving this report and acting on it, the client, or any third party relying on it, accepts that no individual is personally liable in contract, tort, or breach of statutory duty (including negligence).

2. Methodology

- 2.1. This is a desk-based study that utilises existing information in the form of mapping and previously undertaken work. Conclusions made about flooding have been made using our expert judgement and knowledge of similar events.
- 2.2. In preparing this report, information has been gathered and referenced from a number of sources. These are as follows:
- The Environment Agency's Flood Map for Planning
 - The Risk of Flooding from Surface Water (RoFfSW) Mapping
 - The 2021 NPPF
 - The Planning Practice Guidance to the 2021 NPPF
 - Risk of Flooding from Surface Water Data Download (RoFSW)

3. Site Details

3.1. Site Location & Characteristics

3.1.1. The proposed development site is located approximately 4.5km to the northwest of Huddersfield Town Centre in the Metropolitan Borough of Kirklees.

3.1.2. The site currently comprises the existing Wappy Spring Inn Public House, a car park as well as areas of grazing/paddocks. The surrounding area predominantly comprises a mix of residential and commercial properties as well as road infrastructure and undeveloped land.

3.1.3. Access to the site is from Lindley Moor Road

3.1.4. The total development site covers approximately 0.70 hectares.

3.1.5. See Appendix A for a location map of the site.

3.2. Geology

3.2.1. The Soilscales geology map identify the site to be situated on ground comprising 'freely draining slightly acid loamy soils'

3.2.2. A Phase 1 Desktop Study report was prepared by GEO Environmental Engineering in April 2021 which advises *'the presence of sandstone bedrock may allow for the use of soakaways if determined to be present at shallow depth below the site.'*

3.3. Topography

3.3.1. The site, as a whole is relatively flat, no topographic survey information is currently available, however historic maps indicate a Benchmark (BM) of 255.78m is noted on the southern corner of the public house.

3.4. Surface Water Features

3.4.1. No surface water features can be identified on the publicly available Ordnance Survey maps.

3.4.2. The LLFA (Kirklees MBC) provided a plan which shows a culverted watercourse from the old Peat Ponds Farm (now an commercial development) passes through the site. The culvert crosses to a large catchpit manhole just inside National Highways land. Motorway drainage runs in a carrier drain parallel to your northern site boundary. The drainage features are identified on the plan included in Appendix B.

3.5. Sewer Network

3.5.1. A copy of Yorkshire Water sewer records is included in Appendix B.

3.5.2. There are no public sewers in the vicinity of the site.

3.5.3. A CCTV drainage survey was undertaken on the site by DrainsAid during April 2021 which identifies foul from the existing property along with rainwater pipes on the front elevations

of the existing building discharge to a septic tank, which overflows to a soakaway. Rainwater pipes to the rear of the property discharge onto the ground surface. A copy of the drainage survey report is provided in Appendix C.

4. The Proposed Development

4.1. The development proposal will comprise the demolition/clearance of the site and redevelopment as four new units with mixed uses including the following:

- E(g) i Offices to carry out any operational or administrative functions,
- E(g) ii R&D
- E(g) iii Light industrial
- B2 industrial with ancillary offices
- B8 warehousing with ancillary offices

An indicative site layout is included in Appendix D.

5. Flood Risk Planning Policy

5.1. The Environment Agency Flood Map for Planning

5.1.1. The Environment Agency’s Flood Map for Planning gives an indicative prediction of areas at risk of fluvial and tidal flooding. The mapping is an amalgamation modelled flood levels and historical flood event outlines.

5.1.2. The Flood Map is split into ‘Flood Zones’, which demarcate the extent of flooding from rivers or the sea for different return periods. The Flood Map for Planning shows the extent of the natural floodplain if there were no defences or other man-made structures. They do not provide a definitive picture of where flooding would occur; rather, they provide an indicative prediction of areas at risk.

5.1.3. Table 5.1, below, lists the flood zone categories and explains the flood risk probabilities they represent.

Table 5.1 – Flood Zone Categories

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as ‘clear’ on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)

Zone	3b	The	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)
Functional Floodplain			

6. The National Planning Policy Framework

6.1.1. The NPPF sets out the Government’s national policies on different aspects of land use planning in England in relation to flood risk. The Planning Practice Guidance to the NPPF provides further information on the policies set out in the NPPF. It encourages development to be located in areas of lower flood risk wherever possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.

6.1.2. Within each Flood Zone, a key factor in determining planning applications for development is the flood risk vulnerability of a development. Table 2 of the Planning Practice Guidance to the NPPF categorises different development types according to their vulnerability to flooding. These categories are:

- Essential infrastructure;
- Highly vulnerable development;
- More vulnerable development;
- Less vulnerable development, and;
- Water-compatible development.

6.1.3. Within the different Flood Zones each of the above development categories are considered appropriate or not permissible. The Planning Practice Guidance to the NPPF lists these as:

- Flood Zone 1:

6.1.4. All the development categories listed above are appropriate

- Flood Zone 2:

6.1.5. Water-compatible, less vulnerable development, more vulnerable development and essential infrastructure is appropriate in this zone.

- Flood Zone 3a:

6.1.6. Water-compatible and less vulnerable development is appropriate in this zone. Highly vulnerable development should not be permitted in this zone.

- Flood Zone 3b:

6.1.7. Only water-compatible development and essential infrastructure that has to be there should be permitted in this zone.

6.1.8. The above information sets out the basis by which developments must be assessed in terms of flood risk. In Section 8, below, the vulnerability of the proposed development at Lindley Moor Road will be reviewed against the Flood Zone in which it is located. This will inform the appropriateness of the development as per the advice within the Planning Practice Guidance of the NPPF.

7. Flood Risk Assessment

- 7.1. Flooding can arise from a variety or combination of sources. These may be natural or artificial and may be affected by climate change. These are discussed, below, in detail and summarised in Table 7.1, which is at the end of this chapter.
- 7.2. This section will review and discuss each type of flooding and whether it is likely to impact the proposed development site.
- 7.3. Rivers and Seas (Fluvial) Flood Risk
- 7.3.1. The Environment Agency Flood Map for Planning (see Appendix E) indicates the site is located in flood zone 1. Therefore, the risk of flooding from rivers can predominantly be considered as low.
- 7.3.2. The site is not in an area at risk of tidal flooding.
- 7.3.3. As the site area is less than one hectare and within Flood Zone 1 other sources of flooding need not be considered.
- 7.4. Surface Water (Pluvial) Flood Risk
- 7.4.1. Pluvial flooding results from rainfall-generated overland flow, where rainwater has not yet reached a watercourse or sewer and where the local drainage systems become overwhelmed. Pluvial flooding often occurs during short, very intense storms, but can also occur during longer periods of rainfall when the ground is already saturated, or where land has low permeability due to development. Although pluvial flood events are usually short-term, they can be devastating with fast flows and deep waters occurring quickly.
- 7.4.2. In these conditions surface water can build up where the topography is flat. Where it gathers it will travel down prevailing gradients. Pluvial flooding then occurs at locations where significant surface water flow paths converge, at localised low points and/or due to overland obstructions. In urban areas pluvial flooding often occurs where the built environment channels overland flow routes (down roads that are bounded by kerbs, for example) or where there are obstacles to natural overland flow routes. Boundary walls and buildings are often the main culprits and, hence, the likelihood of pluvial flooding to impact property and gardens.
- 7.4.3. Pluvial flooding is exacerbated in many cases by the mistreatment or failure of the below ground infrastructure (including partial or full blockages of gullies and/or within the combined sewers and the accumulation of fats, oils and greases within the sewer networks).
- 7.4.4. The Environment Agency's Risk of Flooding from Surface Water (RoFSW) maps attempt to model the areas where pluvial flooding is likely to occur. The RoFSW map is a

national scale modelled output. It shows the flooding that could take place from the 'surface runoff' generated by rainwater (including snow and other precipitation) which:

- a. is on the surface of the ground (whether or not it is moving), and. has not yet entered a watercourse, drainage system or public sewer.

7.4.5. The RoFSW map predominantly follows topographical flow paths of existing watercourses, or dry valleys with some isolated ponding located in low lying areas.

7.4.6. The RoFSW maps are categorised into High, Medium and Low risk, and correlate to 1 in 30, 1 in 100 and 1 in 1000 chance of flooding in each year respectively.

7.4.7. The RoFSW flood maps identify the site is not at low risk of flooding from overland flows. A localised area of flooding is shown in the north east corner of the site, it is anticipated this is as a consequence of a local low area of ground topography, this will be confirmed following a topographic survey of the site.

7.4.8. In summary, the pluvial flood risk mapping show that the site is at low or not at risk.

8. Flood Risk Assessment Conclusion

- 8.1. This Flood Risk Assessment (FRA) supports the planning application for the proposed site; at Lindley Moor Road. The proposal will comprise the demolition/clearance of the site and redevelopment as four new units with mixed uses with associated infrastructure
- 8.2. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) 2021 and the associated Planning Practice Guidance.
- 8.3. The Environment Agency's Flood Map for Planning indicates that the development site is within Flood Zone 1. Table 3 of the Planning Practice Guidance to the NPPF states that 'less vulnerable' development is appropriate in Flood Zones 1 and 2, which have the same level of probability as the surface water flooding occurring on site. Consequently, the development can be considered to be appropriate in this location, according to the NPPF.
- 8.4. Pluvial flood risk has also been reviewed and found to be low.

9. Drainage Strategy

- 9.1. The NPPF states that opportunities to reduce overall flood risk should be sought and achieved through sustainable development and careful drainage design. This can be achieved through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems (SUDS). SUDS are designed to control surface water runoff close to where it falls and mimic natural drainage as closely as possible. They provide opportunities to:
- Reduce the causes and impacts of flooding;
 - Remove pollutants from urban run-off at source;
 - Combine water management with green space with benefits for amenity, recreation and ecology.
- 9.2. The hierarchy of surface water discharge implemented by the NPPF demonstrates four methods of discharge, from most sustainable to least sustainable. The hierarchy is as follows:
- 9.2.1. To source, via infiltration to the ground;
 - 9.2.2. To a watercourse or water body;
 - 9.2.3. To a surface water sewer or drain;
 - 9.2.4. To a combined sewer.
- 9.3. A Phase 1 Desktop Study report was prepared by GEO Environmental Engineering in April 2021 which advises *'the presence of sandstone bedrock may allow for the use of soakaways if determined to be present at shallow depth below the site.'* Soakaways tests shall be undertaken in accordance with BRE Digest 365 (soakaway design) during the phase 2 geo-environmental survey.
- 9.4. The use of soakaway/infiltration drainage systems shall be confirmed following receipt of the Phase 2 geo-environmental survey reports.
- 9.5. Where the use of soakaway/infiltration drainage systems are not deemed appropriate, then an acceptable rate of discharge to the surface water watercourse/public sewer, must be agreed with the LLFA/water authority. Provided in Appendix H are HR Wallingford calculations to determine the greenfield run-off rate, Q_{bar} , with associated values for the 1 in 1 year, 30 year and 100 year. The run-off rates are summarised on the following page.

Greenfield run-off rates	Litres per second
Qbar	5.29
1 in 1 year	4.55
1 in 30 years	9.26
1 in 100 years	12.54

9.6. Water quality

9.6.1. To meet the requirement to maintain or improve water quality, surface water drainage from impermeable areas that serve vehicular traffic will need to receive treatment improvement in-line with CIRIA guidance.

9.6.2. Sustainable Drainage Systems (SUDSs) may be used in conjunction with conventional drainage systems to improve water quality as well as manage surface water discharge. The following audit has been carried out relating to the suitability of SUDs system. The implementation of SUDs shall be considered at the detailed design stage of the project.

SUDs Method	Comments
Infiltration	Subject to results of phase 2 geo-environmental survey
Ponds/Basins and wetlands	Suitable if space is available on site.
Swales, French/Filter Drains	Suitable if space is available on site. Swale can be used to increase water quality as well as convey surface water flows.

Proprietary Geocellular Systems/Tank systems.	To provide surface water attenuation
Oversized pipe/box culverts	To provide surface water attenuation
Purposed Designed Tanks	To provide surface water attenuation

9.7. SUDS infrastructure maintenance

9.7.1. A Surface Water Management Plan (SWMP) shall be developed when the detailed drainage design is undertaken. The plan shall be given to the site owner/Developer on completion of the development. The plan will provide details for inspection and maintenance specification for sustainable drainage systems (SuDS) maintained by a management company on behalf of the developer if they are not to be adopted by the Local Authority or Water Authority. The principles of the Surface Water Management Plan (SWMP) as set out above will ensure that surface water from the development site will be collected, attenuated, and conveyed in such a way that it manages the flows in accordance with best practice.

9.7.2. Note any proprietary system must have the manufacturer guidance followed.

9.8. Surface Water Disposal.

9.8.1. A discharge to watercourse has been considered, subject to confirmation infiltration type drainage is not suitable it is proposed to discharge surface water to the existing culverted watercourse passing through the east of the site. The discharge to watercourse shall be restricted to the existing greenfield 'Qbar' rate of 5.29 litres/second.

9.8.2. On plot surface water attenuation shall be provided to attenuate surface water flows in excess of the restricted discharge. An initial calculation of the volumes of attenuation using Microdrainage is has been undertaken and is summarised below;

9.8.3. Attenuation Volume

- Restricted surface water discharge rate = 5.29 l/s
- Proposed Impermeable area = 0.5061 Ha
- 1:30 Year Return Period = between 133 & 211m³
- 1:100 Year Return + 45% climate change = between 319 & 472m³

9.8.4. The proposed drainage system shall be designed in accordance with the requirements of the Code for Adoption and shall demonstrate that:

- No surface flooding occurs in 1 in 30-year rainfall event
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event (including an allowance of 45% for the effects of future climate change) as defined in NPPF.

9.8.5. Potential attenuation options shall be considered at detailed drainage design stage, however an area to the east of the site has been reserved for an attenuation basin.

9.8.6. All vehicle trafficked areas shall pass through a suitably designed bypass or full retention separator prior to discharge to the surface water drainage system.

9.9. Foul Water Disposal

9.9.1. Government guidance contained within Planning Policy Guidance and part H3 of Building Regulations 2010 provides a preferred hierarchy of drainage options for the disposal of foul water drainage, that must be considered and discounted in the following order:

- Connection to the public sewer.
- Connection to a private sewer, communicating with a public sewer.
- Either a septic tank or another wastewater treatment system.

9.9.2. There are no foul or combined water public sewers in the vicinity of the site. It is therefore not viable to connect the site to the public sewer network.

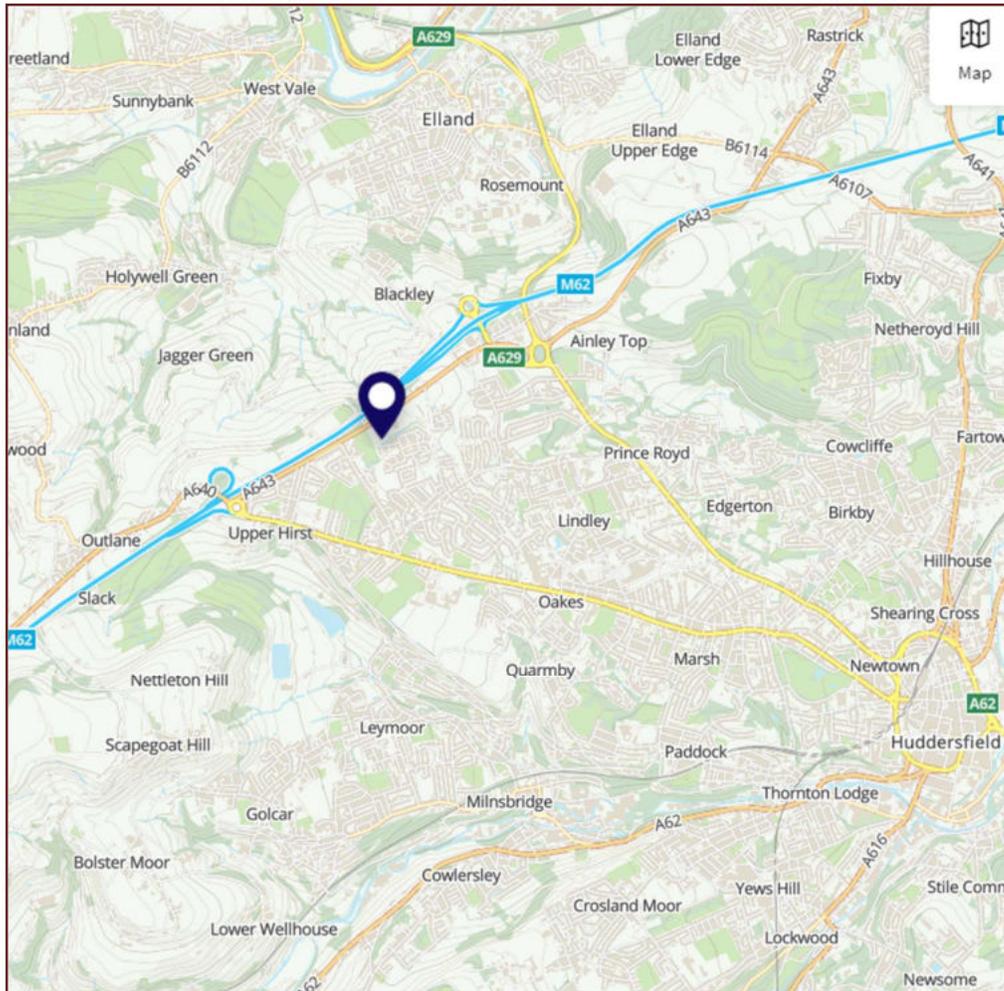
9.9.3. As there are no known private foul/combined sewers in the vicinity of the site the preferred option for the disposal of domestic foul water is using a 'Submerged Aerated Filter' sewage treatment plant. Effluent from the treatment plant will be discharged to the culverted watercourse passing through the east of the site. An environmental permit may be required from the Environment Agency for use of a sewage treatment plant. This should be discussed with the Environment Agency.

9.9.4. Foul water from any canteen/kitchen areas shall be passed through a suitably design grease trap prior to connection to the foul water drainage system.

9.9.5. Foul water disposal shall be in accordance with the Building Regulations Part H “Drainage and Water Disposal”.

Appendix A

Site Location Plan



Job Ref –

Job Name – Former Wappy Springs Public House

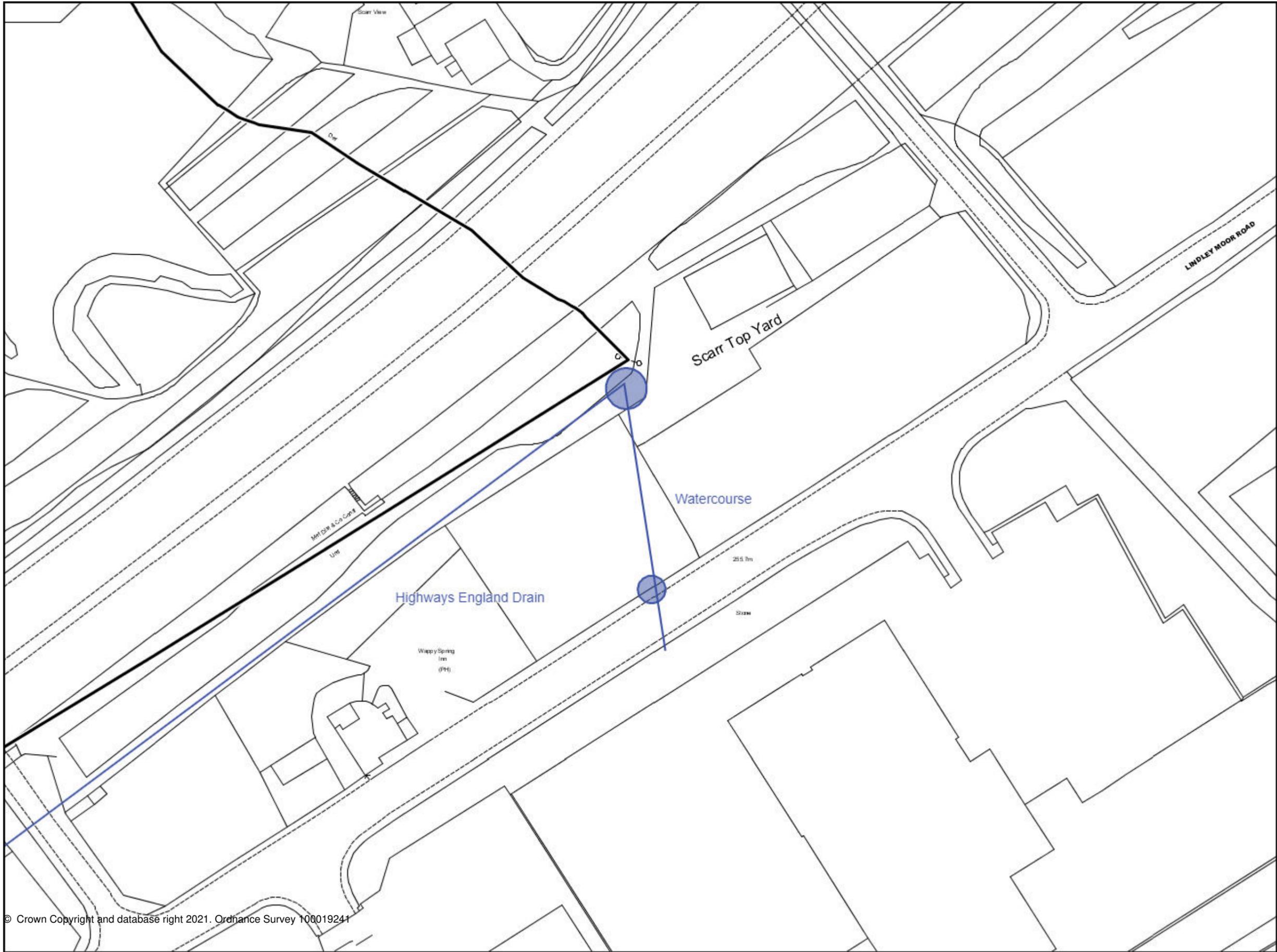
Site Address – Lindley Moor Road, Huddersfield

Post Code (Nearest) – HD3 3TD

NGR – SE 10367 18774

Appendix B





Kompass
Kirklees Mapping Service

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Ordnance Survey
100019241

maps@kirklees.gov.uk



Appendix C



Project

Project Name: 10008506 - Whappy Springs Public House HD3 3TD
Project Date: 06/04/2021
Inspection Standard: MSCC5 Sewers & Drainage GB (SRM5 Scoring)

CCTV Survey Report

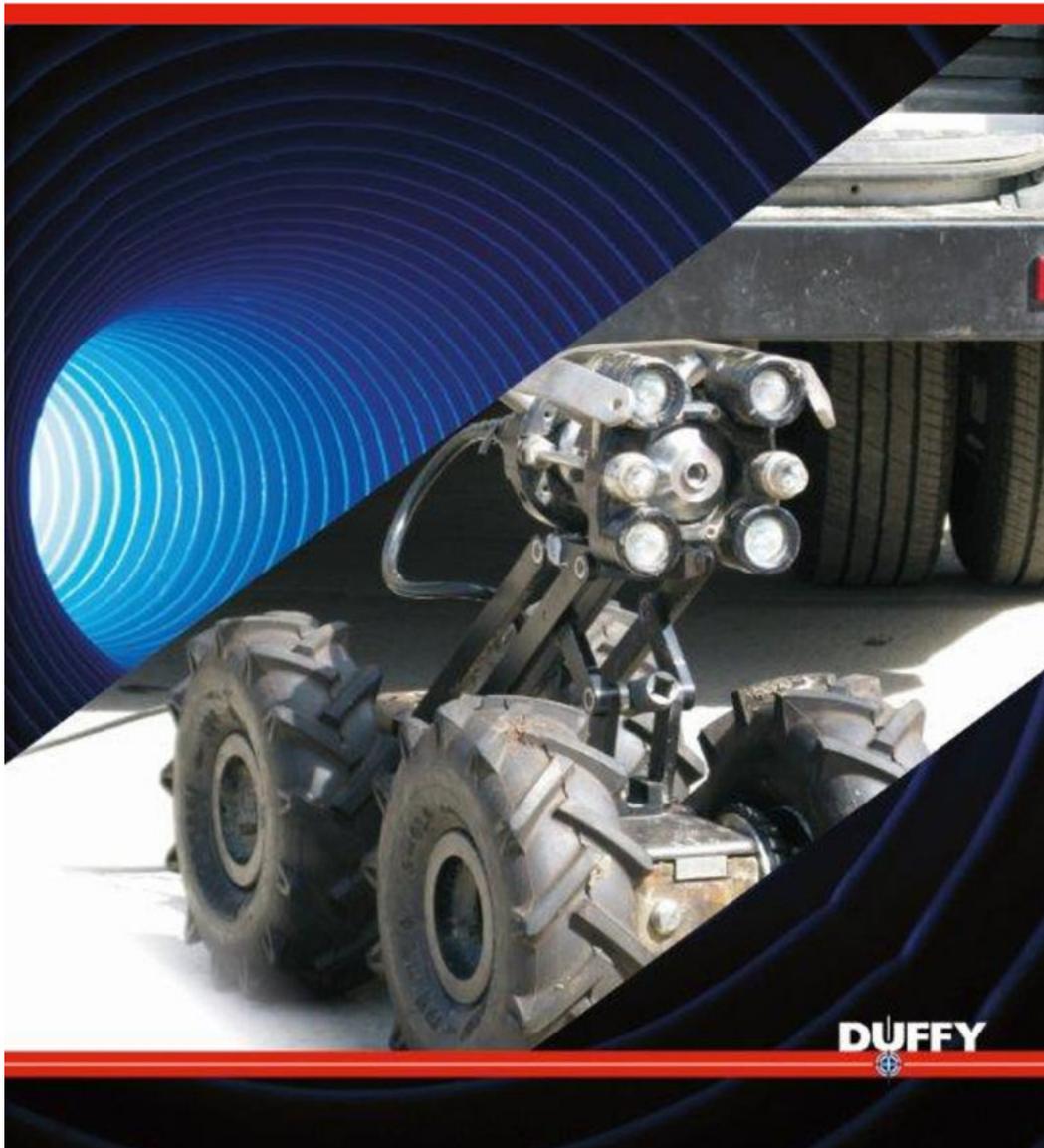




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Project Name	Project Number	Project Date
10008506 - Whappy Springs Public House HD3 3TD		06/04/2021

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Section: 1; CW1 > Septic (CW1X)	1



Project Information

Project Name	Project Number	Project Date
10008506 - Whappy Springs Public House HD3 3TD		06/04/2021

Client

Company:

Contact:

Mobile:

Site

Company:

Contact:

Department: Whappy Springs Public House

Street: Lindley Moor Road

Town or City: Huddersfield

Post Code: HD3 3TD

Mobile: 07496 111048

Contractor

Company: Drainsaid

Contact: Matthew Marsden

Department: CCTV and DESILT Supervisor

Street: Connaught House, Park View

Town or City: Wakefield

County: West Yorkshire

Post Code: WF3 3HA

Mobile: 07852 915244

Email: m.marsden@peterduffyLtd.com



Scoring Summary

Project Name	Project Number	Project Date
10008506 - Whappy Springs Public House HD3 3TD		06/04/2021

Structural Defects

Section	PLR	Grade	Description
All inspected pipes are in an acceptable structural condition (< grade 3).			

Service / Operational Condition

- Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.
- Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.
- Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

Section	PLR	Grade	Description
1	CW1X	4	Settled deposits, fine, 30% cross-sectional area loss

Abandoned Surveys

Section	PLR	Description
1	CW1X	Survey abandoned

Information

These scoring summaries are based on the SRM grading from the WRc.



Project Summary

Project Name 10008506 - Whappy Springs Public House HD3 3TD	Project Number	Project Date 06/04/2021
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Pipe Summary

No.	Type	PLR	Upstream Node	Downstream Node	Road	Town	Use	Mat.	Profile	Length
1	SEC	CW1X	CW1	SEPTIC	Whappy Springs Public House	Huddersfield	C	VC	Circular 150mm	12.00 m
Total:										12.00 m

Pipe Levels

No.	PLR	Upstream Node	Upstream C.L.	Upstream I.L.	Upstream I.D.	Downstream Node	Downstream C.L.	Downstream I.L.	Downstream I.D.
1	CW1X	CW1			0.470 m	SEPTIC			0.000 m

Pipe Summary by Profile

Profile	Total Length	No. Pipes
Circular 150mm	12.00 m	
Circular 150mm =	12.00 m	1
Total =	12.00 m	1

Inspection Summary

Pipe No.	Insp. No.	Upstream Node	Downstream Node	Dir.	Operator	Insp. Date	Insp. Time	Str	Ser	Final Observation	Length
1	1	CW1	SEPTIC	DS	C.Chilton	06/04/2021	10:09	1	5	SA, DES 30%	9.07 m
Total:											9.07 m

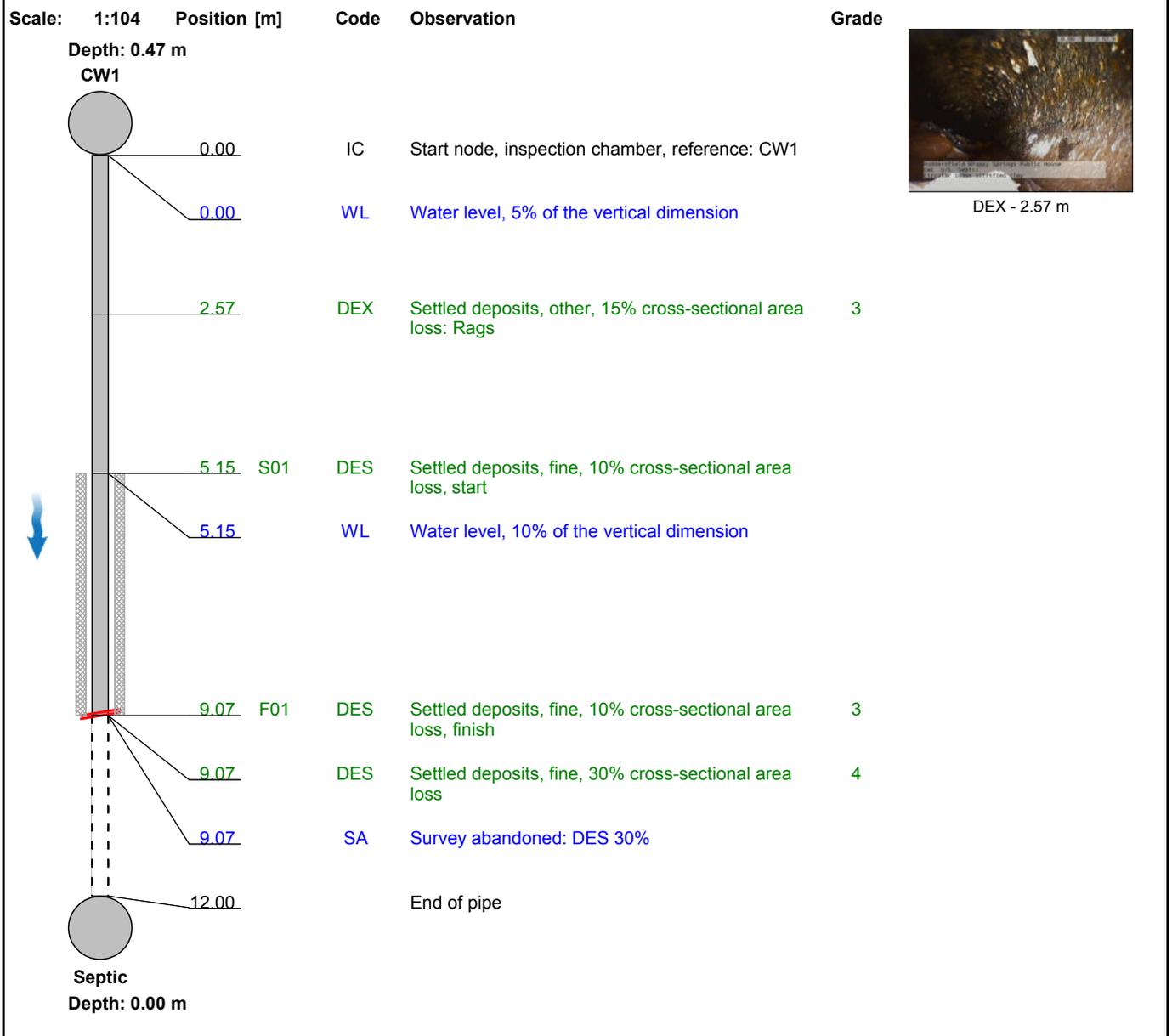
Section Inspection - 06/04/2021 - CW1X

Item No. 1	Insp. No. 1	Date 06/04/21	Time 10:09	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR CW1X
Operator C.Chilton		Vehicle YH70 WXD		Camera Pushrod	Preset Length 0.40 m	Legal Status Not Specified	Alternative ID Not Specified

Town or Village:	Huddersfield	Inspection Direction:	Downstream	Upstream Node:	CW1
Road:	Whappy Springs Public Hou	Inspected Length:	9.07 m	Upstream Pipe Depth:	0.470 m
Location:	Gardens (private)	Total Length:	12.00 m	Downstream Node:	SEPTIC
Surface Type:	Grass	Joint Length:	1.00 m	Downstream Pipe Depth:	0.000 m
Use:	Combined	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	150 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Sample condition survey	Lining Material:	No Lining		

Comments:

Recommendations:



Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	3	5.0	5.8	15.0	5.0

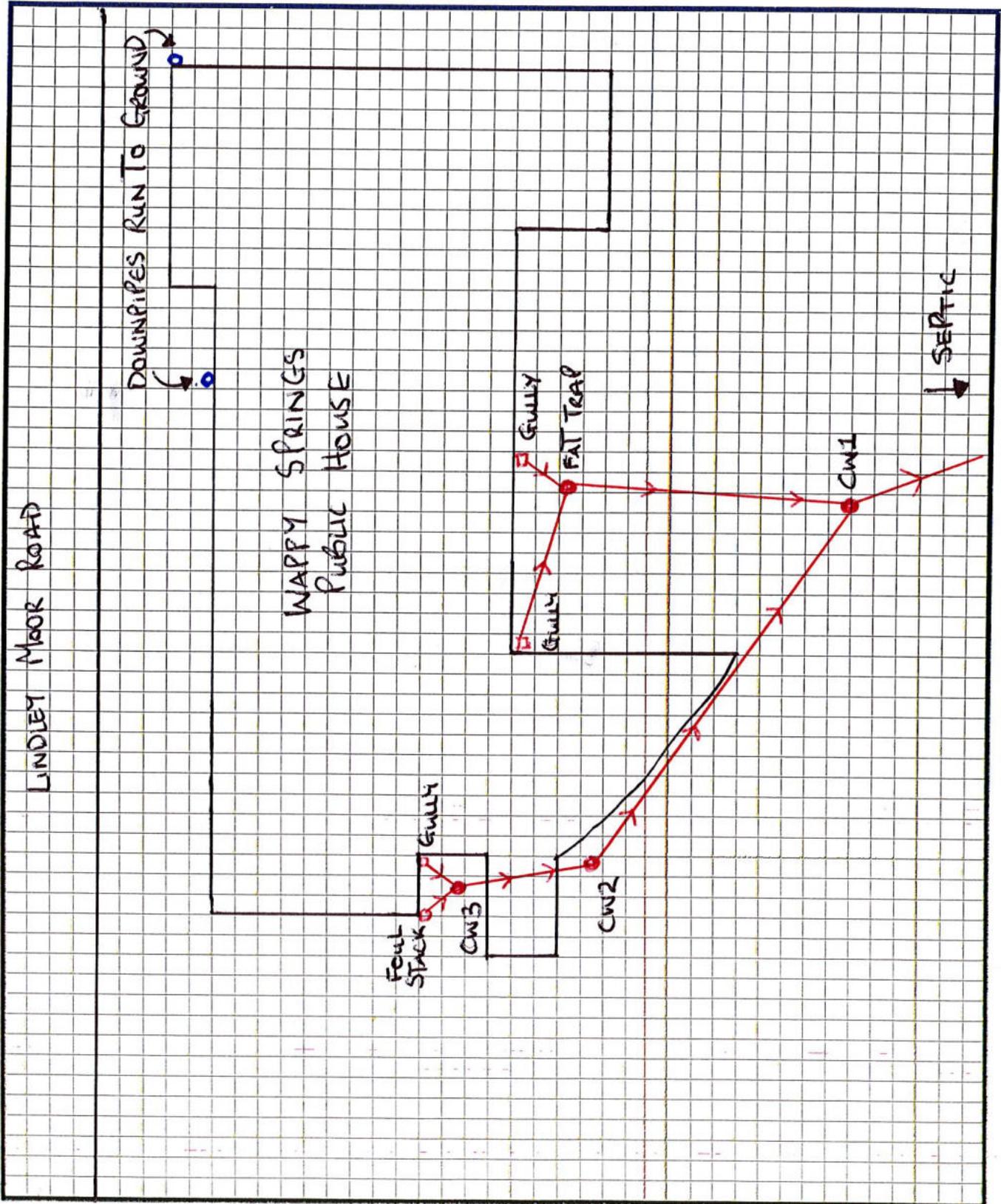
Section Pictures - 06/04/2021 - CW1X

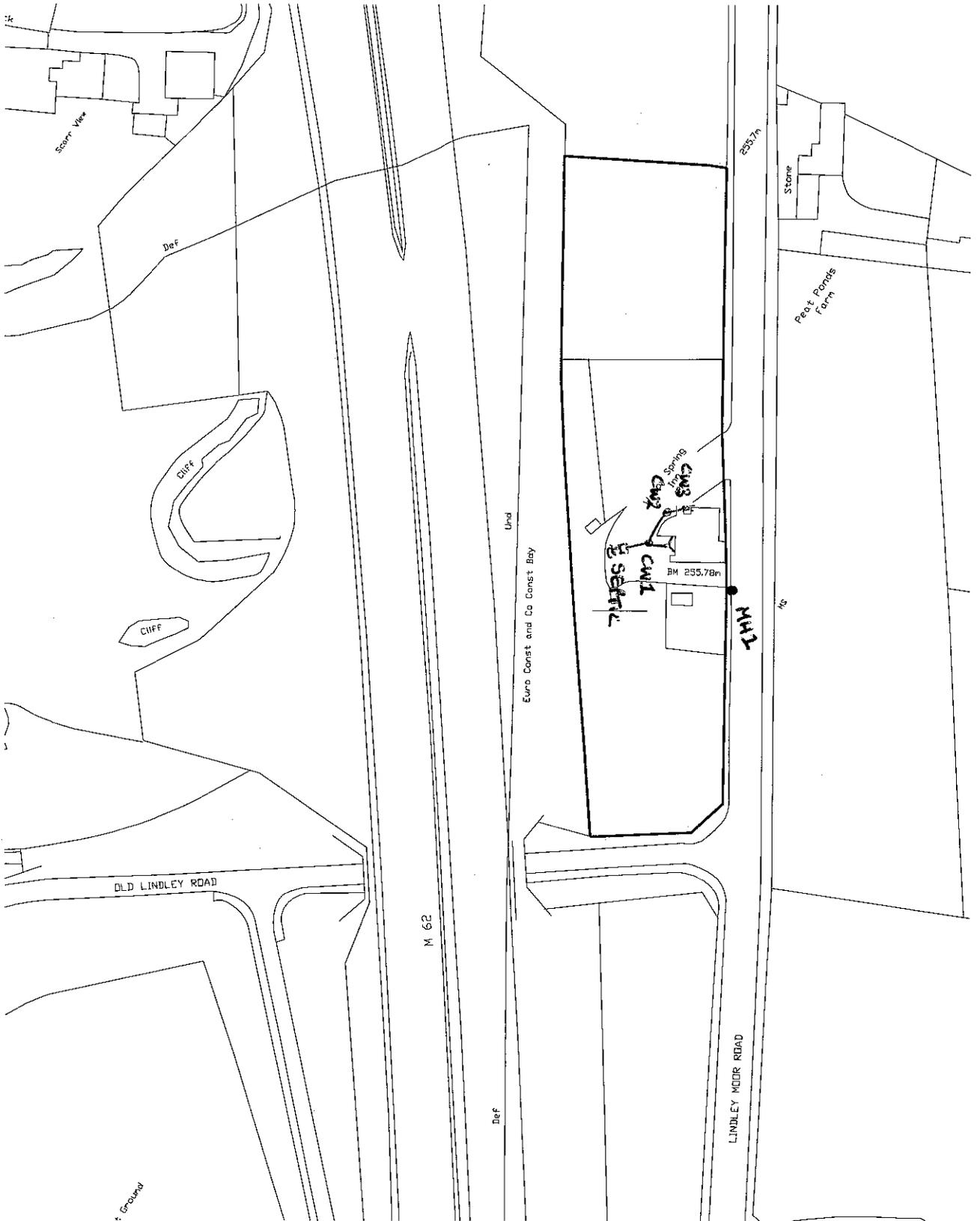
Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Downstream	CW1X		10008506



CW1-DSeptic-1-27853.jpg, 00:00:39, 2.57 m
Settled deposits, other, 15% cross-sectional area loss, Rags

Date:	06/04/2021	Job No:	10008506
Address	WAPPY SPRINGS PH, HUDDERSFIELD HD3 3TD		
Engineer:	C. CHILTON		





Appendix D

M62

Notes:
 This drawing is the sole copyright of KPP Architects Ltd and reproduction in any form is forbidden unless permission is obtained in writing.
 Do not scale from this drawing. Any discrepancies on site should be brought to the attention of KPP Architects Ltd.
 Work and materials must comply with the current building regulations and codes of practice and be read in conjunction with building specifications and other sub-contractors information. All materials are to be installed in strict accordance with the recommendations of the manufacturers.



LINDLEY MOOR ROAD

255.7m

UNIT NUMBER	GROSS INTERNAL AREA	USE CLASS
UNIT 1	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 2	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 3	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 4	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 5	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 6	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 7	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 8	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 9	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 10	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 11	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 12	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 13	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 14	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8
UNIT 15	915 SQ.FT PER FLOOR	E(g)(i, ii, iii), B2 and B8

Rev	Description	By	Chkd	Date
Client				

FRANK MARSHALL ESTATES

Project Title
**WAPPY SPRINGS
 HUDDERSFIELD**

Drawing Title
PROPOSED SITE PLAN

KPP
 ARCHITECTS
 Lodge House
 12 Town Street
 Horsforth, Leeds LS184RJ
 T : +44 (0) 113 2390460
 E : architects@kpp-leeds.co.uk
 W : www.kpp-leeds.co.uk

Scale	Size	Date	Drawn	Checked
1:500	A3	DEC'22	MH	.

Status
PLANNING

KPP Job No. 2278	Rev A
----------------------------	-----------------

Number
2002

Appendix E

Flood map for planning

Your reference
I

Location (easting/northing)
410370/418780

Created
25 Feb 2023 10:43

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>

Flood map for planning

Your reference

I

Location (easting/northing)

410370/418780

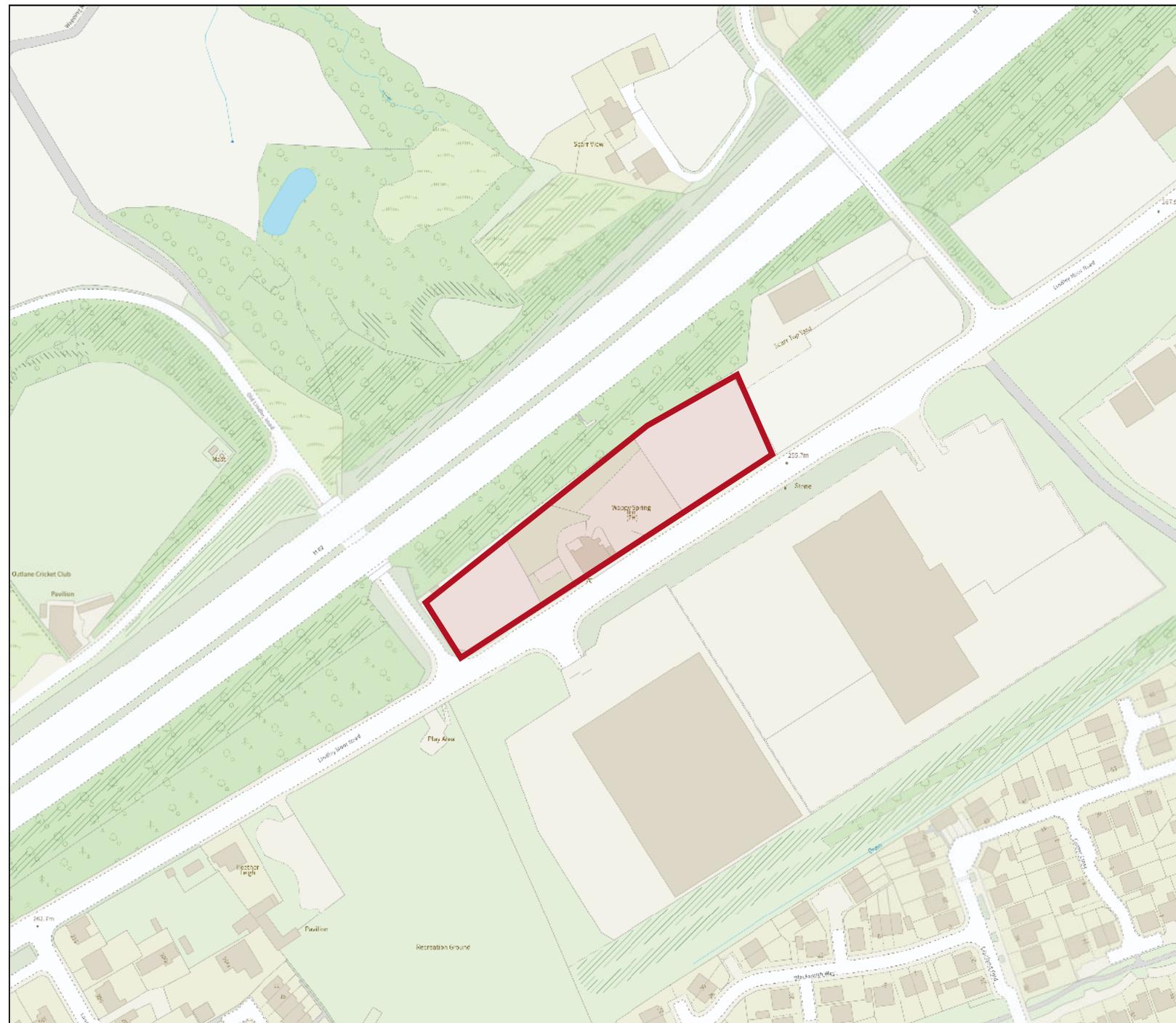
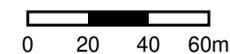
Scale

1:2500

Created

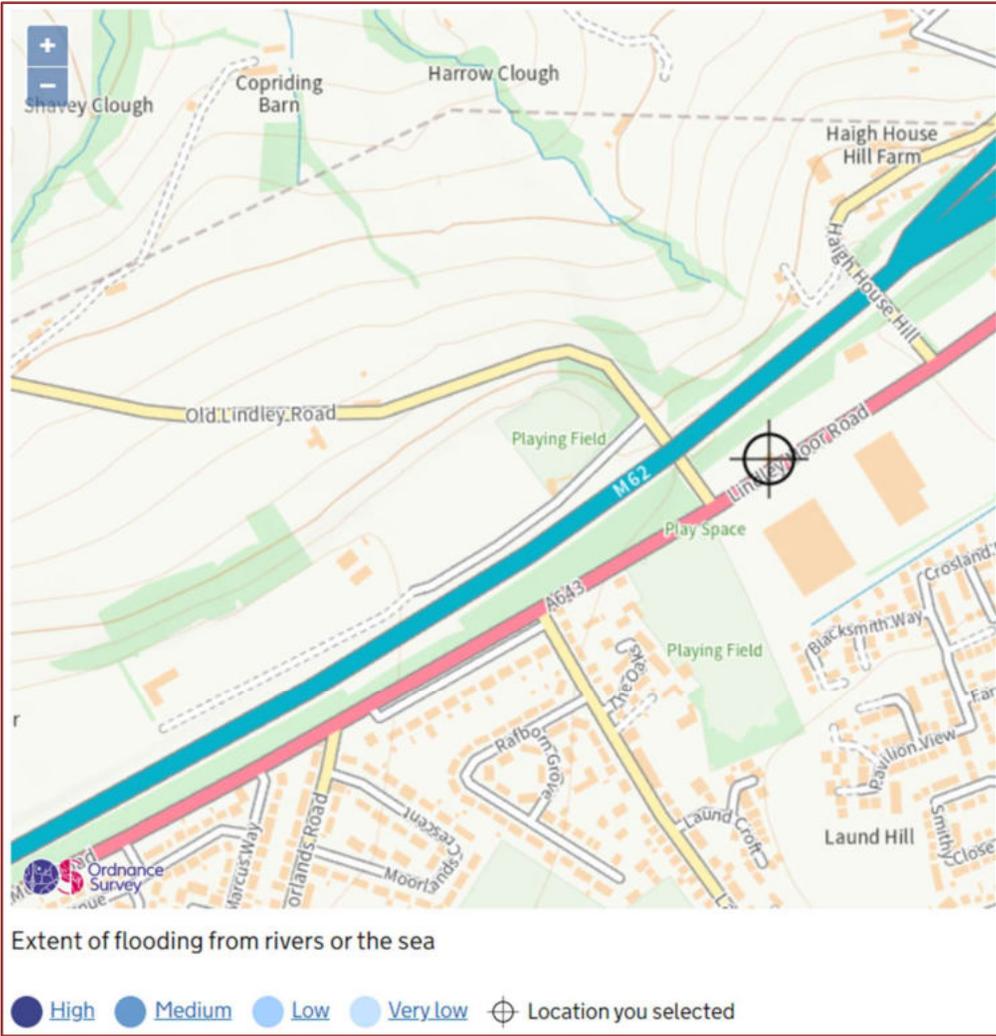
25 Feb 2023 10:43

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area



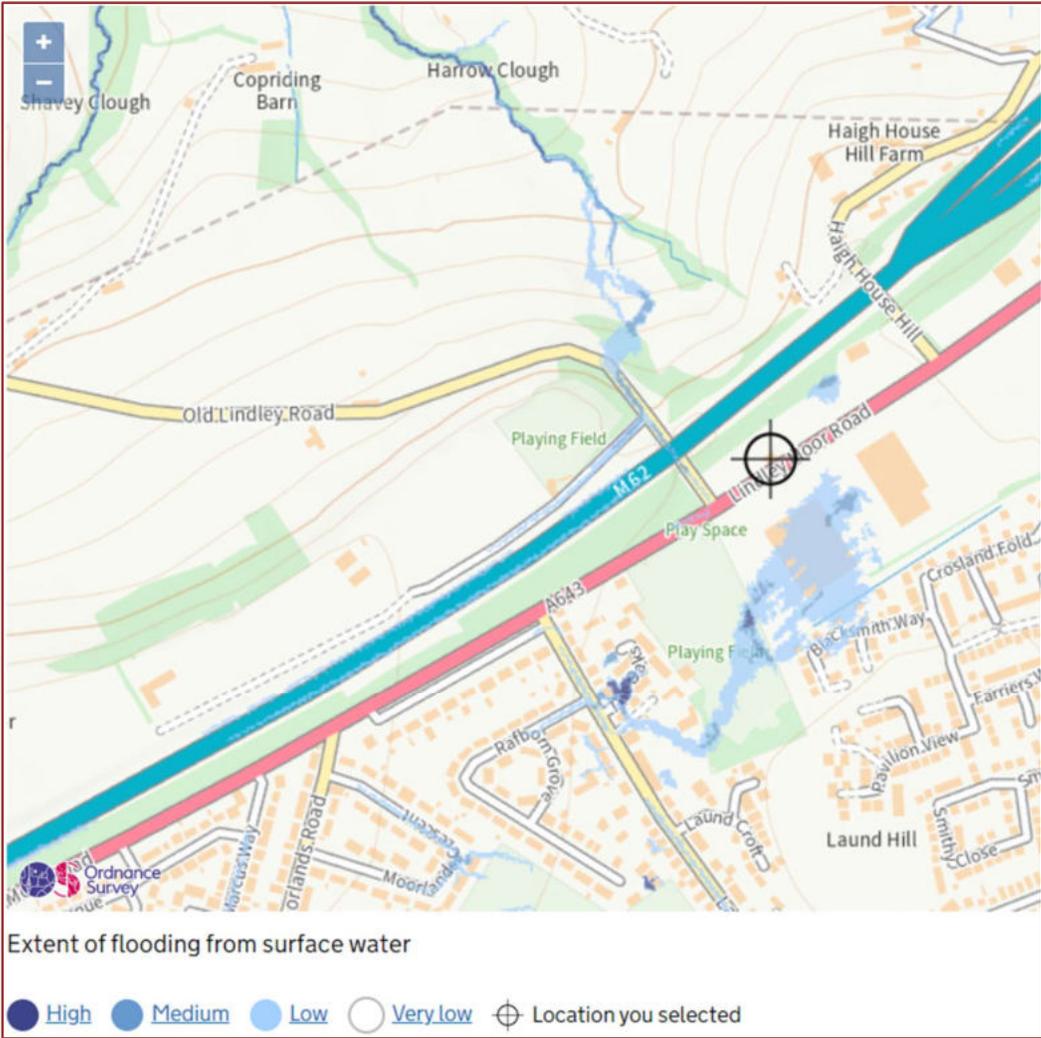
Appendix F

Environment Agency Fluvial Flood Map



Appendix G

Environment Agency Pluvial Flood Map



Appendix H

Print

Close Report



Greenfield runoff rate estimation for sites

www.uksubs.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

mayDate:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments". SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

OBAR estimation method:

SPR estimation method:

Soil characteristics

	Default	Edited
SOIL type:	<input type="text" value="4"/>	<input type="text" value="4"/>
HOST class:	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
SPR/SPRHOST:	<input type="text" value="0.47"/>	<input type="text" value="0.47"/>

Hydrological characteristics

	Default	Edited
SAAR (mm):	<input type="text" value="1027"/>	<input type="text" value="1027"/>
Hydrological region:	<input type="text" value="3"/>	<input type="text" value="3"/>
Growth curve factor 1 year	<input type="text" value="0.86"/>	<input type="text" value="0.86"/>
Growth curve factor 30 years:	<input type="text" value="1.75"/>	<input type="text" value="1.75"/>
Growth curve factor 100 years:	<input type="text" value="2.08"/>	<input type="text" value="2.08"/>
Growth curve factor 200 years:	<input type="text" value="2.37"/>	<input type="text" value="2.37"/>

Notes

(1) Is QBAR < 2.0 l/s/ha?

When QBAR is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
OBAR (l/s):	<input type="text" value="5.29"/>	<input type="text" value="5.29"/>
1 in 1 year (l/s):	<input type="text" value="4.55"/>	<input type="text" value="4.55"/>
1 in 30 years (l/s):	<input type="text" value="9.26"/>	<input type="text" value="9.26"/>
1 in 100 year (l/s):	<input type="text" value="11.01"/>	<input type="text" value="11.01"/>
1 in 200 years (l/s):	<input type="text" value="12.54"/>	<input type="text" value="12.54"/>

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.