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CUCKSTOOL ROAD, DENBY DALE

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

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TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

1.1.1 This Flood Risk Assessment (FRA) and Outline Drainage Strategy (DS) has been provided at the request of Britology Ltd, hereafter referred to as "the client", to assess the flood risks associated with the proposed development of land off Cuckstool Road, Denby Dale, hereafter referred to as "the site".

1.1.2 The purpose of this FRA is to:

- Identify the possible hazards posed from all major sources of flooding (fluvial, surface water, groundwater, infrastructural and coastal sources);
- Provide a qualitative assessment of the probability of each potential flood hazard representing a constraint on the proposed development, based on the proposed land use type for the development and likelihood of flood occurrence;
- Investigate and define any potential drainage impacts associated with the site;
- Conceptually determine and define necessary surface water management controls to ensure no exacerbation of flood risk on the Site or to external receptors due to any increase in surface water runoff; and
- Recommend appropriate and necessary mitigation measures and additional assessments that may be required to progress the sustainable development of the site.

1.1.3 The FRA comprises the following:

- A desktop review of publicly available information, including information from the Environment Agency (EA) and Kirklees Council (KC) who are the Lead Local Flood Authority (LLFA) for the proposed development area; and
- An assessment and outline design of hydraulic controls and drainage requirements and drainage elements required to support the development of the site.

1.1.4 This report further details the methodologies employed within this study and provides recommendations as to any further work or investigations required to support the development of the Site through the planning application process.

1.2 REGULATORY POLICY AND LEGISLATION

1.2.1 This assessment has been carried out in line with the current Government legislation, the National Planning Policy Framework (NPPF) 2021.

1.2.2 It has been assessed with reference to the following documents and legislative guidelines:

- CIRIA 753 The SUDS Manual V6 (2016);
- DEFRA "Flood Risk Assessment Guidance for New Developments" (2006);
- DEFRA "Surface Water Management Plan Technical Guidance" (2010);
- BS 8533 2011 Assessing & Managing Flood Risk in Development Code of Practice (2011);
- BS 8582:2013 Code of practice for surface water management for development Sites (2013);
- National Planning Practice Guidance (2012 – updated 2016);
- C624 Development and Flood Risk – Guidance for the Construction Industry' (2004);

- Design and Construction Guidance for Sewage Sector (DCGSS) (2020);
- Planning Policy Guidance – Flood Risk and Climate Change (2014 and as amended).

1.2.3 In addition to the above, this report has also been informed by the following documents:

- Calder Catchment (CC) Level 1 SFRA (2016)
- Calder Catchment (CC) Level 2 SFRA (2016)
- Kirklees Council (KC) Local Plan (2019)

1.3 SCOPE OF FLOOD RISK ASSESSMENT

1.3.1 The objective of this analysis and report is to provide an FRA in accordance with local and national guidance.

1.3.2 The detail and complexity of the FRA will reflect the level of risk to the site and consider the appropriateness of the proposed development type. This will also include assessment of potential risk to property and livelihoods, consideration of climate change, and the definition of appropriate flood risk mitigations required to satisfy the planning process.

1.3.3 Based on the assessment of requirements for a site-specific FRA as defined within NPPF 2021 technical guidance, the site is indicated as being located within Flood Zone 1, therefore it is necessary to provide a site-specific FRA. Flood Zone 1 refers to an area assessed as having less than 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year.

1.3.4 Similarly, as the site is indicatively located in an area that may be subject to other assessable sources of flooding, such as pluvial (surface water) flooding, it is necessary to undertake a further site-specific assessment to verify the proposals for development.

1.3.5 Policy LP27 of the Kirklees Local Plan states that all future development must ensure that:

1.3.6 Proposals for development which require a Sequential Test in accordance with national planning guidance will need to demonstrate that development has been directed to areas at the lowest probability of flooding, following a sequential risk-based approach. The whole Kirklees district should be the starting point for the sequential test with applicants required to provide justification where a smaller area of search is proposed. If following application of the sequential test, there are no reasonably available sites which could accommodate the development in zones with a lower probability of flooding, it should also be demonstrated that a sequential approach has been applied within sites. This is to ensure that highly vulnerable and more vulnerable uses are directed towards the areas of lowest flood risk within the site. Proposals will also need to demonstrate that the exception test is passed, where applicable, as set out in national planning policy.

1.3.7 Proposals within flood zone 3ai will be assessed in accordance with national policies relating to flood zone 3a but with all of the following additional restrictions:

- no new highly vulnerable or more vulnerable uses will be permitted;
- less vulnerable uses may only be permitted provided that the sequential test has been passed and;
    - i. where extensions are linked operationally to an existing business or,
    - ii. where redevelopment of a site provides buildings with the same or a smaller footprint;
- all proposals will be expected to include flood mitigation measures such as compensatory storage which should be identified and considered through a site specific Flood Risk Assessment;

- development will not be permitted on any part of the site identified through a site specific Flood Risk Assessment as performing a functional floodplain role.

1.3.8 Proposals must be supported by an appropriate site-specific Flood Risk Assessment in line with national planning policy. This must take account of all sources of flooding set out in the Strategic Flood Risk Assessment and demonstrate that the proposal will be safe throughout the lifetime of the development (taking account of climate change). The proposal must also not increase flood risk elsewhere and where possible should reduce flood risk. Mitigation measures, where necessary, should be proposed.

1.3.9 Proposals involving building over existing culverts, or the culverting or canalisation of water courses will not be permitted unless it can be demonstrated to be in the interests of public safety or to provide essential infrastructure and that there will be no detrimental effect on flood risk and biodiversity. Where feasible, development proposals should incorporate re-opening of culverts, modification of canalised water courses and consideration of mitigation measures to achieve a more natural and maintainable state.

1.3.10 Proposals for natural management such as targeted vegetation planting in upper catchments and along riverbanks will be supported in appropriate locations where consistent with national and local plan policies and relevant water catchment management plans to reduce flood risk and improve water quality.

1.3.11 Potential flood risk at the site has been assessed against the site plan, which has been provided as **Appendix A** to this report. Significant changes to the site's developable area may necessitate a further review of this document to ensure that risk of flooding is not exacerbated and has been satisfactorily addressed within the development proposal

1.4 SCOPE OF OUTLINE DRAINAGE STRATEGY

1.4.1 Surface water runoff must be effectively managed to ensure that there is no exacerbation of potential surface water flooding issues on the Site, or at any external receptors, due to any potential increases in surface water runoff rates and volumes.

1.4.2 The drainage hierarchy will be applied in determining the most suitable type and point of discharge of surface waters runoff from impermeable areas on the Site. This will ensure that surface water is sustainably managed on the Site, and that there is no exacerbation of flood risk elsewhere as a result of undertaking the development. This will be undertaken in accordance with industry best practice principles and guidance, such as the C753 SUDS Manual (2016), Design and Construction Guidance for Sewage Sector (DCGSS) (2020) and applicable sections of the Planning Policy Guidance (PPG).

1.4.3 Any increase in surface water runoff rate associated with the development of the Site must also be managed in accordance with the guidelines set by LPA, the LLFA for the area.

1.4.4 As indicated in policy LP28 of the Kirklees Council Local Plan, surface water runoff from the site must adhere to the following:

The presumption is that Sustainable Drainage Systems (SuDS) will be used to assist in achieving the following on each site:

- *For proposals on greenfield sites, typical greenfield run-off rates should not be exceeded.*

- *For proposals on brownfield sites there should be a minimum 30% reduction in surface water run-off where previous positive surface water connections from the site can be proven. New connections will be subject to at least greenfield restrictions;*
- *No negative impact on local water quality and improvements in water quality where practicable;*
- *Consider whether proposed open spaces and green infrastructure within sites can contribute to the sustainable drainage of the site.*

Local conditions including the existence of critical drainage areas may require a lower run-off rate to be agreed to reflect volume control, local surface water risks, water course capacity and flood risk further downstream.

There will be a general presumption against pumping surface water. It must also be demonstrated that the surface water management solution is designed to meet requirements over the lifetime of the development including evidence that management and maintenance arrangements have been secured to cover that period. This includes ensuring proposals to store water meet national standards and latest best practice.

Flow paths accommodating water from outside the site or due to an exceedance event should be designed to avoid buildings and curtilages.

Development will only be permitted if it can be demonstrated that the water supply and wastewater infrastructure required is available or can be co-ordinated to meet the demand generated by the new development.

1.4.5 The Outline Drainage Strategy (DS) will identify potential opportunities and locations for attenuation infrastructure, as well as potential connection points and provide calculations of permissible discharge rates for runoff generated on site.

1.4.6 The Outline DS therefore aims to provide surety that any drainage provided as part of the project development can safely and appropriately convey all flows from the site to appropriate discharge locations. This is to ensure sustainable and safe operation within the site, as well as ensuring sustainable operation of any receiving infrastructure. These assessments have been undertaken in accordance with prescribed best practice and building codes, including prioritising the incorporation of SuDS, where appropriate and practicable for the management of surface water.

1.4.7 Following the completion of a final site masterplan the drainage scheme proposed within this report should be reassessed to ensure surface water runoff and foul water drainage can be appropriately managed in accordance with best practise and local and national standard requirements.

2 METHODOLOGY

2.1 INTRODUCTION

2.1.1 This report aims to demonstrate that the proposed development is sustainable and will not be impacted by or exacerbate flood risk elsewhere through the development of the site. This assessment will account for the effects of climate change, as well as identifying further opportunities to reduce the probability and consequences of flooding within the site locality.

2.1.2 This report aims to identify constraints and opportunities for the site based on the development proposals provided by the client (**Appendix A**) and provide recommendations for the sustainable provision of drainage and mitigation of any potential flood risk for the Site.

2.1.3 The assessment methodology is as follows:

- Desktop review of the geology, hydrology and other pertinent environmental characteristics of the Site, and how these affect flood risk of the proposed development and Site drainage.
- Obtain and review existing baseline flood risk and drainage guidance information from relevant environmental authorities (EA, LLFA, etc.) as to site specific flood risk from all applicable sources
- Produce indicative design calculations for the Outline DS to determine the requirements for developing the Site's surface water drainage and providing adequate storage in line with local planning policy and guidance. This will include the presentation of drawings with an indicative layout for any additional drainage and attenuation infrastructure located on the Site.
- Review the findings from the above and advise on the suitability of developing the Site for the proposed development in consideration of the applicable flood risk and drainage and comment on limitations and opportunities for the site, with recommendations of further mitigation where applicable and appropriate

3 PROJECT BACKGROUND

3.1 DEVELOPMENT DESCRIPTION AND LOCATION

3.1.1 Andrew Moseley Associates (AMA) was appointed by Britology Ltd to provide a Flood Risk Assessment and Drainage Strategy in support of the construction and development of 4 dwellings and associated infrastructure, located at land off Cuckstool Road, Gilthwaites Estate, Denby Dale, Kirklees, West Yorkshire, HD8 8RF NGR: SE 23300 08575.

3.1.2 The proposed development is located in the area of Denby Dale which is approximately 6 miles west of Barnsley. Proposals for the site are for a residential development along with associated infrastructure and landscaping. A site plan has been provided in **Appendix A**.

3.1.3 The Local Planning Authority for this development is Kirklees Council (KC) who are also the Lead Local Flood Authority for the area.

3.1.4 This report has been prepared in accordance with the National Planning Policy Framework (NPPF) and the accompanying technical guidance to assess all forms of flooding including the management of surface water on-site.

3.1.5 The Site is referenced in Table 3-1 and Figure 1 below.

Table 3-1. Site context

Site Name	Land off Cuckstool Road
Location	Denby Dale
NGR (approx.)	SE 23300 08575
Application Site Area (ha)	0.35
General Locality	The site is located on undeveloped Greenfield land and borders Cuckstool Road to the south, further residential dwellings to the east and west, with a small forest and cricket ground to the north. Pedestrian and vehicular access to the site is provided via Cuckstool Road towards the south of the site.
Development Type	Residential
NPPF Vulnerability	Low
EA Flood Zone	Flood Zone 1
EA Office	Yorkshire
Local Planning Authority	KC

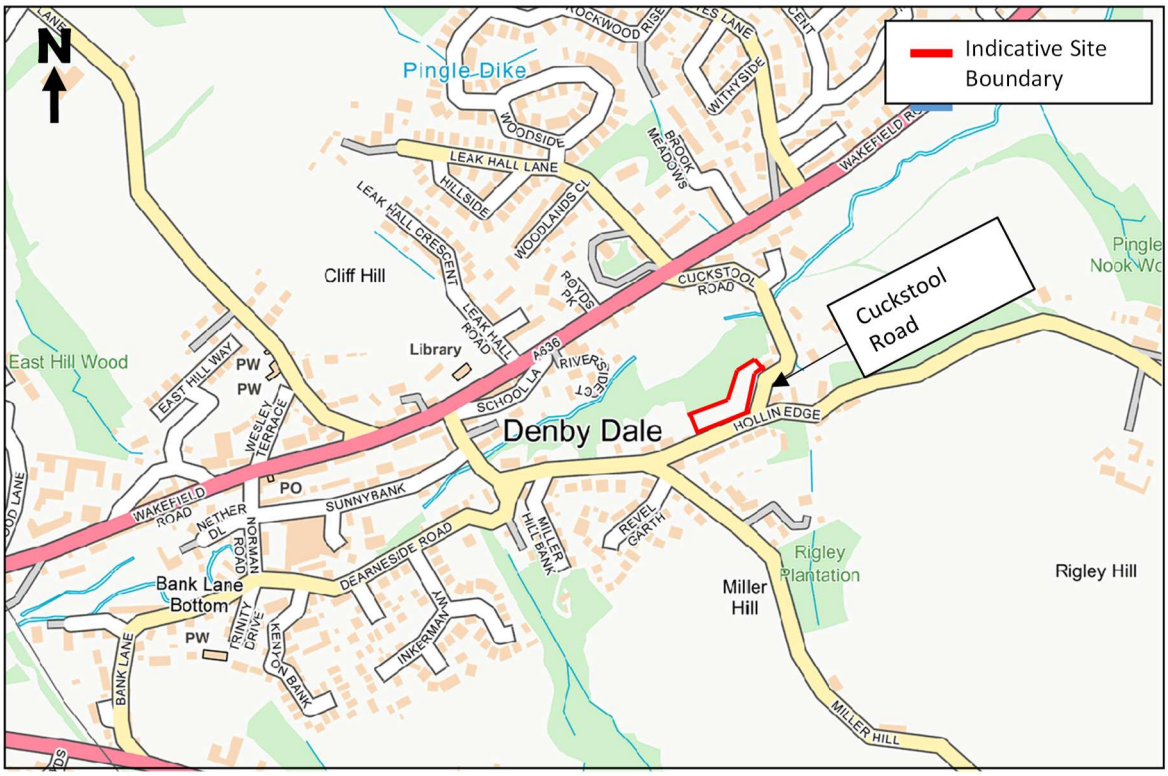


Figure 1. Site location

3.2 CURRENT SITE CONDITIONS

Ground cover and topography

3.2.1 A topographic survey provided by Flatman planning and undertaken by CT Surveys (**Appendix B**) shows ground levels at the site are shown to be in the region of 150.60 to 166.37 m Above Ordnance Datum (m AOD).

3.2.2 Further review of topographical data shows site levels to be lowest towards the northeast corner of the site with an elevation of 150.60m AOD, while greatest levels are located in the southwest corner of the site with a site elevation of 166.37m AOD. A general fall in gradient from the southwest corner of the site to the northeast corner of the site is observed across the site.

As indicated by aerial imagery, the site consists of grass land consisting of light vegetation.

3.3 GEOLOGY

3.3.1 British Geological Survey (BGS) Open Geoscience website[1] indicates that the entire site is underlain by Pennine Lower Coal Measures Formation - Sandstone with no overlying superficial deposits.

3.3.2 The BGS website information indicates that there is no borehole record within close proximity.

[1] Available at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html accessed on 24/11/2021

3.4 HYDROGEOLOGY

3.4.1 According to the Department for Environment, Food and Rural Affairs (DEFRA) MAGIC map[2], the site is indicated as not being located in a Groundwater Source Protection Zone (SPZ), as defined by the Environment Agency (EA) for the protection of a potable groundwater supply.

3.4.2 The site is located as being in an area of high ground water vulnerability and located above a Secondary A bedrock aquifer.

3.4.3 Information obtained from the Cranfield University's Soilscape website[3] indicates that the site is located in an area classified as being Soilscape 6, which is defined as having freely draining slightly acid loamy soils.

3.5 HYDROLOGY

3.5.1 There is only one main watercourse which flows within close proximity of the site. The River Dearne is located approximately 80m north of the site and is classified as a main river by the EA and therefore falls under the jurisdiction of the EA. There are also a series of smaller watercourses located in closer proximity to the site which flow into the River Dearne.

3.5.2 The EA's Catchment Data Explorer website[4] indicates that the site resides within the Dearne Operational Catchment. The site is not situated within an Internal Drainage Board

[2] Available at: https://magic.defra.gov.uk/MagicMap.aspx?startTopic, accessed on 24/11/2021
[3] Available at: http://www.landis.org.uk/soilscapes/, accessed on 24/11/2021
[4] Available at: https://environment.data.gov.uk/catchment-planning/ , accessed on 24/11/2021

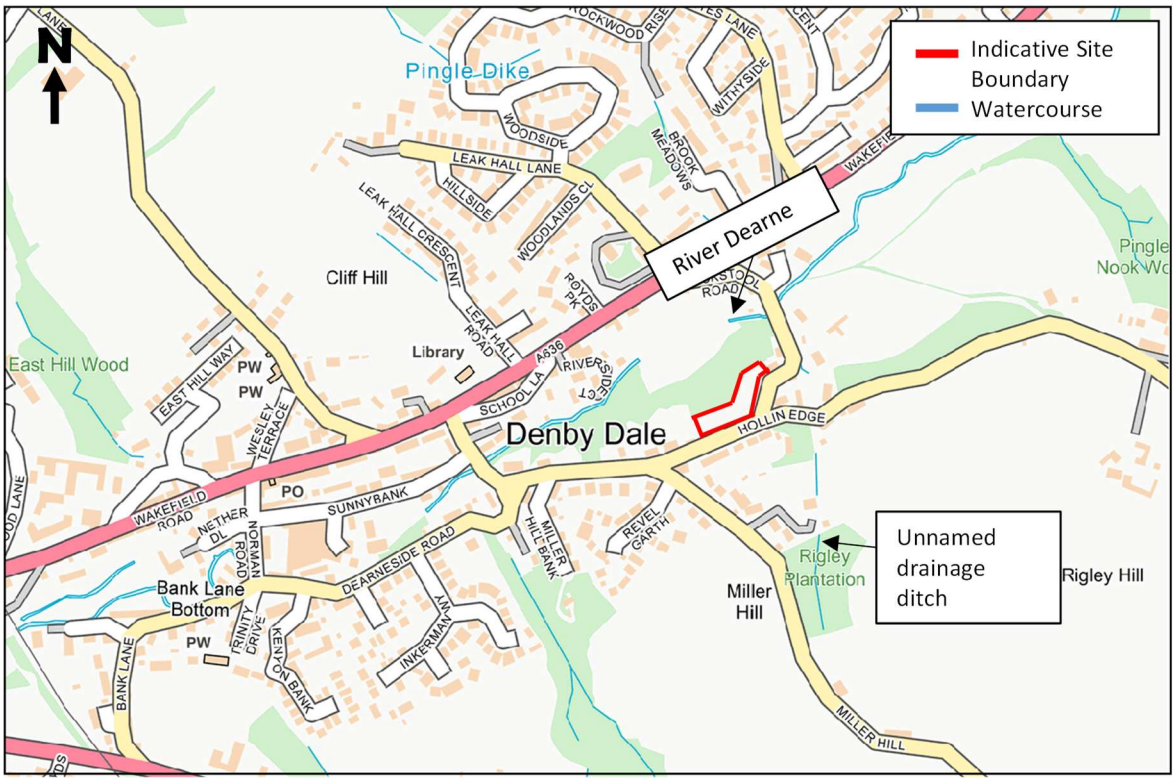


Figure 2. Watercourse location

4 POTENTIAL FLOOD RISK

4.1 SOURCES OF FLOODING

4.1.1 This report is to consider flood risk from all potential sources. Section 5 then discusses in further detail the probability of flooding, any potential impacts and necessary mitigation, where required.

4.1.2 The NPPF (2021) also requires site developers to consider the impact of additional runoff generated by the proposed development on the receiving downstream catchment, and to assess the risk of runoff from the surrounding. This is further discussed in Section 6.

4.1.3 According to Flood Risk maps provided by the Environment Agency the site is located in Flood Zone 1, which is designated as land having less than a 1 in 1000 probability of river or sea flooding. A very low Flood Risk.

4.2 ENVIRONMENT AGENCY FLOOD ZONES

4.2.1 The EA Flood Map for Planning shows the Site is located within Flood Zone 1, i.e., land assessed as having less than 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year. This potential fluvial / coastal flood risk to the site has been illustrated in **Figure 3.**

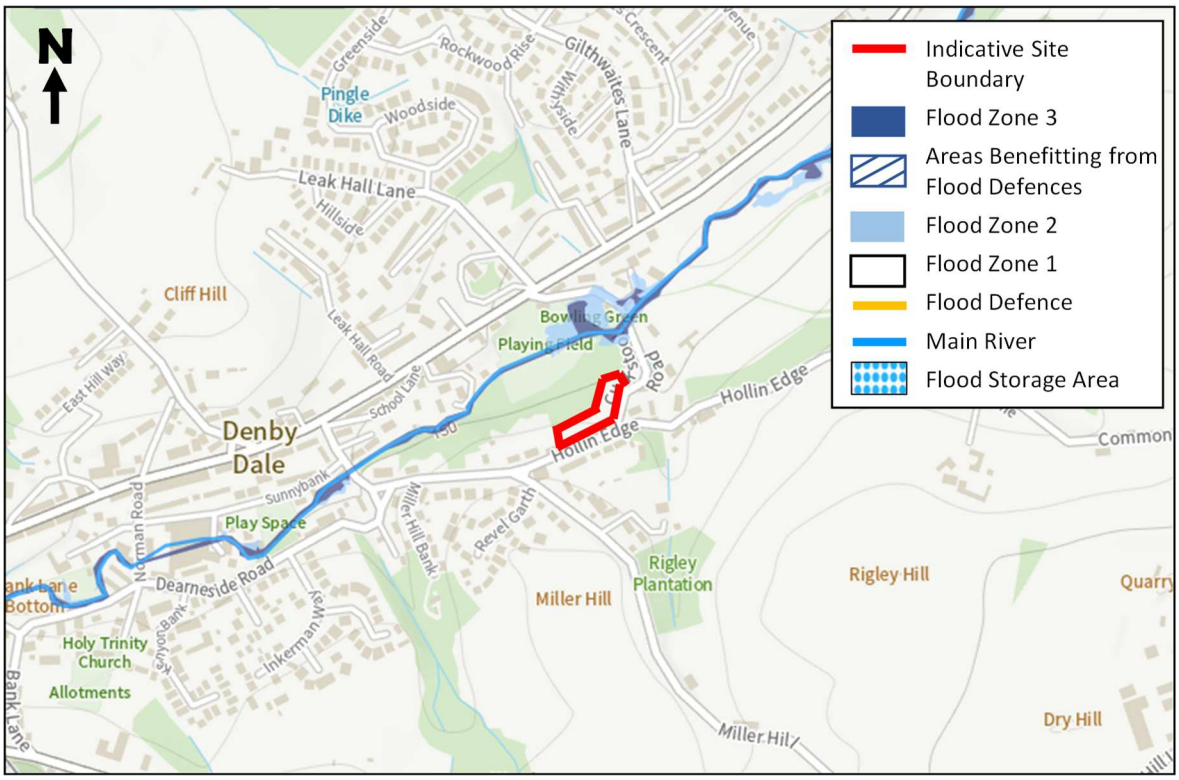


Figure 3. Environment Agency long term flood map for planning - rivers and seas

4.3 FLUVIAL AND COASTAL FLOODING

4.3.1 The EA Long Term Flood Risk Map for fluvial and coastal flooding shown in **Figure 4** indicates that the site is at very low risk of fluvial flooding. As the site is situated 45 miles from the nearest coastline the site is also considered to not be at risk from coastal flooding. The risk of flooding posed to the proposed development is classed as very low.

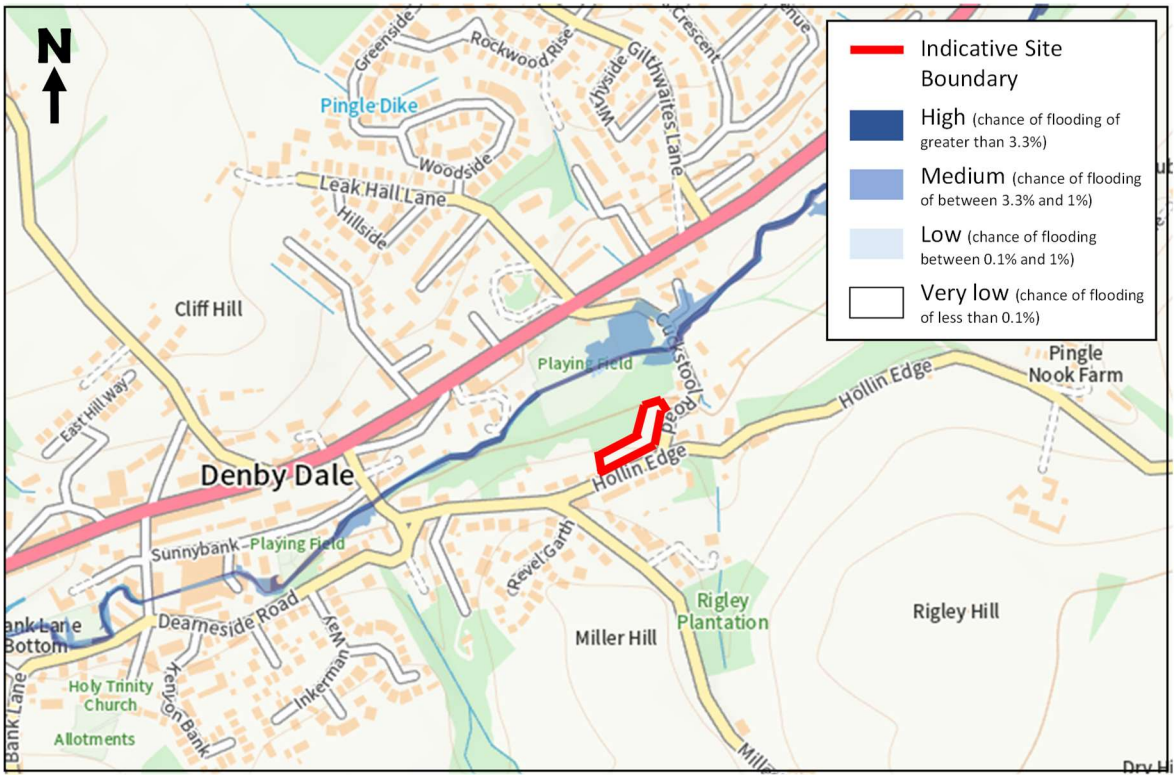


Figure 4. Environment Agency long term flood map – rivers and sea

4.4 PLUVIAL (SURFACE WATER) FLOODING

4.4.1 The EA Long Term Flood Risk Map (**Figure 5**) shows the site is located within an area at very low risk surface water flooding.

4.4.2 As the proposed development of the site may potentially reduce the overall site permeability and potentially increase surface water runoff rates and volumes, the surface water discharge controls must ensure that any proposal for drainage, or discharge, does not adversely impact upon downstream drainage infrastructure or offsite receptors

4.4.3 The site is therefore considered to have very low potential risk of flooding from pluvial sources.

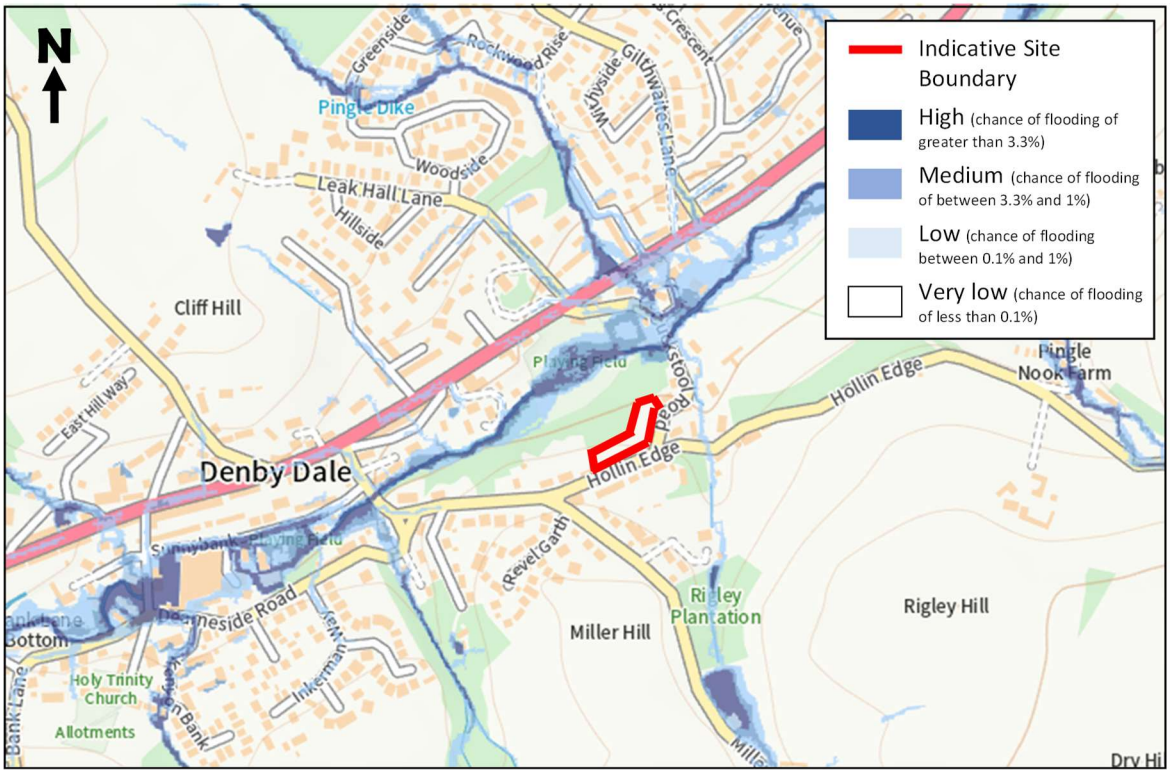


Figure 5. Environment Agency long term flood risk map – pluvial (surface water) flooding

4.5 GROUNDWATER FLOODING

4.5.1 Ground conditions at the site consist of freely draining slightly acid loamy soils, therefore the propensity for ground water emergence at the site is considered to medium risk.

4.5.2 During long periods of heavy rainfall, the water table within an area can rise above the natural ground level, resulting in groundwater flooding. The site is located above a principal bedrock aquifer. This signifies permeable layers which would allow infiltration of water up through the soil.

4.5.3 However, given the impermeable nature of the proposed site's hardstanding areas subsequent to development, potential elevation of groundwater or groundwater emergence within the superficial geology causing flooding within the site post-development will be largely eliminated

4.5.4 According to the Calderdale Council (CC) Level 1 SFRA ground water vulnerability map shown in **Appendix C** the site is situated in an area of less than 25% risk of groundwater emergence; the second lowest risk factor.

4.5.5 Site specific investigations should be able to prove the presence of ground water and propose remedial mitigation where required. Flood risk to the proposed development due to groundwater emergence is therefore considered to be low.

4.5.6 Flood risk to the proposed development due to groundwater emergence is considered to be low provided that all reasonable and practicable mitigation measures for any subsurface construction associated with the development are adhered to.

4.6 FLOODING FROM ARTIFICIAL SOURCES

4.6.1 The EA Long Term Flood Risk Map of flood risk from reservoir and canal failure (**Figure 6**) indicates that the site and its surroundings, are not affected by potential flood waters from artificial sources such as dam or canal failure. The figures provided within the EA mapping principally indicate the worst-case flooding extents.

4.6.2 In addition to the above reservoirs and canals are regularly maintained by relevant local authorities and failure is extremely unlikely. The site is therefore considered to have very low potential risk of flooding from artificial sources.

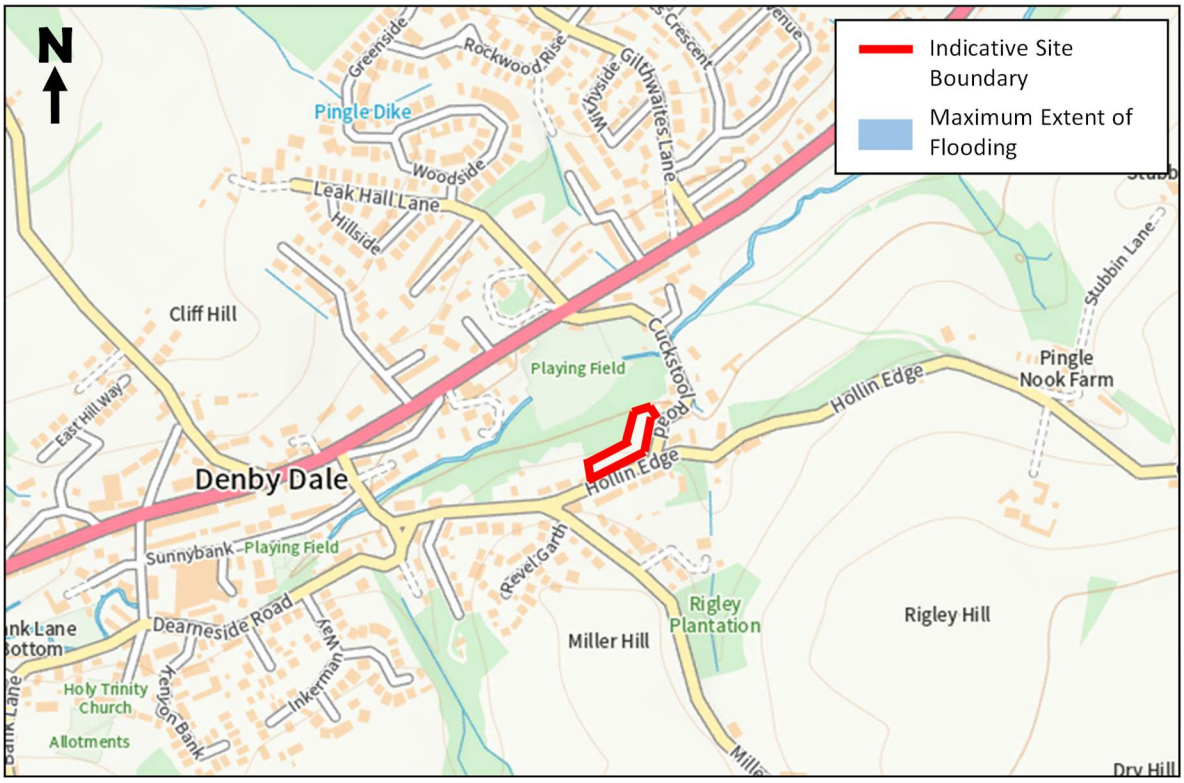


Figure 6. Environment Agency long term flood risk map – artificial sources

4.7 FLOODING FROM SEWERS

4.7.1 The site currently consists of Greenfield land and is not identified as having any drainage infrastructure within is boundary. Furthermore, according to the CC Level 1 SFRA the site is situated in an area with little to no history of sewer flooding. Therefore, the site is therefore considered to have very low potential risk of flooding from sewer flooding.

4.8 HISTORIC FLOODING

4.8.1 The EA historic flood map shows the site to not have experienced historic flooding. A review of the CC level 1 SFRA historic flood map which has been provided in **Appendix D** the site has not experienced any historic flooding.

5 FLOOD RISK ASSESSMENT

5.1 FLOOD RISK PLANNING POLICY

National planning policy framework

5.1.1 The NPPF sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance is also available online.

5.1.2 The Planning Practice Guidance sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.

5.1.3 The Planning Practice Guidance also states that alternative sources of flooding, other than fluvial (river flooding), should also be considered when preparing a Flood Risk Assessment.

5.1.4 This Flood Risk Assessment is written in accordance with the NPPF and the Planning Practice Guidance.

5.1.5 The EA Flood Map for Planning locates the Site within Flood Zone 1, i.e. land assessed as having less than 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year.

5.1.6 The flood map extents indicated on this map show the potential for flooding from fluvial and coastal sources, and although they are indicative, they are a key tool in defining the appropriateness of a development type or the requirement for further assessment.

5.1.7 Under the NPPF (2021), Flood Zone 1 is defined as having a low probability flood risk. The proposed development includes the development and construction of 8 dwellings and associated infrastructure, which are defined within Table 2 of the NPPF technical guidance as being 'More Vulnerable'. Therefore, according to the criteria in Table 3 of the NPPF Technical Guidance (Flood Risk Vulnerability and Flood Zone 'Compatibility'), the proposed development may be deemed as 'Appropriate'.

5.2 SEQUENTIAL AND EXCEPTION TEST

5.2.1 Both the NPPG and the SFRA require the 'sequential test' to be applied to ensure that proposed developments are carried out in area that are at the least risk of flooding, before considering development in areas that are at risk of flooding. The proposed site falls within flood zone 1 and is considered to come under the 'more vulnerable' category as a residential development.

5.2.2 Based on Table 3 in the National Planning Practice Guidance for Flood Risk and Coastal Change, the proposed use of the site is acceptable due to it being located in Flood zone 1 and an exception test is not required.

Table 5-1. Development appropriateness based on vulnerability and flood zone

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable
Flood Zone 1	✓	✓	✓	✓
Flood Zone 2	✓	✓	Exception test required	✓
Flood Zone 3a	Exception test required	✓	x	Exception test required
Flood Zone 3b	Exception test required	✓	x	x

5.3 POTENTIAL SOURCES OF FLOOD RISK

5.3.1 Table 3 identifies the potential sources of flood risk to the site, and the impacts which the development could have in the wider catchment prior to mitigation. These are discussed in greater detail in the forthcoming section. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within Section 3.0.

Table 5-2 Pre-mitigation flood risk summary

Flood Source	Potential Risk			Description
	High	Medium	Low	
Fluvial			X	The site is located in flood zone 1.
Tidal			X	There are no tidal influences effecting the site.
Canals			X	None present.
Groundwater			X	The CC level 1 SFRA indicates the site to be at low risk of groundwater emergence.
Reservoirs and waterbodies			X	The site is shown to fall outside of the catchment for reservoir and waterbodies flooding.
Sewers			X	A review of the CC Level1 SFRA indicates the site to be in an area with little to no risk of sewer flooding.
Pluvial runoff			X	Low risk

Flood Source	Potential Risk			Description
	High	Medium	Low	
Effect of Development on Wider Catchment		X		The impermeable area of the site is being altered.

6 FLOOD RISK MITIGATION

6.1 FLOOD RISK MITIGATION

6.1.1 Section 4 has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be considered within the proposed development detail design to address and reduce the risk of flooding to within acceptable levels.

6.2 EFFECT OF DEVELOPMENT ON WIDER CATCHMENT

Development drainage

6.2.1 The current site is considered to be greenfield. The amount of impermeable area will be altered. Therefore, the existing drainage systems will not be suitable to discharge the surface water from the site alongside the additional run off from the proposed development. A sufficient Drainage strategy will be therefore provided by AMA.

6.3 SITE ARRANGEMENTS

Sequential arrangement

6.3.1 The Flood Zone mapping shows the site to be located within Flood Zone 1.

Finished levels

6.3.2 Given the site's location within Flood Zone 1, there are no specific requirements for finished floor levels with regard to flood risk.

7 FOUL WATER DRAINAGE

7.1 INTRODUCTION

7.1.1 It is proposed to install a new foul drainage system to serve the proposed residential development.

7.1.2 The foul water system will be designed and constructed in accordance with the current Building Regulations, BS EN:752 'Drainage and Sewer Systems Outside Buildings', the Local Authority Building Control specifications and requirements, Sewers for Adoption 7th Edition and the Civil Engineering Specification for the Water Industry.

7.2 FOUL WATER DISCHARGE RATES

7.2.1 The estimate design Dry Weather Flow (DWF) generated by the proposed development, based on a gravity system, has been calculated as 0.185 litres per second.

7.2.2 This figure is based on 4 dwellings at 4,000 litres per dwelling as prescribed in Sewers for Adoption.

7.3 EXISTING SEWERS

7.3.1 As part of the foul and surface water drainage strategy AMA attained a Yorkshire Water Pre-development enquiry which can be found in **Appendix E**. In the Yorkshire Water Pre-development enquiry asset map, it is shown that the site has no existing sewers located within its boundary. There is however a 600mm diameter public surface water sewer to the north of the site which is situated within the cricket ground directly north of the site. Furthermore, there is also an abandoned 300mm diameter public combined sewer which runs parallel to the 600mm diameter public surface water sewer.

7.4 FOUL WATER CAPACITY AND POINT OF CONNECTION

7.4.1 Yorkshire Water have advised through there predevelopment enquiry (**Appendix E**) that foul water can discharge to the existing 600mm diameter public combined sewer to the north of the site. As the sewer is located within the cricket ground a 3rd party agreement would have to be made to enter that sewer.

7.4.2 No depth/ level information is available for these sewers and therefore further survey work in the form of a drainage CCTV and tracing survey will be required to confirm whether a gravity connection will be feasible.

7.4.3 Any proposed connection onto the public recorded sewers will require a S106 connection application.

8 SURFACE WATER DRAINAGE STRATEGY

8.1 INTRODUCTION

8.1.1 The National Planning Policy Framework (NPPF) and accompanying Technical Guidance indicate that surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management.

8.1.2 Consideration should therefore firstly be given to using sustainable drainage (SuDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2015) sets out a hierarchy for the disposal of surface water which encourages a SuDS approach.

8.2 PRE-DEVLOPMENT SURFACE WATER RUN-OFF

8.2.1 The site is approximately 0.35ha in area and currently comprises of green field agriculture land.

8.2.2 For the purposes of determining the existing rate of surface water run-off the site is considered to greenfield therefore the run-off will be estimated using the IH124 method.

8.2.3 The table below summarises the existing greenfield runoff rates generated by the development for a range of storm return periods. A calculation summary sheet from the UK SuDS website can be found in **Appendix F.**

Table 8-1. existing run-off rates

Area (Ha)	Q_{BAR} (L/S)	Q_1 (I/S)	Q_{30} (L/S)	Q_{100} (L/S)	Q_{200} (L/S)
0.35	2.06	1.77	3.60	4.28	4.88

8.3 GROUNDWATER PROTECTION

8.3.1 The proposed development site is not identified as being within a groundwater source protection zone (SPZ), as such no special measures are required to prevent risk to drinking water supplies.

8.4 METHODS OF SURFACE WATER MANAGEMENT

8.4.1 There are three methods that have been reviewed for the management and discharge of surface water which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed:

- Discharge via Infiltration

- Discharge to a watercourse
- Discharge to Surface Water Sewer or Highway Drain
- Discharge to public sewer

8.5 INFILTRATION

8.5.1 Any impermeable areas that can drain to a soakaway or an alternative method of infiltration would significantly improve the sustainability of any surface water systems.

8.5.2 The British Geological Society (BGS) Geology of Britain Viewer indicates that the entire site is underlain by Pennine Lower Coal Measures Formation - Sandstone with no overlying superficial deposits

8.5.3 Information obtained from the Cranfield University's Soilscape website indicates that the site is in an area classified as being Soilscape 6, which is defined as freely draining slightly acid loamy soils.

8.5.4 From a desktop review of the geology and soil at the site. It is believed that infiltration would be an acceptable way of discharging surface water from the site.

8.5.5 Percolation testing has not yet been carried out on this site. However, previous infiltration test results have been provided for the adjacent site taking this into consideration along with anticipated ground conditions it appears to support infiltration methods. It is recommended that infiltration testing to BRE 365 digest is undertaken as part of any future site investigations works at the site so that this can be used as satisfactory evidence for the LLFA or Yorkshire Water as necessary. The results of a percolation test will also be required to produce infiltration/soakaway designs.

8.6 WATERCOURSE

8.6.1 There is 1 watercourse in the area as discussed earlier in section 3.5 of this report, the River Dearne is located approximately 80m to the north of the site, along with smaller watercourses which flow into the River Dearne.

8.6.2 The River Dearne is classified as a main river by the EA and therefore falls under the jurisdiction of the EA.

8.6.3 As the River Dearne is located proximity 120m from the site and there are no dwellings or buildings situated in between the site and the river, it is possible for surface water to discharge into the River Dearne. Furthermore, according to the topographic survey (**Appendix B**) there are smaller watercourses located in closer proximity to the site which could be utilised to discharge surface water from the site, which would ultimately flow into the River Dearne.

8.6.4 AMA contacted the EA about this possibility of discharging surface water into the River Dearne. The EA have granted outline permission to discharge surface water into the Dearne, this can be found in **Appendix G**.

8.7 PUBLIC SEWERS

8.7.1 As a last resort and following the hierarchy of surface water, disposal discharge to the public sewer system may need to be considered.

8.7.2 In the Yorkshire Water pre planning sewer enquiry (**Appendix E**) Yorkshire Water state that surface water should follow the SuDS hierarchy and they note that soakaways and the possibility of discharging surface water into the River Dearne should be examined in further detail.

8.8 PROPOSED DISCHARGE RATES

8.8.1 Discharge via infiltration is required to be explored further before it can be ruled out. If infiltration has proved to be ineffective and evidenced to the satisfaction of the LLFA an agreement in principle to connect into the River Dearne has already been made with the EA (**Appendix G**). As we do not have any infiltration rates for the site, we will basis this surface water strategy on discharging surface water into the River Dearne via existing watercourses in the vicinity of the site. It would be necessary to restrict discharge to greenfield runoff rates in accordance with Local Authority and YW requirements.

8.8.2 The Kirklees Council SuDS Design Guidance requires the proposed rate of runoff from a development to be restricted in line with the Non-Statutory Sustainable Drainage Technical Standards.

8.8.3 From the topographical survey information an estimation of the development area has been calculated to be 0.35ha.

8.8.4 As the site is currently greenfield, the rate of discharge to the watercourse has been calculated using the greenfield run off rate calculation (IH124 Method) in **Appendix F** and provides a QBAR discharge rate of 2.06 l/s.

8.8.5 Typically, any discharge rate less than 5 l/s is prone to blockage and will create maintenance issues because of the small size of the orifice required. Where the greenfield discharge suggests a discharge rate of less than 3 l/s the figure of 3 l/s shall be used to reduce the risk of blockages. This would need to be confirmed by the approving authority

8.9 ATTENUATION REQUIREMENTS

8.9.1 As discussed earlier the site benefits from a freely draining ground conditions, therefore it could be possible to use soakaways as a source of discharging surface water. However due to no infiltration rates for the site being available AMA have based this surface water strategy on discharging surface water into the River Dearne. Consequently, AMA have based the discharge rate on the greenfield run off rate of 2.0l/s. Therefore, there will be a need for storage requirement during periods of intense rainfall. An impermeable area plan can be found in **Appendix H.**

8.9.2 Causeway Flow drainage design software has been used to estimate the maximum storage volume required on-site for the 100-year storm event plus 40% (30% allowance for climate change and 10% for urban creep).

8.9.3 The results below are based on a single detention basin feature situated in the northeast corner of the site as shown in the outline drainage layout drawing presented in **Appendix I**.

Detention Basin

8.9.4 This volume is based on using a single detention basin with a discharge 2/s. The details of the detention basin can be found in table 8-2 bellow. The causeway results can also be found in **Appendix J**.

Table 8-2. Detention Basin Volume

Detention Basin Volume

Gross area (ha)	Max Discharge (l/s)	Imp. Area (ha)	Q100+40% Volume (m^3)
0.35	2.0	0.05	18.8

9 SUSTAINABLE DRAINAGE SYSTEMS

9.1.1 Where possible, Sustainable drainage (SuDS) systems/techniques should be used to drain the site of surface water runoff. These could be in the form of permeable paving, rainwater harvesting, ponds, and other above ground green systems. Swales could also be incorporated into the layout to convey surface runoff rather than below ground pipes (which tend to have a higher velocity).

9.2 SUSTAINABLE DRAINAGE (OVERVIEW)

9.2.1 Drainage systems can contribute to sustainable development and improve urban design, by balancing the different issues that influence the development of communities. Approaches to manage surface water that take account of water quantity (flooding), water quality (pollution) and amenity issues are collectively referred to as Sustainable Drainage Systems (SuDS).

9.2.2 SuDS mimic nature and typically manage rainfall close to where it falls. SuDS can be designed to slow water down (attenuate) before it enters streams, rivers, and other watercourses, they provide areas to store water in natural contours and can be used to allow water to soak (infiltrate) into the ground or evaporated from surface water and lost or transpired from vegetation (known as evapotranspiration).

9.2.3 SUDS are technically regarded a sequence of management practices, control structures and strategies designed to efficiently and sustainably drain surface water, while minimising pollution and managing the impact on water quality of local water bodies.

9.2.4 SuDS are more sustainable than traditional drainage methods because they:

- Manage runoff volumes and flow rates from hard surfaces, reducing the impact of urbanisation on flooding
- Protect or enhance water quality (reducing pollution from runoff)
- Protect natural flow regimes in watercourses
- Are sympathetic to the environment and the needs of the local community
- Provide an attractive habitat for wildlife in urban watercourses
- Provide opportunities for evapotranspiration from vegetation and surface water
- Encourage natural groundwater/aquifer recharge (where appropriate)
- Create better places to live, work and play.

9.3 SUDS PRINCIPALS

9.3.1 Sustainable drainage is a departure from the traditional approach to draining sites. There are some key principles that influence the planning and design process enabling SuDS to mimic natural drainage by:

- storing runoff and releasing it slowly (attenuation)
- allowing water to soak into the ground (infiltration)
- Slowly transporting (conveying) water on the surface
- filtering out pollutants
- allowing sediments to settle out by controlling the flow of the water
- The above was replicated from www.susdrain.org

9.4 SUDS TECHNIQUES

9.4.1 The following table is a list of SuDS features that may/may not be feasible for the proposed site.

Table 9-1. SuDS feasibility table

SUDS Technique	Can they be feasibly incorporated into the site?	Comments
Green Roofs	✓	The sloping roofs of the proposed development would not permit a green-roof design
Basins and Ponds	✓	The proposed development could be designed to incorporate these elements.
Filter Strips, Swales and Bio-Retention	×	The proposed development could not be designed to incorporate these elements due to site constraints.
Infiltration techniques	✓	Desktop review of the available data indicate that infiltration would be feasible at the site.
Permeable surfaces and tree pits	✓	Surfacing of the external areas could be in a permeable material, such as permeable paved access roads and driveways.
Rainwater Harvesting	✓	New roofs could be directed to rainwater harvesting tanks for reuse.
Tanked Systems	×	A tanked Attenuation system will not be needed.

10 SUDS MAINTENANCE PLAN

10.1 SURFACE WATER DRAINAGE MAINTENANCE AND MANAGEMENT SCHEDULE

Soakaway

Table 10-1. Soakaways

Soakaways

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify areas that are not operating correctly. If required take remedial action	Monthly for the first 3 months of operation then annually
	Recover debris from catchment surface area where it may cause risk to performance	Monthly
	Remove sediment and debris from pre-tank system	Annually
Remedial Actions	Repair inlets/outlets/vents/overflows	As necessary
Monitoring	Inspect all inlets/outlets and upstream drainage system to ensure they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment and build up and remove if necessary	Every 5 years

Detention Basin

Table 10-2. Detention Basin

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify areas that are not operating correctly. If required take remedial action	Monthly for the first 3 months of operation then annually
	Recover debris from catchment surface area where it may cause risk to performance	Monthly
	Remove sediment and debris from pre-basin system	Annually
Remedial Actions	Repair inlets/outlets/vents/overflows	As necessary
Monitoring	Inspect all inlets/outlets and upstream drainage system to ensure they are in good condition and operating as designed	Annually
	Survey inside of basin for sediment and build up and remove if necessary	Every 5 years

Permeable Paving

Table 10-3. Permeable Paving

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly
	Inspect surface, inlet and outlet pipework and control system for blockages, clogging, standing water and structural damage	Monthly
Occasional Maintenance	Remove to control tree roots where they are encroaching to sides of paving using recommended methods (NJUG, 2007 or BS 3998:2010)	As necessary
	Clear pipework of blockages	As necessary

Flow Control

Table 10-4. Flow Control

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove sediment and debris from flow control chambers and upstream manholes	Monthly for first 12 months then 6 monthly
Remedial Actions	Replace or clean hydrobrake if performance deteriorates or failure occurs	As necessary
Monitoring	Check flow control to ensure emptying is occurring	Quarterly and post high intensity storm event

11 SUMMARY & CONCLUSION

11.1.1 The site is in an area identified as having a low probability of flooding on the EA Flood Map and is located in Flood Zone 1.

11.1.2 As with any drainage system, blockages within the surface water sewer systems constructed to serve the development has the potential to cause flooding or disruption. Any drainage systems which are not to be offered for adoption to either the Water Company or the Local Authority will have a suitable maintenance regime scheduled and an appropriate management company appointed to carry out the works.

11.1.3 The primary option for surface water disposal is to discharge surface water into the River Dearne via existing watercourses in the proximity of the site.

11.1.4 Surface water disposal through infiltration will require an BRE 365 infiltration test on site to confirm the ground conditions could support infiltration.

11.1.5 There is not a suitable public sewer in the vicinity of the site which could be utilised to dispose of the surface water as Yorkshire Water have stated.

11.1.6 Attenuation will be required as the means of surface water disposal is through discharging into the River Dearne with a discharge limit of 2l/s.

11.1.7 There is a formal point of connection into a YW public foul water sewer towards the north of the site. Foul water domestic waste can discharge to the existing 600mm diameter public combined sewer to the north of the site.

12 LIMITATIONS

12.1 LIMITATIONS

12.1.1 This report has been prepared for exclusive use by Britology Ltd for the purpose of assisting them in evaluating the potential constraints imposed by flood risk and drainage in making a Planning Application.

12.1.2 AMA accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of AMA. Any advice, opinions or recommendations within this document should be read and relied upon only in the context of the document as a whole.

12.1.3 AMA has endeavoured to assess all information provided to them during this appraisal. The report summarises from several external sources and cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon.

12.1.4 This report has been undertaken with the assumption that the site will be developed in accordance with the above proposals without significant change. The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.

12.1.5 A topographic survey has been completed for the site and was supplied to AMA by the client. AMA accepts no liability for the accuracy of this survey, and it is recommended that it is verified on-site prior to the commencement of any construction work.

12.1.6 Existing drainage information is based on third party survey data and record information which is considered to be incomplete. It is therefore recommended that a FULL drainage investigation survey is commissioned to establish the precise alignment, level, and condition of ALL existing drainage within the development site to inform the masterplan and future detailed design proposals.

APPENDICES

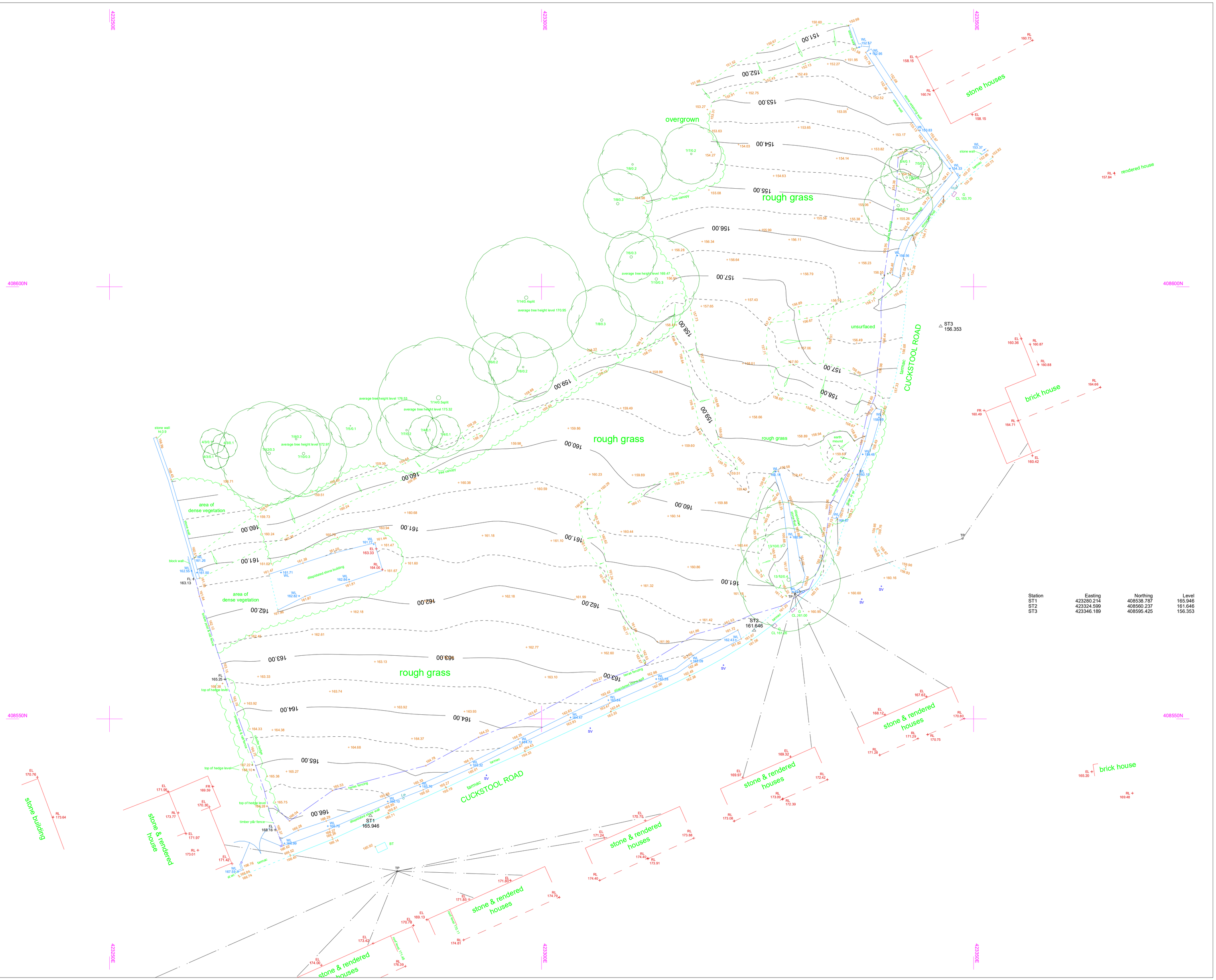
Appendix A

PROPOSED SITE LAYOUT


EXISTING WOODS
SLOPED BANKING DOWN TO CROKET PITCH
overgrown
rough grass
PROPOSED ECOLOGICAL ENHANCEMENT AREA
unsurfaced
TREE PLANTING & LANDSCAPING
rough grass
CUCKSTOOL ROAD
stone houses
brick house
stone & rendered houses
stone & rendered houses
stone & rendered houses
stone & rendered houses
stone & rendered house
plot 1
plot 2
plot 3
plot 4
garden
garage
gravel
brick sets
timber fence
hedgerow
area of dense vegetation
250sqm / 2690sqft (approx)
170sqm / 1830sqft (approx)
pavement
Drystone walls on boundary facing highway
Station
ST1
ST2
ST3

Appendix B

TOPOGRAPHIC SURVEY



ABBREVIATIONS

AR	ASSUMED ROUTE	OSA	OUTSIDE SURVEY AREA
AV	AIR VALVE	P	POST / POLE
B	BOLLARD	RL	RIDGE LEVEL
BH	BOREHOILE	RE	RODDING EYE
BT	BRITISH TELECOM CHAMBER	RS	ROAD SIGN
CATV	CABLE TV	RWP	RAINWATER PIPE
CP	CABLE PIT	S	STAY
CL	COVER LEVEL	SC	STOP COCK
CR	CABLE RISER	SD	TREE STEM DIAMETER
CS	TREE CROWN SPREAD	SP	SIGN POST
DP	DOWN PIPE	ST	STOP TAP
EL	EAVES LEVEL	SV	STOP VALVE
EP	ELECTRICITY POLE	SVP	SOIL VENT PIPE
ER	EARTH ROD	TC	TRAFFIC CONTROL
FH	FIRE HYDRANT	TCB	TELEPHONE CALL BOX
FL	FLOOR LEVEL or FENCE LEVEL	TFR	TAKEN FROM RECORDS
FR	FLAT ROOF LEVEL	TH	THRESHOLD LEVEL
G	GULLY	TL	TRAFFIC LIGHTS
GPR	TRACED BY G.P.R.	TP	TELEGRAPH POLE
GV	GAS VALVE	UTGA	UNABLE TO GAIN ACCESS
IC	INSPECTION CHAMBER	UTL	UNABLE TO LOCATE
IL	INVERT LEVEL	UTR	UNABLE TO RAISE
JB	JUNCTION BOX	UTS	UNABLE TO SURVEY
KW	KERB WIER	UTT	UNABLE TO TRACE
LB	LITTER BIN or LETTER BOX	WL	WATER LEVEL or WALL LEVEL
LP	LAMP POST	VP	VENT PIPE
MH	MANHOLE	WM	WATER METER
MI	MISCELLANEOUS	WO	WASH OUT VALVE
NL	NOT LOCATED	WP	WATER PIPE
NT	NO TRACE		

WALLS

bk/wl	BRICK WALL
bl/wl	BLOCK WALL
st/wl	STONE WALL
co/wl	CONCRETE WALL
ds/wl	DRY STONE WALL
gb/wl	GABBION BASKETS
wall	GENERIC WALL

FENCES

pr/fe	PRE-POST & RAIL FENCE
bw/fe	BARBED WIRE FENCE
cb/fe	CLOSE BOARDED FENCE
ta/fe	TIMBER PALISADE FENCE
pm/fe	POST & MESH FENCE
pw/fe	POST & WIRE FENCE
tp/fe	TIMBER PANEL FENCE
cp/fe	CONCRETE PANEL FENCE
mp/fe	METAL PALISADE FENCE
mr/fe	METAL RAILING FENCE
	GENERAL FENCE

CT SURVEYS IS A MEMBER OF:

THE SURVEY ASSOCIATION

constructionline

SURVEY NOTES:

The survey is fitted to OSGB36 National Grid and Level Datum using RTK GPS, with OSGM15 Model Transformation and has been drawn at a scale factor of 1.000

Due to the scale factor any setting out or design works should strictly use the control co-ordinates as shown on the drawing.

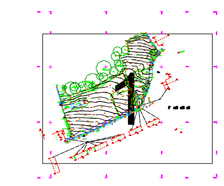
If manhole invert levels / basic drainage information is shown on this drawing, this will have been surveyed from observation only.
If any drainage becomes critical to design we advise that a full utility survey is carried out to verify any drainage information shown on this drawing.

SURVEY REVISIONS

PREVIOUS DWG NO:	
REVISION NO:	
DATE:	

REVISION NOTES:

LAYOUT VIEWS



Station	Easting	Northing	Level
ST1	423280.214	408538.787	165.946
ST2	423324.599	408560.237	161.646
ST3	423346.189	408595.425	156.353

CT SURVEYS
TOPO · SCAN · UAV · BIM

UNIT 5
KILLINGBECK COURT
LEEDS
LS14 6FD

TEL : 0113 44 00 435
MOB : 07949 195764
EMAIL : MAIL@CT-SURVEYS.COM
WEBSITE : WWW.CT-SURVEYS.COM

CLIENT:

Cadvis3d

PROJECT TITLE:

Land off Cuckstool Road,
Denby Dale, HD8 8RB

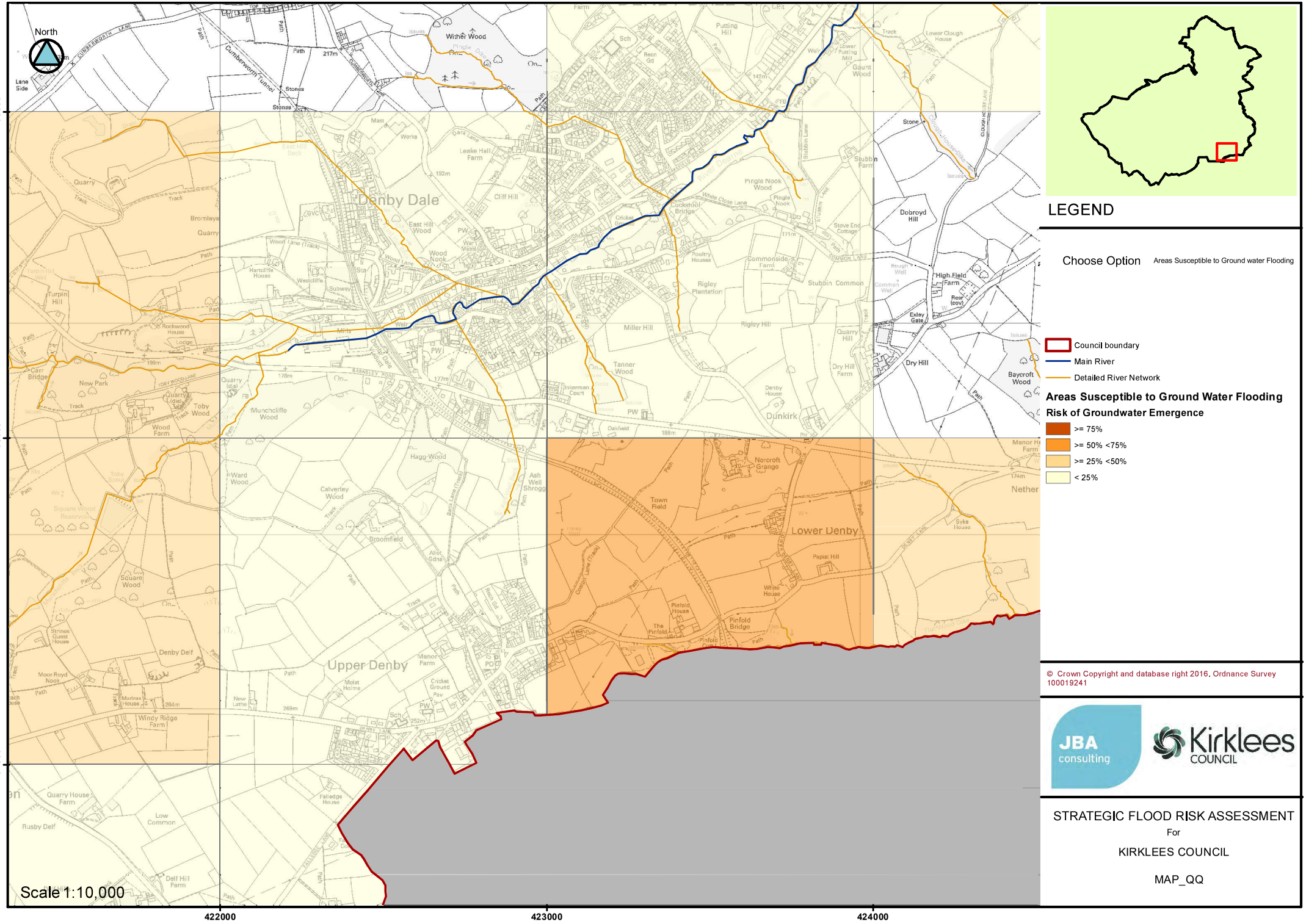
DRAWING NUMBER:

5339AB/1

SCALE: 1:200 @ A1	SURVEY DATE: December 2021	
LEVEL DATUM: OSGB by GPS	GRID DATUM: OSGB fixed at ST1	
BENCH MARK USED: Nail at ST1 surveyed by GPS	BM VALUE: 165.946m	SHEET NUMBER: 1 of 1

Appendix C

GROUNDWATER VULNERABILITY MAP



LEGEND

Choose Option

Areas Susceptible to Ground water Flooding

Council boundary

Main River

Detailed River Network

Areas Susceptible to Ground Water Flooding

Risk of Groundwater Emergence

- >= 75%
- >= 50% <75%
- >= 25% <50%
- < 25%

JBA consulting

Kirklees COUNCIL

STRATEGIC FLOOD RISK ASSESSMENT

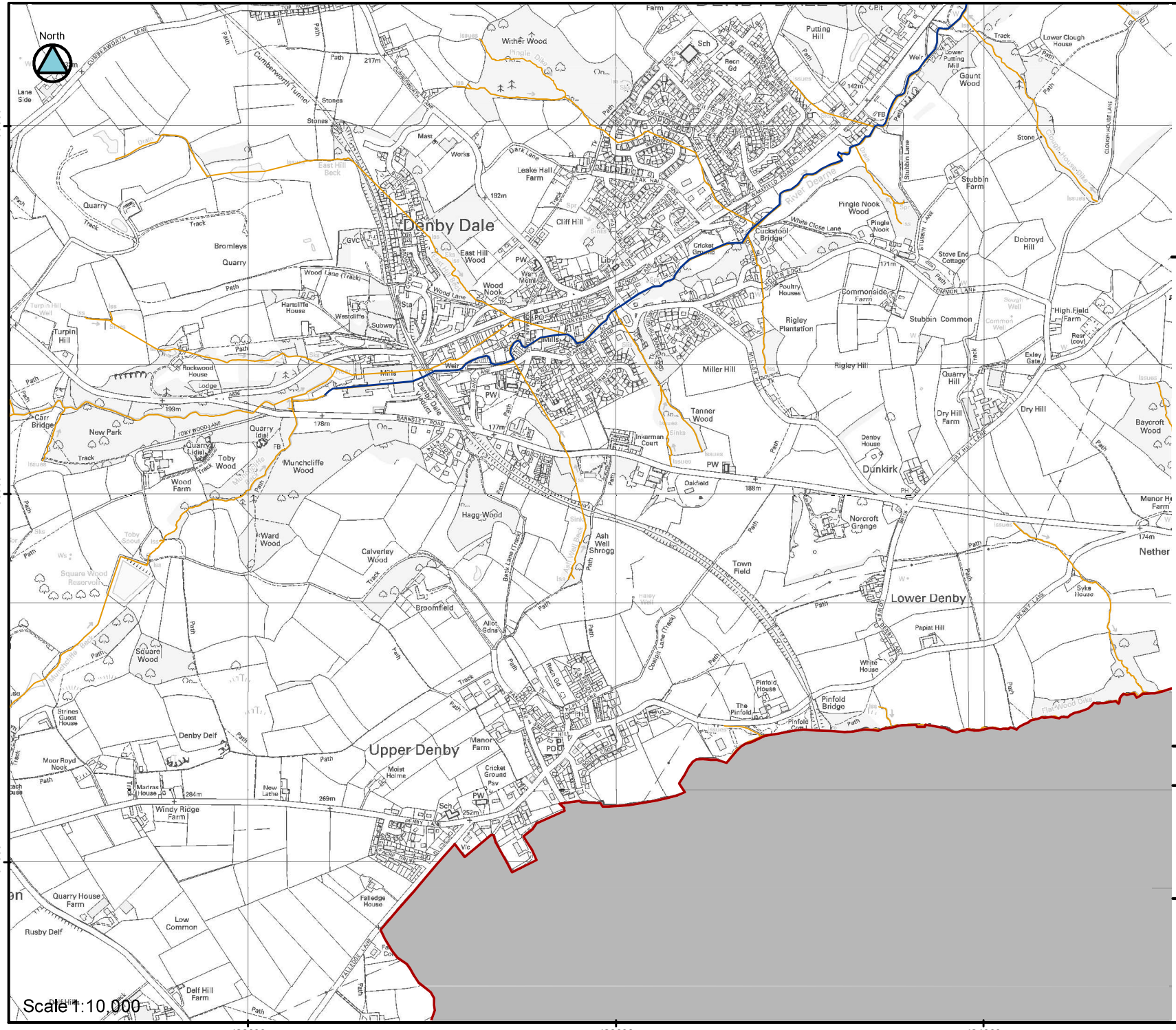
For

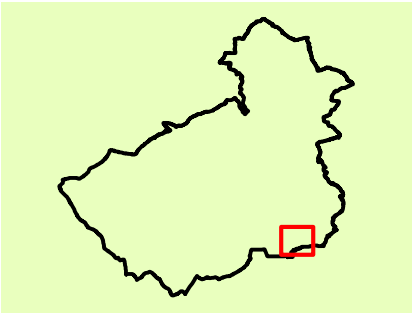
KIRKLEES COUNCIL

MAP_QQ

Appendix D

HISTORIC FLOOD MAP





LEGEND

Choose Option Historic

- Council boundary
- Main River
- Detailed River Network

Historic Flooding

- Historic Flood Map (EA)
- DG5 Register incident (YWS)
- Breach (CRT)
- Overtopping (CRT)

JBA consulting

Kirklees COUNCIL

STRATEGIC FLOOD RISK ASSESSMENT

For

KIRKLEES COUNCIL

MAP_QQ

Appendix E

YORKSHIRE WATER PRE-DEVELOPMENT ENQUIRY

YorkshireWater

Mr A Yesudian
Andrew Moseley Associates
Ground Floor + Basement Offs
51A St Pauls Street
Leeds
LS1 2TE
aaron@amatp.co.uk

Yorkshire Water Services
Developer Services
Pre-Development Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482
Fax:

Email:
technical.sewerage@yorkshirewater.co.uk

Your Ref:
Our Ref: X021335

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

8th December 2021

Dear Mr Yesudian,

Land at Cuckstool Road, Gilthwaites Estate, Denby Dale, HD8 8RF - Pre-Planning Sewerage Enquiry U474048 (RESIDENTIAL)

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records.

The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months:

YorkshireWater

Existing Infrastructure

There is a 600mm diameter public surface water sewer recorded crossing the site. No buildings, or other obstructions, are to be erected within 4 (four) metres is required at each side of the sewer centre-line, no trees planted within 5 (five) metres of this public sewer. It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0345 120 84 82.

On the Statutory Sewer Map, there is an abandoned 300 mm diameter public combined surface water sewer recorded to cross the site. It is essential that the presence of this infrastructure is taken into account in the design of the scheme.

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

Foul water domestic waste can discharge to the 600 mm diameter public combined sewer recorded to the north of the site.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2010. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

It is understood that the River Dearne is located through to the north east of the site. This appears to be the obvious place for surface water disposal (if SuDS are not viable). Please note Yorkshire Water cannot provide plans of culverted watercourses or highway drains. To obtain plans please contact the Lead Local Flood Authority for more details.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply on line or obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0345 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Codes for Adoption as supplemented by Yorkshire Water's requirements, pursuant to an agreement under Section 104 of the Water Industry Act 1991. An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Developer Services Team (telephone 0345 120 84 82) for further information.

The site is within an area that may be affected by river, coastal or estuarine flooding. We would advise you to contact the Environment Agency for details.

All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future

development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours sincerely

Chris Roberts
Development Services Technician

Denby Dale

Cricket Ground

Cuckstool Bridge

Pavilion
Bowling Green

Path

Green Tops
140.5m

FBs

FB

WHITE CLOSE

149.0m

CUCKSTOOL ROAD

144.5m

ROYDS PARK

Briarfield

RIVERSIDE COURT

Pie Hall

Club

Gas Gov

152.4m

Gas Works
Yard

Surgery

The Spring

River Dearne

ABANDONED

Issues

The
Hollins

Heywood
Bottom

HOLLIN ED

Poultry Houses

Hollin Edge House

160.3m

Well

169.5m

The Old
Chapel

Track

ESS

MILL

423133 : 408500

Map Name : SE2308SW

Yorkshire Water,
PO Box 500,
Halifax Road,
Bradford BD6 2LZ
Contact Name :
YorMap Advisor C ROBERTS
Contact Tel : 87 2582

Title

Notes

Partial Key

Foul Sewer = F
Combined Sewer = C
Surface Water Sewer = SW
Trade Sewer = TD
Partially Separate = PS

Date Req : 08/12/2021, 15:19:43

Date Gen : 08/12/2021, 15:19:59

Source : Sewer Network Enquiry

UPN: Undefined

Originator: C ROBERTS, YorMap, 87 2582

Appendix F

UK SUDS GREENFIELD RUN OFF RATES

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Aaron Yesudian
Site name:	Cuckstool Road
Site location:	Denby Dale

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.

Site Details

Latitude:	53.57350° N
Longitude:	1.64938° W
Reference:	3272653976
Date:	Feb 02 2022 15:35

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.35

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics	Default	Edited
SAAR (mm):	829	829
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} 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
Q_{BAR} (l/s):	2.06	2.06
1 in 1 year (l/s):	1.77	1.77
1 in 30 years (l/s):	3.6	3.6
1 in 100 year (l/s):	4.28	4.28
1 in 200 years (l/s):	4.88	4.88

Appendix G

EA SURFACE WATER DISCHARGE PERMIT

Mr Aaron Yesudian
Andrew Moseley Associates Limited
51A St Paul's St
Leeds
LS1 2TE

Our Ref: EPR/XB3290WF/A001
Date: 19 November 2021

Dear Mr Yesudian

Pre application checks – Basic service

Following your pre-application request dated 18/11/2021 we have the following advice:

Pre-application reference number	EPR/XB3290WF/A001

This pre-application response is based upon the information you have provided within your pre-application form only. If you provided incorrect information at the time of submission, you will need to resubmit a new basic pre-application request with the correct information.

Discharges to Surface Water (i.e. a river, stream, ditch):
You enquired about the discharge of clean, uncontaminated surface water runoff, the Environment Agency specifies that you do not need a permit to:

- discharge uncontaminated water, for example, clean rainwater from roofs or small areas of hardstanding to surface water
- discharge uncontaminated water collected from public roads and small parking areas (that's been through a maintained oil separator or sustainable urban drainage system) to surface water

For further information please see: https://www.gov.uk/guidance/discharges-to-surface-water-and-groundwater-environmental-permits#when-you-do-not-need-a-permit

It is the responsibility of the applicant to prevent pollution using appropriate methods. More information on this can be found here: https://www.gov.uk/guidance/pollution-prevention-for-businesses

If you meet the above then you will **not** need to apply for a discharge permit.

If you **cannot** meet the above, then you will need to apply for a discharge permit. To help you with this you can submit a second pre-application request using our online form: https://www.gov.uk/government/publications/environmental-permit-pre-application-advice-

form

If you submit an environmental permit application or pre-application request, then please quote this pre-application reference number.

Disclaimer

The advice given is based on the information you have provided, and does not constitute a formal response or decision of the Environment Agency with regard to future permit applications. Any views or opinions expressed are without prejudice to the Environment Agency's formal consideration of any application. Please note that any application is subject to duly making and then full technical checks during determination, and additional information may be required based on your detailed submission and site specific requirements and the advice given is to address the specific pre-application request.

This advice covers Water Discharge Activities only. Other permissions from the Environment Agency and/or other bodies may be required for associated or other activities.

Please note that a permit does not give any right or permission to discharge where land is not owned by the applicant. In addition, for discharges to watercourse it does not imply the suitability, with regard to volumetric capacity of the receiving watercourse. It is the responsibility of any permit holder to negotiate any wayleaves, easements etc. in order to use or cross another person's land; and to identify and negotiate any requirement for downstream improvement works with the riparian owners concerned.

Useful information on other permissions can be found here:

https://www.gov.uk/guidance/check-if-you-need-an-environmental-permit#what-you-need-a-permit-for
https://www.gov.uk/permission-work-on-river-flood-sea-defence
https://www.gov.uk/permits-you-need-for-septic-tanks/general-binding-rules (Installing a new system sub-section)
https://www.gov.uk/guidance/water-management-abstract-or-impound-water

What happens next?

This pre-application request is now closed. Further enquiries resulting from this response must be logged as a new request using the online form:

https://www.gov.uk/government/publications/environmental-permit-pre-application-advice-form

If you need more extensive or technical pre-application advice, you can ask for our Enhanced service. The enhanced pre-application advice is charged at £100 per hour plus VAT. You will need to complete and submit a new online pre-application request to request enhanced pre-application advice.

If you have any questions please call 03708 506 506.

Yours sincerely,

Water Quality Pre Application Team
National Permitting Service
preapplicationservice@environment-agency.gov.uk

Appendix H

IMPERMEABLE AREA PLAN

NOTES

KEY

Impermeable Area (507.57 m^2)

P1	Preliminary - Initial Issue	07-02-2022	AY

ANDREW MOSELEY ASSOCIATES
TRANSPORT AND DEVELOPMENT PLANNING CONSULTANTS

Project:
Cuckstool Road, Denby Dale

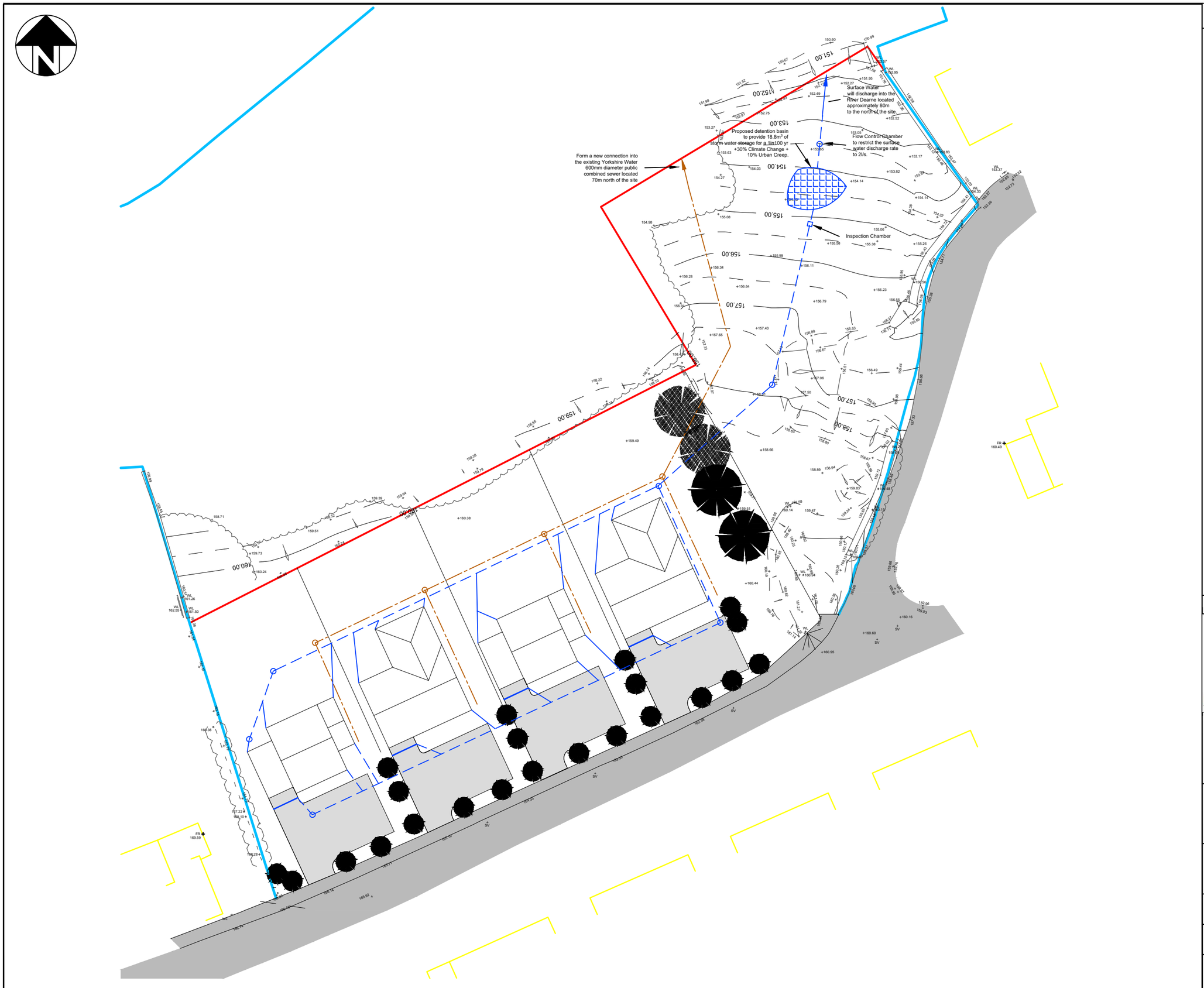
Client:
Flatman Planning

Drawing:
Impermeable Area

Drawn By:	Date:	
AY	07/02/2022	
Checked: GS	Scale: 1:500	A3
Drawing No. AMA/21246/D/001		Rev. P1

Appendix I

DRAINAGE LAYOUT PLAN



NOTES

KEY

- Detention Basin
- Surface Water
- Foul Water
- SW Manhole
- FW Manhole
- Channel Drain

P1	Preliminary - Initial Issue	07-02-2022	AY

ANDREW MOSELEY ASSOCIATES
TRANSPORT AND DEVELOPMENT PLANNING CONSULTANTS

Project:
Cuckstool Lane, Denby Dale

Client:
Flatman Planning

Drawing:
Drainage Layout

Drawn By:	Date:	
AY	07/02/2022	
Checked: TW	Scale: 1:500	A3

Drawing No.	Rev.
AMA/21246/D/001	P1

Appendix J

CAUSEWAY ATTENUATION CALCULATIONS

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
AT	0.050	5.00	100.000	1200	100.000	100.000	1.000

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.300	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	30	10	0

Node AT Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	99.000	Product Number	CTL-SHE-0067-2000-1000-2000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node AT Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	106

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	15.8	0.0	1.000	45.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	AT	43	99.128	0.128	3.7	2.5330	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
60 minute winter	AT	Hydro-Brake®	1.7	5.4

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	AT	49	99.352	0.352	8.8	8.1206	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
60 minute winter	AT	Hydro-Brake®	2.0	12.9

Results for 100 year +30% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	AT	114	99.713	0.713	10.7	20.2724	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
120 minute winter	AT	Hydro-Brake®	2.0	30.7

Andrew Moseley Associates, 51A St Paul's Street, Leeds, LS1 2TE

www.amatp.co.uk