

Pitt Street, Wombwell

Flood Risk Assessment & Drainage Strategy

May 2025

Alphin Property

AMA Project Number: 23131

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1 INTRODUCTION

- 1.1.1 This Flood Risk Assessment (FRA) and Outline Drainage Strategy (DS) has been provided at the request of Alphin Property, hereafter referred to as “the client”, to assess the flood risks associated with the proposed development of Pitt Street, Wombwell, hereafter referred to as “the site”.
- 1.1.2 The purpose of this FRA and DS 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 and DS comprises the following:
- ▶ A desktop review of publicly available information, including information from the Environment Agency (EA) and Barnsley Metropolitan Borough Council 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) 2024.
- 1.2.2 It has been assessed with reference to the following documents and legislative guidelines:
- ▶ CIRIA 753 The SUDS Manual V8 (2018);
 - ▶ DEFRA “Flood Risk Assessment Guidance for New Developments” (2006);
 - ▶ DEFRA “Surface Water Management Plan Technical Guidance” (2010);
 - ▶ BS 8533 2017 Assessing & Managing Flood Risk in Development Code of Practice (2017);
 - ▶ BS 8582:2013 Code of practice for surface water management for development Sites (2013);
 - ▶ National Planning Practice Guidance (2012 – updated 2022);
 - ▶ C624 Development and Flood Risk – Guidance for the Construction Industry’ (2004);
 - ▶ Sewage Sector Guidance (2022);
 - ▶ Planning Policy Guidance – Flood Risk and Climate Change (2014 – updated 2022).
- 1.2.3 In addition to the above, this report has also been informed by the following documents:
- ▶ Barnsley Local Plan 2019
 - ▶ Barnsley Strategic Flood Risk Assessment Level 1 2010

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 2024 technical guidance, the site is indicated as being located within Flood Zones 1, 2 and 3, therefore it is necessary to provide a site-specific FRA. Flood Zone 1 refers to an area assessed as having less than a 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year. Flood Zone 2 refers to an area assessed as having between a 1 in 100 and a 1 in 1,000 annual probability (1% - 0.1%) of river flooding, or between a 1 in 200 and a 1 in 1,000 annual probability (0.5% - 0.1%) of sea flooding in any one year. Flood Zone 3 refers to an area assessed as having a 1 in 100 greater annual probability (>1%) of river flooding, or a 1 in 200 or greater annual probability (>0.5%) of 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 CC3 of the Barnsley Local Plan states that all future development must ensure that:
 - ▶ The extent and impact of flooding will be reduced by:
 - ▶ Not permitting new development where it would be at an unacceptable risk of flooding from any sources of flooding, or would give rise to flooding elsewhere;
 - ▶ Ensuring that in the Functional Floodplain (Flood Zone 3b), only water compatible development or essential infrastructure (subject to the flood risk exception test) will be allowed. In either case it must be demonstrated that there would not be a harmful effect on the ability of this land to store floodwater;
 - ▶ Requiring developers with proposals in Flood Zones 2 and 3 to provide evidence of the sequential test and exception test where appropriate;
 - ▶ Requiring site-specific Flood Risk Assessments (FRAs) for proposals over 1 hectare in Flood Zone 1 and all proposals in Flood Zones 2 and 3;
 - ▶ Expecting proposals over 1000 m² floor space or 0.4 hectares in Flood Zone 1 to demonstrate how the proposal will make a positive contribution to reducing or managing flood risk; and
 - ▶ Expecting all development proposals on brownfield sites to reduce surface water run-off by at least 30% and development on greenfield sites to maintain or reduce existing run-off rates requiring development proposals to use Sustainable Drainage Systems (SuDS) in accordance with policy CC4; and
 - ▶ Using flood resilient design in areas of high flood risk.
- 1.3.6 Potential flood risk at the site has been assessed against the site layout 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 CC4 of the Barnsley Local Plan, surface water run-off from the site must adhere to the following:
 - ▶ All major development will be expected to use Sustainable Drainage Systems (SuDS) to manage surface water drainage, unless it can be demonstrated that all types of SuDS are inappropriate.
 - ▶ The Council will also promote the use of SuDS on minor development.
 - ▶ To enable the Council to determine the suitability of a proposed SuDS scheme:
 - Outline Planning applications must be supported by a conceptual drainage plan and SuDS design statement; and
 - Detailed Planning applications must be supported by a detailed drainage plan and SuDS design statement, which should contain information on how the SuDS will operate, be managed and maintained for the lifetime of the development.
- 1.4.5 The outline Drainage Strategy 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 Drainage Strategy 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.
 - ▶ 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 comment on limitations and opportunities for the site, with recommendations of further mitigation where applicable and appropriate
 - ▶ Produce indicative design calculations for the outline Drainage Strategy 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

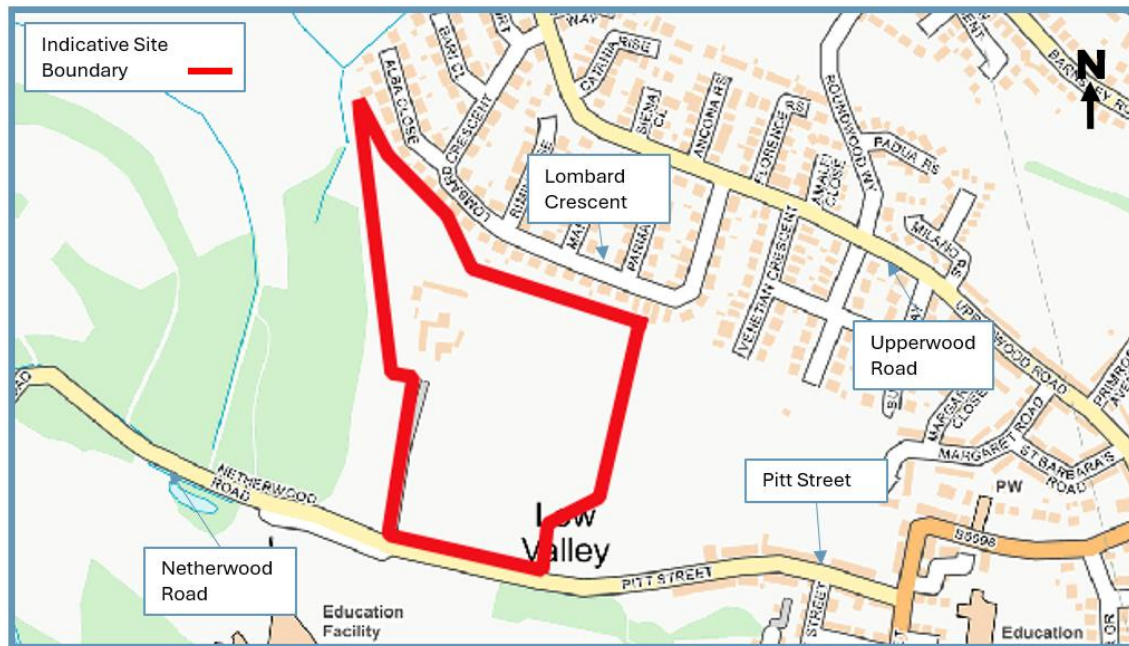
3.1 DEVELOPMENT DESCRIPTION AND LOCATION

- 3.1.1 Andrew Moseley Associates (AMA) was appointed by Alphin Property to provide a Flood Risk Assessment and Drainage Strategy in support of a residential development, located off Pitt Street, Wombwell, Barnsley, South Yorkshire, S73 8AU at NGR: SE 40332 04200.
- 3.1.2 The proposed development is located in the area of Wombwell, approximately 3.9 miles southeast of Barnsley. Proposals for the site are for residential use, consisting of 210 residential units with associated hardstanding, landscaping, and infrastructure. A site layout can be found in [Appendix A](#).
- 3.1.3 The Local Planning Authority for this development is Barnsley Metropolitan Borough Council 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 3-1](#) below.

Table 3-1 Site Context

Site Name	Pitt Street, Wombwell
Location	Barnsley
NGR (approx..)	SE 40332 04200
Application Site Area (ha)	7.21
General Locality	The site is located on undeveloped greenfield land, with existing agricultural units within the centre of the site and borders residential developments to the north and east, Pitt Street to the south, and undeveloped land to the west. Pedestrian and vehicular access to the site is provided via Pitt Street, which is located along the southern boundary of the site.
Development Type	Residential
EA Flood Zone	Flood Zone 1, 2 and 3
EA Office	Yorkshire
Local Planning Authority	Barnsley Metropolitan Borough Council

Figure 3-1 Site Location Plan



3.2 TOPOGRAPHY

- 3.2.1 A topographic survey provided by the client and undertaken by PQS Tech (Ref: JRP001.WMBWL001) shows ground levels at the site are shown to be in the region of 30.28 to 38.13 m Above Ordnance Datum (m AOD). The topographic survey can be seen in [Appendix B](#).
- 3.2.2 Further review of topographical data shows site levels to be lowest at the southeast of the site, while greatest levels are located at northwest of the site. A general fall in gradient from north to south is observed across the site.
- 3.2.3 As indicated by aerial imagery, the site consists of mostly agricultural grass land consisting of light vegetation, with a small proportion of the site being a farmhouse.

3.3 GEOLOGY AND GROUND CONDITIONS

- 3.3.1 British Geological Survey (BGS) Open Geoscience website indicates that the northeast and west of the site is underlain by Pennine Middle Coal Measures Formation – Mudstone, siltstone and sandstone, with no overlying superficial deposits. The centre of the site is underlain by Ackton Rock – Sandstone, with no overlying superficial deposits.
- 3.3.2 The BGS website information indicates that there are two borehole records within close proximity to the site (borehole records ref: SE40SW220 and SE40SW84); which are provided in [Appendix C](#).
- 3.3.3 Borehole SE40SW220 is located in the northwest of the site. This borehole record shows ground conditions to consist of stoney topsoil, which is underlain by clayey sand, sandy clay, and finally sandstone. Resting groundwater levels were found to be in the order of 0.95m below ground level (bgl).
- 3.3.4 Borehole SE40SW84 is located just south of the site within Netherwood Road. This borehole record shows ground conditions to consist of silty mudstone, which is underlain by coal, mudstone, and siltstone. No detail was provided regarding groundwater levels.
- 3.3.5 Information obtained from the Cranfield University's Soilscape website indicates that the majority of the site is located in an area classified as being Soilscape 6, which is defined as having freely draining slightly acid loamy soils. The southwest corner of the site is located in an area classified as being Soilscape 20, which is defined as having loamy and clayey floodplain soils with naturally high groundwater.

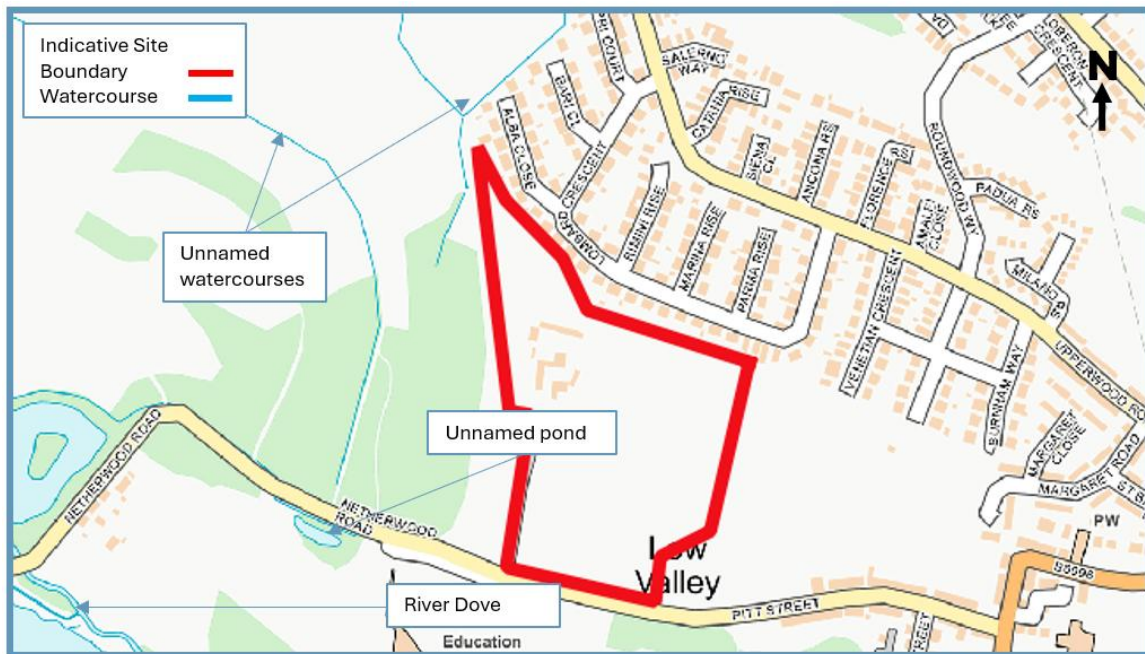
3.4 HYDROGEOLOGY

- 3.4.1 According to the Department for Environment, Food and Rural Affairs (DEFRA) MAGIC map, the site is indicated as not being located in a Groundwater Source Protection Zone (SPZ) for the protection of a potable groundwater supply.
- 3.4.2 The site is located as being in an area of high groundwater vulnerability and located above a Secondary A bedrock aquifer.

3.5 HYDROLOGY

- 3.5.1 There are a number of unnamed watercourses within close proximity of the site, including within the west of the site, and in the northwest corner. There is also an unnamed pond approximately 30m to the south of the site, over Netherwood Road. Finally, the River Dove is located approximately 320m to the southwest of the site at its closest point.
- 3.5.2 The EA's Catchment Data Explorer website indicates that the site resides within the Dearne operational catchment and the Dove from Source to River Dearne sub catchment.

Figure 3-2 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.

4.2 ENVIRONMENT AGENCY FLOOD ZONES

- 4.2.1 The EA Flood Map for Planning shows the majority of the site is located within Flood Zone 1, which is designated as land having less than a 1 in 1,000 annual probability of river or sea flooding. A section within the west of the site is identified as being located within Flood Zone 2 and 3. Flood Zone 2 is designated as land having between a 1 in 100 and a 1 in 1,000 annual probability of river flooding, or between a 1 in 200 and a 1 in 1,000 annual probability of sea flooding. Flood Zone 3 is designated as land having a 1 in 100 or greater probability of river flooding or a 1 in 200 or greater probability of sea flooding.
- 4.2.2 This potential fluvial/coastal flood risk to the site has been illustrated in [Figure 4-1](#).

Figure 4-1 Environment Agency Long Term Flood Map for Planning



4.3 FLUVIAL AND COASTAL FLOODING

- 4.3.1 It is necessary to consider the risk of fluvial and coastal flooding at the site during both present times and with the impacts of climate change. Therefore, the EA Long Term Flood Risk Map for fluvial and coastal flooding between the years 2036 and 2069 has been presented below in [Figure 4-2](#). This figure indicates that the majority of the site is at very low risk of fluvial and/or coastal flooding, with an area in the west, adjacent with the watercourse within the site, being at low to high risk of fluvial and/or coastal flooding.

Figure 4-2 Environment Agency Long Term Flood Map – Rivers and Sea – Yearly Chance of Flooding between 2036 and 2069



4.3.2 As the site is partially situated in Flood Zone 2 and 3, additional flood data was requested from the EA on the 19th of November 2024 and was received on the 18th of December 2024. This data has been provided in [Appendix D](#).

4.3.3 The data provided by the EA included information from the 2009 ASM River Done model, the 2017 Low Valley ERR model, and the 2018 Middle and Lower Don – Don Dearne model.

Defences

4.3.4 As shown in [Appendix D](#), there are a number of flood defences located upstream of the site along the River Dove, and around the RSPB Dearn Valley – Wombwell Ings nature reserve to the southeast of the site.

4.3.5 The defences discussed consist of embankments with a 30-year standard of protection, and downstream crest levels of circa 23.0 mAOD to 23.66 mAOD.

4.3.6 Although there are defences that exist within close proximity to the site, the site does not fall within an area identified as benefitting from defences. As such, the flood risk at the site will be assessed against an undefended scenario.

Fluvial

4.3.7 The data provided by the EA shows that in accordance with the 2017 Low Valley ERR model, for a 1in100year + 50% climate change no defences exist scenario, there is no risk of flooding to the site.

Coastal and Tidal

4.3.8 As the site is located approximately 56 miles from the nearest coastline, the site is not considered to be at risk of either coastal or tidal flooding.

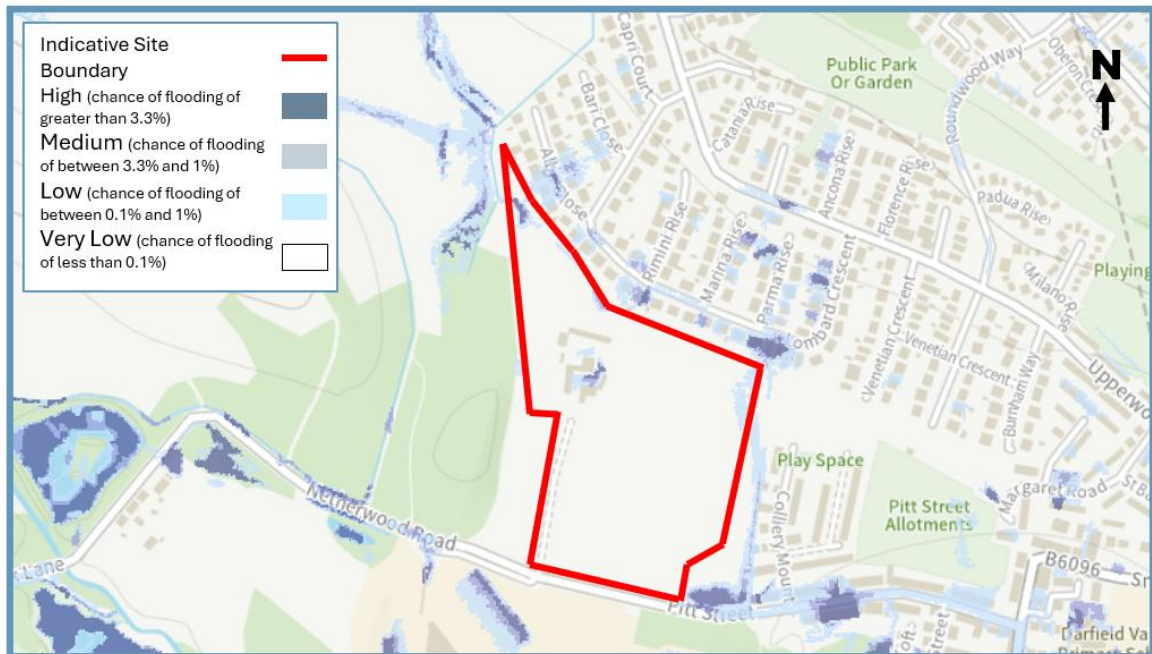
Conclusion

4.3.9 The data provided by the EA shows that the site is not at risk of flooding for a defended scenario or an undefended scenario.

4.4 PLUVIAL (SURFACE WATER) FLOODING

- 4.4.1 Similarly to that discussed in [Section 4.3](#), the impacts of climate change on the potential for surface water flooding should be considered within the assessment of the flood risk at the site. The EA Long Term Flood Risk Map for surface water flooding between the years 2040 and 2060 is shown below in [Figure 4-3](#). This figure shows that the majority of the site is at very low risk of surface water flooding however, there are some areas in the northwest and northeast, as well as in the centre of the site which are at low to high risk of surface water flooding. These areas are identified as having a risk of reaching a maximum flood depth of 0.30m.
- 4.4.2 As the proposed development of the site may potentially reduce the overall site permeability and potentially increase surface water run-off 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 low potential risk of flooding from pluvial sources.

Figure 4-3 Environment Agency Long Term Flood Risk Map – Pluvial (Surface Water) Flooding – Yearly Chance of Flooding between 2040 and 2060



4.5 GROUNDWATER FLOODING

- 4.5.1 Ground conditions in the majority of the site is located in an area classified as being Soilscape 6, which is defined as having freely draining slightly acid loamy soils. The southwest corner of the site is located in an area classified as being Soilscape 20, which is defined as having loamy and clayey floodplain soils with naturally high groundwater. Therefore the propensity for groundwater emergence at the site is considered to be medium, and the potential risk of groundwater emergence affecting the site development is considered to be low.
- 4.5.2 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.
- 4.5.3 According to the Barnsley SFRA Level 1, the Upperwood area of Darfield is identified as being at risk of groundwater flooding.
- 4.5.4 During long periods of heavy rainfall, the water table within an area can rise above the natural ground level, resulting in groundwater flooding.

- 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 In accordance with information taken from the EA Long Term Flood Risk information, the site and its surroundings are unlikely to experience flooding from artificial sources such as dam or canal failure. In addition, reservoirs and canals are regularly maintained by relevant local authorities and failure is extremely unlikely. Therefore, the potential risk of flooding from reservoir and/or canal failure is considered to be negligible.

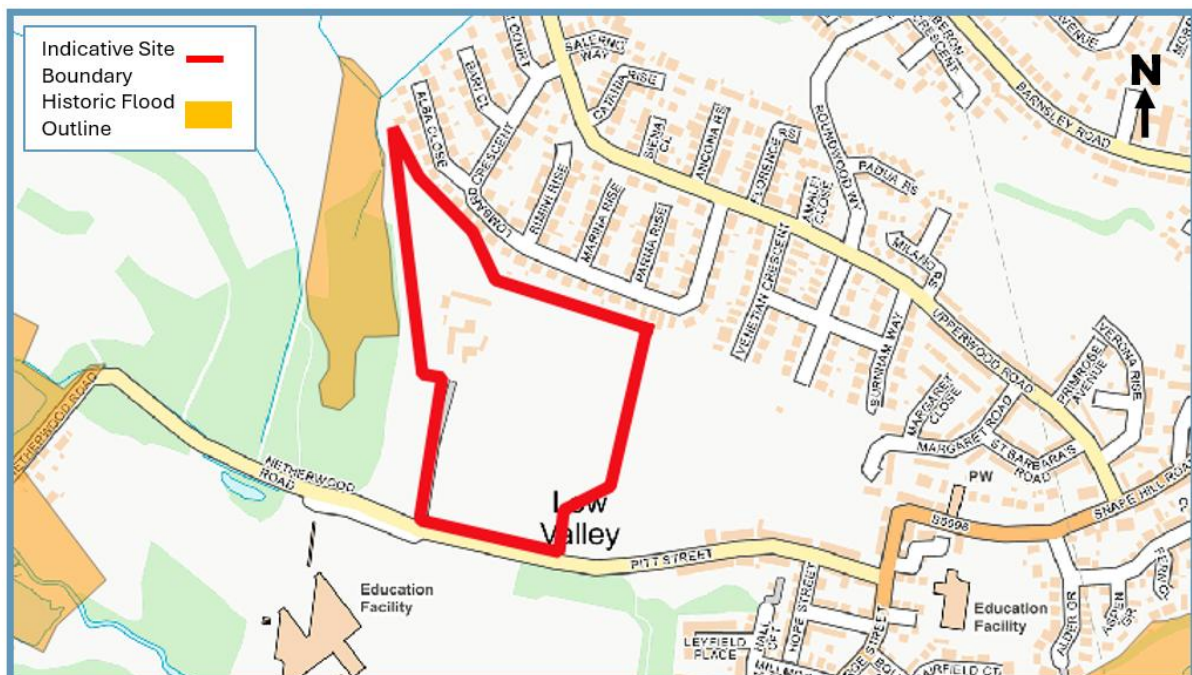
4.7 FLOODING FROM SEWERS

- 4.7.1 The site currently consists of greenfield land and is not identified as having any drainage infrastructure within its boundary. The site is therefore considered to have very low potential risk of flooding from sewer flooding.
- 4.7.2 The Barnsley Level 1 SFRA identifies the area of Darfield to the north of the site as being more prone to external sewer flooding. However, as discussed the site consists of greenfield land and as such is not considered to be at risk.

4.8 HISTORIC FLOODING

- 4.8.1 The EA historic flood map shows the site to not have experienced historic flooding within the northwest of the site.
- 4.8.2 Product 4 information obtained from the EA and provided within [Appendix D](#) agrees with the EA historic flood map.

Figure 4-4 Environment Agency Historic Flood Map



5 FLOOD RISK ASSESSMENT

5.1 FLOOD RISK PLANNING POLICY

National Planning Policy Framework

- 5.1.1 The National Planning Policy Framework (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 majority of the site within Flood Zone 1, i.e., land assessed as having less than a 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year. There is a small section in the west of the site which is located within Flood Zone 2, i.e., land assessed as having between a 1 in 100 and a 1 in 1,000 annual probability (1% - 0.1%) of river flooding, or between a 1 in 200 and a 1 in 1,000 annual probability (0.5% - 0.1%) of 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 (2024), Flood Zones 1 and 2 are defined as having a low to medium probability flood risk, respectively. The proposed development includes 210 residential units with associated hardstanding, infrastructure and landscaping, 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 Zones 1, 2 and 3 and is considered to come under the 'More Vulnerable' category as a residential development.
- 5.2.2 The proposed development has been arranged sequentially so all residential dwellings are located within Flood Zone 1, and the areas of the site within Flood Zone 2 and 3 will remain as areas of open space. As such, the proposed use of the site is acceptable and there is no requirement for a Sequential or Exception Test to be undertaken.

Table 5-1 Development Appropriateness Based on Vulnerability and Flood Zones

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less 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	x

5.3 CONCLUSION

- 5.3.1 In light of this assessment against the sites applicable flood zone (Flood Zones 1, 2 and 3), further assessment against the sequential or exception test is not required, due to the sequential arrangement of the site.
- 5.3.2 **Table 5-2** summarises the pre mitigation flood risk associated with the site as well as the impacts of the flood risk on the wider catchment prior to mitigation. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within **Section 3**.

Table 5-2 Pre-Mitigation Flood Risk Summary

Sources	Probability of Flood Risk	Impacts	Description
Tidal	N/A	N/A	The site is located inland and therefore, is not tidally influenced.
Fluvial	Low	Low	The site is located in Flood Zones 1, 2 and 3. The EA data shows that the site is not at risk of flooding for a defended scenario.
Surface Water (Pluvial)	Low	Low	Review of information from multiple sources (EA, LLFA) reveals evidence of surface water flooding in the northwest, northeast and centre of the site. These areas are shown to be at risk of experiencing flood depths of up to 0.30m.
Groundwater	Medium	Low	The site is shown to be at risk of groundwater flooding; however, given the hardstanding nature of the site following development, groundwater emergence at the site will be limited.
Artificial Sources	Very Low	Very Low	Review of information from multiple sources (EA, LLFA) reveals no evidence of flooding from reservoirs or canals.
Sewers	Very Low	Very Low	The risk of flooding from the surcharging of sewers is considered to be low.
Effect of development on wider catchment	Low	Low	The impermeable area of the site is being altered.

- 5.3.3 Based on the assessable information presented, the site is considered to meet the requirements of the NPPF, given the assessed potential flood risk posed from all applicable sources, the means of adopting suitable mitigation measures to prevent increase in the potential for flood risk and based on the

vulnerability of the development type. Further consideration of necessary surface water run-off mitigation measures will be provided, so as to address the potential for increase of surface water arising from the proposed development of the site.

6 FLOOD RISK MITIGATION

6.1 INTRODUCTION

- 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 Zones 1, 2 and 3. As previously discussed, the site has been arranged sequentially so that the majority of residential dwellings are located within Flood Zone 1. Therefore, a Sequential Test is not required for this site.

Finished Floor Levels

- 6.3.2 Given the site's location within Flood Zone 1, 2 and 3, it is recommended that a finish floor level of 0.15m is set for the proposed development.
- 6.3.3 In addition, the SFRA mentions that any lower floors which are at risk of flooding should seek to be less vulnerable development. This means that no ground floor sleeping arrangements should be proposed for the dwellings located in Flood Zone 2 and 3.

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 8th Edition and the Civil Engineering Specification for the Water Industry.

7.2 EXISTING SEWERS

- 7.2.1 AMA attained a Yorkshire Water pre-development enquiry which can be seen in [Appendix E](#). This shows no existing public sewers located within the site.

7.3 FOUL WATER DISCHARGE RATES

- 7.3.1 The estimate design Dry Weather Flow (DWF) generated by the proposed development, based on a gravity system, has been calculated as 7.09 litres per second.
- 7.3.2 This figure is based on 210 dwellings at 4,000 litres per dwelling as prescribed in Sewers for Adoption.

7.4 FOUL WATER CAPACITY AND POINT OF CONNECTION

- 7.4.1 Yorkshire Water state that at present the sewer network does not have capacity to support the development. However, they state that should the site be granted permission, the closest point of connection is the 300mm public foul sewer to the southeast of the site in Stonyford Road.
- 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 OVERVIEW AND CONCEPT

- 8.2.1 As detailed in [Section 3.1](#), development proposals for the site consist of residential use, consisting of 210 residential units with associated hardstanding, landscaping and infrastructure. The site plan shows the developable area of the site to be restricted to the red line boundary, as shown in [Appendix A](#), with an approximate total developable area of 7.21 ha.
- 8.2.2 Review of the site plan shows proposals to consist of an approximate total impermeable area of 2.49 ha, which equates to approximately 35% of the total proposed developable area ([Table 8-1](#)). The contributing areas have been identified within the Drainage Layout Drawing, in [Appendix F](#).
- 8.2.3 It is considered that green open space and landscaped areas will not produce or contribute run-off to the surface water management infrastructure proposed as part of this strategy. This has been taken into account when deriving the impermeable area for the site.

Table 8-1 Contributing Surface Water Drainage Areas

Drainage Area	Area (ha)	% Impermeable	Contributing area
Green open spaces and landscape areas	4.72	0	0.65
Impermeable areas	2.49	100	0.35
Totals	7.21		

8.3 PRE-DEVELOPMENT SURFACE WATER RUN-OFF

Greenfield

- 8.3.1 The site is approximately 7.21 ha in area and currently comprises of undeveloped greenfield land.
- 8.3.2 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.
- 8.3.3 The table below summarises the existing greenfield run-off rates generated by the development for a range of storm return periods.

Table 8-2 Existing Run-Off Rates

Area	Q _{BAR}	Q ₁	Q ₃₀	Q ₁₀₀	Q ₂₀₀
7.21	11.79	10.14	20.63	24.52	27.94

8.4 GROUNDWATER PROTECTION

- 8.4.1 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.

8.5 METHODS OF SURFACE WATER MANAGEMENT

- 8.5.1 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

8.6 INFILTRATION

- 8.6.1 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.
- 8.6.2 Information obtained from the Cranfield University's Soilscape website indicates that the majority of the site is located in an area classified as being Soilscape 6, which is defined as having freely draining slightly acid loamy soils. The southwest corner of the site is located in an area classified as being Soilscape 20, which is defined as having loamy and clayey floodplain soils with naturally high groundwater.
- 8.6.3 The SFRA states that the area is at risk of groundwater flooding and as such, infiltration is unlikely to be supported at the site.
- 8.6.4 From a desktop review of the geology and soil at the site, it is believed that infiltration would not be an acceptable way of discharging surface water from the site.
- 8.6.5 Percolation testing has not yet been carried out on this site. 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.

8.7 WATERCOURSE

- 8.7.1 As discussed in [Section 3.4.1](#) there are existing watercourses located to the east of the site.
- 8.7.2 Due to third party land between the site and the watercourse, it would not be an acceptable way to discharge surface water from the site.

8.8 PUBLIC SEWERS

- 8.8.1 As a last resort and following the hierarchy of surface water, disposal discharge to the public sewer system may need to be considered.
- 8.8.2 In the Yorkshire Water pre development enquiry ([Appendix E](#)) they state that as the site is not previously developed, the local sewer network does not have capacity to accept flows from the proposed development.

- 8.8.3 AMA contacted Yorkshire Water regarding a surface water connection into the public sewer system, at a point in George Street, just before the sewer connects into the River Dove. Yorkshire Water confirmed surface water can discharge into this surface water sewer in George Street, however the rate must be restricted to 3.5 l/s. This correspondence can be found in [Appendix G](#).

8.9 PROPOSED DISCHARGED RATES

- 8.9.1 Surface water from the site will be discharged via a rising main to the Yorkshire Water public sewer located within George Street.
- 8.9.2 As the site will be drained by discharging surface water into the public sewer, surface water will be restricted to 3.5 l/s, as agreed with Yorkshire Water.
- 8.9.3 Typically, any discharge rate less than 5.0 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 3.0 l/s the figure of 3.0 l/s shall be used to reduce the risk of blockages. This would need to be confirmed by the approving authority.

8.10 ATTENUATION REQUIREMENTS

- 8.10.1 As discussed earlier the site will be drained into a public sewer at a restricted discharge rate of 3.5 l/s. Therefore, attenuation will have to be provided.
- 8.10.2 Causeway Flow drainage design software has been used to estimate the maximum storage volume required on-site for the 100-year storm event plus 50% (40% allowance for climate change and 10% for urban creep). The results of these calculations can be found in [Appendix H](#).
- 8.10.3 The results below are based on an attenuation basin located in the southeast of the site.
- 8.10.4 A Drainage Layout Drawing can be found in [Appendix F](#).

Total Impermeable Area

- 8.10.5 This volume is based on using an attenuation basin with a discharge rate of 3.5 l/s. The details on the attenuation of the attenuation basin can be found in Table 8-3 below.

Table 8-3 Attenuation Volume

Gross Area (ha)	Max Discharge (l/s)	Imp. Area (ha)	Q100+50% Volume (m³)
7.21	3.5	2.49	2975

8.11 DRAINAGE NETWORK

- 8.11.1 An indicative drainage network has been illustrated showing how flows would be intercepted and conveyed to the basin. This includes a series of pipes and manholes.
- 8.11.2 The final surface water drainage network servicing the site should ideally consist of permeable paving to limit the run-off from any paved areas, whilst extending time of concentration for discharge to the accompanying drainage network.
- 8.11.3 For any portion of the network crossing a highway or an area to be trafficked by heavy grade vehicles (HGV's), a minimum cover requirement of 1.20 m below cover level should be provided where practically possible for the internal drainage network to satisfy Sewers for Adoption standards.
- 8.11.4 Proposals for the drainage network are to discharge to the Yorkshire Water public sewer located to the southeast of the site entrance.

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 as a sequence of management practices, control structures and strategies designed to drain surface water efficiently and sustainably, 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

- 9.3.2 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 as the topography supports this.
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 not 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.

9.5 PROPOSED SUDS FEATURES

- 9.5.1 The index approach identified within the SuDs Manual (Ciria C753) has been used to quantify the hazard from pollution present at the site and ensure adequate SuDS features are implemented to offset this value.
- 9.5.2 As identified in Table 26.2 in The SuDS manual, given the sites proposed end use of residential development, the site would fall under a low pollution hazard level. The corresponding indices for pollutant types have been provided in the [Table 9-2](#) below.

Table 9-2 Pollution Hazard Indices for Different Land Use Classifications (Table 26.2 Ciria C753)

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-Carbons
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4

- 9.5.3 Taking the values shown above, a cumulative pollution hazard index of 1.3 has been calculated for the site.
- 9.5.4 To offset the pollution index of 1.3, a combination of SuDS features has been proposed for the site. The proposed SuDS feature and their associated mitigation indices have been provided in [Table 9-3](#) below.

Table 9-3 Proposed SuDS Features and Associated Mitigation Indices

Types of SuDS Component	Stage of treatment	Treatment factor	TSS	Metals	Hydro-Carbons
Basin	Primary	1.0	0.5	0.5	0.6
Total					

- 9.5.5 Taking the total values identified in the table above, the cumulative SuDS mitigation indices for each potential contaminant group are shown as providing a greater degree of mitigation than the pollution hazard indices. It is therefore considered that integrated system of SuDS proposed would provide suitable betterment and quality improvement to the surface water run-off quality for the site, and will not require additional treatment via retention interceptors or other means before being discharge from the site to the external receiving environment.

10 SUDS MAINTENANCE PLAN

10.1 SURFACE WATER MAINTENANCE AND MANAGEMENT SCHEDULE

Attenuation Basin Maintenance Schedule

Table 10-1 Attenuation Basin Maintenance Schedule

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

Hydrobrake Manhole Maintenance Schedule

Table 10-2 Hydrobrake Manhole Maintenance Schedule

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

- 11.1.1 The proposals for the site are for residential use, consisting of 210 residential units with associated hardstanding, infrastructure and landscaping.
- 11.1.2 The site is in an area identified as having a low, medium and high probability of flooding on the EA Flood Map and is located in Flood Zone 1, 2 and 3.
- 11.1.3 The site is at risk from fluvial, pluvial and groundwater flooding. The fluvial and pluvial flooding is mostly within the north of the site.
- 11.1.4 The site is not at risk from artificial sources, flooding from sewers and tidal flooding.
- 11.1.5 The mitigation measures proposed include raising the FFLs by 0.15m, and to have no sleeping arrangements on the ground floor. The majority of residential dwellings are located outside Flood Zones 2 and 3.
- 11.1.6 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.
- 11.1.7 The primary option for surface water disposal is to use a connection into the public sewer system.
- 11.1.8 From a desktop study, infiltration is an unfeasible method to discharge surface water from the site.
- 11.1.9 There is not a suitable watercourse in the vicinity of the site which could be utilised to dispose of surface water from the site.
- 11.1.10 There is a suitable public sewer in the vicinity of the site which could be utilised to dispose of the surface water. It is proposed that surface water will discharge through a connection into the surface water sewer located to the southeast of the site, in George Street.
- 11.1.11 Attenuation is required as the means of surface water disposal is through a connection into the public sewer system. Furthermore, there will be a restricted discharge limit of 3.5 l/s, as agreed with Yorkshire Water.
- 11.1.12 There is a formal point of connection into a Yorkshire Water public foul water sewer in close proximity to the site. Foul water domestic waste can discharge to the public foul sewer recorded in Stonyford Road, at a point to the southeast of the site.

12 LIMITATIONS

- 12.1.1 This report has been prepared for exclusive use by Alphin Property 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

Appendix B Topographic Survey

Appendix C BGS Borehole Records

Appendix D Additional EA Data

Appendix E Yorkshire Water Pre Development Enquiry

Appendix F Drainage Layout Drawing

Appendix G Yorkshire Water Correspondence

Appendix H Causeway Flow Calculations



Appendix A
Proposed Site Layout



SITE AREAS
GROSS - 72067.6m² / 7.2 Hectares / 17.8 Acres
NET AREA - 51328m² / 5.1 Hectares / 12.7 Acres
PROJECTED HOUSE NUMBERS
189 @ 35 D.P.H.
204 @ 40 D.P.H.



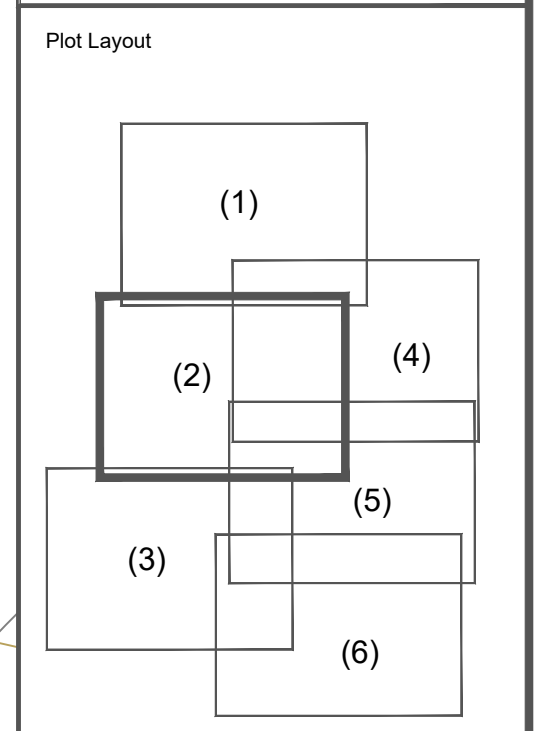
Appendix B
Topographic Survey





Topographical Survey Key

▲ Air Valve	⬢ Invert
⬢ Fire Hydrant	⬢ Manhole
⬢ Stop Tap	⬢ Telephone Pole
⬢ Tap	⬢ Telecom Cover
⬢ Water Meter	⬢ Bus Stop
⬢ Stop Valve	⬢ CCTV Camera
⬢ Manhole	⬢ Road
⬢ Water Valve	⬢ Post Box
⬢ Bench Mark	⬢ Threshold Level
⬢ Light	⬢ Cable TV Cover
⬢ Lamp Post	⬢ Cable TV Supply
⬢ Traffic Light	⬢ Sign
⬢ Electricity Pole	⬢ Traffic Signal Cover
⬢ Earth Road	⬢ Electric Cover
⬢ Boundary	⬢ Gas Valve
⬢ Road	⬢ Road
⬢ Circular Manhole	⬢ Road
⬢ Square Manhole	⬢ Road
⬢ Triangular Manhole	⬢ Road
⬢ Chamber Extents	⬢ Road



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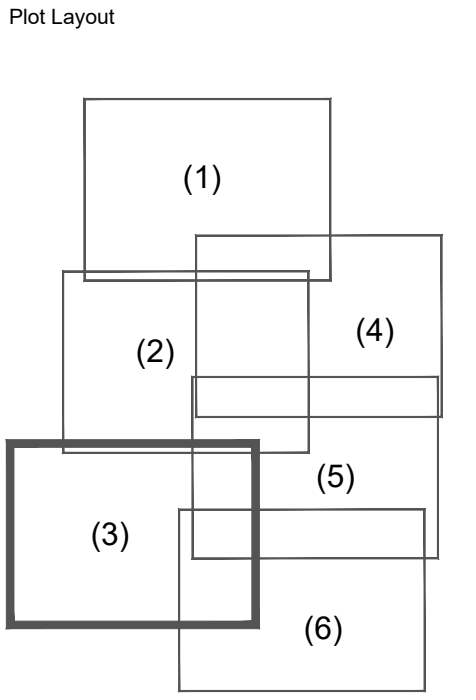
SURVEYED: CA, DE, EW
PROCESSED: CA, DE, EW
DATE: 03-04-2025
REVISION: N/A

SITE: PITT STREET, WOMBSWELL
CLIENT: JRP
TITLE: TOPOGRAPHICAL SURVEY
REF / SCALE: JRP001 WMBW001
(1:2000/8400)



Topographical Survey Key

AV	Air Valve	DN	Drainage
FX	Five Hydrant	KO	Kern Outlet
ST	Step Tap	TP	Telephone Pole
TAP	Tap	TEL	Telephone
W	Water Meter	BS	Bus Stop
WC	Wash Out	CCV	CCV Camera
WV	Water Valve	SCG	Softland
WU	Water Valve	MAL	Mail Box
BM	Bench Mark	TH	Threshold Level
L	Light	COL	Column
LP	Lamp Post	C	Cable TV Cover
TL	Traffic Light	C	Cable TV Supply
EP	Electric Pole	SGP	Street Sign
E	Electric	TP	Telephone Sign Cover
BL	Bus Stop	E	Electric Cover
T	Trash	G	Gas Valve
CH	Chamber	RP	Reading Post
MSH	Circle Manhole	M	Marking Post
SC	Square Manhole	KC	Inspection Cover
TR	Triangular Manhole		
CH	Chamber Extents		



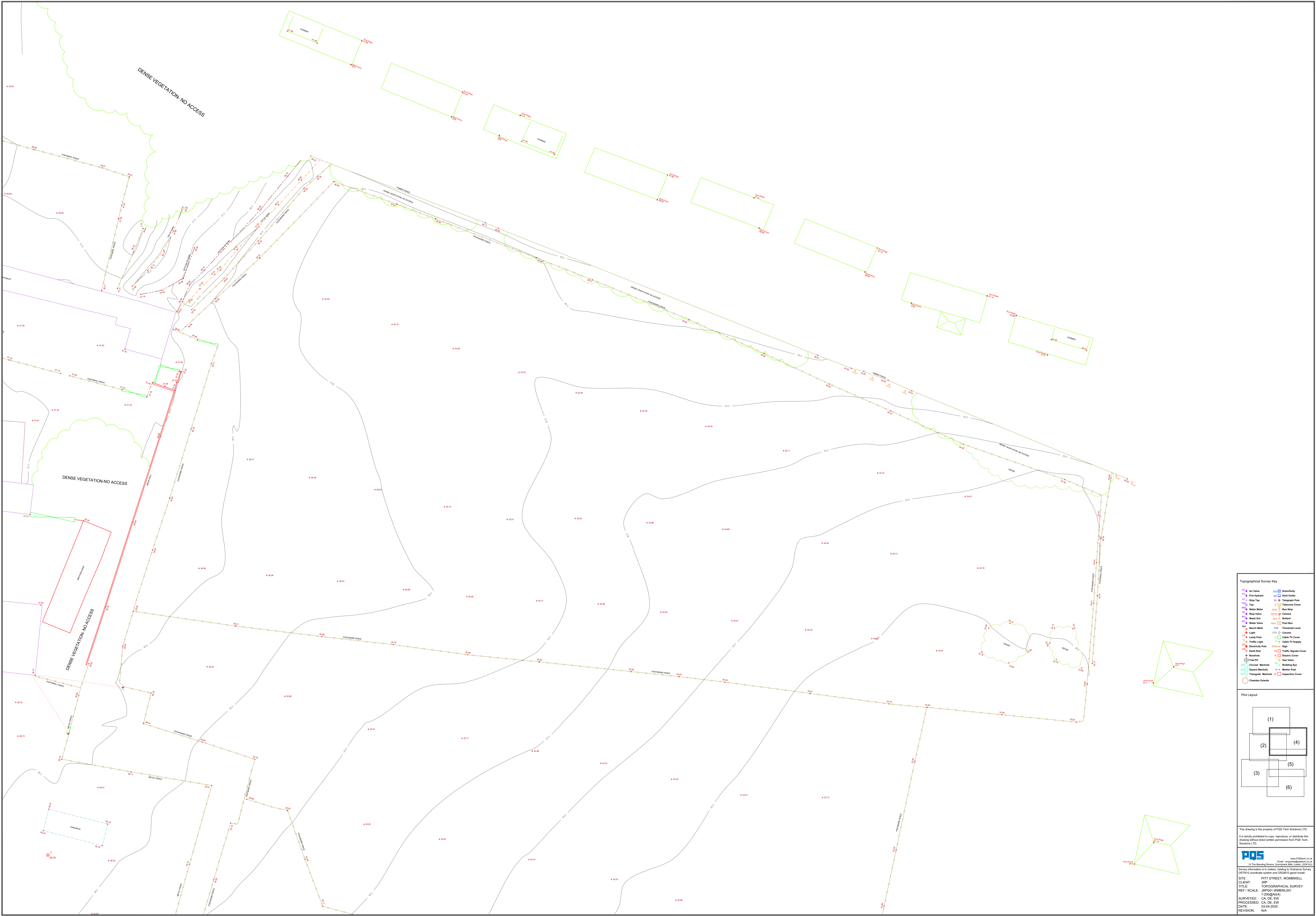
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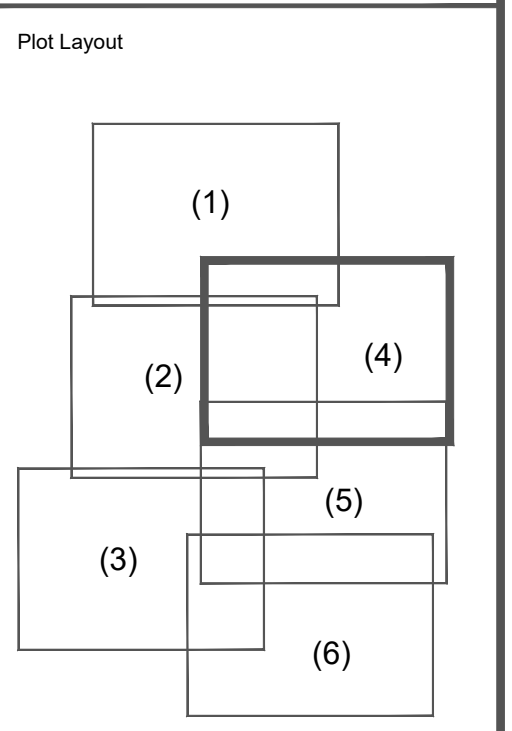
Survey information is in meters, relating to Ordnance Survey OSTN15 coordinate system and OSGM15 geoid model.

DATE : PITT STREET, WOMBWELL
CLIENT: JRP
SURVEY: TOPOGRAPHICAL SURVEY
REF / SCALE: JRP001.WMBWL001
1-200@A0(3)
SURVEYED: CA, DE, EW
PROCESSED: CA, DE, EW
DATE: 03-04-2025
REVISION: N/A



Topographical Survey Key

▲ Air Valve	⬢ Drainage
⬢ Fire Hydrant	⬢ Man Outlet
⬢ Stop Tap	⬢ Telegraph Pole
⬢ Water Meter	⬢ Telecom Cover
⬢ Stop Valve	⬢ Bus Stop
⬢ Water Valve	⬢ CCTV Camera
⬢ Bench Mark	⬢ Street Light
⬢ Light	⬢ Post Box
⬢ Lamp Post	⬢ Threshold Level
⬢ Electricity Pole	⬢ Cable TV Cover
⬢ Earth Road	⬢ Cable TV Supply
⬢ Square Manhole	⬢ Sign
⬢ Circular Manhole	⬢ Traffic Signal Cover
⬢ Triangular Manhole	⬢ Electric Cover
⬢ Chamber Extents	⬢ Gas Valve
	⬢ Road Sign
	⬢ Road Mark
	⬢ Inspection Cover



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SITE: PITT STREET, WOMBWELL
CLIENT: JRP
TITLE: TOPOGRAPHICAL SURVEY
REF / SCALE: JRP001 WMBWL001
1:2000(84/01)
SURVEYED: CA, DE, EW
PROCESSED: CA, DE, EW
DATE: 03-04-2025
REVISION: N/A



Appendix C
BGS Borehole Records

7.

Kshire Regional Laboratory

Report No:- 17313

Seam Studies Report No:- 6073

Nat.Grid Ref. E 440211 N 404094

Barnsley

Date Received: 14-JUN-85

HOUGHTON MAIN, SILKSTONE LINK ROAD-1995m INBYE

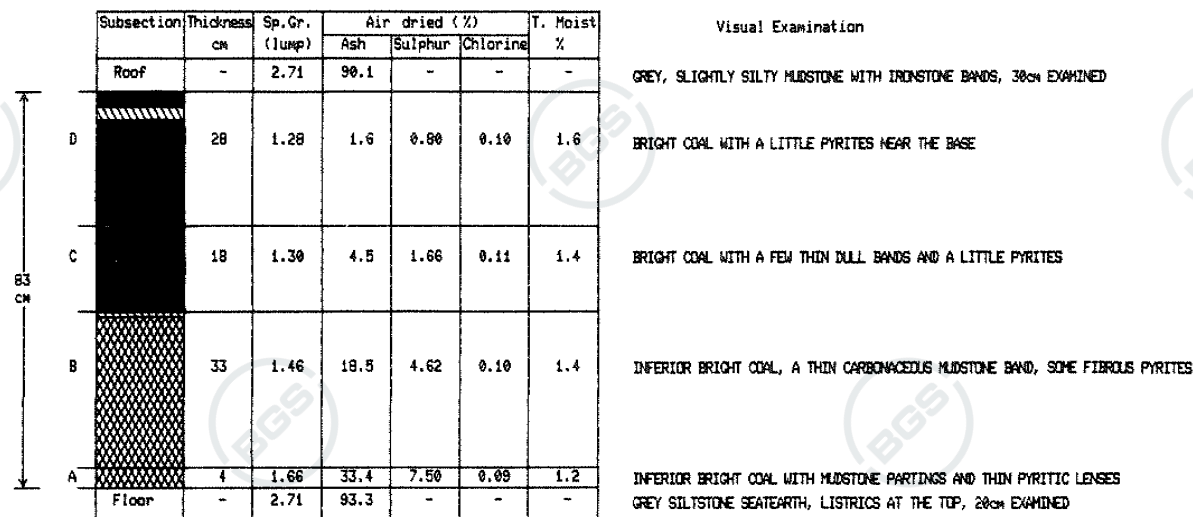
SE40SW/8k

Depth below O.D. 607.200m

SILKSTONE

08.170.760

Cover 637.400m



A-D	83	1.37	11.2	2.98	0.10	1.5	Whole seam
C,D	46	1.29	2.7	1.14	0.10	1.5	Clean coal



Washability of a Sample of the Whole Seam, A-D, 83cm thick						
	Floats at		Middlings	Sinks at		Whole
Sp. Gr.	1.4	1.6	1.4-1.6	1.4	1.6	-
Wt. %	77.6	89.7	12.1	22.4	10.3	100.0
Ash %	3.0	5.3	20.4	34.8	51.8	10.1
Sulphur	1.6	2.2	6.2	7.1	8.1	2.8

Barnsley - Doncaster

SE40SW/220

BOREHOLE No. AND LOCATION	DEPTH		SOIL DESCRIPTION 4020, 0442	SAMPLES	
	From	To		Depth	Test and Result
Borehole 2 13.7.75.	0	0.35	Grass and stoney topsoil.		
	0.35	0.5	Dark brown clayey sand with fragments of coal.		
	0.5	1.4	Firm to stiff light brown and rusty brown mottled sandy clay.	0.6- 1.0	m 25 LL 41 PL 26 DD 1520 CU 45 QU 0
	1.4	1.8	Firm rusty brown and light grey sandy clay with fragments of ironstained sandstone, becoming more abundant with depth.	1.5- 1.85	m 15 LL 28 PL 23 DD 1630 CU 40 QU 9
	1.8	2.25	Grey and brown weathered flaggy sandstone becoming less weathered with depth.	1.85- 1.95	m 13
				2.0- 2.25	m 11 83 blows for 75mm penetration. N 332
		2.25	End of Borehole. Water encountered at 1.85m, depth after 24 hours 0.95m.		

Dearne Valley and South Yorkshire Highway

APPENDIX

BOREHOLE No. AND LOCATION	DEPTH		SOIL DESCRIPTION	SAMPLES	
	From	To		Depth	Test and Result
Borehole 4. 16.6.70 Filcon. SE 13023 SE 40SW 230	0	2'0"	Fill mainly coarse sandstone gravel.		
	2'0"	3'6"	Light brown shaly weathered sandstone with traces of light brown clay.		
	3'6"	4'3"	Shaly weathered sandstone with ironstained laminations.	3'0"- 4'0"	m 14 LL 24 PL 21
	4'3"	6'2"	Grey sandstone. Chiselling for one hour.	5'0"- 5'6"	m 7.6 LL 22 PL 20 N 186
			End of Borehole. Dry.		
Borehole 5. 19.6.70 Filcon. SE 447019 SE 40SW 231	0	3"	Grass and topsoil.		
	3"	3'0"	Mainly soil with ash and fine gravel fill.		
	3'0"	5'0"	Soft to firm light brown sandy clay.	3'9"- 4'6"	m 22 LL 29 PL 24
	5'0"	6'2"	Firm mainly yellow with light brown mottled sandy silty clay.	5'3"- 6'3"	m 19 LL 31 PL 21 c U 10 φ U 11 DD 118
	6'2"	7'9"	Poor quality fine coal with traces of soft brown clay.	7'0"- 8'0"	m 55 LL 47 PL 36 N 19
	7'9"	11'2"	Grey brown weathered sandstone. Clayey silty sandstone.	8'6"- 9'0"	m 20 LL 27 PL 19
			Light grey fine sandstone.	10'4"- 10'9"	N > 200
			End of Borehole. Dry.		
Borehole 6. 20.6.70 Filcon. SE 461025 SE 40SE 220	0	9"	Grass and topsoil.		
	9"	1'3"	Ash.		
	1'3"	8'0"	Soft to firm light brown sandy silty clay. Changing to firm mainly yellow with brown silty sandy clay with traces of fine coal fragments. Water at 7'9".	1'9"- 2'3"	m 27 LL 35 PL 20
				3'0"- 4'0"	m 19 LL 29 PL 17 c U 11 φ U 7 DD 114
			/Continued		



Appendix D
Additional EA Data

Flood risk assessment data



Location of site: 440254 / 404260 (shown as easting and northing coordinates)

Document created on: 4 April 2025

This information was previously known as a product 4.

Customer reference number: 7A5A3DTRY5G5

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- past floods
- flood defences and attributes
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Surface water and other sources of flooding

When using the surface water map on the [check your long term flood risk service](#) the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- [reservoir flood risk](#)
- groundwater flood risk - you could use the [British Geological Survey groundwater flooding data](#), [groundwater: current status and flood risk](#) and the guide on [mining and groundwater constraints for development](#) - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Barnsley District.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: 2009 ASM River Dove
Scenario(s): Defended fluvial
Date: 1 October 2009

Model name: 2017 Low Valley ERR
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 31 January 2017

Model name: 2018 Middle and Lower Don - Don Dearne
Scenario(s): Defended fluvial, defences removed fluvial, defended climate change fluvial
Date: 1 March 2020

These models contain the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

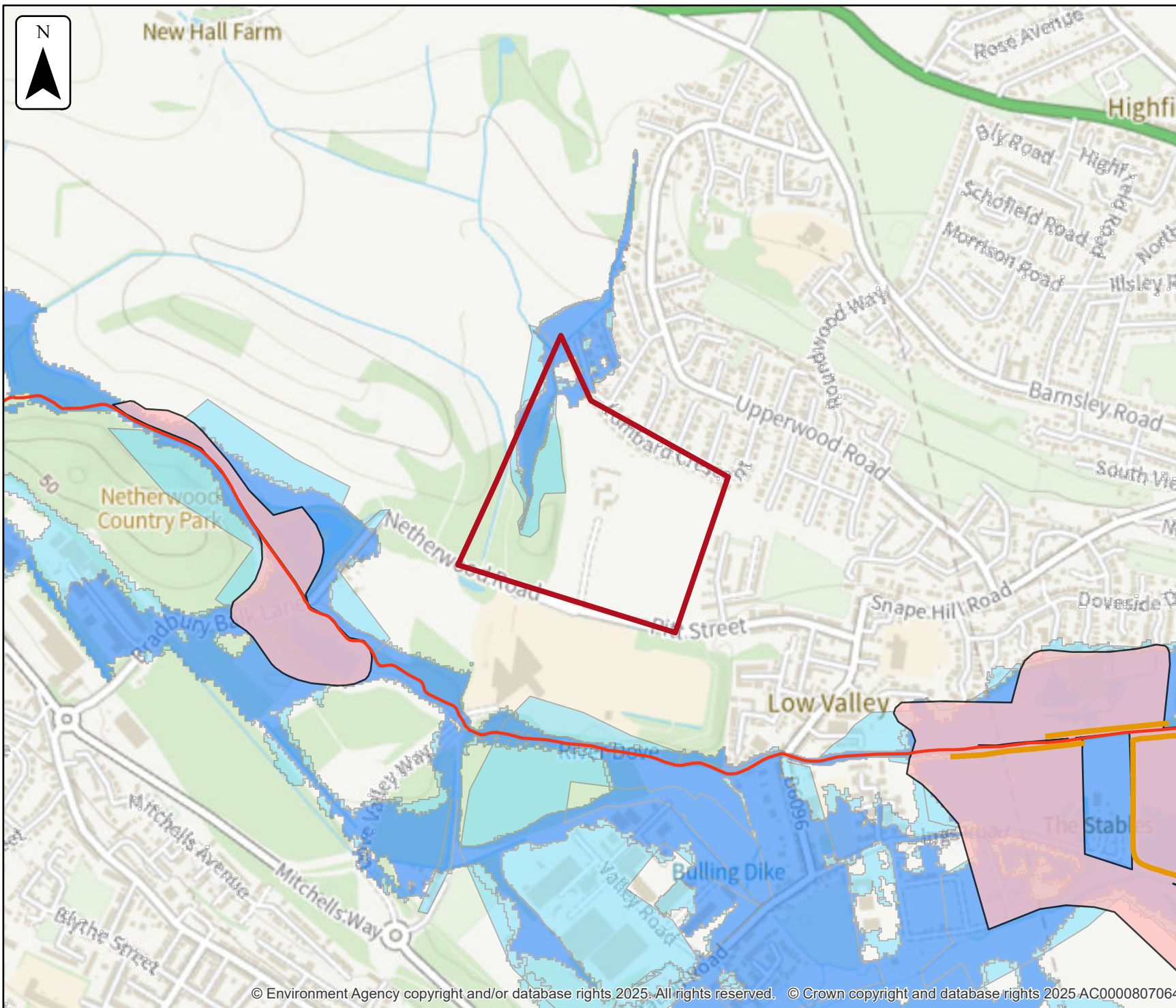
- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change



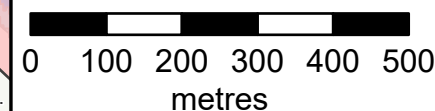
Flood map for planning

Location (easting/northing)
440254/404260

Scale
1:10,000

Created
4 Apr 2025

- Selected area
- Main river
- Flood defence
- Water storage area
- Flood Zones 2 and 3
- Rivers and Sea
- Flood Zone 2
- Flood Zone 3



Past floods

Past flood events included in this document

The recorded flood outlines included in this document are for areas of land local to your site location that have been flooded by any of these sources:

- ephemeral water
- main rivers
- ordinary watercourses
- the sea
- unknown

Data limitations

The outlines do not include flooding from:

- drainage where rainfall has led to surface water ponding or overland runoff
- artificial, water-bearing sewer, water supply and wastewater treatment pipelines

Changes to flood defences

The defences (also known as assets) that were in place may also have changed. For example, assets may have been built more recently than the last recorded flood outline.

What the recorded flood outlines dataset is

The recorded flood outlines are a geographical information system (GIS) data layer that show our verified records of areas that have flooded in the past from:

- rivers
- the sea
- groundwater
- surface water

[Download the complete recorded flood outlines dataset](#), which includes data quality flags for outlines recorded after April 2020. This indicates the confidence we have in an outline.

Get flood information from other organisations

Contact Barnsley District Lead Local Flood Authority (LLFA) and your drainage board to get information about past flooding caused by surface water or drainage systems.



New Hall Farm



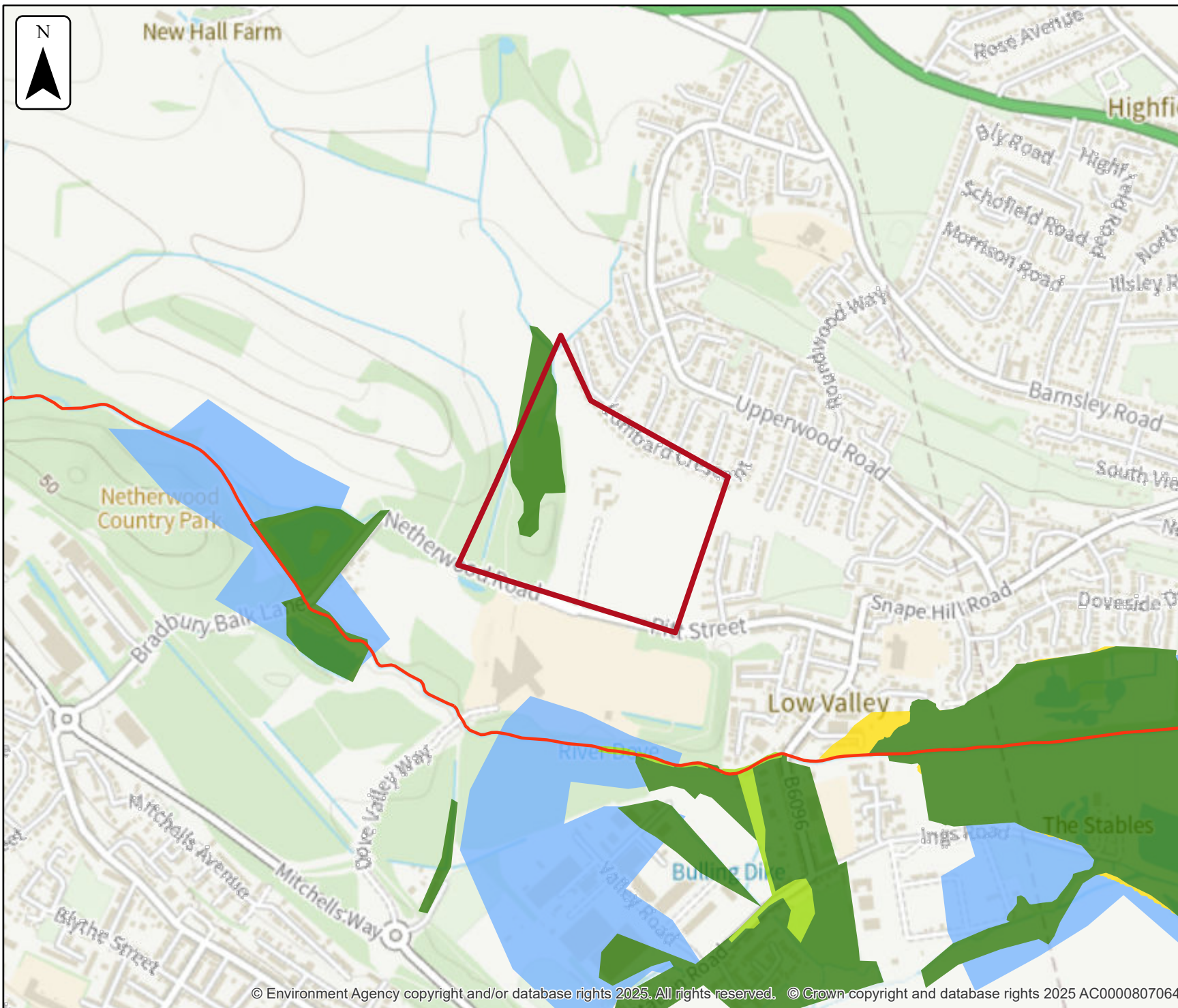
Past floods

Location (easting/northing)
440254/404260

Scale
1:10,000

Created
4 Apr 2025

-  Selected area
-  Main river
- Date of flood event
 -  November, 2019
 -  June, 2007
 -  November, 2000
 -  March, 1947



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Data on past flood events

Start date	End date	Source of flood	Cause of flood	Affects location
7 November 2019	8 November 2019	main river	channel capacity exceeded (no raised defences)	No
25 June 2007	26 June 2007	unknown	unknown	Yes
6 November 2000	4 December 2000	main river	unknown	No
19 March 1947	22 March 1947	main river	channel capacity exceeded (no raised defences)	No

Flood defences and attributes

The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is in mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



Flood defences

Location (easting/northing)
440254/404260

Scale

1:7,500

Created

4 Apr 2025

-  Selected area
-  Main river
-  Flood defence



Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	184003	Engineered High Ground	30				

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

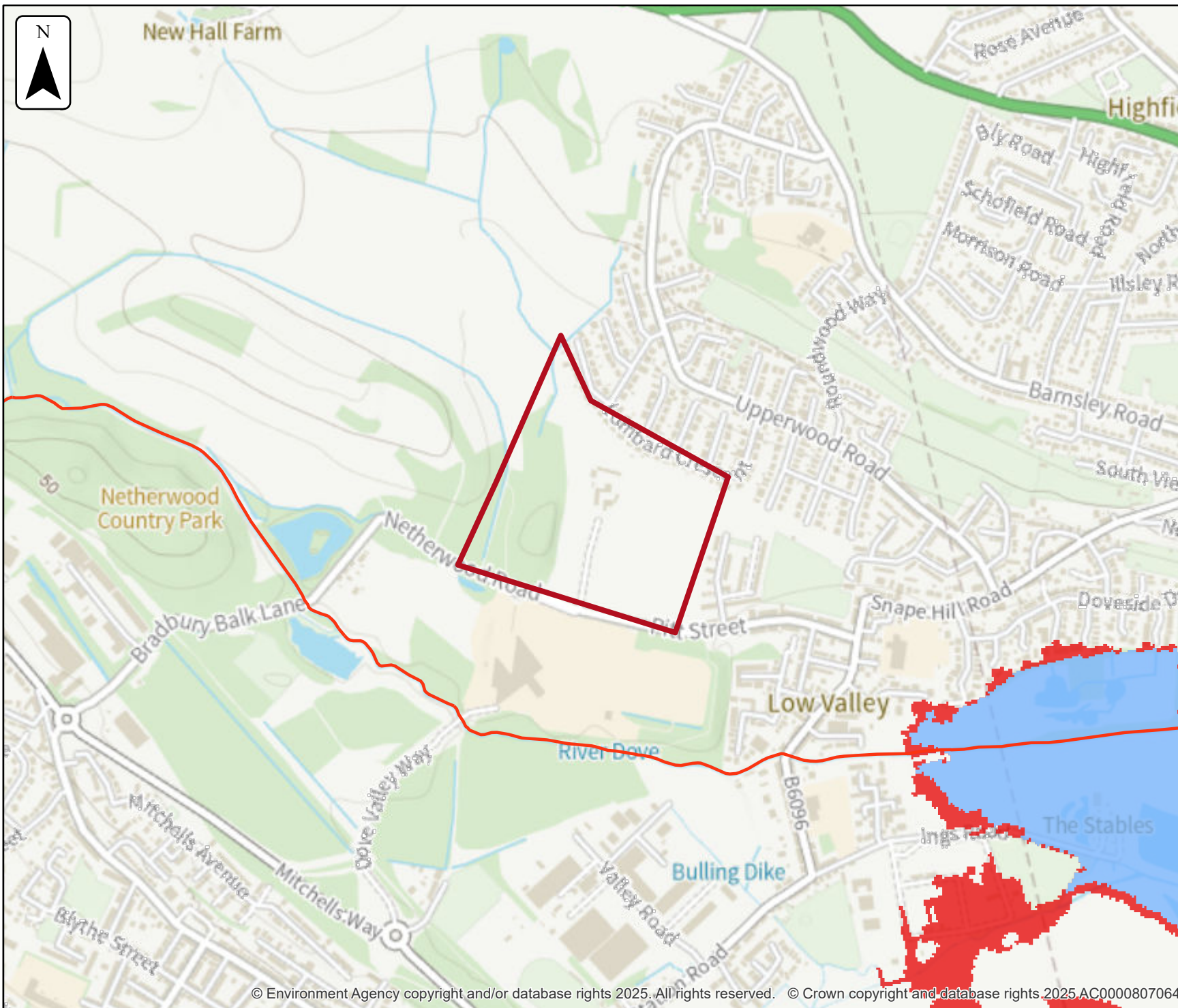
The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- Defended modelled fluvial: risk of flooding from rivers where there are flood defences
- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed
- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- Defended climate change modelled fluvial: risk of flooding from rivers where there are flood defences, including estimated impact of climate change
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



Defences removed modelled fluvial extent

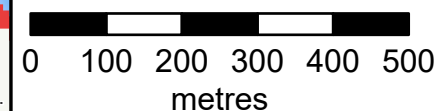
Location (easting/northing)
440254/404260

Scale Created
1:10,000 4 Apr 2025

Model name
**2018 Middle and Don
Don Dearne**

- Selected area
- Main river
- Modelled flood extent
- 1% AEP
- 0.1% AEP

Flood extents may not be
visible where they overlap
other return periods





Defended climate change modelled fluvial extent

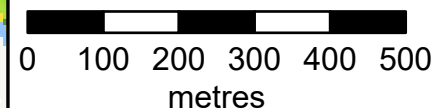
Location (easting/northing)
440254/404260

Scale Created
1:10,000 4 Apr 2025

Model name
**2018 Middle and Don
Don Dearne**

- Selected area
- Main river
- Modelled flood extent
 - 1% AEP (+20%)
 - 1% AEP (+30%)
 - 1% AEP (+50%)
 - 0.1% AEP (+20%)

Flood extents may not be
visible where they overlap
other return periods





Defended modelled fluvial extent

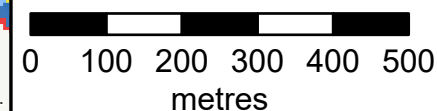
Location (easting/northing)
440254/404260

Scale Created
1:10,000 4 Apr 2025

Model name
**2018 Middle and Don
Don Dearne**

- Selected area
- Main river
- Modelled flood extent**
- 5% AEP
- 2% AEP
- 1.33% AEP
- 1% AEP
- 0.5% AEP
- 0.1% AEP

Flood extents may not be
visible where they overlap
other return periods





Defended modelled fluvial extent

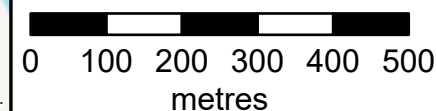
Location (easting/northing)
440254/404260

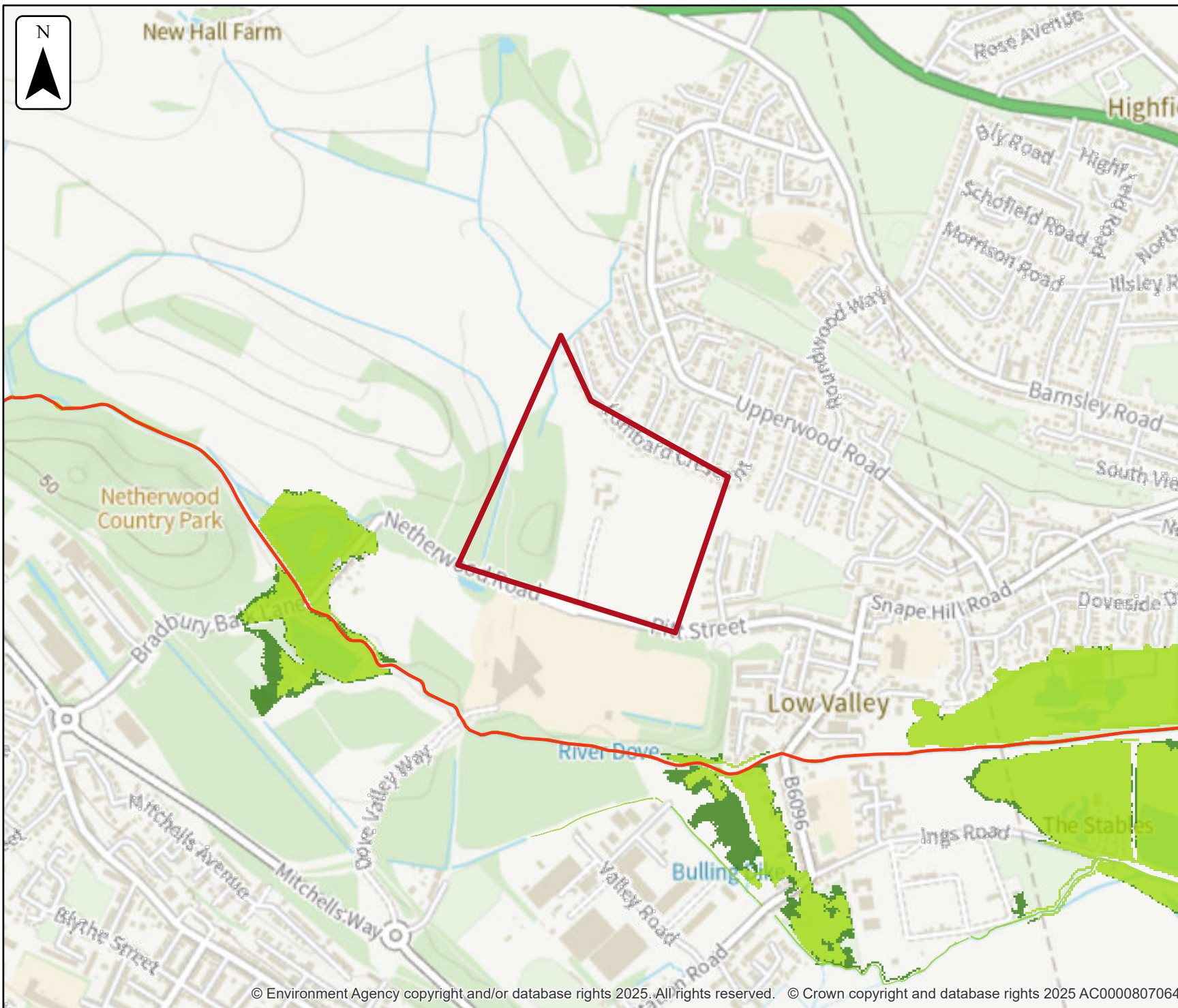
Scale Created
1:10,000 4 Apr 2025

Model name
2009 ASM River Dove

-  Selected area
-  Main river
- Modelled flood extent
 -  2% AEP
 -  1.33% AEP
 -  1% AEP

Flood extents may not be
visible where they overlap
other return periods





No defences exist climate change modelled fluvial extent

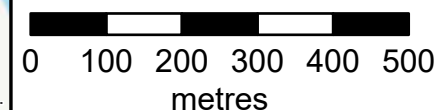
Location (easting/northing)
440254/404260

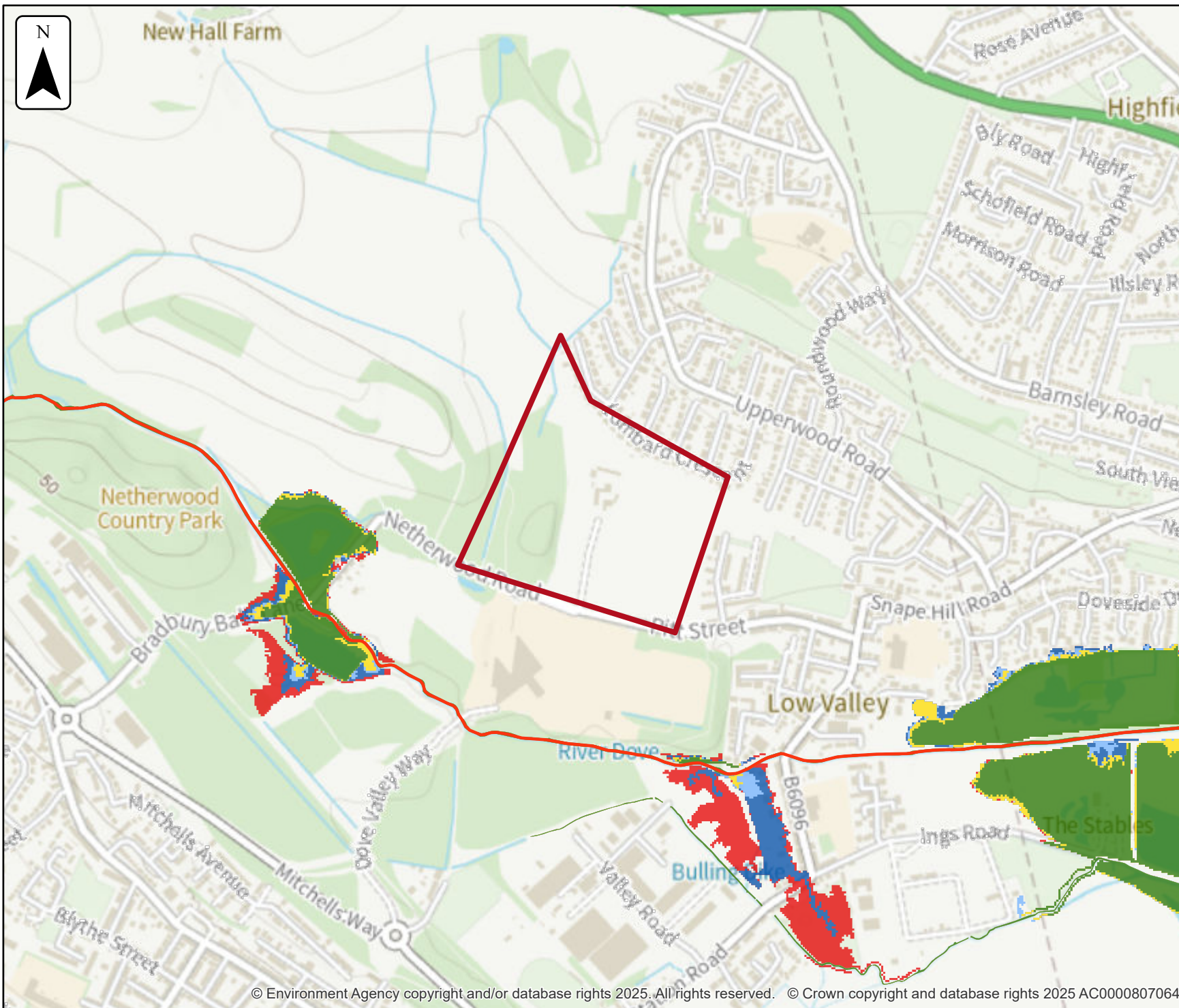
Scale Created
1:10,000 4 Apr 2025

Model name
2017 Low Valley ERR

- Selected area
- Main river
- Modelled flood extent
- 1% AEP (+30%)
- 1% AEP (+50%)

Flood extents may not be
visible where they overlap
other return periods





No defences exist modelled fluvial extent

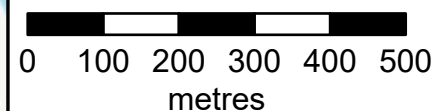
Location (easting/northing)
440254/404260

Scale Created
1:10,000 4 Apr 2025

Model name
2017 Low Valley ERR

-  Selected area
-  Main river
- Modelled flood extent**
 -  2% AEP
 -  1.33% AEP
 -  1% AEP
 -  0.5% AEP
 -  0.1% AEP

Flood extents may not be
visible where they overlap
other return periods



Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Barnsley District.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Yorkshire Environment Agency team at neyorkshire@environment-agency.gov.uk for:

- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for



Appendix E
Yorkshire Water Pre Development
Enquiry





YorkshireWater

Andrew Moseley Associates
15 St Pauls Street
Leeds
LS1 2JG

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

Tel: 0345 120 8482

Fax:

Your Ref:
Our Ref: A007165

Email:
technical.sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
George Mullaney on 0345 120 8482

18th March 2025

Dear Ms Ellenor,

Pitt Street, Wombwell, Barnsley S73 8AU – Pre-Planning Sewerage Enquiry V810758

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:

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.

At present the sewer network does not have sufficient available capacity to support the size of development proposed. It is understood that the site is not allocated within the adopted Barnsley Local Plan and as such the site has not been considered within the current Yorkshire Water Asset Management Plan (AMP) period. Should the site come



forward as part of a planning application Yorkshire Water (YWS) would likely not support the proposal.

Should the site benefit from the grant of permission, the closest practicable point of discharge for foul effluent would be the 300mm diameter public foul sewer in Stonyford Road to the southeast 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.

As the proposed site is currently undeveloped no surface water is known to have previously discharged to the public sewer network.

As such, the local public sewer network does not have capacity to accept any surface water from the proposed site. If SuDS are not viable, the developer is advised to contact the Environment Agency/local Land Drainage Authority/Internal Drainage Board with a view to establishing a suitable watercourse (if any nearby) for discharge.

It is understood that a watercourse is located crossing 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 online or obtain an application form from our website (www.yorkshirewater.com/developers/sewerage/sewerage-connections/) or by telephoning 0345 120 84 82.

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for Code for Adoption under Section 104 of the Water Industry



YorkshireWater

Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Code for Adoption, pursuant to an agreement under Section 104 of the Water Industry Act 1991. We are happy to offer pre-development technical advice on any prospective sites that you would like to put forward for adoption, prior to submission of your adoption application.

An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Sewer Adoption, Diversion and Requisition (telephone 0345 120 84 82) or email technical.sewerage@yorkshirewater.co.uk or visit - <https://www.yorkshirewater.com/developers/sewerage/sewer-adoptions/> 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.

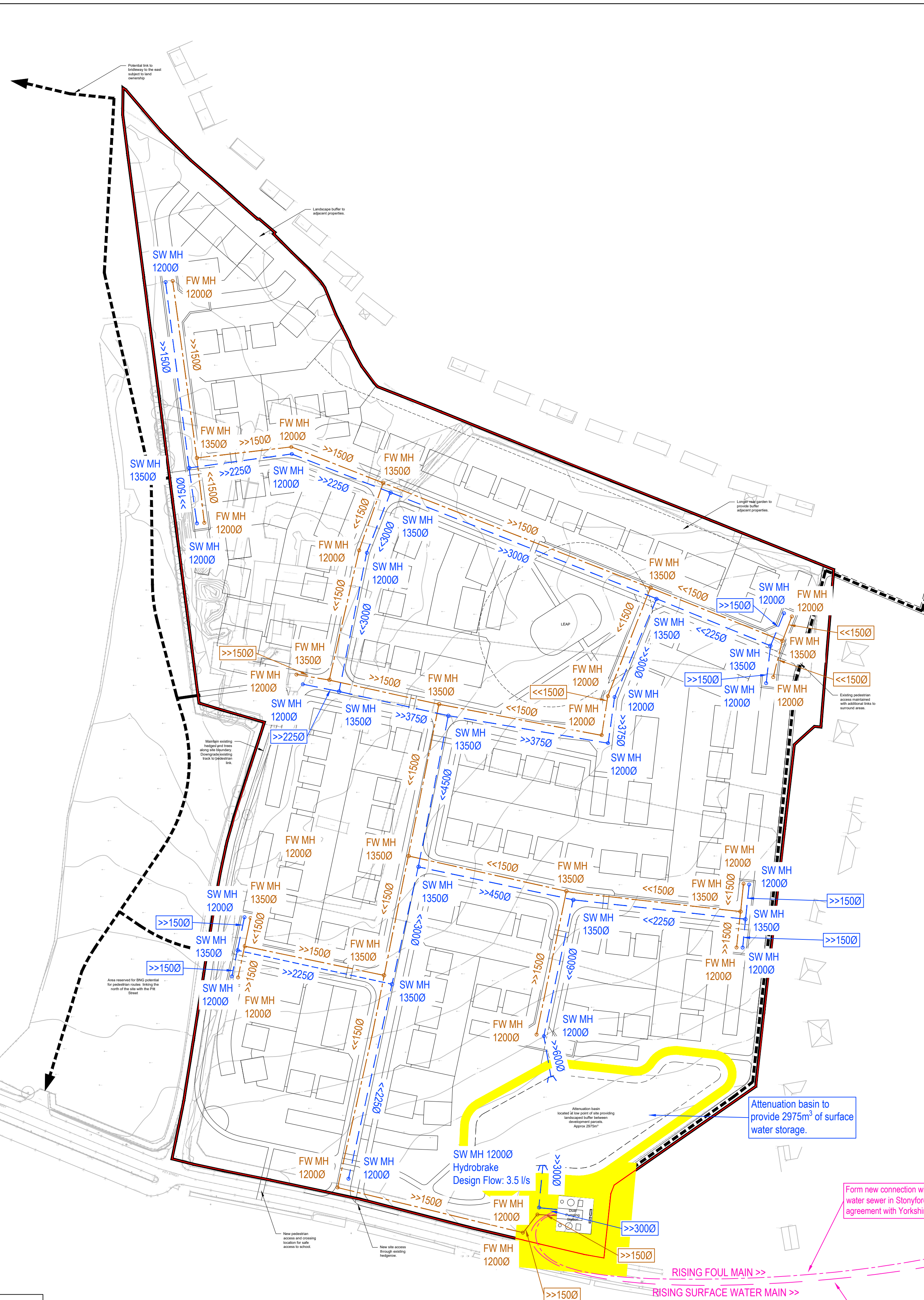
All the above comments are based upon the information and records available at the present time and are valid for a period of 12 months. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is 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

George Mullaney
Town Planning Technician



Appendix F
Drainage Layout Drawing



P01	Preliminary Issue	27/05/25	Transpor tation Consultation 15 to Pacific Street Second Floor Level 15 Unit 1501
 ANDREW MOSELEY ASSOCIATES		www.amao.co.uk	
Project:			
PITT STREET, WOMBWELL			
Client:			
Alphin Property			
Drawing:			
DRAINAGE LAYOUT DRAWING			
Drawn By: CS		Date: 27/05/2025	
Checked: TD	Scale: 1:1000	Paper: A1	
Drawing No: AMA-23131-DS-001		Rev: P01	

Appendix G
Yorkshire Water Correspondence

Caitlin Shearer

From: Technical Sewerage <technical.sewerage@yorkshirewater.co.uk>
Sent: 20 May 2025 11:21
To: Caitlin Shearer
Subject: RE: V810758 - Pitt Street, Wombwell, Barnsley S73 8AU

Good morning Caitlin,

As mentioned in my consultation response, the foul / combined network in the area does not have adequate capacity and the additional flows from this development will exacerbate flooding issues in the area. The 300mm diameter foul sewer in Stonyford Road does not have any record of flooding incidents so is the most suitable sewer, despite it being some distance away. If foul pumping is required the rate should be limited to 4.75 litres/second.

Regarding the surface water proposals, I have no issue with you discharging surface water to the 375mm surface water sewer in George Street near manhole reference 6816, but the rate of discharge must be limited to 3.5 litres/second.

Kind regards



George Mullaney
Town Planning Techr
Land and Property
0345 120 8482
george.mullaney@yorkshirewater.co.uk

From: Caitlin Shearer <Caitlin@amatp.co.uk>
Sent: 08 May 2025 10:26
To: Technical Sewerage <technical.sewerage@yorkshirewater.co.uk>
Subject: RE: V810758 - Pitt Street, Wombwell, Barnsley S73 8AU

WARNING - EXTERNAL SOURCE

This email has been sent from an account outside of the Kelda Group network and could be a phishing email.
Please **THINK** before clicking links or opening any attachments.
If you suspect that this email is suspicious please report it to the Cyber Security Team using the "Report Message" button.

Hi George,

I hope you're well.

For foul water discharge, please can you confirm if a rising main to the foul sewer in Stonyford Road will be acceptable?

In regard to surface water, the site adjacent to this development has ruled out infiltration testing with confirmation from the IDB that it is unlikely to work for the area. Additionally, there are no appropriate watercourses nearby, as the one near the north of the site is not located within land owned by our client. As such, would it be possible to have a rising main connect to the surface water sewer in George Street, ideally near manhole 6816, which will then discharge into the River Dove directly rather than create a new outfall, meaning it will be more beneficial for the EA. We are currently proposing discharging surface water at greenfield run-off rate of 6.9 l/s.

Please let me know if you require any more information.

Kind regards,

Caitlin

Caitlin Shearer
BSc MSc
Graduate Flood Risk Engineer

Office: 01134182615

Mobile: 07585807998

Web: www.amatp.co.uk

Andrew Moseley Associates Ltd, 15 St Pauls Street, Leeds, LS1 2JG



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Andrew Moseley Associates Limited, a limited company registered in England & Wales with registered number 10876561 and registered office: 15 St Pauls Street, Leeds, LS1 2JG.

From: Technical Sewerage <technical.sewerage@yorkshirewater.co.uk>

Sent: 18 March 2025 14:58

To: Jasmine Ellenor <jasmine@amatp.co.uk>

Subject: V810758 - Pitt Street, Wombwell, Barnsley S73 8AU

Good afternoon,

Please see the attached consultation and statutory sewer map extract for application reference V810758 - Pitt Street, Wombwell, Barnsley S73 8AU.

Kind regards



George Mullaney
Town Planning Techn
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Yorkshire Water Services Limited

Registered Office Western House, Halifax Road, Bradford, BD6 2SZ

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Appendix H
Causeway Flow 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)	19.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.370	Preferred Cover Depth (m)	1.200
CV	1.000	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)	Depth (m)
AT	2.486	5.00	100.000	1200	1.500

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	19.000	Drain Down Time (mins)	240
Ratio-R	0.370	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	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)	98.500	Product Number	CTL-SHE-0092-3500-0800-3500
Design Depth (m)	0.800	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.5	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)	98.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	3950.0	0.0	0.800	3950.0	0.0	0.801	0.0	0.0



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	AT	1380	98.669	0.169	23.3	634.3202	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)				
1440 minute winter	AT	Hydro-Brake®	3.4	220.3				

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	AT	1410	98.882	0.382	47.7	1435.5190	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)				
1440 minute winter	AT	Hydro-Brake®	3.5	253.5				

Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
1440 minute winter	AT	1440	99.292	0.792	93.1	2974.5130	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
1440 minute winter	AT	Hydro-Brake®	3.5	277.6



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