



FLOOD RISK ASSESSMENT

**AT LAND OFF
CATHERINES WALK,
BARNSELY**

**ON BEHALF OF
LEEDS AND YORKSHIRE
HOUSING ASSOCIATION**



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Flood Risk Assessment at Land Off Catherines Walk, Barnsley

1315/03r1

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CONTENTS

		Page
1.0	Introduction	4
2.0	Walkover Survey	
	General	2.1 - 2.2 5
	Current Use	2.3 5
	Boundaries	2.4 5
	Topography and Vegetation	2.5 - 2.7 6
	Drainage	2.8 - 2.10 6 - 7
3.0	Environment Agency Consultation	8 - 9
4.0	Water Authority Consultation	10 - 11
5.0	Land Drainage Authority Consultation	12 - 13
6.0	Material Consideration in Respect of NPPF and PPG	
	Flood Classification	6.1 14
	End Use	6.2 - 6.3 14
	Flood Sources	6.4 - 6.11 14 - 16
	Climate Change	6.12 - 6.16 16 - 17
	Flood Mitigation	6.17 17
	Sustainable Drainage	6.18 17 - 18
	Drainage	6.19 18
	Existing Surface Water Run-off	6.20 18
	Proposed Foul Drainage	6.21 18
	Proposed Surface Water Drainage	6.22 - 6.25 19
	Emergency Egress During Times of Flood	6.26 - 6.27 20
7.0	Comments	21 - 22

APPENDICES

Appendix A	Site Location Plan
Appendix B	Topographical Survey
Appendix C	Existing Drainage Investigation Results
Appendix D	Environment Agency Consultation
Appendix E	Water Authority Consultation
Appendix F	Land Drainage Authority Consultation
Appendix G	Proposed Development Layout
Appendix H	Greenfield Run-Off Rate Calculations
Appendix I	Indicative Surface Water Drainage Calculations

1.0 INTRODUCTION

- 1.1 Leeds and Yorkshire Housing Association is proposing to develop a parcel of land located off Catherine's Walk, Barnsley, for 54No. dwellings. As part of the viability of the site and to supplement a planning application, it was decided that a Flood Risk Assessment Report should be undertaken.
- 1.2 It is within the general development strategy of the country for development in areas where there is a risk of flooding to be assessed to avoid unnecessary increase in the requirement for flood defence. Under the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG), consultation is required with the Environment Agency, Land Drainage Authority and Water Authority and a Flood Risk Assessment Report should be prepared considering the development proposals and make recommendations for any flood mitigation measures.
- 1.3 ARP Associates have been appointed to carry out an assessment of the site, implement appropriate consultations and prepare a Flood Risk Assessment Report, in accordance with NPPF, to satisfy the requirements of the Planning Authority.
- 1.4 The consultations and walkover survey have been carried out between September and November 2017.
- 1.5 The report has been initially prepared for the use and reliance of the Client only. The report shall not be relied upon or transferred to any other parties without the written agreement of ARP Associates. For the avoidance of any doubt, where ARP Associates enters into a letter of reliance for the benefit of a third party, that third party will be permitted to rely on the report. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party without ARP Associates consent.

2.0 WALKOVER SURVEY

General

- 2.1 The site is greenfield open space and is an irregularly shaped piece of land with an area of approximately 1.5ha. The site is centred on Ordnance Survey Grid Reference 435024, 409240.
- 2.2 A site location plan is presented in Appendix A.

Current Use

- 2.3 The land is predominately grassed and is used by dog walkers, with an element of the western portion of the site left more natural as scrubland.

Boundaries

- 2.4 The site is bounded to the northwest by Catherines Walk, which is a short cul-de-sac off Edwins Close, which also forms part of the northern boundary. There is a low-height wooden birds-mouth fence along the Catherines Walk boundary, and a k-barrier anti-motorbike gate with metal poles spaced at approximately one metre apart along Edwins Close. Along the eastern side of the site, the boundary is formed by the fencelines of private gardens, associated with dwellings served from Wingfield Road to the east. The south and west of the site is open onto a footway, which is used as a short-cut to reach the nearby Laithes Primary School. Athersley South Primary School, located just to the southwest of the site with school playing fields to the southwest is also accessed by this footpath. Generally, however, the site is surrounded by the dense urban area of Athersley North and South, although there are wetlands associated with the River Dearne to the southwest.

Topography and Vegetation

- 2.5 The site is generally very flat with a gentle fall from the south to the north and from west to east. However, the southern portion of the site has a slight fall to the west. There is a high point at the southeastern corner of 83.60m A.O.D. with the low point of 81.73m A.O.D. at the north of the site. Levels surrounding the site are generally very similar to adjacent land, although the areas bounded by Catherines Walk and Edwins Close are slightly lower due to the kerb upstands associated with these carriageways.
- 2.6 In terms of vegetation, the site is grassed, with an area to the southwest, which is characterised as scrubland with bushes and sparse trees. There are some mature trees dotted along the western boundary, which includes a strip that is maintained less frequently than the bulk of the site.
- 2.7 A topographical survey is presented in Appendix B.

Drainage

- 2.8 There are a number of manholes recorded crossing the site, with several forming a reasonably straight line, heading in a northerly direction. Jet Aire Drain Care Ltd were appointed by ARP Associates to undertake a drainage CCTV survey to determine the connectivity of this drain.
- 2.9 Following the on-site investigations three of the manholes were unable to be lifted, however, the most southerly manhole was accessible. Unfortunately, this was blocked substantially, suggesting that this sewer/drain is no longer live as the upstream system would be surcharging if still in use. However, it was concluded that the sewer/drain outfalls into the public combined sewer recorded to the north of the site. A plan showing the results of the investigation are presented in Appendix C. Prior to construction on-site, it will be necessary to remove the debris from the blocked manhole and undertake a further investigation of the drain upstream to conclude that the sewer is abandoned.

- 2.10 The nearest watercourses are located approximately 600m to the north, with a network of ditches and watercourses also located to the southeast, approximately 870m that are believed to drain into the River Dearne which is approximately 1.2km to the southwest of the site flowing in an easterly direction.

3.0 ENVIRONMENT AGENCY CONSULTATION

- 3.1 A consultation was requested from the Environment Agency (EA) and a copy of their response, reference RFI/2017/61765 dated 19th October 2017, is provided in Appendix D for reference purposes
- 3.2 The Environment Agency has provided a Flood Map, which shows areas of land that could flood from rivers or the sea and are shaded blue. These areas do not take into account defences as water can overtop or can fail in extreme conditions. The Zone classifications are:-
- 3.2.1 Flood Zone 1 - "Low Probability" is assessed as having a less than 1 in 1,000 annual probability of river or sea flooding in any year (less than 0.1%).
- 3.2.2 Flood Zone 2 - "Medium Probability" is assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding in any year (1% - 0.1%) and between a 1 in 200 and 1 in 1,000 annual probability of flooding from the sea (0.5% - 0.1%).
- 3.2.3 Flood Zone 3 - "High Probability" is assessed as having a 1 in 100 or greater annual probability of river flooding in any year (greater than 1%) and a 1 in 200 chance or greater annual probability of flooding from the sea (less than 0.5%).
- 3.3 The Environment Agency flood map confirms that the site falls within Flood Zone 1.
- 3.4 A Flood History Map has been provided, and this highlights the extent of flooding from events in Autumn 2000 and also 2007. The site is recorded as being unaffected by these events. It is possible that other flooding may have occurred, but there are no records held by the Environment Agency.

3.5 The Environment Agency also include a map showing a risk of surface water flooding. The majority of the site is shown to be outside the risk of either a 1 in 30, 1 in 100 or 1 in 1000 year flood event probability. However, a proportion of the southwestern area of the site is shown to be at risk of flooding in these flood event probabilities.

4.0 WATER AUTHORITY CONSULTATION

- 4.1 A consultation was requested from Yorkshire Water who are the Water Authority for this area, and a copy of their response, reference R721829 dated 10th October 2017, is presented in Appendix E for reference purposes.
- 4.2 There is a 300mm diameter public combined sewer recorded close to the site. No buildings or other obstructions are to be erected within 3m nor trees planted within 5m of this public sewer. It may be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. There is a 600mm diameter public combined water sewer recorded close to the site. No buildings or other obstructions are to be erected within 3.5m nor trees planted within 5m 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.
- 4.3 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.
- 4.4 Foul water domestic waste should discharge to the 600mm diameter public combined sewer recorded to the west of the site.
- 4.5 In respect of surface water, reference is made to Requirement H3 of Building Regulations 2000 and Sustainable Drainage Systems. This establishes a hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration and watercourse in that priority order. Where appropriate, soakaways, swales and infiltration trenches (SUDS) may be adopted as part of the Public Sewer Network.
- 4.7 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 for discharge.

- 4.8 As the proposal site is mostly undeveloped, no surface water is known to have previously discharged to the public network.
- 4.9 Further consultation has been carried out with Yorkshire Water regarding the outfall location of both foul and surface water, however, at the time of writing the report a response had not been received. The following, has been requested:-
- 4.9.1 A connection into the 600mm diameter combined sewer to the west of the site would require a long off-site sewer, approximately 100m in length over third party land. It is likely that any such connection would require a sewer Requisition and due to the topography of the site, an adoptable pumping station. A request has, therefore, been made to connect into the existing 225mm diameter public combined sewer recorded within the site boundary at the north of the site.
- 4.9.2 A Stage 2 Ground Investigation has been carried out by ARP Geotechnical Ltd, but at the time of writing this report, the Stage 2 Report had not been finalised. However, the results of infiltration testing undertaken on-site concluded that the use of infiltration techniques are not practical. Consultation with the Land Drainage Authority has confirmed that no watercourses are recorded within the vicinity of the site, therefore, a request has been made to connect into the existing 225mm diameter public surface water sewer recorded to the north of the site at a restricted discharge rate of 3-5l/s. It should be noted that in order for a drainage system to be designed and adopted by Yorkshire Water a minimum orifice size of 75mm is required, hence, the requirement of a flow rate at 3-5l/s.

5.0 LAND DRAINAGE AUTHORITY CONSULTATION

- 5.1 A consultation was requested from Barnsley Metropolitan District Council who is the Land Drainage Authority for this area, and a copy of their response dated 5th October 2017, is presented in Appendix F.
- 5.2 The Council have no records of any culverted or open watercourses crossing the site, and confirm that to their knowledge, it is not affected by any flood plains from major watercourses in the area.
- 5.3 There should be no increase in surface water run-off from the new development. PPS25 recognises that the management of flood risk is not simply restricted to flood plains and that a catchment wide approach should be employed.
- 5.4 There are foul, combined and surface water public sewers adjacent to the site. The Developer should contact Yorkshire Water if they wish to discharge to the sewers and to discuss allowable discharge rates.
- 5.5 Any balancing facilities should be designed to accommodate a 1 in 30 year flow from the site and a 1 in 100 year flow retained within the site (including an allowance of 30% for climate change), without causing any flooding to buildings.
- 5.6 There are alternatives to conventional storage for the control of surface water run-off that are feared by the Authority where ground conditions are suitable. Sustainable Urban Drainage Techniques (SuDS) tackle surface water run-off problems at source using features such as soakaways, permeable pavements, grass and swales, infiltration trenches, ponds and wetlands to attenuated flood peak flows, produce water quality improvements and environmental enhancements.

- 5.7 The Authority seeks to promote the use of SuDS techniques to the Authority expects the Developer of the site to submit detailed investigations such that the use of SuDS has been fully explored. The Authority has a policy of not adopting SuDS features unless they are specifically designed to drain adoptable highways only. Developers should explore other avenues for adoptions, example, Yorkshire Water.

6.0 MATERIAL CONSIDERATION IN RESPECT OF NPPF AND PPG

Flood Classification

- 6.1 Environment Agency mapping confirms that the site falls within land assessed as having a less than 1 in 1,000 annual probability of river flooding in any year (less than 0.1%). In accordance with Table 1 of the PPG, the site is located in Flood Zone 1. The proposed development site is, therefore, situated wholly within a low flood risk of fluvial flooding area.

End Use

- 6.2 The development proposal is for the construction of 54No. residential dwellings. The proposed development layout is presented in Appendix G for reference purposes.
- 6.3 When applying Table 2 of the PPG, the flood risk vulnerability classification shows that the proposed end use will fall into a "More Vulnerable" classification under the general classification "dwellings". With reference to NPPF, the siting of More Vulnerable development within Flood Zone 1 is deemed appropriate and the Sequential Test is satisfied.

Flood Sources

- 6.4 Flooding from Rivers - The River Dearne is located approximately 1.2km to the southwest at its nearest location. However, there are flood defences in place and the highest modelled flood level is over 30m below the level of the site. Therefore, there is no risk of flooding from this source.

- 6.5 Flooding from Local Watercourses - No watercourses are known to the present in the vicinity of the site, and, therefore, there is no risk of flooding from this source.
- 6.6 Flooding from the Sea - The site is not located near enough to the sea to cause a problem of flooding from this source.
- 6.7 Flooding from Land - The Environment Agency Surface Water Flood Map shows very low surface risk across the majority of the proposed development site. However, an area in the southwest of the site is shown to be at risk of flooding. Levels across the site are generally quite flat, however, in this location there is a slight fall towards the western boundary where water may pond. As the site becomes developed run-off will be reduced, thereby reducing the risk of flooding to low, however, will still need to be considered.
- 6.8 Flooding from Groundwater - Whilst there is no intrusive ground investigation at the time of writing the report, the Geological Survey Map of Great Britain, provided on the British Geology Survey website, shows the site to be located on on Glacial Clay, overlying Wooley Edge Rock-Sandstone. The geology is likely to be impermeable, therefore, flooding from this source is considered to be low risk.
- 6.9 Flooding from Sewer - There are existing sewers across part of the northern extent of the site and also in land adjacent to the northern part of the site. There will also be new drainage systems for the development. It is possible, therefore, that any blockage of the sewers will result in flooding from the lowest cover level of manholes or gullies, and this will need to be considered as part of any proposed development.
- 6.10 Flooding from Reservoirs, Canals or Artificial Sources - The Environment Agency produce maps, which show the expected inundation area should a reservoir fail and release its capacity. It should be noted, however, that reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925.

- 6.11 The proposed development site is shown to be outside of the maximum extent of reservoir flooding. There are no canals or other artificial sources within the vicinity of the proposed development site, therefore the risk from this source is deemed to be low.

Climate Change

- 6.12 The NPPF and PPG have indicated that the Global sea level will continue to rise, depending on greenhouse gas emissions, and the sensitivity of the climate system and there will be an increase in rainfall across the country.
- 6.13 United Kingdom climate change guidance was revised in February 2016 for peak river flows and peak rainfall intensities. With regards to peak river flows, a regionalised approach has now been adopted to climate change impacts based upon the river basin district of the proposed development site, the flood risk vulnerability of the proposed development and the present day Flood Zone classification.
- 6.14 The proposed development site is situated within the River Humber river basin district, which based on an “upper end” climate change scenario, could see peak river flows increase by 50% by 2115. As the site is situated entirely within Flood Zone 1 an increase of 50% flows is deemed unlikely to affect the proposed development site.
- 6.15 In accordance with the revised climate change data, the published figures show that, for an expected life of greater than 50 years for any new development, the anticipated increase in rainfall could be around 40% and the drainage system should be designed in accordance with this. However, the Barnsley Metropolitan Borough Council flood risk requirements for managing on/off-site flood risk from fluvial flooding is to assess the development using a 30% allowance for climate change for the 1 in 100 year event.

- 6.16 Due to the topography of the land and surrounding area overland run-off from adjoining land is unlikely to be an issue. Therefore, any run-off from outside the site will be insignificant and on this basis, only rainfall falling within the site boundaries will need to be considered in respect of climate change.

Flood Mitigation

- 6.17 As the site falls within Flood Zone 1, flood mitigation measures are only required in the event of a catastrophic storm, blockage of the existing or proposed sewers and surface water flooding. The following precautionary mitigation measures are, therefore, recommended:-

- 6.17.1 The finished floor levels to the properties shall be raised above external levels by a minimum of 150mm, and preferably 300mm, wherever possible.
- 6.17.2 The proposed dwellings shall be designed without any basements and ground floor shall comprise solid concrete slabs or beam and block floors with screed construction.
- 6.17.3 Incoming electricity supplies shall be raised above ground floor level and ground floor electric sockets shall be served by loops from upper level.
- 6.17.4 In the unlikely event of flooding on the site, it would be appropriate to design external levels with falls to non-critical areas, such as landscape, where the water can pond without causing flooding of buildings.

Sustainable Drainage

- 6.18 In order to comply with the requirements of NPPF, it will be necessary to consider aspects of sustainable drainage techniques for the new development. Whilst no intrusive investigation of the ground conditions have been carried out at the time of writing the

report, a review of the Geological Survey Map of Great Britain shows the site to be underlain by Glacial Clay overlying the Wooley Edge Rock - Sandstone. This material is likely to be impermeable and, therefore, unsuitable for the disposal of surface water using infiltration techniques. It will be necessary to carry out appropriate infiltration tests in accordance with BRE Digest 365 'Soakaway Design', prior to construction on site and the results presented in a report for the approval of the Planning Authority. However, for the purpose of this report, a positive drainage system to the existing public surface water sewer recorded to the north of the site will be required for the proposed development.

Drainage

- 6.19 It is a requirement to ensure that surface water run-off from any proposed development has negligible consequence on downstream areas either in sewer capacity or discharge to watercourse.

Existing Surface Water Run-Off

- 6.20 The site is greenfield and, therefore in accordance with current guidelines and regulations, indicative surface water calculations have been undertaken using the IH124 Method of calculating greenfield run-off rates. This shows that for the site area of 1.5ha, a rate of 1.2l/s has been calculated for the 1 in 1 year storm for the site. The indicative greenfield run-off calculations are presented in Appendix H.

Proposed Foul Drainage

- 6.21 Foul water domestic waste should discharge to the 600mm diameter public combined sewer recorded to the west of the site, however, a request has been made to Yorkshire Water to discharge into the 225mm diameter public combined sewer recorded to the north of the site to avoid a requisition across third party land and an adoptable pumping station.

Proposed Surface Water Drainage

- 6.22 Consideration of the proposed drainage should firstly be given to infiltration techniques (to ground). However, based on information available, the disposal of surface water using infiltration techniques may not be feasible. It will be necessary to carry out appropriate infiltration tests in accordance with BRE Digest 365 "Soakaway Design" prior to construction on site and the results presented in a report for the approval of the Planning Authority. However, for the purpose of this report a positive drainage system to watercourse or sewer will be required for surface water drainage.
- 6.23 The Land Drainage Authority has confirmed that no watercourses are recorded within the vicinity of the site, therefore, it will be necessary to discharge into the public surface water sewer.
- 6.24 An assessment of the likely impermeable area has been made to assess the implications of surface water discharge from the development. Assuming that the proposed impermeable area will not be greater than 50% of the proposed site area for semi-detached and detached properties, calculations have been carried out using the WinDES Source Control Computer Program. The proposed surface water system should be designed to accommodate a 1 in 30 year storm event without flooding and the 1 in 100 year storm, plus climate change event, should be retained within the site in an area which will not affect the new buildings from flooding.
- 6.25 Restricting the discharge rate to no greater than 3l/s, based on an impermeable area of 0.75ha on-site storage of 259.4m³ will need to be provided for a 1 in 30 year storm. This can be achieved by several methods including oversized pipes or underground tanks. The drainage system will also need to accommodate the 1 in 100 year plus 30% climate change event without causing flooding of property or third party land. In the event that levels dictate that the 1 in 100 year plus climate change floodwater will flow off-site an additional or larger storage facility will be required. Therefore, on-site storage would increase to 504.1m³. The surface water calculations are presented in Appendix I. However, detailed calculations and proposals will need to be prepared and submitted to the Planning Authority for approval prior to construction.

Emergency Egress During Times of Flood

- 6.26 It is a requirement under the PPG that occupants should be able to egress any building during times of flood, without being trapped by flood conditions.
- 6.27 As the site falls within Flood Zone 1 and there is no flooding from the local watercourse, no special mitigation measures are required for emergency egress during times of flood.

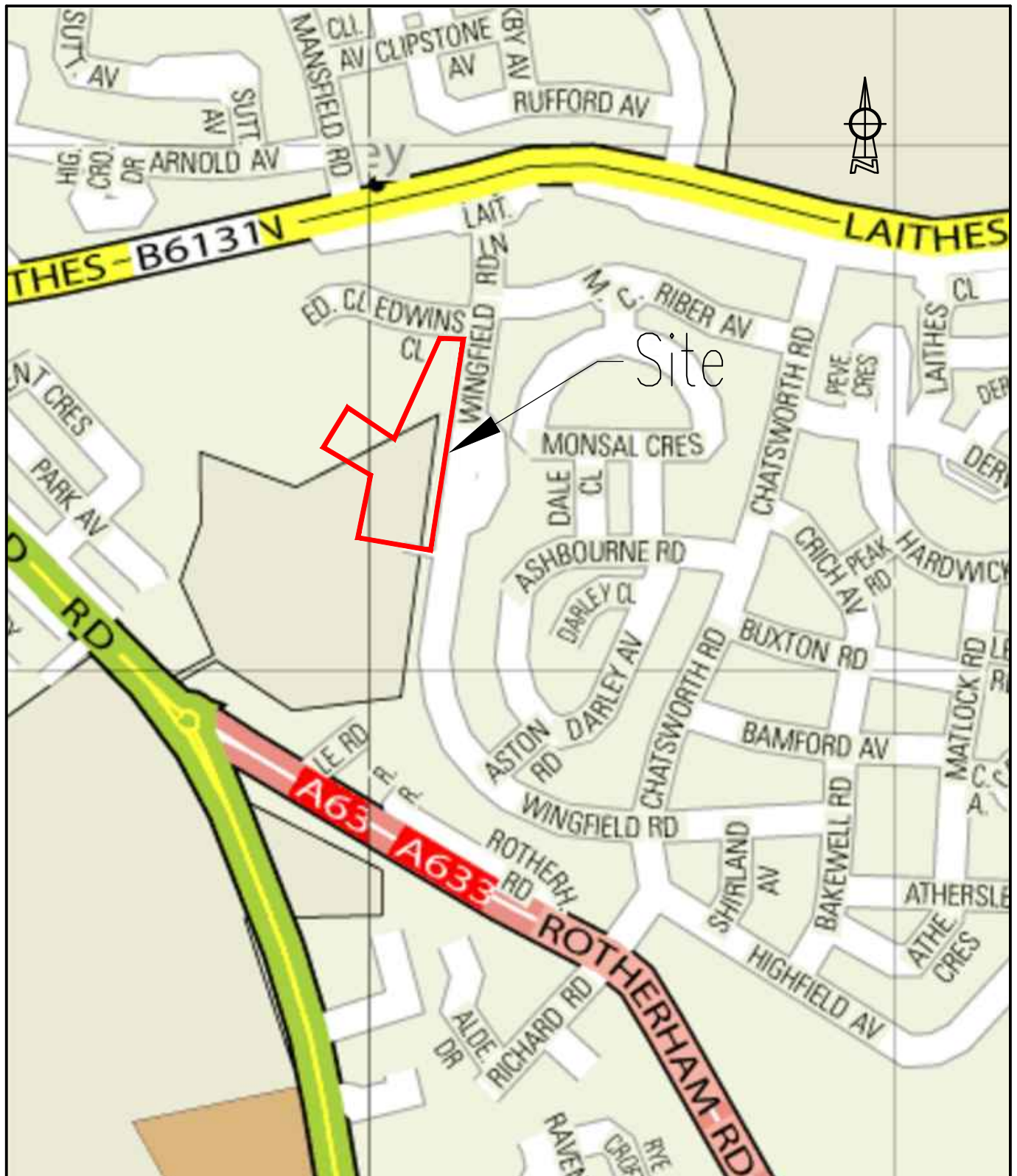
7.0 COMMENTS

- 7.1 The site falls within Flood Zone 1 and the Sequential Test is satisfied. However, in order to accommodate the possibilities of flood from a catastrophic storm, blockage of the existing or proposed sewers and surface water flooding, the following precautionary mitigation measures are recommended:-
- 7.1.1 The finished floor levels to the properties shall be raised above external levels by a minimum of 150mm, and preferably 300mm, wherever possible.
- 7.1.2 The proposed dwellings shall be designed without any basements and ground floor shall comprise solid concrete slabs or beam and block floors with screed construction.
- 7.1.3 Incoming electricity supplies shall be raised above ground floor level and ground floor electric sockets shall be served by loops from upper level.
- 7.1.4 In the unlikely event of flooding on the site, it would be appropriate to design external levels with falls to non-critical areas, such as landscape, where the water can pond without causing flooding to buildings.
- 7.2 A 30% increase in rainfall shall be incorporated into any new positive drainage system to satisfy the requirements of climate change.
- 7.3 Sustainable Drainage Systems of infiltration techniques are considered to be unsuitable on this particular site and for the purpose of the report a positive drainage system will be required. However, infiltration testing will need to be carried out in accordance with BRE Digest 365 "Soakaway Design" prior to construction on site and the results will be reported to the Planning Authority for approval.

- 7.4 Should infiltration techniques prove unsuccessful, the surface water drainage shall discharge to the existing public sewer network recorded at a point to the north of the site. Subject to the agreement of the Regulatory Authorities.
- 7.5 The proposed surface water drainage system shall be designed for an allowance for climate change and restricted to the agreed discharge rate with appropriate attenuation incorporated into the design. A detailed design and calculations shall be submitted to the Planning Authority for approval prior to construction on site.
- 7.6 Foul water drainage shall discharge to the existing 600mm diameter public combined sewer located to the west of the site, however, a request has been made to Yorkshire Water to discharge into the 225mm diameter public combined sewer recorded to the north of the site to avoid a requisition across third party land and an adoptable pumping station.
- 7.7 No special mitigation measures are required for emergency egress during times of flood.
- 7.8 Subject to compliance with the above, the proposed development can satisfy the requirements of the National Planning Policy Framework and the Planning Practice Guidance in relation to flood risk.

APPENDIX A

SITE LOCATION PLAN

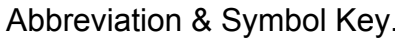
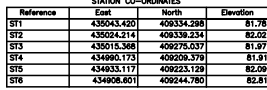


OS Grid Reference: SE 34991 09215

OS Grid Reference: SE 34991 09215													
		/ DJG		28.09.17		Issued for approval				WMW			
		Rev		By		Date		Amendment				Chk	
Title		SITE LOCATION PLAN		 ARP ASSOCIATES CHARTERED CONSULTING ENGINEERS Northwest House • 5/6 Northwest Business Park Servia Hill • Leeds LS6 2QH Telephone : 0113 245 8498 • Fax : 0113 244 3864 E-Mail : leeds@arpassociates.co.uk						Scale 1:5000 @ A4		Drawn DJG	
Date SEP 17										Chk. WMW			
Project/Client										Drg. No. 1315/01/NA		Rev /	
CATHERINES WALK, BARNSLEY LEEDS & YORKSHIRE HOUSING													

A P P E N D I X B

T O P O G R A P H I C A L S U R V E Y



General
Details or services hidden or obscured by vegetation, debris or vehicles at survey dates may be omitted. Hedge & Vegetation details are outline

Grid - Station ST01 Coordinates are OS GPS RTK
All other Stations are relative to this in Plan
Grid Projection and Grid North

OS Grid @ 50m to cover Site

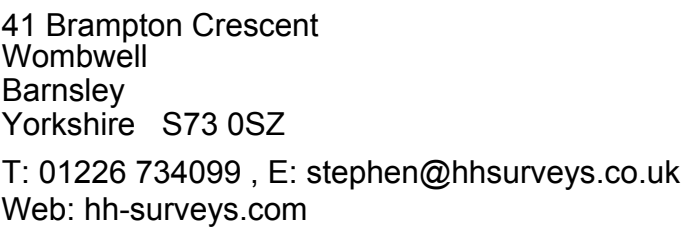
Surv.	Drawn	Date	Chkd	Date	Appr'd	Date
GH/KH	GH	22/09/17	SH	22/09/17		

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Acanthus WSM

SITE PLAN

Cathrines Walk
Athersley South
Barnsley



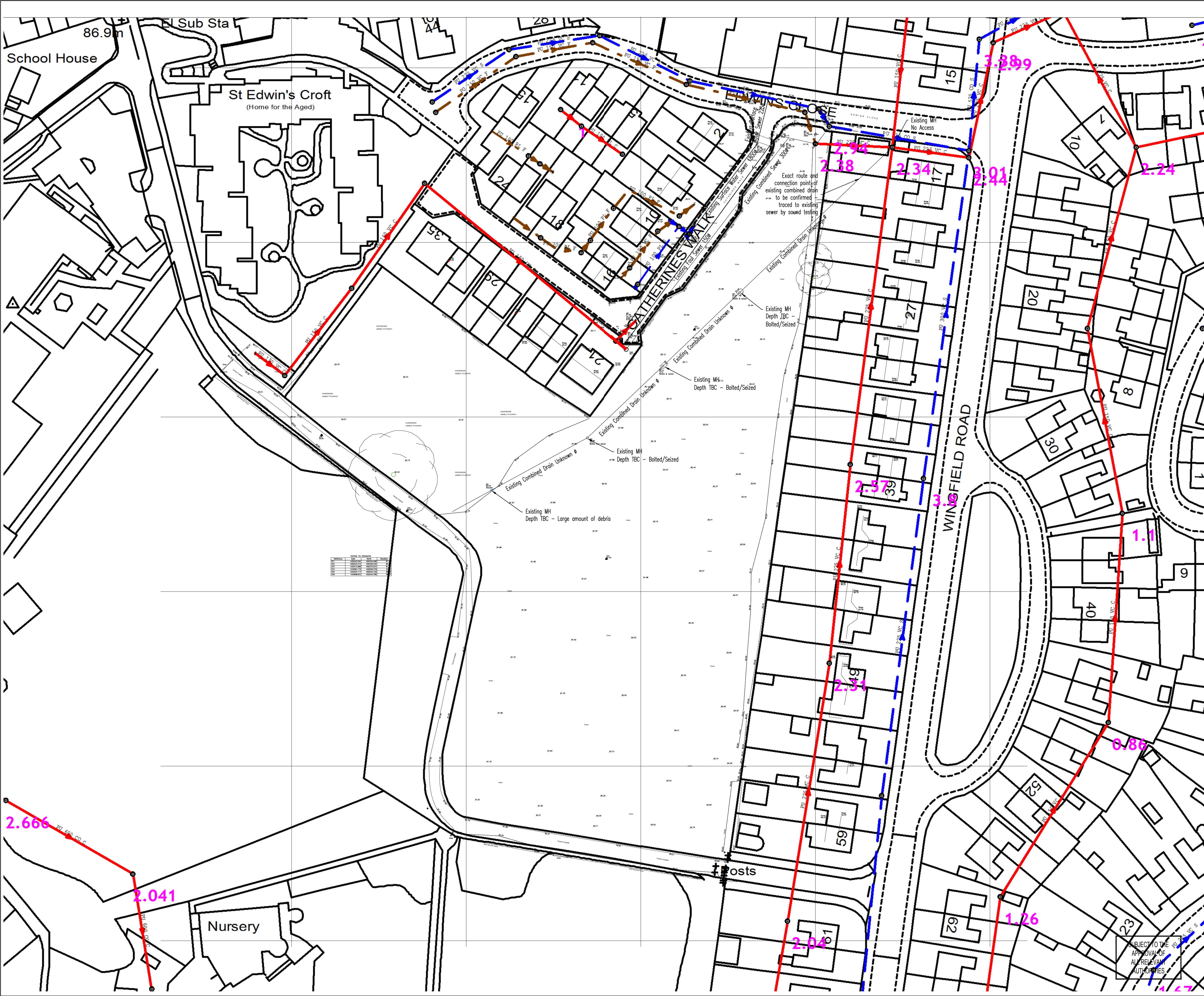
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APPENDIX C

EXISTING DRAINAGE INVESTIGATION RESULTS



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E
S

Rev	By	Date	Revision	Chk	Apd
/	CST	24.11.17	Issued for approval	WMW	WMW

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TITLE
EXISTING DRAINAGE LAYOUT

PROJECT
CATHERINES WALK,
BARNSELY

CLIENT
LEEDS & YORKSHIRE
HOUSING

DRAWING STATUS
PRELIMINARY

Scale
1:500 @ A1

Date
Nov 17

Drawn
CST

Chk.
WMW

Drg. No.
1315/03/SK.01

Rev
/

SUBJECT TO THE
APPROVAL OF
ALL RELEVANT
AUTHORITIES

A P P E N D I X D

ENVIRONMENT AGENCY CONSULTATION

From: Glenton, Rob <Rob.Glenton@environment-agency.gov.uk>
Sent: Thursday 19 October, 2017 10:22 am
To: Dave Griffiths
Subject: Your Enquiry: RFI/2017/61765
Attachments: flood risk & flood consequence assessments.pdf; Risk of Flooding from Surface Water RFI 61765.pdf; Asset Information RFI 61765.pdf; Asset Location Map RFI 61765.pdf; Flood History Map RFI 61765.pdf; Flood History RFI 61765.pdf; Flood Map for Planning RFI 61765.pdf; Model Cross Sections Map RFI 61765.pdf; Modelled Measurements RFI 61765.pdf

Our Ref: RFI/2017/61765

Your Ref: 1315/03/DJGjc

Dear Dave

Provision of Product 4 for Catherines Walk, Barnsley

Thank you for your request of 29 September 2017 to use Environment Agency data, Product 4, in the development of the FRA. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the detail in the attached advisory text on the use of Environment Agency Information for Flood Risk Assessments.

Supporting Information

The Flood Map for Planning

The Environment Agency provides the Flood Map (see enclosed extract).

What is the Flood Map for Planning?

The Flood Map for Planning provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.

The Flood Map for Planning shows the following:

1. Flood Zone 3 (dark blue area on the enclosed map): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences
 - For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year;
 - For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) chance of happening each year.
2. Flood Zone 2 (light blue area): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences. Flood Zone 2:
 - indicates the extent of a flood with a 0.1% (1 in 1000) chance of happening each year.
 - and/or indicates the greatest recorded historic flood, whichever is greater.
3. Flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, together with some natural or constructed entities which retain, store or channel water and which may protect against smaller floods.

4. Areas benefiting from flood defences - areas that benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening each year. If the defences were not there, these areas would flood.

Flood History

Flood History

See the attached map showing the flood history for this site. The extent of flooding, and/or flood level information is only shown for those watercourses surveyed after the flood. Other flooding may have occurred which is not shown. This is the best information currently available.

Please refer to the attached table detailing the causes of those past floods.

Water causing flooding can come from different places, for example from rivers or the sea; surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system); overflowing or backing up of sewers or drainage systems which have been overwhelmed or from groundwater rising up from underground aquifers.

Currently the Environment Agency can only supply flood risk data relating to the risk of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding or drainage systems that have been overwhelmed. Local Authorities and/or Water Companies may be able to provide some knowledge on the risk of flooding from sources other than rivers and the sea and we are working with these organisations to improve knowledge and understanding of surface water flooding.

Assets

Asset Location Map

Please find attached asset map(s) showing location of all (Agency and non Agency maintained) flood defences and channels.

Description of Works

See attached table with description of the defences and structures shown on the above drawing, including condition ratings, upstream and downstream crest levels, where available.

Risk of Flooding – Environment Agency Defences

The risk of flooding in this area is now reduced by the presence of flood defences that we maintain, but there still is a residual risk of flooding if these were to breach or be overtopped by a flood greater than that for which they were designed.

Risk of Flooding – Privately Maintained Defences

You will see that the Environment Agency does not maintain any of those defences. However we undertake regular risk based visual inspections. We do not hold design levels and have no height information on these defences or structures.

Asset Condition Ratings

The performance of a flood defence asset is recorded as the condition of the asset. Our asset inspectors subjectively assess the conditions of assets (during visual inspection site visits) with reference to a national standard template. Each asset is given a rating between one and five with one being very good condition and five being very poor. A condition rating of 3, or 'fair' is the minimal acceptable standard for a critical asset, such as a defence wall that protects properties. We are striving to improve all assets below 'fair' to an acceptable standard.

Asset inspections are done on average every six months, although some critical assets are assessed on a more regular basis. It is possible that adjacent assets are inspected on different dates, which may result in two assets of a similar state of repair having different condition ratings.

Condition ratings of assets may also be affected by the time of year the surveys are conducted, as vegetation may obscure the asset in the summer months, or accessibility may be an issue during winter months. These factors would not usually affect the recorded condition rating of an asset unless the asset is on a borderline between two ratings.

Asset Standard of Protection

Please note that the provided Design Standard of Protection is an estimate and should not be relied on. Please note that where available the defended flood extents provide more reliable information relating to the protection offered by the defence (i.e. at which return period the water levels are likely to overtop the defence). If available and required the defended flood extents can be provided on request.

Modelling

2010 Upper Dearne Study

See enclosed extracts from the Upper Dearne Flood Mapping Study produced by Halcrow Group Limited in May 2010.

Extracts consist of

- A spreadsheet showing the results for max stage and 0.1% (1 in 1000yr), 1% (1 in 100yr), 1% CC (1 in 100yr +climate change), 1.3% (1 in 75yr), 2% (1 in 50yr), 4% (1 in 25yr), 10% (1 in 10yr) and 20% (1 in 5yr) annual chance events.
- An associated map showing the location of the model cross sections.

Climate Change

Please note that new guidance on climate change allowances for Flood Risk Assessments has been published in February 2016.

The new guidelines are available from:

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Other

Surface Water Map

Risk of flooding from surface water information for S71 3BS, Catherines Walk

Thank you for your enquiry dated 29th September 2017 regarding the above location.

Enclosed is a map of showing the risk of flooding from surface water for this area, produced in partnership with Local Authorities.

Surface water flood risk is widely distributed and can happen far from rivers and the sea. It's sometimes hard to say whether you're in an area at risk of flooding from surface water because surface water flooding can follow many more paths and can be affected by very small features such as kerb height and even speed bumps. We recommend you consider not only whether your property is shown in or near an area at risk, but also the broader scale and pattern of surface water flooding shown in your area. You may also wish to view this and other flood risk maps on our website.

Whether your property is at risk will depend on the accuracy of the mapping in this area, and on the details of your property – for example, how waterproof the structure is, the levels of doors and airbricks, and whether you have installed any flood resilience measures such as airbrick covers and flood boards.

If you require information on what is being done to manage surface water flood risk in your local area, please contact Barnsley Metropolitan District Council.

Information Warning

Please note:

It is not possible to say for certain what the flood risk is but we use the best information available to provide an indication so that people can make informed choices about living with or managing the risks. The information we supply does not provide an indicator of flood risk at an individual property / site level.

The flood risk information provided on the attached map does not cover other sources of flooding such as from rivers and sea.

Risk of Flooding from Reservoirs Map

Outlines and simplified depth and velocity maps can be viewed on our website:

<http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=reservoir&scale=1&textonly=off&ep=map&layerGroups=default&lang=e&y=355134&x=357683#x=438988&y=406600&scale=2>

Please, zoom into the location of interest, and then click on the inundated location for details. As a result a list of reservoirs will be provided with supporting information and a links to other data, such as estimated depths and speed of flooding, at the bottom of the result page.

A map of showing the outlines can also be provided on request.

Flood Warning

The site is covered by a Flood Warning. To register to receive this service, you can call Floodline 24 hours a day on 0845 988 1188.

LIDAR Data

Please note that our LiDAR data is now available free of charge (Open Data) from

<http://environment.data.gov.uk/ds/survey/index.jsp#/survey> (once zoomed to the relevant location the available LiDAR products will be listed below the map).

Two LiDAR products are available:

1. Tiled LiDAR data - The full tiled dataset consists of historic LiDAR data which has been gathered since 1998. For some areas we have carried out repeat surveys and data is available in a range of resolutions.
2. Composite LiDAR data - The composite dataset is derived from a combination of our full tiled dataset which has been merged and re-sampled to give the best possible spatial coverage.

Light Detection and Ranging (LiDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. This technique results in the production of an accurate, cost-effective terrain model suitable for assessing flood risk and other environmental applications.

The Environment Agency owns two LiDAR systems, which are installed in a survey aircraft along with its other operational remote sensing instruments.

The aircraft is positioned and navigated using Global Positioning System (GPS) corrected to known ground reference points. The aircraft typically flies at a height of about 800 metres above ground level and a scanning mirror allows a swath width of about 600 metres to be surveyed during a flight.

The Rights & Responsibilities of a Riverside Owner

The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership.

The responsibility for general maintenance and repair of the watercourse and its banks rests with the riparian owner. For more information on Rights and Responsibilities of a riverside owner, you can visit our website at: <https://www.gov.uk/government/organisations/environment-agency> go to the Flooding and coastal change section and click on 'Riverside ownership: rights and responsibilities ('living on the edge') under the River maintenance section and download the 'Living on the Edge' booklet.

Alternatively type the following address into your web browser:

<https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities>

Ordnance Survey Data

Under the terms of our licence agreement with the Ordnance Survey, we are unable to supply the OS data. Under this agreement we can only supply OS data to consultants/contractors carrying out work on our behalf.

Flood Portal

It's a new 'one-stop shop' web portal providing guidance and information on flood risk management in the UK. Arup have written and designed the site, in conjunction with CIRIA, the Local Government Association, the EA and Defra, primarily as a resource for local authority officers, flood risk management professionals, and others with an interest in flood risk. It's a part of the Capacity Building Strategy.

<http://www.local.gov.uk/floodportal>

This information is provided subject to the Open Government Licence ([here](#)) - please read for details of permitted use.

If you have any queries or would like to discuss the content of this letter further please contact us on the telephone number below.

We would be really grateful if you could spare five minutes to help us improve our service. Please click on the link below and fill in our survey – we use every piece of feedback we receive:

<http://www.smartsurvey.co.uk/s/EnvironmentAgencyCustomerSurvey/?a=Y>

Yours sincerely,

Rob

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