



DRAINAGE & FLOOD RISK STATEMENT

Hoyland Lowe Hoyland

Reference	AMF/DFS/5003.2.v2
Date	September 2018
Version	2

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CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Avant Homes (Yorkshire)
Unit 2
Mariner Court
Peel Avenue
WAKEFIELD
WF4 3FL

This report has been prepared for the sole use and reliance of the above named party. This report shall not be relied upon or transferred to any other parties without the express written authorisation of JPG (Leeds) Limited. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

VERSION	PURPOSE/DESCRIPTION	DATE
1	Final – For issue to Client	September 2018
2	Final – For issue to Client	September 2018



1.0 INTRODUCTION

JPG (Leeds) Limited has been instructed by Avant Homes (Yorkshire) to carry out a Drainage and Flood Risk Statement for a proposed residential development on land immediately to the west of Hoyland.

The report will review the drainage and flood risk issues associated with the proposed development and recommend any mitigation which should take place as part of the development.

This document is prepared in accordance with the requirements of and in response to the Planning Practice Guidance & National Planning Policy Framework (NPPF) which states that those proposing particular developments are responsible for:

-) Providing an assessment of whether any proposed development is likely to be affected by flooding and whether it will increase the flood risk elsewhere and of the measures proposed to deal with these effects and risks; and
-) Satisfying the local planning authority that any flood risk to the development or additional risk arising from the proposal will be successfully managed with the minimum environmental effect, to ensure that the site can be developed and occupied safely.

NPPF defines flood zones as follows:

-) Zone 1 – Low Probability – less than 1 in 1000 annual probability (< 0.1%) of river or sea flooding in any year.
-) Zone 2 – Medium Probability – between a 1 in 100 and 1 in 1000 annual probability (1% - 0.1%) of river flooding or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.
-) Zone 3a – High Probability – 1 in 100 or greater annual probability (> 1%) of river flooding or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
-) Zone 3b – Functional Floodplain – 1 in 20 or greater annual probability (5%) of river flooding in any year. This is land on which water has to flow or be stored in times of flood.

A Flood Risk Assessment is required for all sites in excess of 1ha within Zone 1 and all sites within Zones 2 and 3.



2.0 THE SITE

The site is located to the north east of Junction 36 of the M1 motorway, on the north side of Hawshaw Lane, approximately 1.5km northwest of Hoyland town centre. The approximate centre of the site is located at NGR 435912, 400876.

The site has an irregular shape and covers an area of approximately 11.05ha.

Access to the site is from the east through a wooden gate off Hawshaw Lane.

The site comprises two large fields and one smaller field. These are separated by fences and hedges.

The large field in the east of the site generally slopes steeply to the south west with local undulations.

The southern part of the large field in the west slopes towards the northwest; the northern part of this field slopes towards the southwest.

The smallest field, which is situated in the southern portion of the site, it is flat but topographically higher than the surrounding area.

Electrical pylons oriented south west to north east form the boundary between the proposed residential development (to the southeast of the pylons) and the land to the northwest which will accommodate the proposed surface water detention basin.

The site is bound by open fields/restored former opencast to the north and east and residential development to the south and west.

A topographic survey is provided in Appendix B.

3.0 EXISTING DRAINAGE AND SEWER NETWORK

A Yorkshire Water public sewer plan is provided in Appendix C, this indicates the following public sewers in close proximity to the site:

- J There is a 375 mm diameter public combined water sewer recorded immediately beyond the western boundary of the site.
- J There is a waste water sewage pumping station, under the control of Yorkshire Water located within the site adjacent the western boundary, with an associated rising main running from the pumping station in a southerly direction through the site.
- J There are a number of public foul, surface and combined sewers in the residential areas to the east and south beyond the site boundaries.

An open watercourse/pond exists adjacent the north-western corner of the site, this being a tributary of the downstream watercourse known as Short Wood Dike.



4.0 DEVELOPMENT PROPOSALS

It is proposed to develop the site for a residential end use.

5.0 FLOOD RISK ASSESSMENT

Publicly available information on flooding obtained from the Environment Agency (EA) website database is provided in Appendix D.

The site is indicated to fall within Flood Zone 1 which comprises land assessed as at a low risk of flooding from watercourse and/or sea with less than a 1:1000 annual probability of river or sea flooding.

NPPF Technical Guidance states all uses of land are appropriate in Flood Zone 1.

As the site area is greater than 1ha other sources of flooding need to be considered.

These include:

-) Adjoining land.
-) Ground water.
-) Flooding from sewers.
-) Flooding from reservoirs, canals and other artificial sources.

5.1 Flooding from Adjoining Land

The site sits in an elevated position above the surrounding land to the north, south and west therefore flooding from these locations is considered unlikely.

The land to the east is occupied by a playing field, there is potential for overland flows to enter the site from these areas.

5.2 Flooding from Groundwater

The Phase 1 Environmental Desk Study report prepared by JPG advises the site lies within an area which is susceptible to flooding due to groundwater. This classification is based on the limited geological information available to the BGS for the site at the present time. The susceptibility and the risk of groundwater flooding occurring at the site should be assessed based on site specific information.

However given the sites elevated position flooding from ground water is considered unlikely.



5.3 Flooding from Sewers

The sewers in close proximity to the site are public sewers owned by Yorkshire Water and will be subject to regular maintenance and inspection, therefore blockage of these sewers is unlikely.

The risk of flooding from sewers is considered to be low.

The measures to mitigate the risks of flooding from new drainage are as detailed in Section 6.0.

5.4 Flooding from Reservoirs, Canals and Other Artificial Sources

There are no known reservoirs, canals or artificial sources within the vicinity of the site. The site is therefore not at risk from such sources.

6.0 SURFACE AND FOUL WATER DRAINAGE

The proposed site drainage will comprise of a separate surface and foul water drainage system.

The following summarises the requirements for the discharge of surface and foul water from the site.

6.1 Sustainable Urban Drainage Systems (SUDS)

The following geological publications were consulted as part of the Phase 1 Environmental Desk Study report prepared by JPG:

-)] British Geological Survey. Sheet 87. Barnsley. 1:50,000 Scale. Bedrock and Superficial Geology. Dated 2008.
-)] British Geological Survey. Sheet SE30SE. Wombwell. 1:10,000 Scale. Bedrock and Superficial Deposits. Dated 2005.

No superficial deposits are shown to be present on the site.

The underlying bedrock is shown to comprise Pennine Middle Coal Measures Formation, which comprises mudstone, siltstone and sandstone, with bands of distinct sandstone.

Three named sandstone units and coal seams are shown to outcrop on the site:

-)] The Barnsley Rock and Barnsley Coal seam (2.39m to 2.64m thick) are shown in the southern part of the site.
-)] The Kents Rock is shown to cross the central part of the site, the Kents Thin Coal seam (0.86m to 2.26m thick) is shown to outcrop adjacent to the southern boundary of the site (this is terminated against the unnamed fault).



- J) The Abdy Rock and Abdy or Winter Coal seam (0.79m to 0.86m thick) are shown in the eastern part of the site.

Infilled ground, comprising backfilled opencast workings, are shown to the north east of the outcrop of the Barnsley Coal Seam. This infilled ground extends to the north, beyond the site boundary.

An extensive area of made ground is shown immediately beyond the northwest boundary of the site, this encroaches for a small distance onto the site, immediately west of the outcrop of the Barnsley Coal seam.

Historical borehole information has been obtained from the BGS. There are records of two boreholes on the site. These boreholes record the strata between the Silkstone Coal seam and the Whinmoor Coal seam, which occur at depth beneath the site.

A third borehole log, located 60m to the east of the site in Upper Hoyland records made ground to 0.25m, underlain by weathered silty sandstone to 1.20m and sandstone bedrock to 6.63m.

Given the underlying ground strata the use of infiltration methods for the discharge of surface water is deemed unsuitable due to potential settlement issues associated with the made ground becoming inundated with surface water.

Sustainable Urban Drainage System (SUDS) may be used in conjunction with conventional drainage systems to improve water quality as well as manage surface water discharge.

The following audit has been carried out relating to suitability of SUD's systems.

Drainage Method	Description/Suitability	Proposal/Feasibility
1. Infiltration.	Methods not deemed suitable due to underlying ground strata	Not applicable.
2. Ponds and wetlands.	May be suitable if land is allocated	Applicable.
3. Infiltration Basins.	Methods not deemed suitable due to underlying ground strata	Not applicable.
4. Detention Basins.	May be suitable if land is allocated.	Applicable.
5. Swale.	May be utilised convey water.	Applicable.
6. French/Filter drain.	May be utilised convey water.	Applicable.
7. Pervious/Permeable Pavement.	Methods not deemed suitable due to underlying ground strata	Not applicable.
8. Geocellular Systems/Tank systems.	May be used as surface water attenuation.	Applicable.
9. Oversized pipes.	May be used as surface water attenuation.	Applicable.
10. Box culverts.	May be used as surface water attenuation.	Applicable.
11. Purpose designed tanks.	May be used as surface water attenuation.	Applicable.

6.2 Surface Water Drainage

The disposal of surface water shall be in accordance with the Requirement H3 of Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway/infiltration system, watercourse and public sewer in that priority order.



As noted in Section 6.1 the discharge of surface water drainage via infiltration methods is not feasible, therefore the second consideration should be discharge to watercourse.

The nearest watercourse is a tributary of the downstream watercourse known as Short Wood Dike which passes through the west of the site. Following consultation with Barnsley MDC land drainage department, they have confirmed a greenfield discharge rate of 4.4 litres/second/hectare is applicable for the site. A copy of the correspondence with Barnsley MDC is included in Appendix E. A greenfield run-off calculations prepared on Windes Microdrainage software is provided on Appendix F.

A significant area of the site lies within an area of uncontrolled backfilled opencast mining thus it is not proposed to develop residential properties within these area. The area proposed for residential development is circa 5.7Ha, the total surface water discharge rate to watercourse will therefore be 25.08 litres/second (5.70 by 4.4 l/s/Ha).

Given the restricted surface water discharge rate on-plot surface water attenuation will be required, it is proposed this will be provided in a detention basin to the west of the site. The basin will be put forward to Yorkshire Water for adoption under a Section 104 agreement. The following provides a brief calculation of the approximate volumes of attenuation using the 'Quick Storage Estimate' element of Windes Microdrainage:

Attenuation Volumes

Storage Design Parameters

-] Restricted discharge rate = 25.08 litres/second.
-] Site area to be developed = 5.70 Ha.
-] Proposed Impermeable area = 3.42 Ha. (60% impermeable).
-] M5-60 = 19.0.
-] Ratio R = 0.363.
-] 1:2 Year Return Period = 373-615 m³.
-] 1:30 Year Return Period = between 891-1322m³.
-] 1:100 Year Return Period (+30% cc) = between 1786-2526 m³.

As the surface water drainage system is to be put forward for adoption under a Section 104 agreement the surface water attenuation for the 1:2 year event shall be stored in the pipe network only.

The proposed onsite drainage system shall be designed in accordance with the requirements of Sewers for Adoption and shall demonstrate that:

-] No surcharge of pipes occurs in the 1 in 2 year rainfall event.
-] No surface flooding occurs in 1 in 30 year rainfall event.



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

A schematic drainage drawing is provided in Appendix G.

6.3 Foul Water Drainage

JPG have been appointed by Barnsley MDC and a number of private Developers to develop a foul and surface water drainage strategy for the wider Hoyland North development areas. The site covered by this report is located with a parcel of land names as Plot H16 and falls within the drainage strategy 'Catchment No.2.'

There is potential for 713 residential units to be constructed within Catchment No.2, using a foul flow rate of 0.017 litres/second/dwelling as advised by Yorkshire Water the cumulative foul flow for Catchment No.2 is 12.1 litres/second.

Yorkshire Water have advised a foul flow rate of 12.1 litres/second can be accommodated in the 375 mm diameter public combined sewer recorded at to the west of the site, at a point immediately upstream of the existing foul water pumping station. They have advised the connection to the sewer must be a minimum of 8m upstream of the existing combined sewer overflow chamber.

7.0 DRAINAGE MAINTENANCE AND MANAGEMENT

The proposed foul and surface water drainage systems including the detention basin will be put forward for adoption by Yorkshire Water under a Section 104 agreement, the future maintenance will therefore be undertaken by Yorkshire Water.

However in the interim prior to formal adoption of the drainage system the following maintenance and management guidance is provided.

7.1 Introduction

Pipe sizes and gradients are designed to be self-cleansing albeit regular maintenance and inspections are required to ensure the long-term efficiency of the systems.

All works should be undertaken by suitably qualified personnel and waste should be treated and removed by an appropriately registered company.



7.2 Sewers

The main objective of maintenance guidance is to establish procedures to ensure the sewer system functions appropriately in the long term within an environment of fiscal control.

Maintenance includes:

-) Local repair or local replacement of damaged pipes or other structures in order to maintain the functioning of the sewer.
-) Cleaning and removal of sediments, obstructions etc. to restore hydraulic capacity.
-) Jetting/vacuum of sewers to be undertaken as often as necessary to remove silts and/or ordinary debris.
-) In the event that any extraordinary issues are encountered during an inspection, further information may be required such as a CCTV survey report.
-) Maintenance to be undertaken on a six monthly schedule.

To avoid damaging the pipe, PSI pressures need to be verified before jetting of plastic twin wall sewers. Cleaning of drainage systems may require the temporary sealing of the system and careful collection of the effluent for disposal off site.



7.3 Detention Basin

Regular inspection and maintenance is important for the effective operation of the detention basin. CIRIA's SUDS manual C753 Table 23.1 recommends the following maintenance regime for detention basins:

Maintenance schedule	Required action	Typical Frequency
Regular Maintenance	Remove litter and debris.	Monthly (or as required)
	Cut the grass – public areas.	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season, and autumn).
	Inspect marginal and bankside vegetation and remove nuisance plants (first 3 years).	Monthly (at start, then as required).
	Inspect inlets, outlets, bankside, structures, pipework, etc. for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May – October)
	Inspect silt accumulation rates in any dry weather channel and in main body of the basin and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices, e.g. flow controls	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above basin base; include 25% of basin surface)	Annually
	Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually.
	Remove sediment from any dry weather channel	Every 1-5 years, or as required.
	Remove sediment and planting from one quadrant of the main body of basins	Every 5 years, or as required.
	Occasional maintenance	Remove sediment from the main body of big basins when pool volume is reduced by 20%
Remedial actions	Repair erosion or other damage	As required.
	Replant, where necessary	As required.
	Repair/rehabilitation of inlets, outlets and overflows.	As required.

This regime can be tailored to suit the detention basin dependant on final landscaping details and many of the maintenance activities may be undertaken as landscaping maintenance.

7.4 Flow Control Chamber

The surface water drainage network has a discharge restriction imposed by Barnsley MBC, this is controlled by a flow control device.



Regular inspections of the flow control chamber should be carried out to ensure that debris that may obstruct the inlet to the flow control is not present. The frequency of inspection will depend on the location of the unit, it is recommended initial inspections should be on a three-month basis for the first year of operation followed by a six monthly basis thereafter.

In the event that the inlet to the control unit becomes blocked, the pivoting bypass door may be operated by pulling the wire rope attached upwards to drain down the chamber and provide access for maintenance.

7.5 Manholes/Access Chambers

All manhole covers should be lifted and the manholes visually inspected for silt, debris and signs of blockages within the drainage system. Check manhole covers and frames for damage and ensure correctly bolted together. This should be undertaken on a six monthly basis.

Should any debris or blockages be detected, the manholes should be cleaned along with associated pipe runs which should be high pressure jetted and CCTV surveyed to verify/identify that no further remedial works are required.

8.0 CONCLUSIONS

This assessment has looked at the drainage and flood risk issues to support a proposed residential development on land immediately to the west of Hoyland.

The site lies within Flood Zone 1 and is therefore at low risk of flooding from river or sea. NPPF Technical Guidance states all uses of land are appropriate in Flood Zone 1.

Other sources of flooding have been assessed and the risk of flooding from these sources is considered to be low.

Surface water shall discharge to tributary of the downstream watercourse known as Short Wood Dike which passes through the west of the site at a greenfield rate of be 25.08 litres/second. Surface water attenuation will be provided in a detention basin located to the west of the site.

As the surface water drainage system is to be put forward for adoption under a Section 104 agreement the surface water attenuation for the 1:2 year event shall be stored in the pipe network only.



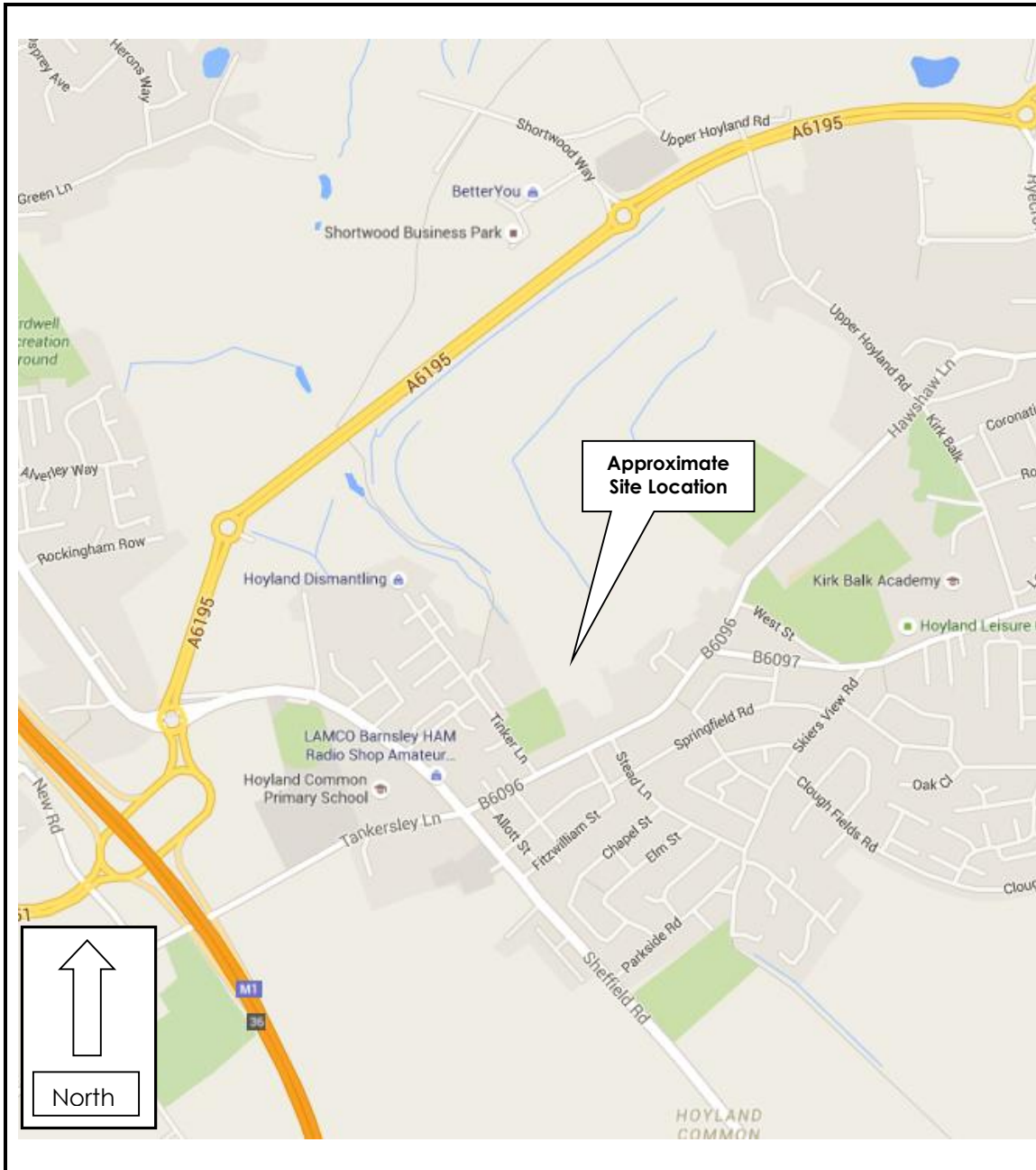
Foul water shall discharge to the 375 mm diameter public combined sewer recorded to the west of the site upstream of the existing foul water pumping station, at a point located a minimum of 8m upstream of the existing combined sewer overflow chamber.

Andrew Fairburn
For and behalf of JPG (Leeds) Limited

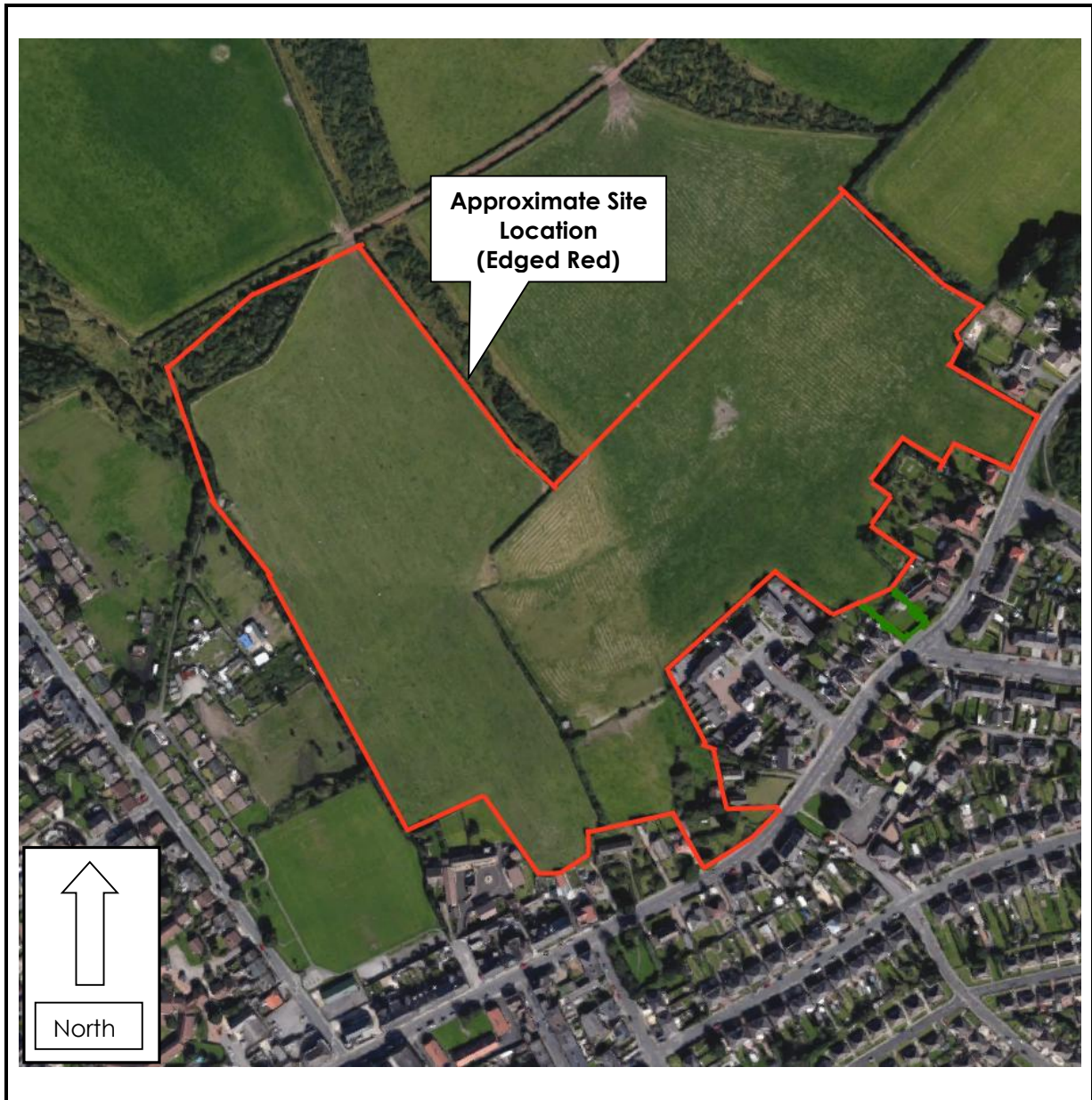
September 2018



Appendix A Site Location Plan and Aerial Photograph



Site Location Plan	
Site	Hoyland Lowe, Hoyland
Client	Avant Homes (Yorkshire)
Job Number	5003.2
Scale	NTS



Aerial Photograph	
Site	Hoyland Lowe, Hoyland
Client	Avant Homes (Yorkshire)
Job Number	5003.2
Scale	NTS



Appendix B Topographic Survey



Appendix C Yorkshire Water Correspondence

Andrew Fairburn

From: Chris Roberts <Chris.Roberts@yorkshirewater.co.uk>
Sent: 19 July 2018 14:42
To: Andrew Fairburn
Subject: RE: FW: 5003 - Hoyland - Foul Water Drainage - R100989

Hi Andrew,

Thank for the extra info.

Catchment 1 - 4.1 l/s foul to 150 mm foul can be accepted to this sewer subject to formal planning approval

Catchment 2 - 12.1 l/s foul to the 375 mm combined sewer can be accepted to this sewer subject to formal planning approval.

Catchment 3 - 5.66 l/s to the 375 mm combined sewer can be accepted to this sewer subject to formal planning approval.

Kind Regards

Chris Roberts
Sewerage Technician
Yorkshire Water

*** Please note, all correspondence must be sent to technical.sewerage@yorkshirewater.co.uk and will be responded to within 10 working days ***

-----Original Message-----

From: Andrew Fairburn [mailto:Andrew.Fairburn@jpgg.group]
Sent: 19 July 2018 14:31
To: Chris Roberts <Chris.Roberts@yorkshirewater.co.uk>
Subject: RE: FW: 5003 - Hoyland - Foul Water Drainage - R100989

Chris

Thank you for the email, unfortunately you appear to have based the assessment on the older flow figures, the figures were updated to suit the YW flow basis you provided and the drawing re-issued (Revision B), which provided significantly reduced flow rates (see attached email),

Would you be able to update your response by Monday to allow me to present at our meeting with the council on Tuesday

Thanks again

Kind Regards

Andrew Fairburn – Director

E: andrew.fairburn@jpgg.group
T: 0113 263 1155
W: www.jpgggroup.global

-----Original Message-----

From: Chris.Roberts@yorkshirewater.co.uk [mailto:Chris.Roberts@yorkshirewater.co.uk] On Behalf Of technical.sewerage@yorkshirewater.co.uk

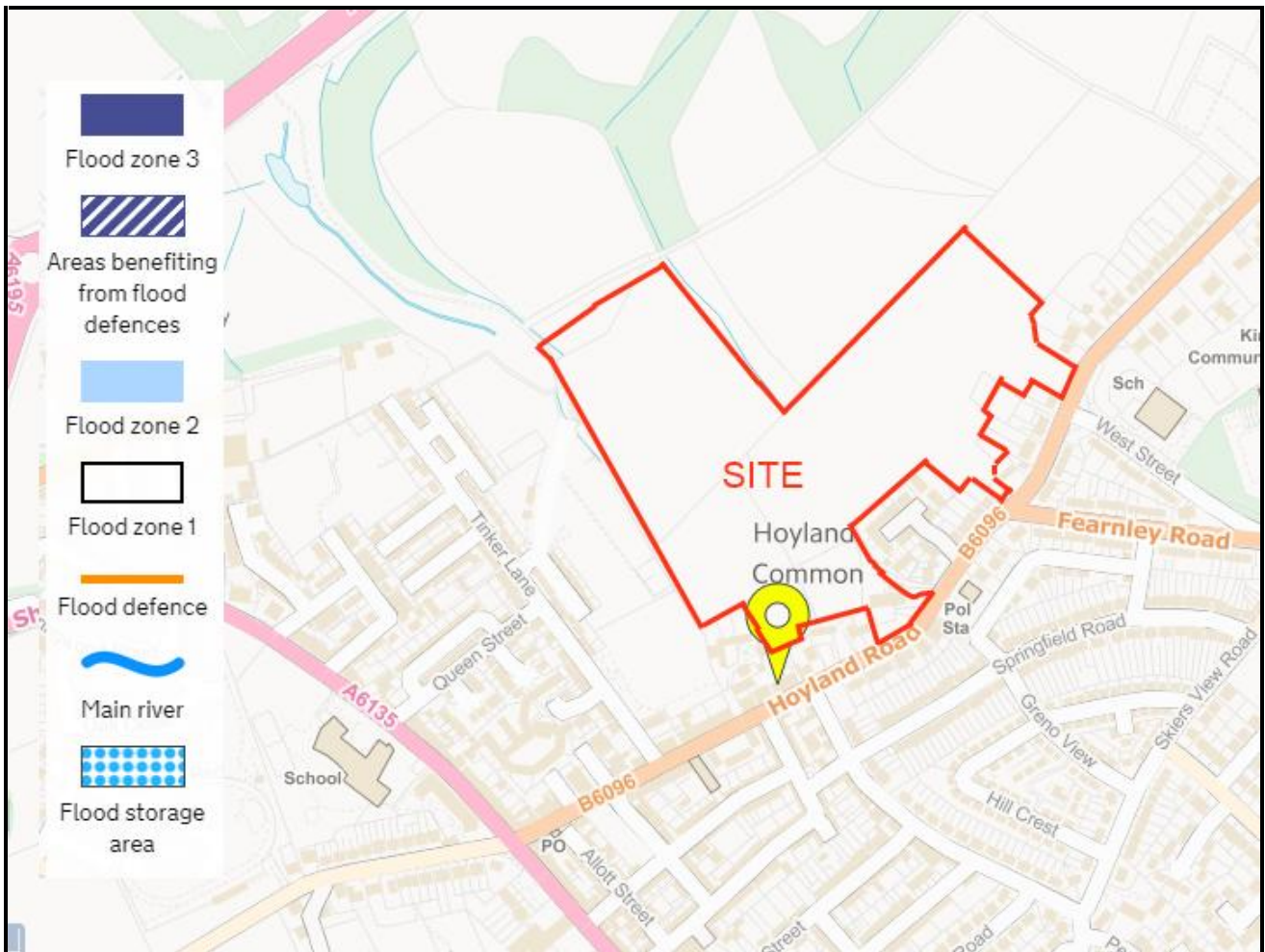


	Project Name: Site Reference: Drawing No.:	Date: Scale:
	Client: Designer: Checker:	Date: Scale:

This drawing is the property of Yorkshire Water and is not to be used for any other purpose without the written consent of Yorkshire Water.



Appendix D Environment Agency Flood Map



Flood Map obtained from Gov.uk website (September 2018)



Appendix E Barnsley MDC Correspondence

Andrew Fairburn

From: Atkins , Wayne <WayneAtkins@barnsley.gov.uk>
Sent: 19 June 2018 11:29
To: Andrew Fairburn
Subject: RE: 5003 - Development at Hoyland - Barnsley

Hi Andrew,

I have discussed with colleagues and we believe there is a small diameter (225mm?) culvert adjacent to the boundary of 18 to 28 Stoney Croft, we are unsure of the route from here but believe it connects into Shortwood Dyke to the West of your site. The exact line of the culvert through your development site should be ascertained prior to works commencing on site and any protection / diversion works agreed with BMBC as LLFA.

I would confirm my agreement to the discharge rate of 4.4 l/s/ha into Shortwood Dyke as previously agreed.

If you need any further information please let me know.

Regards

Wayne Atkins
Principal Engineer – Drainage
Environment & Transport
Place Directorate
Barnsley Metropolitan Borough Council

Telephone: 01226 772182
E-mail: wayneatkins@barnsley.gov.uk

From: Andrew Fairburn [mailto:Andrew.Fairburn@jpg.group]
Sent: 15 June 2018 14:17
To: Atkins , Wayne
Subject: FW: 5003 - Development at Hoyland - Barnsley

Wayne

Further to our recent meeting as discussed i have provided below an email from Derek Bell confirming our assessment of the greenfield discharge rate of 4.4 litres/second/ha is appropriate. I would be grateful if you could review and confirm the same.

When we met we noted a YW surface water sewer than enters the site and comes of an abrupt end, an discussed could you review your record drawings to see if there are any watercourse in the vicinity that the sewer may discharge to? I have provided an extract of the sewer plan below the email footer.

Thank you

Kind Regards

Andrew Fairburn – Director

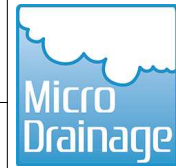
E: andrew.fairburn@jpg.group
T: 0113 263 1155
W: www.jpggroup.global



Appendix F Microdrainage Greenfield Discharge Calculations

5 John Charles Way
Leeds
LS12 6QA

5003 - Hoyland



Date 23.02.16

Designed by AMF

File

Checked by

XP Solutions

Source Control 2015.1

IH 124 Mean Annual Flood

Input

Return Period (years)	1	Soil	0.450
Area (ha)	50.000	Urban	0.000
SAAR (mm)	700	Region Number	Region 3

Results l/s

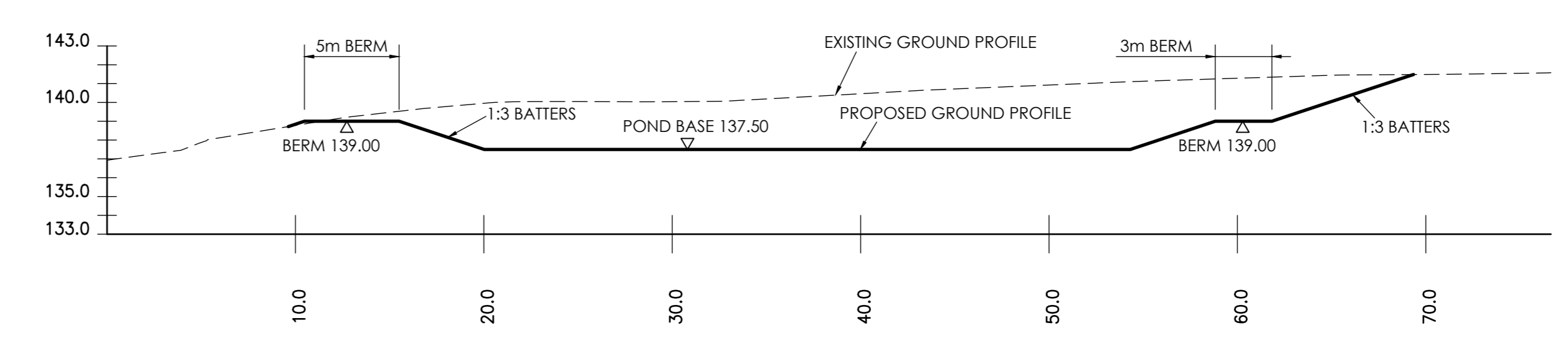
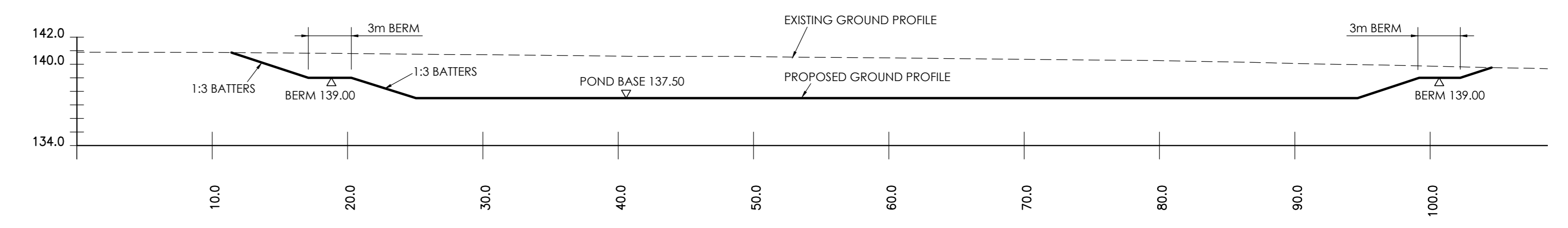
QBAR Rural 219.7
QBAR Urban 219.7

Q1 year 188.9

Q1 year 188.9
Q2 years 207.3
Q5 years 274.6
Q10 years 318.5
Q20 years 360.7
Q25 years 374.7
Q30 years 386.1
Q50 years 416.0
Q100 years 456.9
Q200 years 518.4
Q250 years 538.2
Q1000 years 667.8



Appendix G Schematic Drainage Drawings



REV	DESCRIPTION	DATE	BY
A	NOTES ADDED	26.09.18	AMF

Job Title
 HOYLAND LOWE,
 HOYLAND,
 SOUTH YORKSHIRE

Drawing Title
 SCHEMATIC DRAINAGE LAYOUT

PRELIMINARY

Architect

JPG
 www.jpg-group
 Leeds: 0113 263 1155 | London: 020 7747 4148

Checked	Date	Scale	AO	Drawn
	05.09.18	1:500		AMF

Drawing No 5003-SK14 A

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