DRAINAGE & FLOOD RISK STATEMENT

Hay Green Lane, Birdwell
Barnsley

Reference	**5568-JPG-XX-XX-RP-D-0630-S2-P02**
Date	**May 2020**
Author	**JDM**

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CONTENTS

APPENDICES

CONFIDENTIALITY STATEMENT

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

Harworth Group
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S60 5TR

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

Rev	Date	Revision Details	Status	Author(s)	Approved
P01	11.05.2020	First Issue	Information	JDM	
P02	12.05.2020	Second Issue	Information	JDM	

1.0 INTRODUCTION

JPG (Leeds) Limited has been instructed by Harworth Group to carry out a Drainage and Flood Risk Assessment for a proposed residential development on land to the south of Hay Green Lane, Birdwell, near Barnsley.

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 must 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 in the village of Birdwell approximately 4.80km to the south of Barnsley town centre. The approximate centre of the site is located at NGR 434718, N401305.

The site is to the south of Hay Green Lane and is an irregular shape covering an area of approximately 3.590ha.

The site is bounded by existing properties to the north on Hay Green Lane.

To the west is a recreation ground, children's playground and further over existing residential properties on Sheffield Road.

To the south and east land are open fields referred to a grazing paddock.

Also, to the east is a public footpath running north/south and further over a listed property/building referred to as Hawk Wood Cottage.

The existing site levels generally falls from west to east. Levels in the west are in the order of 131.5m and in the east in the order of 120.0m.

A Site Location Plan is located in Appendix A and topographic survey 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:

- There is a 225mm diameter public combined water sewer recorded running to the south of the site in a west to east direction. This sewer turns north east and increases in size to a 375mm diameter pipe. The sewer continues in a north east direction running along the eastern boundary of development and into Hay Green Lane to the north.
- In addition, there is a 100 mm diameter public combined sewer recorded within the site connectivity unknown. It may serve Hay Green farm but further investigation in the form of a connectivity survey is required.
- There are other YW public sewers locating in both Hay Green Lane and Sheffield Road.

In response from the LLFA it is noted that a culverted water course runs across the site. Further investigation is required into this at detailed design stage and this may need to be diverted within the development.

There are no other known or recorded watercourse and/or ditches located within the site boundary.

The nearest water course /land drainage system is located approximately 400.0m to the east and is known as Short Wood Dike. This runs in a north easterly direction.

There are two small water bodies which appear to be the head of the watercourse. It is not known whether these are natural or manmade features.

There is also land drainage features located approximately 400.0m to the south of the site which are understood to ultimately discharge into Short Wood Dike.

In addition, there is a pond/lake adjacent to Dearne Valley Parkway which is understood to act as attenuation balancing for adjacent development and the highway.

4.0 DEVELOPMENT PROPOSALS

The proposed development comprises of 118 residential units and associated infrastructure in this phase.

Proposed development area is approximately 3.590 Ha.

Impermeable area is approximately 2.154 Ha. Assuming 60% impermeable area.

A proposed site plan is provided in Appendix D.

5.0 FLOOD RISK ASSESSMENT

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

The site is indicated to fall within Flood Zone 1 which comprises land assessed as having 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

Adjoining land to the north and west is occupied by existing properties and public highway. Drainage from these is understood to connect into the adjacent public sewer network in Hay Green Lane and Sheffield Road, respectively.

Sheffield Road falls in a northerly direction and Hay Green Lane falls west to east.

Ground levels on the carriageway are similar to levels at the site boundary. Thus, any overland flows would be contained in the highway corridor and run along the roads and past the site.

Levels to the south of the plot are similar to levels at the site boundary and fall from west to east. Any overland flow would flow past the site in this general direction.

Ground levels to the east are generally lower than the site and fall away to the east towards Short Wood Dike which is at a lower level than the site.

Any over land flows would fall away from the site in this direction toward Short Wood Dike.

The risk of flooding from adjoining land is considered to be **low**.

5.2 Flooding from Groundwater

The proposed site is in an elevated position in relation to the nearest watercourses, thus it is unlikely there will be an issue with groundwater effecting the site.

The site generally falls from west to the east.

The risk of flooding from ground water is considered to be **low**.

5.3 Flooding from Sewers

The sewers in 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**.

5.4 Flooding from Reservoirs, Canals and Other Artificial Sources

A surface water balancing pond is located to the south of the site and two drainage features are located to the east refer to section 3.0 for details.

These features would all appear to be at a level lower than the site and thus any flooding from these would not affect the site.

There are also two drainage features (ponds) located to the north east of the site.

The level of these are lower than the site levels and thus any flooding from these features would not affect the site.

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

The risk of flooding from other sources is considered to be **low**.

6.0 SURFACE AND FOUL WATER DRAINAGE

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

The proposed drainage will be designed in accordance with current Building Regulations, SFA and industry best practice as required.

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

A drainage strategy plan for the development is in appendix F.

6.1 Sustainable Urban Drainage Systems (SUDS)

Initial investigations indicate the site is underlain by the Pennine Middle Coal Measure interbedded with grey mudstone, siltstone, and pale grey sandstone and commonly coal seams. At shallow depth there is clay material and former coal mine workings are known in the area. However, infiltration testing will be carried out on site to confirm this.

Given the underlying ground strata the use of infiltration methods for the discharge of surface water is deemed unsuitable for this development.

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 detailed in section H3 of Building Regulations 2010. 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 located approximately 400.0m to the east of the site and known as Short Wood Dike.

This would be the most logical place for discharge of surface water from the development.

Surface water discharge from the development would be restricted to agreed rates with the LLFA (Barnsley).

In consultation with Barnsley MBC land drainage department, BMBC confirmed the site should be restricted to a greenfield run off and rate determined using an industry recognised method.

The greenfield run off rate was calculated using the ICP SUDS method and gave a figure of 7.90 litres/second.

Greenfield run-off calculations have also been prepared using Windes Micro Drainage software and are in Appendix G.

Given the restricted surface water discharge rate on-plot surface water attenuation will be required, it is proposed this will be provided in a combination of a below ground attenuation tank and detention basin to be located in the south east corner of the site. Connection from the site boundary would be via an off-site drain/sewer to Short Wood Dike. This is likely to be a requisition sewer and adopted by YW.

The following provides an overview of the approximate volumes of attenuation using the 'Quick Storage Estimate' element of Windes Microdrainage.

Surface water drainage calculations are in appendix H.

Storage Design Parameters and Attenuation Volumes:

- Restricted discharge rate = 7.90 litres/second.
- Site area to be developed = 3.590Ha.
- Proposed Impermeable area = 2.154 Ha. (60.0% impermeable).
- M5-60 = 19.0.
- Ratio R = 0.393.

Attenuation Volume 1:30 Year Return Period = between 673-948 m^3.

Attenuation Volume 1:100 Year Return Period (+40% cc) = between 1431-1932 m^3.

The proposed onsite drainage system shall be designed in accordance with the requirements of Building Regulations and 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.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event (including an allowance of 40% for the effects of future climate change), as defined in NPPF Technical Guidance.
- Infrastructure drainage shall be put forward for adoption under a Section 104 agreement with the local Water Company (YW).

6.3 Foul Water Drainage

The proposed foul water discharge has been calculated for the development and is detailed below:

- Foul water discharge – 5.463 l/s (design flow 6xDWF+10%).

Calculation have been carried out using the method as detailed in SFA.

Foul Water drainage calculations are in Appendix I.

Connection of foul water will be into the adjacent public combined water sewer located to the east of the development where it passes through the site. YW confirmed the point of connection in their pre planning response.

The proposed infrastructure drainage will be designed to SFA and Yorkshire Water requirements and have sufficient capacity to serve the development. The drainage will be put forward for adoption via a Section 104 agreement with the Water Company (YW).

7.0 DRAINAGE MAINTENANCE AND MANAGEMENT

The proposed foul and surface water drainage infrastructure including the below ground detention tank would be put forward for adoption by the local Water Company (YW) via a Section 104 agreement.

The dry detention basin could either be put forward for adoption via the same Section 104 agreement or be maintained via the local authority or a management company.

There would be more scope for the basin to be enhance for use as amenity space if adopted by the local authority or a private management company.

The following general maintenance and management guidance is provided. Detailed maintenance proposals would need to be provided by the individual body maintaining the feature as part of the detailed design process.

7.1 Introduction

Pipe sizes and gradients should be 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 Drains/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.

Where parts of the system are to be adopted by the local Water Company (YW) via a Section 104 agreement the Water Company internal policy on maintenance would take precedence over any recommendations in this report.

7.3 Drains/Sewers

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%.	With effective pre- treatment this will only be required rarely, e.g. every 25-50 years.
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.

The maintenance regime will also depend upon who will be responsible of the basin. Where this is likely to be the local authority or local Water Company (YW) internal maintenance policy at these bodies would take precedence over any recommendations in this report.

7.4 Flow Control Chamber

The surface water drainage network has a discharge restriction imposed by the LLFA (BMBC). This will require a flow control device to be incorporated into the drainage system.

Regular inspections of the flow control chamber should be carried out to ensure any 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.

Where the flow controller is to be part of the adopted system, the local Water Company internal policy on maintenance would take precedence over any recommendations in this report.

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.

Where parts of the system are to be adopted by the local Water Company (YW) via a Section 104 agreement the Water Company internal policy on maintenance would take precedence over any recommendations in this report.

8.0 CONCLUSIONS

This assessment has looked at the drainage and flood risk issues to support a proposed residential development on land to the south of Hay Green Lane, Birdwell, Barnsley.

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.

Further investigation into the existing culvert crossing the site is required at detailed design stage by the developer.

Surface water shall discharge into a local watercourse known as Short Wood Dike and is located approximately 400.0m to the east of the site.

Discharge will be restricted to greenfield run off rate as detailed in the report.

Surface water attenuation will be provided in a below ground attenuation tank and detention basin located in the south east of the development site. Refer to the drainage strategy plan for details.

Further investigation into the existing 100mm diameter public combined water sewer located in the site is required at detailed design stage by the developer.

Foul water drainage will discharge to the existing 375 diameter public combined water sewer which crosses through the east of the site. YW have confirmed this point of connection via a pre planning response. Refer to the drainage strategy plan for details.

This report confirms that the site is appropriate for the development type proposed subject to detailed design of the drainage infrastructure. Detailed design is outside the scope of this report.

[redacted]

Jonathan Millar
For and behalf of JPG (Leeds) Limited

May 2020

Appendix A Site Location Plan

DO NOT SCALE

NOTES

GENERAL NOTES

1. ALL MATERIALS AND WORKMANSHIP IS TO COMPLY WITH JPG CONSULTANTS STANDARD SPECIFICATION & ALL RELEVANT BRITISH & EUROPEAN STANDARDS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, M & E CONSULTANTS AND JPG CONSULTANTS DRAWINGS.
3. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.

SITE INFORMATION

SITE ADDRESS
HAY GREEN LANE, BIRDWELL, BARNSLEY
NEAREST POSTCODE - S70 5XA
OS SHEET/TILE - SE347013
OS CO-ORDINATES - E434718, N401305

SITE LOCATION

REV	DESCRIPTION	DATE	BY

Project
HAY GREEN LANE, BIRDWELL

Drawing Title
LOCATION PLAN

INFORMATION ISSUE

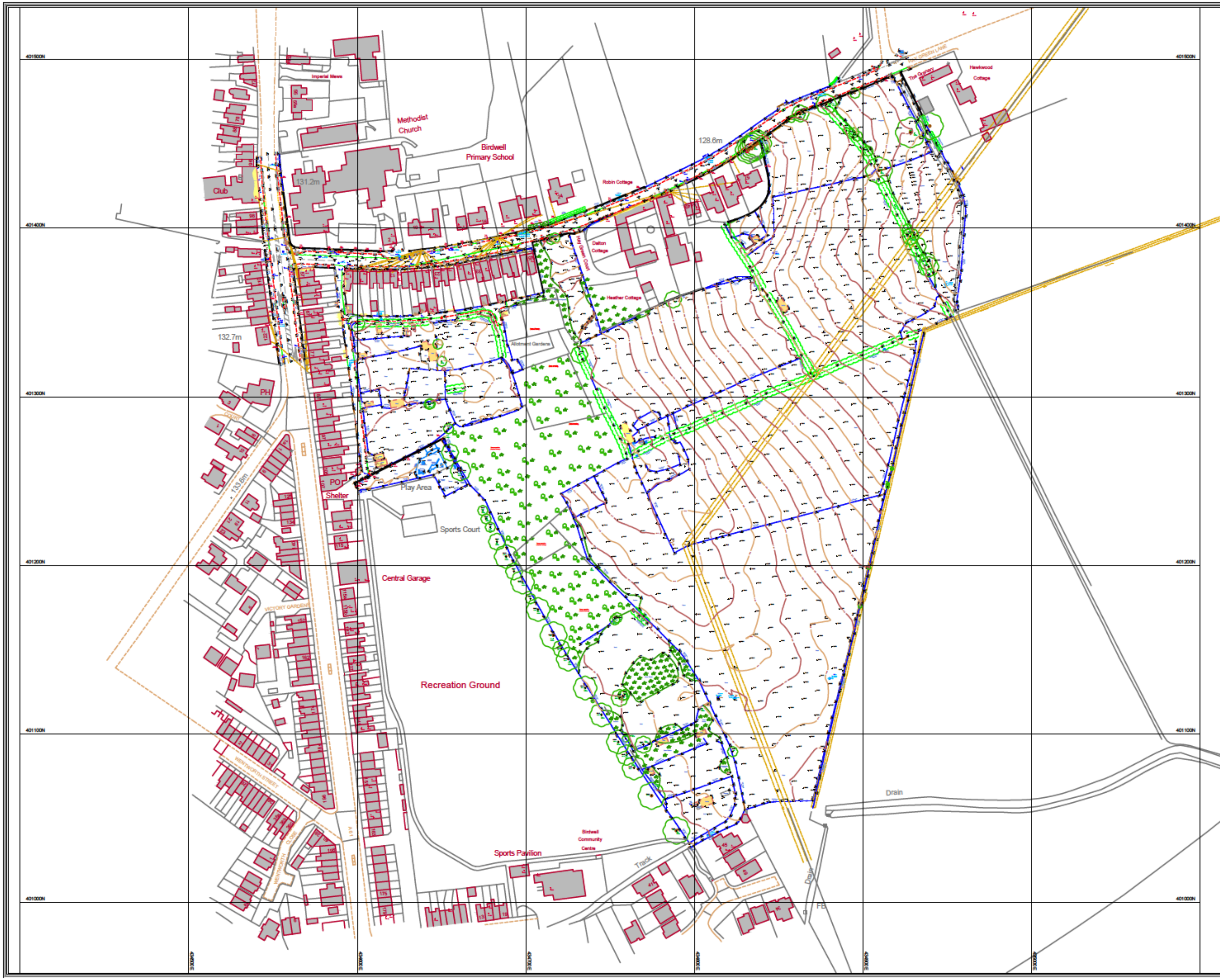
Architect
JRP ARCHITECTS

JPG
www.jpg.group
Leeds London Birmingham 0113 263 1155

JPG Project Ref	Scale at A1	Date	Checked	Drawn
5568	1:2500	NOV 2019		JDM

5568 - JPG - SW - 00 - DR - D - 1460 | S2 | P01

Appendix B Topographic Survey



Station Information:

Station	Easting (m)	Northing (m)	Level (m)
BB2	434591.4801	401345.7262	131.5619
BB3	434607.0034	401254.4364	131.1916
BB4	434650.1080	401347.0551	130.7450
HGL1	434644.3581	401378.6921	130.7416
HGL2	434588.9363	401385.9807	131.1589
HGL3	434547.9670	401381.9267	131.7181
JC2	434906.5536	401494.6448	121.4947
JC3	434803.9817	401438.6245	128.7390
JC4	434709.7214	401393.8639	131.6309

OS Note:

Some services may have been omitted due to parked vehicles. The Ordnance Survey tile is to be used as a guide only.

OS Buildings | *Surveyed Buildings*

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models. The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Rev	Date	Description	Drawn	Q. Ref

greenhatch group

- Topographical Surveys
- Site Engineering
- Utility / CCTV Surveys
- Measured Building Surveys
- 3D Laser Scanning
- Revit & BIM Models

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Poland: ul. Panewnicka 91, 40-761 Katowice, Poland, t. 0048 32 202 2292, www.greenhatch.pl

CLIENT
Harworth Estates Ltd

PROJECT
Hay Green Lane Birdwell Barnsley

TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 1000	22.11.18
DRAWN	QUALITY REF
JT	GH8830

Level datum	See Notes
Grid orientation	See Notes
Job number	35318

Drawing No.	Rev.
35318_T	0

Comments

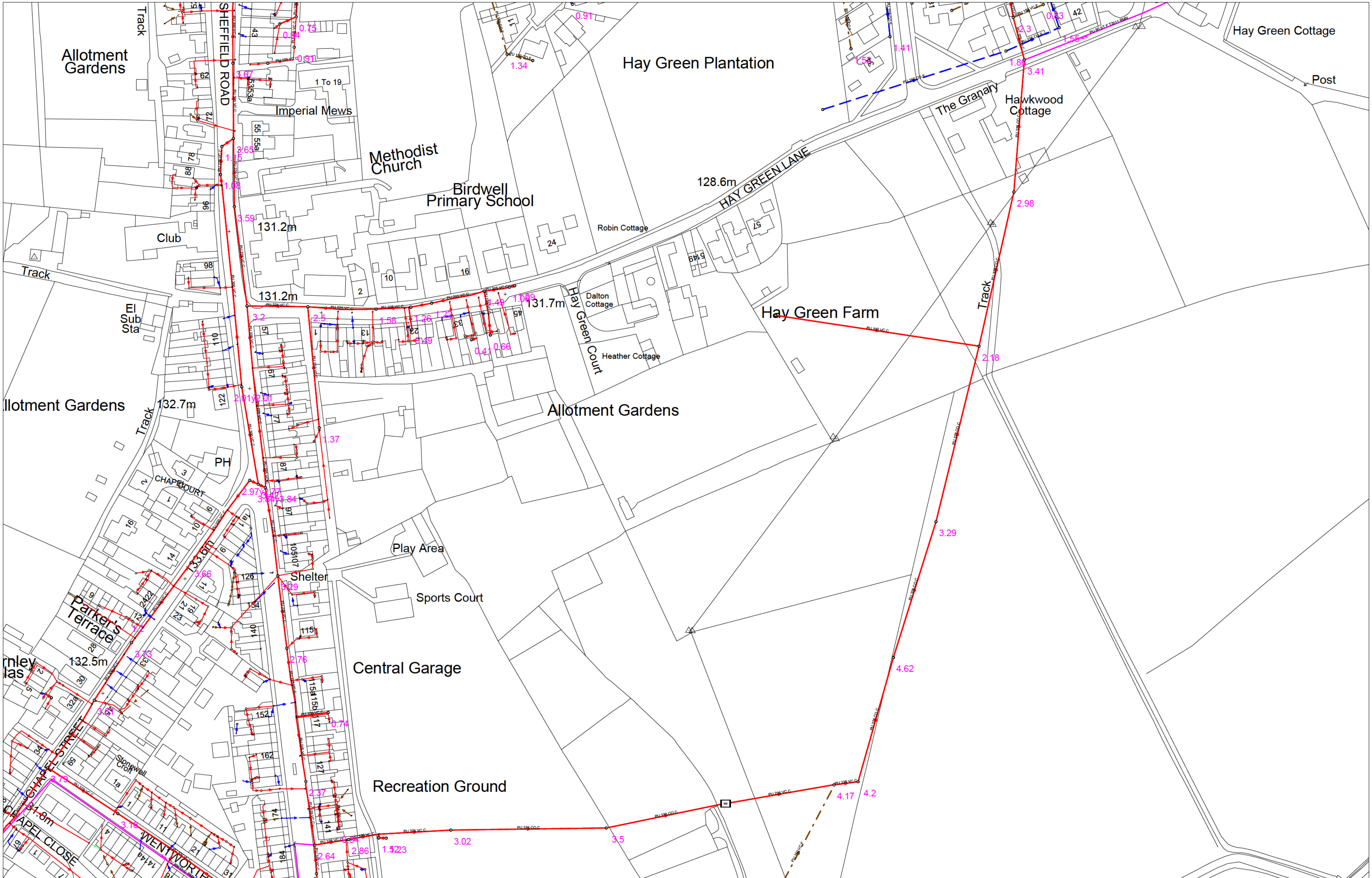
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

Appendix C Yorkshire Water Sewer Records


Allotment Gardens
Track
SHEFFIELD ROAD
Imperial Mews
1 To 19
Methodist Church
Birdwell Primary School
Hay Green Plantation
HAY GREEN LANE
128.6m
Robin Cottage
The Granary
Hawkwood Cottage
Hay Green Cottage
Post
Club
131.2m
131.7m
Dalton Cottage
Hay Green Court
Heather Cottage
Hay Green Farm
El Sub Sta
132.7m
Allotment Gardens
PH
CHAPEL COURT
Play Area
Shelter
Sports Court
Parker's Terrace
132.5m
Central Garage
Recreation Ground
Stonewell Croft
CHAPEL STREET
CHAPEL CLOSE
WENTWORTH

434625 : 401206	Map Name : SE3401SW	Title	Partial Key	This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.
YorkshireWater	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : YorMap Advisor C ROBERTS Contact Tel : 87 2582	Notes	Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS	
			Date Req : 22/11/2019, 10:10:09	Date Gen : 22/11/2019, 10:11:04
			Source : Sewer Network Enquiry	

UPN: Undefined Originator: C ROBERTS, YorMap, 87 2582

Appendix D Proposed Development Plan

11 / ILLUSTRATIVE MASTERPLAN

REV	DATE	DESCRIPTION	BY	CHECK
D	25.04.20	PROW TO WESTERN BOUNDARY ADJUSTED TO REFLECT EXISTING ROUTE AS SHOWN ON PROW PLAN	LS	LB
C	17.04.20	DETAILED MASTER PLAN FORMULATED SHOWING POTENTIAL EXTENTS OF HOUSING DEVELOPMENT	LS	LB
B	31.01.20	OPEN SPACE AMENDED TO ACCOMMODATE 30m STAND-OFF TO POTENTIAL NEAP EXTENSION OF EXISTING PLAYSPACE	LB	TS
A	30.01.20	MASTERPLAN REVISED IN RESPONSE TO PRE-APP: OPEN SPACE LOCATED ADJACENT TO COMMUNITY PARK RED LINE AMENDED TO BE COMPLETELY WITHIN ALLOCATION EMERGENCY LINK REMOVED	LB	TS

jrp ARCHITECTURE | PLANNING | LANDSCAPE

CLIENT: HARWORTH GROUP

PROJECT: HAY GREEN LANE BIRDWELL

DRAWING: ILLUSTRATIVE MASTERPLAN

DRAWING NUMBER: 17 5085 11

SCALE @ A1: 1:1000

DRAWN: LB **DATE:** 06.11.19

CHECKED: TS **DATE:** 06.11.19

NORTH

1:1000 SCALE

10m 100m

14 MARINER COURT / CALDER PARK / WAKEFIELD / WF4 3FL
01924 383322 / www.jrpassoc.co.uk / info@jrpassoc.co.uk
jrpassociates is a trading style of John R Foley Associates Limited

Appendix E Environment Agency Flood Map

Flood map for planning

Your reference	Location (easting/northing)	Created
5568	**434779/401348**	**5 Nov 2019 8:32**

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

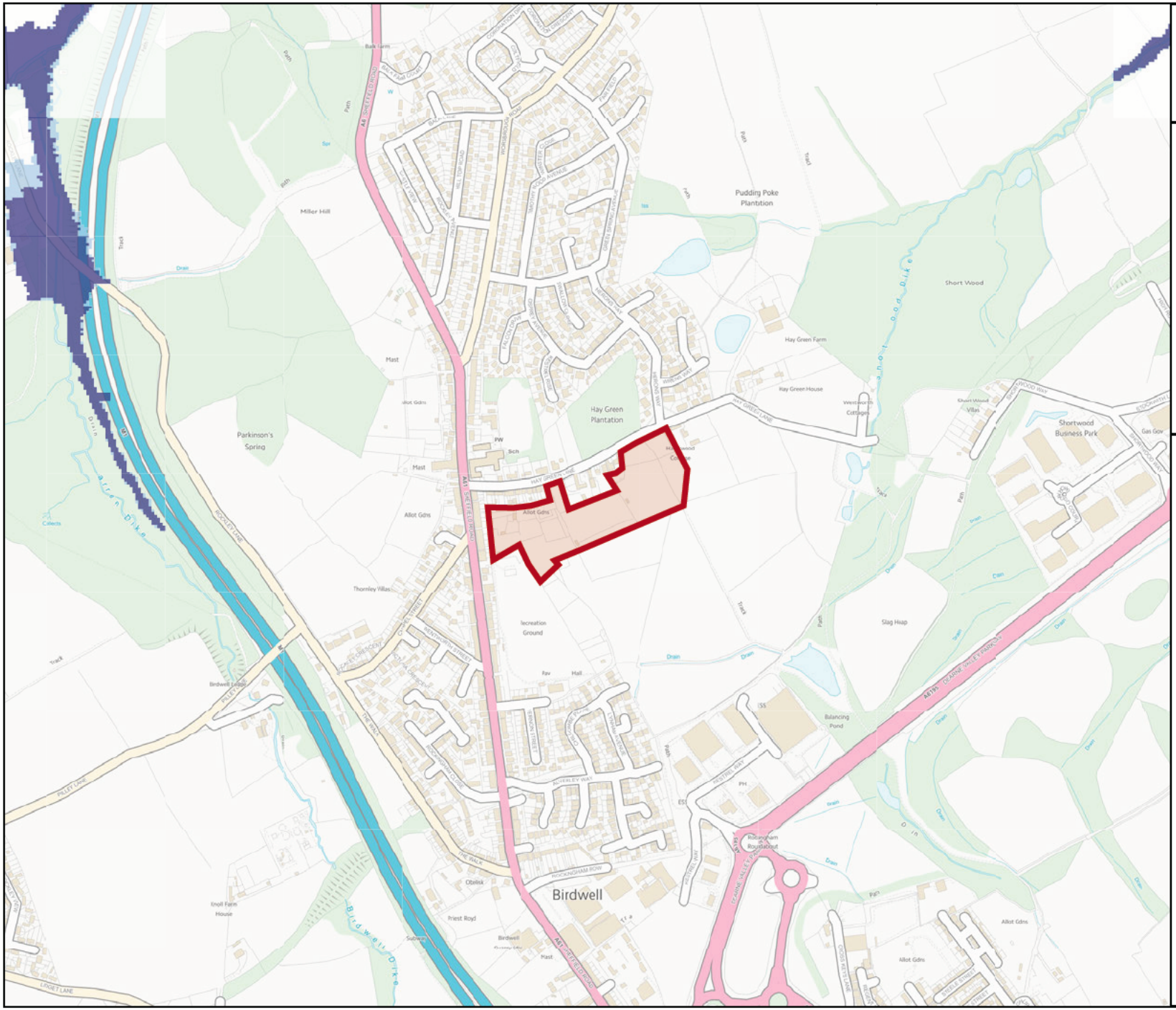
This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

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

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



Environment Agency

Flood map for planning

Your reference
5568

Location (easting/northing)
434779/401348

Scale
1:10000

Created
5 Nov 2019 8:32

- Selected area
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 100 200 300m

Appendix F Drainage Strategy Plan

DO NOT SCALE

NOTES

GENERAL NOTES

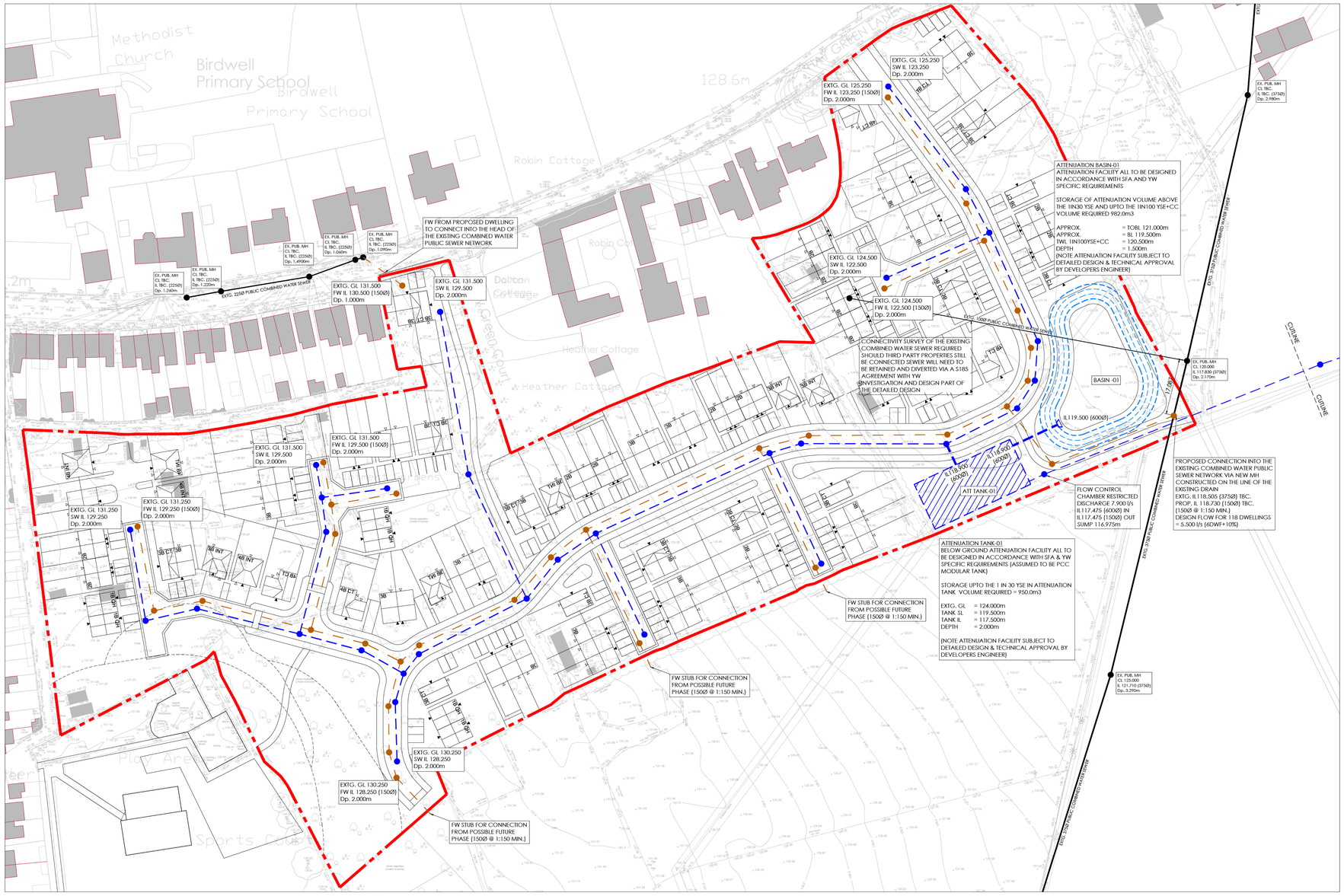
1. ALL MATERIALS AND WORKMANSHIP IS TO COMPLY WITH JPG CONSULTANTS STANDARD SPECIFICATION & ALL RELEVANT BRITISH & EUROPEAN STANDARDS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, M & E & CONSULTANTS AND JPG CONSULTANTS DRAWINGS.
3. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.

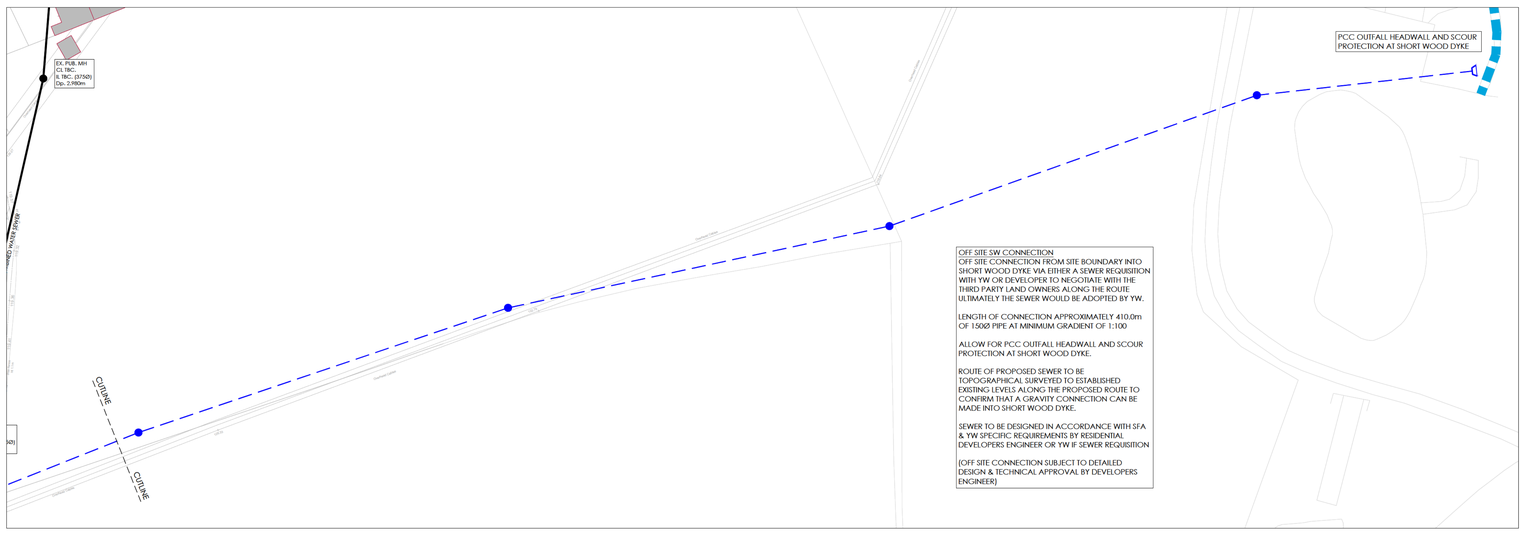
DRAINAGE KEY

- PROPOSED SITE BOUNDARY
- EXISTING FW PUBLIC SEWERS
- EXISTING CW PUBLIC SEWERS
- EXISTING SW PUBLIC SEWERS
- EXISTING WATERCOURSES
- EXISTING WATERCOURSES CULVERTED SECTIONS
- PROPOSED SW SEWERS
- PROPOSED FW SEWERS

LEVELS AND DETAILS OF THE EXISTING SEWER NETWORK ARE TO BE SURVEYED TO CONFIRM COVER AND INVERT LEVELS AND CONDITION OF THE RECEIVING SEWERS

DWELLING NUMBERS TO BE CONFIRMED AS PART OF THE DETAILED PLANNING AND DETAILED DESIGN PROCESS BY THE RESIDENTIAL DEVELOPER





FOUL WATER CALCULATIONS

PARCEL RAREA-A FW CALCULATION

RESIDENTIAL DEVELOPMENTS
BASED ON SFA RATE OF 4000 LITRES/DWELLING/DAY

USE	L/DAY	No.	TOTAL L/DAY
GENERAL HOUSING	4000	118.0	472000.000
DESIGN FLOW=TOTAL/86400s			5.463l/s (6xDWF+10%)
			0.819l/s (1xDWF)

NUMBER OF HOUSES BASED ON 42 RESIDENTIAL UNITS PER HECTARE.

FW DESIGN ASSUMPTION AS FOLLOWS

ASSUMED 42 DWELLING/Ha

ALL FOUL WATER INFRASTRUCTURE PIPES ASSUMED TO BE MINIMUM 150Ø AT A MINIMUM GRADIENT OF 1:150 (SUBJECT TO DETAILED DESIGN BY OTHERS)

FW POINTS OF DISCHARGE AND DISCHARGE RATES INTO THE EXISTING FW PUBLIC SEWER SYSTEM ARE TO BE AGREED WITH YW. YW HAVE CONFIRMED VIA A PPE THAT FW FROM THE DEVELOPMENT SHOULD DISCHARGE INTO THE EXISTING 375mm COMBINED WATER SEWER LOCATED WITHIN THE SITE

SURFACE WATER CALCULATIONS

PARCEL AREA-A SURFACE WATER RUN OFF

VOLUME RUN OFF (CV)	0.750
ROUTING COEFFICIENT (Cr)	1.300
AVERAGE RAINFALL (I) IN mm/hr	50.000
AREA IN HECTARES (A)	2.154
FLOW RATE (Q) = 2.78 x Cv x Cr x I x A	291.921l/s

Impermeable area based on 60% of the total plot area refer to table below

POINTS OF DISCHARGE FOR SW RUN OFF INTO THE EXISTING WATER COURSE/LAND DRAINAGE SYSTEM & DISCHARGE RATES ARE TO BE AGREED WITH THE LLFA
DESIGN RATES USED ARE BASED ON CALCULATED GREENFIELD RATES USING RECOGNISED METHODS TO CALCULATE THE GREENFIELD RATES CALCULATED RATE 7.900 l/s
YW HAVE CONFIRMED THERE IS NO CAPACITY FOR SW INTO THE PUBLIC SEWER NETWORK

ATTENUATION VOLUMES ARE BASED ON THE FOLLOWING ASSUMPTIONS
ASSUMED 60% MAX. IMPERMEABLE AREA OF TOTAL DEVELOPMENT PARCEL AREA
ALLOWANCE FOR CLIMATE CHANGE 40%

PARCEL REF.	TOTAL AREA (Ha)	IMP. AREA (Ha)	UNRESTRICTED DISCHSRGE (l/s)	RESTRICTED DISCHSRGE (l/s)	SW ATTENUATION VOL. 1 IN 30 (m3)	SW ATTENUATION VOL. 1 IN 100 + CC (m3)
AREA-A	3.590	2.154	SEE CALCULATION	7.900	948.0	1932.0
IMPERMEABLE AREA BASED ON 60% OF THE TOTAL PARCEL AREA.						
RESTRICTED DISCHARGE BASED CALCULATED GREENFIELD RUN OFF RATE USING ICP-SUDS METHOD IN MICRO DRAINAGE DESIGN SOFTWARE = 7.900l/s						
ALLOWANCE FOR CLIMATE CHANGE 40%						

RESIDENTIAL PARCELS DISCHARGE RATES AND VOLUMES

ALL PIPE/SEWER RUN AND INFRASTRUCTURE ARE SHOWN INDICATIVELY AND SUBJECT TO DETAILED DESIGN BY THE RESIDENTIAL DEVELOPERS ENGINEER

REV	DESCRIPTION	DATE	BY
P01	INITIAL ISSUE	07.05.2020	JDM

Project
HAY GREEN LANE, BIRDWELL

Drawing Title
FW & SW DRAINAGE STRATEGY PLAN

INFORMATION ISSUE

Architect
JRP ARCHITECTS

JPG
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Leeds London Birmingham 0113 263 1155

JPG Project Ref	Scale at A0	Date	Checked	Drawn
5568	1:2500	APR 2020		JDM

5568 - JPG - SW - 00 - DR - D - 1401 | S2 | P01

Appendix G Micro Drainage Greenfield Discharge Calculations

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	Soil	0.450
Area (ha)	2.154	Urban	0.000
SAAR (mm)	600	Region Number	Region 3

Results l/s

QBAR Rural	7.9
QBAR Urban	7.9
Q1 year	6.8
Q1 year	6.8
Q30 years	13.9
Q100 years	16.4

Appendix H Surface Water Drainage Calculations

Calculation sheet

Job No	5568	Sheet No	1	
Project	HAY GREEN LANE, BIRDWELL	By - JDM	Date	30/04/2020
Element	Preliminary SW Attenuation Calculations Area A		Checked - JDM	

SURFACE WATER ATTENUATION VOLUME

The following surface water attenuation volumes have been calculated using "Micro Drainage Windes" design software using the "Quick Storage Estimate" module.

These calculations generate a range of attenuation volumes for a given storm event. The actual volume of water to be attenuated will be subject to detailed design calculations.

SITE DETAILS

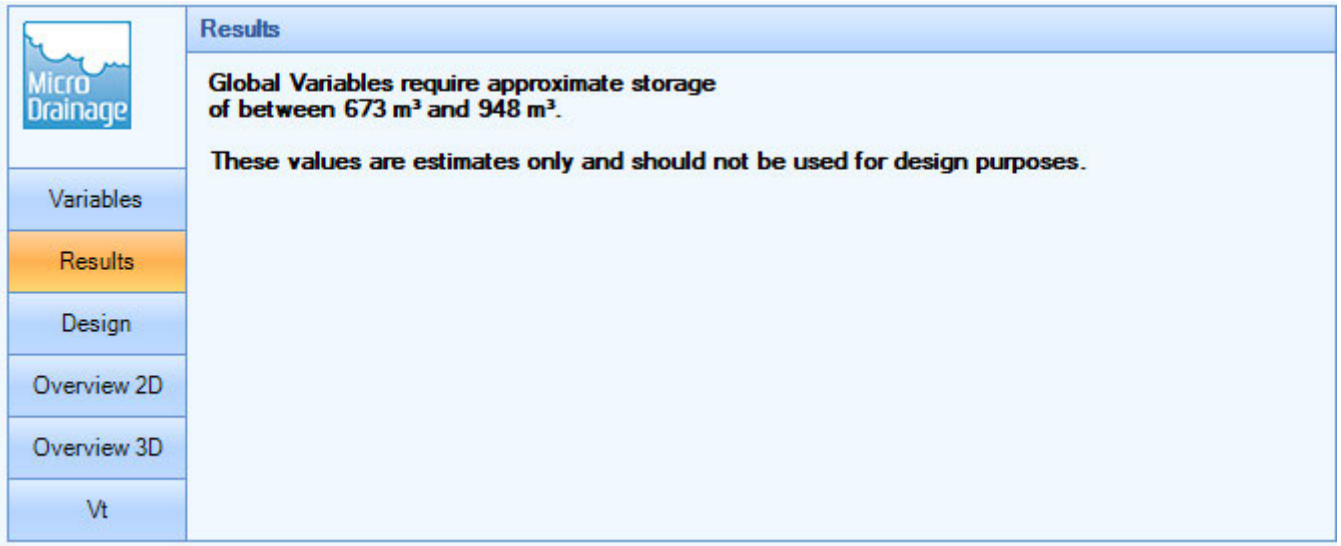
The proposed site impermeable area (both roofs and externals) for Area A totals 2.154Ha.

Based on the maximum restricted discharge of 7.9l/s the following estimated attenuation volumes have been calculated.

M5-60 = 19.000mm

R = 0.393

STORAGE VOLUME FOR A 1IN 30 YEAR STORM EVENT (YSE) + NO CLIMATE CHANGE

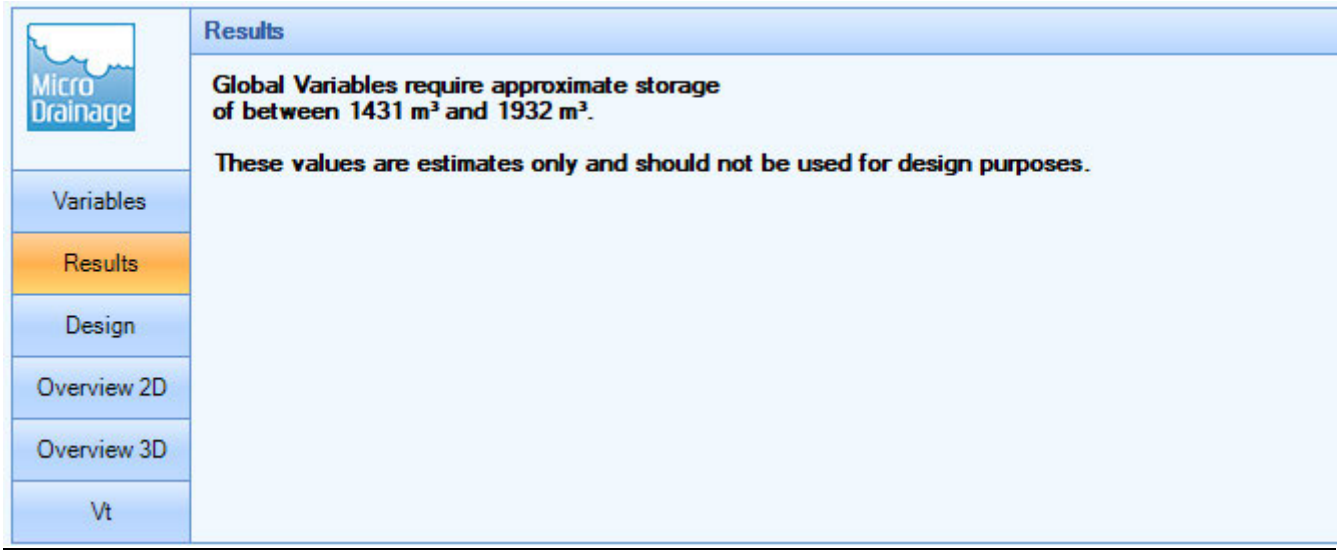


For a 1 in 30 YSE+CC maximum storage volume would be **948.0m3**.

Calculation sheet

Job No	5568	Sheet No	2	
Project	HAY GREEN LANE, BIRDWELL	By - JDM	Date	30/04/2020
Element	Preliminary SW Attenuation Calculations Area A		Checked - JDM	

STORAGE VOLUME FOR A 1IN 100 YEAR STORM EVENT (YSE) + 40% CLIMATE CHANGE



For a 1 in 100 YSE+CC maximum storage volume would be **1932.0m3**.

No surface water run off generated for up to a 1 in 100 YSE + CC should be allowed to run off overland on to third party land and thus shall be retained on the site.

Hence the maximum volume of attenuation required for up to a 1 in 100 YSE + CC should not exceed 1932.0m3.

Investigation should be carried out into and existing on plot drainage system where this exists to establish connectivity off the site.

We would recommend that a CCTV drainage connectivity survey is carried out as necessary.

It is unlikely that the site is suitable for Infiltration drainage methods due to the underlying ground conditions. However, infiltration testing should be carried out to confirm this.

Appendix I Foul Water Drainage Calculations

Project:	LAND OFF, HAY GREEN LANE, BIRDWELL			
Date:	Apr-20	Job No.	Sheet No.	Rev
By:	JDM	5568	1	B
Checked:				
Title:	PRELIMINARY FW DRAINAGE CALCULATIONS			

JPG
CIVIL & STRUCTURAL ENGINEERING

Residential Developments

Based on SFA rate of 4000.0 Litres/dwelling/day

Use	L/Day	No.	Total (L/day)
General Housing	4000 per dwelling	118.0	472000.00

Design Flow = Total/86400 Second = **5.463** **l/s (6DWF+10%)**
0.819 **l/s (1xDWF)**

Commercial/Industrial Developments

Based on SFA allow 0.6 litres/second/hectare of developable land for domestic flow

Domestic Flow	Area (ha)	Flow l/s
Commercial	0.000	0.000

Based on SFA allow 0.5 litres/second/hectare of developable land for trade effluent normal process and 1.0 litres/second/hectare of developable land for wet process

Trade Effluent	Area (ha)	Flow l/s
Normal	0.000	0.000
Wet	0.000	0.000

Total flow domestic + trade effluent = **0.000** **l/s**

Based on SFA allow 0.7 litres/second/hectare of developable land where proportion of wet industry is not known

Domestic +Trade	Area (ha)	Flow l/s
Commercial	0.000	0.000

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