

FLOOD RISK ASSESSMENT
SMITHY WOOD LANE, DODWORTH
FOR
AVANT HOMES



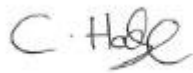
45944-001

12th April 2021

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SMITHY WOOD LANE, DODWORTH
FOR
AVANT HOMES

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EXECUTIVE SUMMARY

The project comprises the proposed development of two parcels of greenfield land for residential use with a total area of 5.88-hectares.

The Environment Agency's Flood Map for Planning shows the site to lie within Zone 1. The site is not at significant risk of flooding from any source. In accordance with current Planning Practice Guidance 'Flood Risk and Coastal Change', sequential testing is not required.

The site has surface water flow routes with a north-west to south-east orientation, represented as low to medium risk of surface water flooding. The south-eastern portion of the site is at medium to high risk of surface water ponding corresponding with the low point on site.

The ground levels on the site will be altered to raise depressions. This will remove surface water ponding and will lower the modelled flood depth.

Surface water flow paths will be routed appropriately to the proposed surface water discharge point.

A suitable easement from the public surface water sewer crossing the eastern parcel will be provided or a diversion under S185 agreement will be required and early discussions with the sewerage regulator are recommended.

Surface water disposal is considered in accordance with the drainage hierarchy in Building Regulations Part H 2010 and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 80.

Infiltration type SuDS, such as soakaways, will not be viable on the site due to the presence of impermeable ground.

Surface water will discharge via gravity to the culvert on the south-eastern boundary of the eastern land parcel. Surface water discharge will be attenuated to the 1 in 1 year greenfield rate for the combined drainage area of both land parcels as agreed by the LLFA. This is equal to 23.4 l/s.

Attenuation storage for rainfall events will be provided for up to the 1 in 100 year plus climate change event. The total estimated storage volume is 2,300 m³ subject to detailed design.

Foul effluent will discharge via a pumped system to the 225 mm public foul sewer in Calver Close.

The drainage systems will be offered for adoption by Yorkshire Water.

1.0 THE DEVELOPMENT AND NATIONAL PLANNING POLICY

1.1 Introduction

This Flood Risk Assessment has been prepared in accordance with current National Planning Policy Framework¹ and Planning Practice Guidance 'Flood Risk and Coastal Change'² on the instruction of Avant Homes. Any other parties using the information in this report do so at their own risk, unless previously approved in writing.

The project comprises the proposed development of two parcels of greenfield land for residential use with a total area of 5.88-hectares.

1.2 Site location and description

The site is located within Dodworth, to the south-west of Barnsley, and is centred on coordinates 432284, 404392 (Appendix 1).

The eastern parcel of land is bounded by Calver Close and residential buildings to the west, residential buildings to the north-east, and a playing field to the north-west. The Trans Pennine Trail is located along the south-eastern boundary and Smithy Wood Lane runs along the south-western boundary with open farmland beyond.

The western parcel of land is bounded by residential dwellings to the west, Smithy Wood Lane to the north-east and open farmland to the south.

Both land parcels are currently occupied by open farmland bordered by mature trees and hedgerows.

The eastern parcel of land falls from the northern and north-western boundaries to a low spot on the south-eastern boundary. The fall from the north is from approximately 98.0 mAOD to 88.0 mAOD over a distance of 155 m at an average gradient of 1 in 15. The fall from the north-west is from 101.0 mAOD to 88.00 mAOD over 205 m at an average gradient of 1 in 16. The western parcel of land falls from the western boundary to the south-east corner from approximately 115.0 mAOD to 102.0 mAOD at an average gradient of 1 in 12 (Appendix 2).

Proposals are for approximately 170 houses with access from Smithy Wood Lane and Calver Close (Appendix 3).

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

² <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

1.3 Environment Agency - Flood Map for Planning

The Environment Agency's Flood Map for Planning (Appendix 4) shows that both parcels of land lie within Zone 1 (low risk); land having a less than 1 in 1,000 annual probability of river flooding.

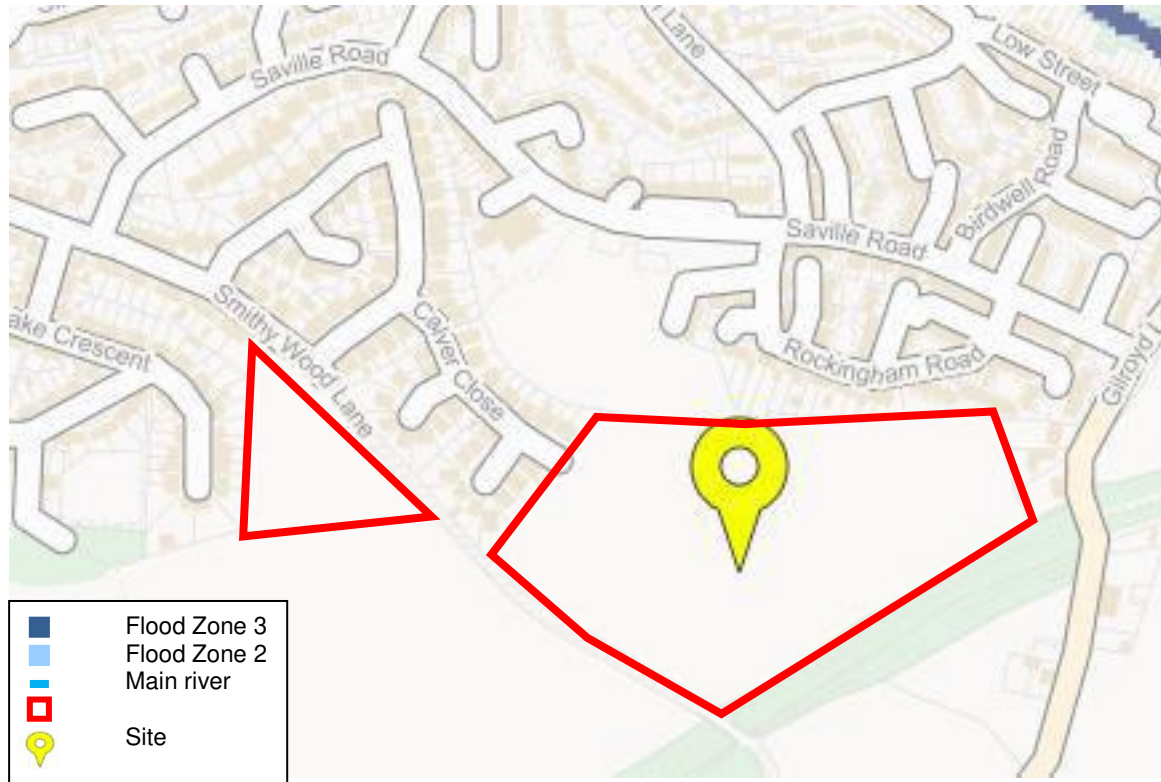


Figure 1: Environment Agency: Flood Map for planning

1.4 Barnsley Metropolitan Borough Council Strategic Flood Risk Assessment

Barnsley Metropolitan Borough Council's Strategic Flood Risk Assessment flood maps are based on the Environment Agency's Flood Map for Planning and show the site is in Flood Zone 1 (Appendix 5).

1.5 National Planning Policy Framework

The National Planning Policy Framework (February 2019) sets out the principles for assessing the suitability of sites for development, in relation to flood risk, as part of the planning process.

1.5.1 Sequential Test

Initially a Sequential Test is applied to the allocation of land suitable for development. The test is required for any development proposed in Flood Zone 2 or 3 (and occasionally also in Flood Zone 1 where there are flood risks present which are not identified on the Environment Agency's Flood Maps for Planning).

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites, appropriate for the proposed development, in areas with a lower probability of flooding.

The site lies within Zone 1 and this report confirms that the site is not at significant risk of potential flooding from any source. Both land parcels are separately designated as land allocated for housing in Barnsley Metropolitan Borough Council's 2019 Local Plan³ (western parcel: HS15; eastern parcel: HS9). The sequential test is not required for sites in Flood Zone 1 where other significant flood risks do not exist. As the sites are designated in the Local Plan for development it is assumed that if sequential testing was required it would already have been undertaken.

1.5.2 Climate change

An issue emphasised in the Planning Policy Guidance is the requirement to take account of potential climate change effects. New development is generally accepted as having a 100 year design life for flood risk purposes. The Environment Agency's report 'Flood risk assessments: climate change allowances'⁴, published in February 2016, recommends a 20 to 40% increase in peak rainfall intensity is taken into account for small and urban catchments for design horizons up to 2115. For the purposes of this Flood Risk Assessment, a 30% increase in peak rainfall intensity has been used for assessing storage requirements; 30% being an average between the 'central' and 'upper end' of the data range given in the report.

³ <https://www.barnsley.gov.uk/services/planning-and-buildings/local-planning-and-development/our-local-plan/barnsleys-local-plan/>

⁴ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-2>

2.0 FLOOD RISK

2.1 Potential sources of flooding

The Environment Agency and Strategic Flood Risk Assessment maps are intended for general guidance on flood risk and it is also necessary to consider other, more detailed, sources in relation to local factors.

2.1.1 Fluvial

The nearest watercourse is an unnamed ordinary watercourse located approximately 300 m south-west of the western parcel of land. This watercourse is then culverted under the Trans Pennine Trail and discharges to House Carr Dike approximately 160 m further south. There are additional ordinary watercourses located 310 m north-east of the eastern parcel of land (Dodworth Dike) and 330 m north-west of the western parcel of land. There are no main rivers within the local vicinity of the site. Flood risk from this source is assessed as negligible (Appendix 4).

2.1.2 Surface water

The Environment Agency surface water flood risk map (Appendix 4) shows the western parcel of land is at very low risk of surface water flooding. Very low risk corresponds to the unshaded areas of the map.

The majority of the eastern parcel of land is also at a very low risk of surface water flooding. Two surface water flow routes with a north-west to south-east orientation are identified as a low to medium risk. These flow routes lead to an area at high risk of surface water ponding on the south-eastern boundary of the site, corresponding with the lowest point on site.

Very low risk refers to land having less than a 1 in 1,000 annual exceedance probability of flooding (0.1% AEP). Low risk refers to land having between a 1 in 1,000 and 1 in 100 annual exceedance probability of flooding (0.1% - 1% AEP). Medium risk refers to land having between 1 in 100 and 1 in 30 annual exceedance probability of flooding (1% - 3.33% AEP). High risk refers to land having a greater than 1 in 30 annual exceedance probability of flooding (>3.33% AEP).

The majority of surface water flooding is at risk of flood depths less than 300 mm. The surface water ponding on the south-eastern boundary is at risk of flood depths between 300 mm and 900mm, with the central area at risk of over 900 mm.

Barnsley Metropolitan Borough Council's SFRA surface water flood map (Appendix 5) shows a very small area at risk of surface water flooding on the south-eastern boundary of the eastern land parcel associated with the low spot. This shows flood depths could reach up to 1 – 1.15 m.

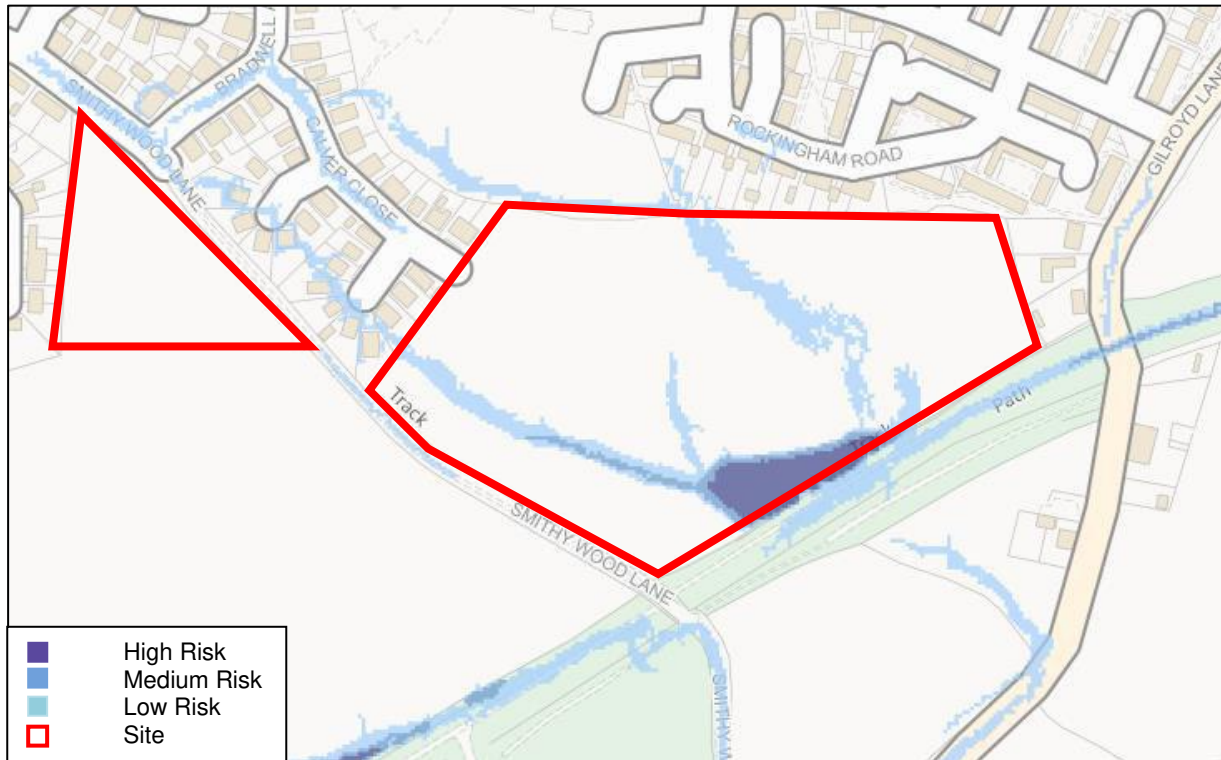


Figure 2: Environment Agency – Risk of surface water flooding map

2.1.3 Groundwater

Groundwater is a potential flood risk to areas which are low lying and on permeable ground or, occasionally, to areas of higher ground in the vicinity of springs. There are no online records of groundwater flooding at the site.

2.1.4 Sewerage

The surrounding public sewer network is owned and maintained by Yorkshire Water. There are no online records of sewer flooding at the site.

2.2 Historic Flooding

The DEFRA historical online flood map records the site to be outside the historical flood outline (Appendix 6).

2.3 Residual flood risk

The eastern land parcel has surface water flow routes with a north-west to south-east orientation with a low to medium risk of surface water flooding.

The south-eastern portion of the eastern land parcel is at medium to high risk of surface water ponding corresponding with the low point on site.

These risks are not a development constraint and will be managed on the site within the surface water drainage strategy and by the mitigation measures in Section 2.4.

2.4 Flood Mitigation Measures

The ground levels on the site will be altered to raise depressions. This will remove surface water ponding and will lower the modelled flood depth.

Surface water flow paths will be routed appropriately to the proposed surface water discharge point where SuDS will be provided. This will mitigate the surface water ponding.

3.0 DRAINAGE STRATEGY

3.1 Existing drainage

Yorkshire Water sewer maps (Appendix 6) record a 300 mm public surface water sewer crossing the eastern parcel of land from the north-western boundary to the low spot on the south-eastern boundary where the Yorkshire Water records show the asset terminating. A suitable easement will be required. There is also a 150 mm diameter public combined sewer to the west of the western parcel of land in residential gardens and a 225 mm public foul sewer located in Calver Close.

A drainage survey has been conducted by JetAire which confirmed that the public surface water sewer in the lower part of the eastern parcel of land is 600 mm in diameter rather than 300 mm. Yorkshire Water have been informed. The findings of the drainage survey are detailed in an email to Barnsley Metropolitan Borough Council included in Appendix 5. It was discovered that where the Yorkshire Water sewer map shows the surface water sewer terminates at the low spot on the south-eastern boundary of the eastern land parcel, an existing chamber is located with an open grated grill which accepts surface runoff from the upstream catchment. From the grill chamber it was proven that water passes underneath the Trans-Pennine trail via a brick culvert to a brick chamber and onwards to the south-east via a large diameter concrete pipe generally in the direction of Gilroyd Lane towards House Carr Dike / Dodworth Dike.

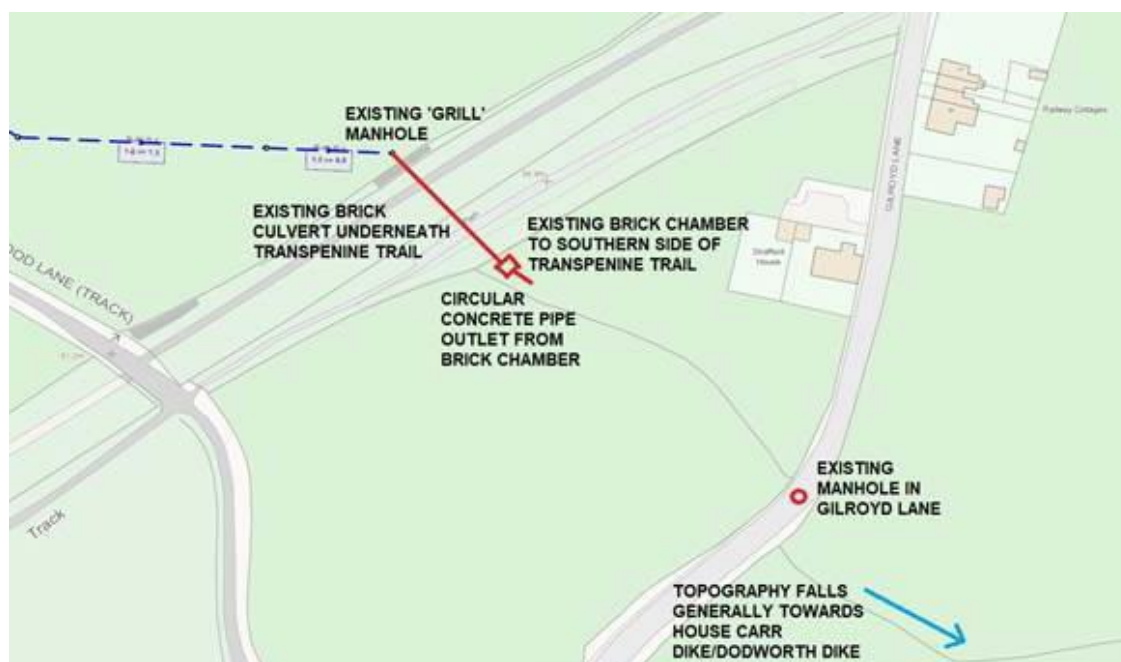


Figure 3: Existing surface water drainage schematic

3.2 Yorkshire Water consultation

Email correspondence received from Yorkshire Water (Appendix 7) on 24th March 2021 highlights the following points:

- Surface water discharge should follow the surface water disposal hierarchy, and should look to drain either to soakaway or watercourse in the first instance.
- A maximum surface water discharge rate of 16.5 l/s would be accepted to the Yorkshire Water surface water sewer within the site boundary.

3.3 Barnsley Metropolitan Borough Council consultation (LLFA)

Email correspondence received from Barnsley Metropolitan Borough Council (Appendix 5) on 1st April 2021 states the following points:

- The 1-year baseline discharge rate of 23.41 l/s is acceptable for this site.
- The LLFA do not currently allow for variable discharge rates.

3.4 Ground conditions

The British Geological Survey maps show that the western parcel of land overlies Pennine Middle Coal Measures Formation – Sandstone. The eastern parcel of land overlies Haigh Moor Rock – Sandstone.

A borehole log (SE30SW5) located 30 m east of the site records asphalt overlying sandstone and clay. Another borehole log (SE30SW114) located 150 m south of the site records gravel overlying coal and ironstone.

A site investigation was conducted by LITHOS in June 2020 (ref: 1979/2), recording topsoil overlying mudstone, siltstone and sandstone across the site. Ground water was encountered as seepages in 3 of the 25 trial pits at depths between 1 m and 2.9 m.

3.5 Greenfield Calculations

Greenfield runoff is calculated using the IH 124 methodology as requested by Barnsley Metropolitan Borough Council as the Lead Local Flood Authority (Appendix 8). Table 1 below summarises the flow rates for varying return periods. These figures relate to the drained area of the western and eastern parcels of land (measured as 1.1 ha and 4.52 ha respectively).

Greenfield runoff					
Catchment		Return period			
		1 in 1 yr	1 in 2 yr	1 in 30 yr	1 in 100 yr
Don and Rother	Western parcel of land (4.52 ha)	18.83 l/s	21.89 l/s	38.32 l/s	45.54 l/s
	Eastern parcel of land (1.1 ha)	4.58 l/s	5.33 l/s	9.32 l/s	11.08 l/s
	Total site (5.62 ha)	23.41 l/s	27.22 l/s	47.64 l/s	56.62 l/s

Table 1: Greenfield runoff rates

3.6 Drainage hierarchy

Surface water disposal should be in accordance with the drainage hierarchy in Building Regulations Part H 2010⁵ and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 80 reference ID 7-080-20150323. Disposal via SuDS methods should be considered as the first option. Disposal to the public sewer should be considered only when SuDS methods and disposal to the watercourse are shown to be unsuitable.

3.6.1 Sustainable Drainage Systems (SuDS)

SuDS methods include water infiltration systems such as soakaways, basins and filter strips, together with swales, pervious pavements, detention basins, ponds and other wetland solutions. The various methods are considered in detail in The SuDS Manual (CIRIA C753).

Infiltration type SuDS such as soakaways are not viable due to the presence of impermeable mudstone ground conditions.

Other SuDS methods may be applicable and their use is summarised in the appended SuDS checklist (Appendix 8).

⁵ <https://www.gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h>

3.6.2 Watercourse

The nearest watercourse is an ordinary watercourse located approximately 300 m south-west of the western parcel of land. This is separated by third party land. Disposal to this watercourse is therefore discounted.

There is a culvert which runs under the Trans-Pennine Trail from the point at which the public surface water sewer is shown to terminate on the Yorkshire Water sewer map. This is under the authority of Barnsley Metropolitan Borough Council as the Lead Local Flood Authority and permission has been granted to discharge surface water to this point.

3.6.3 Public sewer

There is a 300 / 600 mm public surface water sewer crossing the western portion of the eastern parcel of land. It is proposed to connect to the culvert downstream of the sewer.

3.7 Proposals for surface water disposal

The final disposal strategy for surface water run-off requires detailed consideration and approval during the design phase of the project. The final design will need the approval of the relevant statutory bodies but will broadly follow these principles:

- Surface water disposal will be via gravity to the culvert on the south-eastern boundary of the eastern land parcel.
- Surface water discharge will be attenuated to the 1 in 1 year greenfield rate for the combined drainage area of both land parcels. This is equal to 23.4 l/s and has been agreed with the LLFA (Appendix 5).
- Attenuation storage for rainfall events will be provided for up to the 1 in 100 year plus climate change event. The total estimated storage volume is 2,300 m³ subject to detailed design. Attenuation calculations are provided in Appendix 8.
- The surface water drainage system will be offered for adoption to Yorkshire Water.

3.8 Proposals for foul disposal

Foul effluent will discharge via a pumped system to the 225 mm public foul sewer in Calver Close. The foul drainage system will be offered for adoption to Yorkshire Water.

3.9 Residual flood risk

There is a potential flood risk to site occupiers and to others from surface water runoff as a result of developing the site. The residual risk can be managed by the general flood mitigation measures outlined below.

3.10 Mitigation measures

A suitable easement from the 300 / 600 mm public surface water sewer crossing the eastern parcel is to be included in the proposed layout or a diversion under S185 agreement will be required and early discussions with the sewerage regulator are recommended.

The proposed surface water drainage system is designed to current best practice and to the standards laid out in the publication 'Design and Construction Guidance for foul and surface water sewers' and Building Regulations Part H 2010.

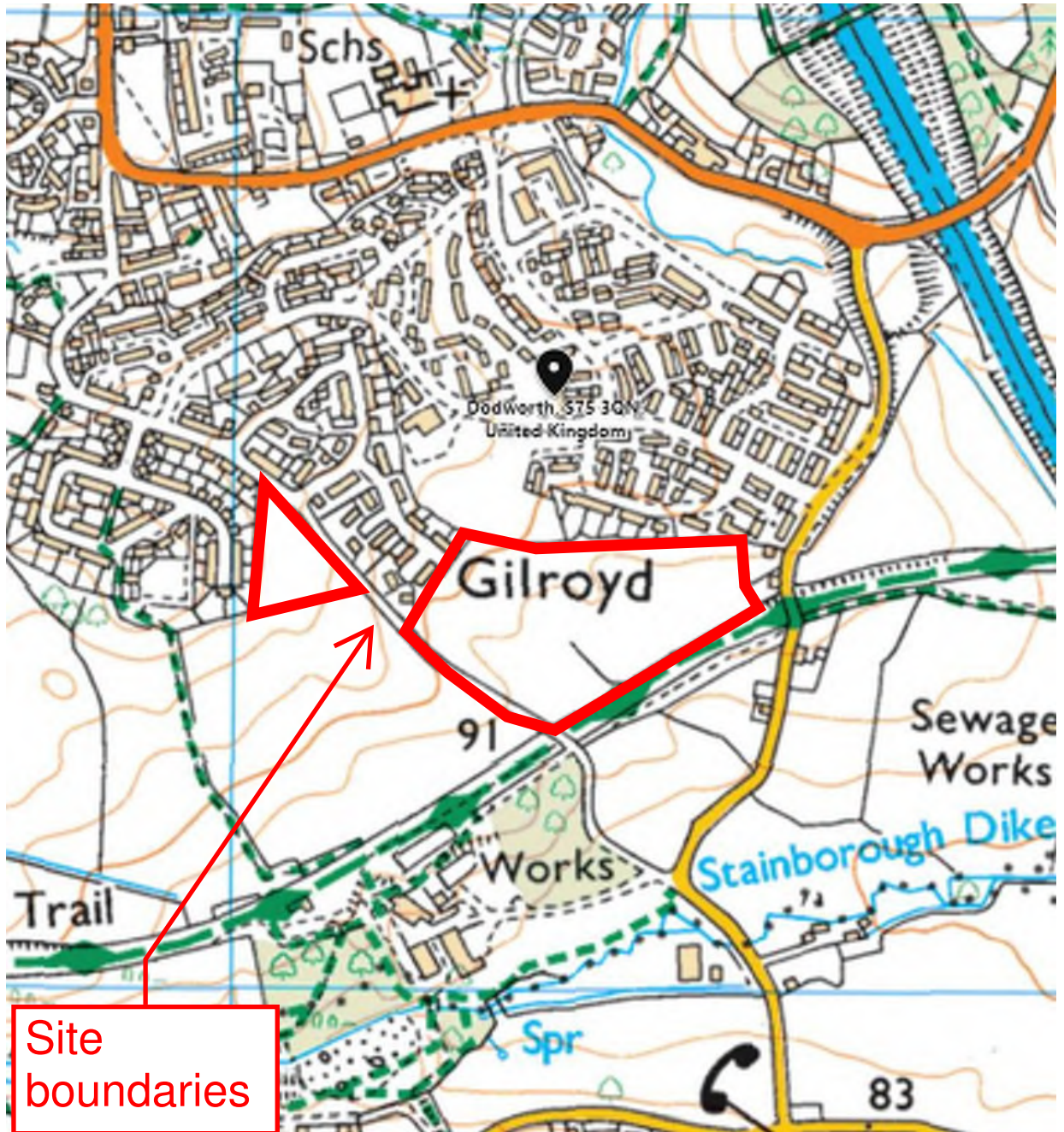
In the event of surface water exceedance during extreme rainfall events the site is laid out so that surface water runoff is directed away from houses, including those on neighbouring streets.

4.0 CONCLUSIONS

1. The site is within Flood Zone 1 and is not at significant risk of fluvial flooding.
2. The site has surface water flow routes with a north-west to south-east orientation, represented as low to medium risk of surface water flooding. The south-eastern portion of the site is at medium to high risk of surface water ponding corresponding with the low point on site.
3. The ground levels on the site will be altered to raise depressions. This will remove surface water ponding and will lower the modelled flood depth.
4. Surface water flow paths will be routed appropriately to the proposed surface water discharge point.
5. A suitable easement from the public surface water sewer crossing the eastern parcel is to be provided or a diversion under S185 agreement will be required and early discussions with the sewerage regulator are recommended.
6. Surface water disposal will be via gravity to the public surface water sewer located in the western boundary of the eastern parcel of land. A new connection will be required.
7. Surface water discharge will be attenuated to 23.4 l/s.
8. Attenuation storage for rainfall events will be provided for up to the 1 in 100 year plus climate change event. The total estimated storage volume is 2,300 m³ subject to detailed design.
9. Foul effluent will discharge via a pumped system to the 225 mm public foul sewer in Calver Close.
10. The surface water and foul drainage systems will be offered for adoption to Yorkshire Water.
11. The level of risk and safeguards available are considered appropriate to this class of development.

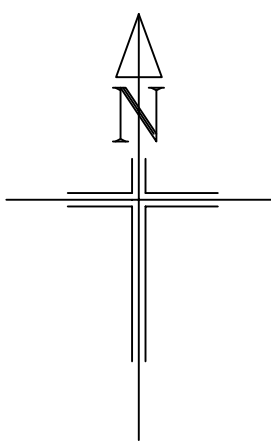
APPENDICES

APPENDIX 1



APPENDIX 2

NOTES
ALL COORDINATES AND LEVEL DATA RELATE TO OSG83(15) BY MEANS OF RECEIVING
REAL TIME CORRECTIONS VIA OS SMARTNET



Station	Easting	Northing	Level
STN1	432231.430	404437.466	101.447
STN2	432193.360	404456.743	104.613
STN3	432184.750	404481.574	107.152
STN4	432156.644	404497.374	107.787
STN5	432155.150	404522.466	108.593

KEY

LEVELS	POSTS
OBM Ordinance Bench Mark	CPO Concrete Post
CL Cover Level	HYD Fire Hydrant Marker
FRL Finished Floor Level	FPO Fence Post
FL Flat Roof Level	GM Gas Marker Post
IL Invert Level	GPO Gate Post
SSL Structural Slab Level	LPO Lockable Post
WL Water Level	MK Marker Post
	MPO Metal Post
	RP Reflector Post
	TPO Timber Post

BUILDINGS - HEIGHTS ABOVE FLOOR	STREET FURNITURE
C Ceiling	BS Bollards Beacon
DH Door Head	BO Bollard
FC False Ceiling	BS Bus Stop
WC Window Cill	DK Drip Kerb
WH Window Head	EC Electric Cupboard

INSPECTION CHAMBERS	STREET FURNITURE
AC Access Cover	EP Electric Pole
CA Cellar Access	FB Flower Border
CATV Cable Television	FL Flood Light
EIC Electric Inspection Chamber	FP Flag Pole
HYD Fire Hydrant	LB Light Bollard
FMH Foul Water Inspection Chamber	LBO Letter Box
IC Inspection Cover	LP Lamp Post
IGC Gas Inspection Chamber	NP Name Plate
GV Gas Valve	PM Parking Meter
G Gully	RS Road Sign
IC Inspection Chamber	SI Sign
JB Junction Box	STN Survey Station
KI Kerb Inlet	TL Traffic Light
RE Roofing Eye	TCB Traffic Light Control Box
SV Stop Valve	TP Telephone Pole
SWCP Surface Water Catch Pit	
SWMH Surface Water Inspection Chamber	
BT Telephone Inspection Chamber	
U Unidentified	
UTL Unable to lift	
WIC Water Inspection Chamber	
WM Water Meter	
WSV Water Stop Valve	

PIPES	FENCES
GP Gas Pipe	BW Barbed Wire
RWP Rain Water Pipe	CB Close Board
SVP Sewer Vent Pipe	CL Chain Link
VP Vent Pipe	CIP Chestnut Paving
PVP Perforated Vent Pipes	COW Conc. Post & Wire
	SIP Steel palisade
	IR Iron Railings
	PR Post and Rail
	RTW Retaining Wall

LEGEND

SPOT LEVEL	SPOT LEVEL
SURVEY STATION	SURVEY STATION
WATER FEATURE...DITCH ETC	WATER FEATURE...DITCH ETC
SAPLING	SAPLING
BUSHES/SHRUB	BUSHES/SHRUB
HEDGE/AREA OF UNDERGROWTH	HEDGE/AREA OF UNDERGROWTH
TREE (SPREAD TO SCALE)	TREE (SPREAD TO SCALE)
BUILDING	BUILDING
CONTOUR	CONTOUR
BOREHOLE/TEST HOLE	BOREHOLE/TEST HOLE
TRIAL PIT	TRIAL PIT
RETAINING WALL	RETAINING WALL
BUILDING WALLS	BUILDING WALLS
GATE	GATE
STILE	STILE
KERB LINE	KERB LINE
BANKING	BANKING
ROCKFACE	ROCKFACE
OSBM VALUE	ORDNANCE SURVEY BENCH MARK
TBM VALUE	TEMPORARY BENCH MARK/SITE DATUM

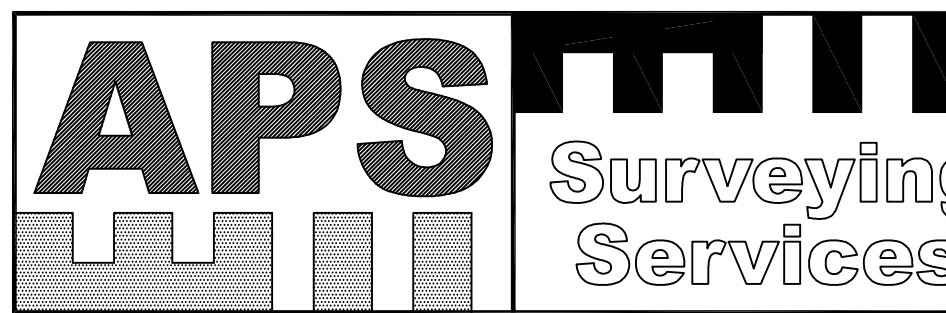
REVISIONS

CLIENT	AVANT HOMES
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SITE	LAND OFF. CALVER CLOSE, DODDORTH
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DRAWING	TOPOGRAPHICAL SURVEY
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DRAWING NUMBER AV21-11	SURVEYED BY CP	DATE APR 2021
SHEET 1 OF 2	DRAWN BY CP	SCALE 1:500@A0
REVISION No.		



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404550N
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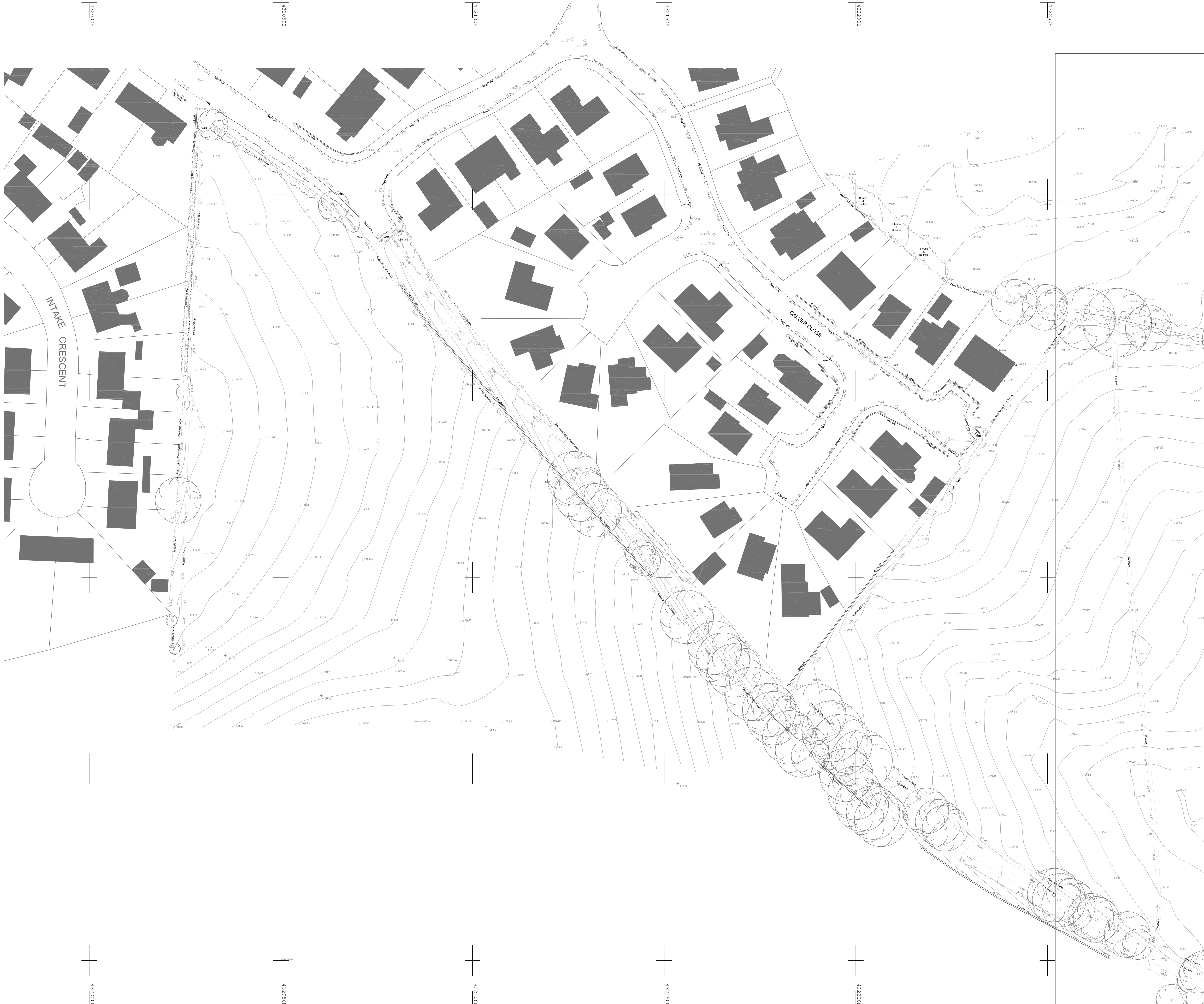
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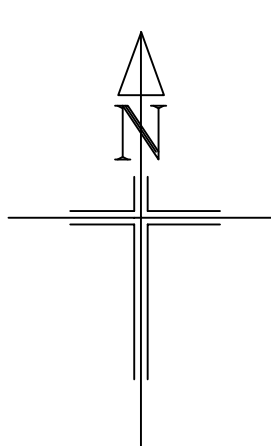
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NOTES
ALL COORDINATES AND LEVEL DATA RELATE TO OSG630(15) BY MEANS OF RECEIVING
REAL TIME CORRECTIONS VIA GNS SMARTNET



Station	Easting	Northing	Level
STN1	432231.430	404437.466	101.447
STN2	432193.360	404456.741	104.613
STN3	432164.750	404481.525	107.152
STN4	432156.644	404497.374	107.787
STN5	432155.150	404522.466	108.593

KEY

LEVELS

- OBM Ordnance Bench Mark
- CL Cover Level
- FFL Finished Floor Level
- FRL Flat Roof Level
- IL Invert Level
- SSL Structural Slab Level
- WL Water Level

BUILDINGS - HEIGHTS ABOVE FLOOR

- C Ceiling
- CH Door Head
- FC False Ceiling
- WC Window Cill
- WH Window Head

INSPECTION CHAMBERS

- AC Access Cover
- CA Callier Access
- CATV Cable Television
- EIC Electric Inspection Chamber
- HYD Fire Hydrant
- FMH Foul Water Inspection Chamber
- IC Inspection Cover
- GC Gas Inspection Chamber
- GV Gas Valve
- G Gully
- IC Inspection Chamber
- JB Junction Box
- KI Kerb Inlet
- RE Roadside Eye
- SV Stop Valve
- SWCP Surface Water Catch Pit
- SWMH Surface Water Inspection Chamber
- BT Telephone Inspection Chamber
- UJ Undersight
- UTL Unable to lift
- WIC Water Inspection Chamber
- WM Water Meter
- WSV Water Stop Valve

POSTS

- CPO Concrete Post
- HYD Fire Hydrant Marker
- FFO Fence Post
- GM Gas Marker Post
- GPO Gas Post
- LPO Lookable Post
- MK Marker Post
- MPO Metal Post
- RP Reflector Post
- TPO Timber Post

STREET FURNITURE

- BB Bellis Season
- BO Bollard
- BS Bus Stop
- DK Drop Kerb
- EC Electric Cupboard
- EP Electric Pole
- FB Flower Border
- FL Flood Light
- FP Flag Pole
- LB Light Bollard
| LBO | Letter Box |
| LP | Lamp Post |
| NP | Name Plate |
| PM | Parking Meter |
| RS | Road Sign |
| SI | Sign |
| STN | Survey Station |
| TL | Traffic Light |
| TCB | Traffic Light Control Box |
| TP | Telephone Pole |

FENCES

- B/W Barber Wire
- CB Close Board
- CL Chain Link
- CP Chestnut Paling
- C/W Conc. Post & Wire
- S/P Steel palisade
- IR Iron Railings
- PR Post and Rail
- RTW Retaining Wall

PIPES

- GP Gas Pipe
- RWP Rain Water Pipe
- SVP Sewer Vent Pipe
- VP Vent Pipe
- PVP Percol Vent Pipes

LEGEND

- SPOT LEVEL
- SURVEY STATION
- WATER FEATURE, DITCH ETC
- SAPLING
- BUSHES/SHRUB
- HEDGE/AREA OF UNDERGROWTH
- TREE (SPREAD TO SCALE)
- BUILDING
- CONTOUR
- BOREHOLE/TEST HOLE
- TRIAL PIT
- RETAINING WALL
- BUILDING WALLS
- GATE
- STILE
- KERB LINE
- BANKING
- ROCKFACE
- OSBM VALUE
- ORDNANCE SURVEY BENCH MARK
- TBM VALUE
- TEMPORARY BENCH MARK/SITE DATUM

REVISIONS

NO.	DESCRIPTION
-----	-------------

CLIENT

AVANT HOMES

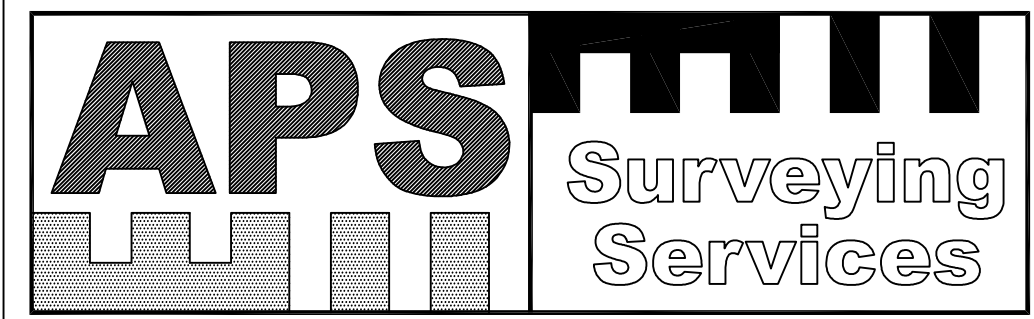
SITE

LAND OFF, CALVER CLOSE, DODWORTH

DRAWING

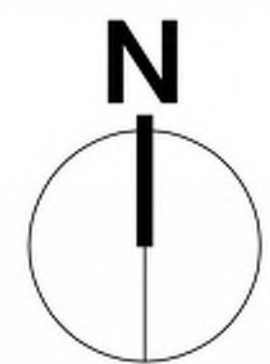
TOPOGRAPHICAL SURVEY

DRAWING NUMBER AV21-11	SURVEYED BY CP	DATE APR 2021
SHEET 2 OF 2	DRAWN BY CP	SCALE 1:500@A0
REVISION No.		



Land Surveying & Site Engineering
The Office, 7 Thurnscoe Road
Bolton Upon Dearne
Rotherham, S63 8JW
Tel/Fax (01709) 894322 / 891433
Mobile (07785) 352291
E-mail info@apssurveying.co.uk

APPENDIX 3



- Redline boundary (5.88ha)
- Affordable housing
- Indicative SuDS

PLANNING | DESIGN | ENVIRONMENT | ECONOMICS | HERITAGE

Floor 3
Gainsborough House
Grey Street
Newcastle upon Tyne
NE1 6AE

0191 917 6700
www.pegasusgroup.co.uk



Client	Vistry Group / Linden Homes (YORKS)	Date	Oct 2020
Project	Smithywood Lane, Dodworth	Scale	1:500 @ A0
Title	Testing Layout	Drawn	RNM Auth JS
-	Draft		
Job No.	Draw. No.	Revision	
P20-2554	100	-	

Do not scale from this drawing. Work to figured dimensions. Any discrepancy is to be reported to the issuing office. Refer to larger scale drawings where available. Pegasus Group

APPENDIX 4

Flood map for planning

Your reference
Dodworth west

Location (easting/northing)
432098/404434

Created
7 Apr 2021 10:49

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

This means:

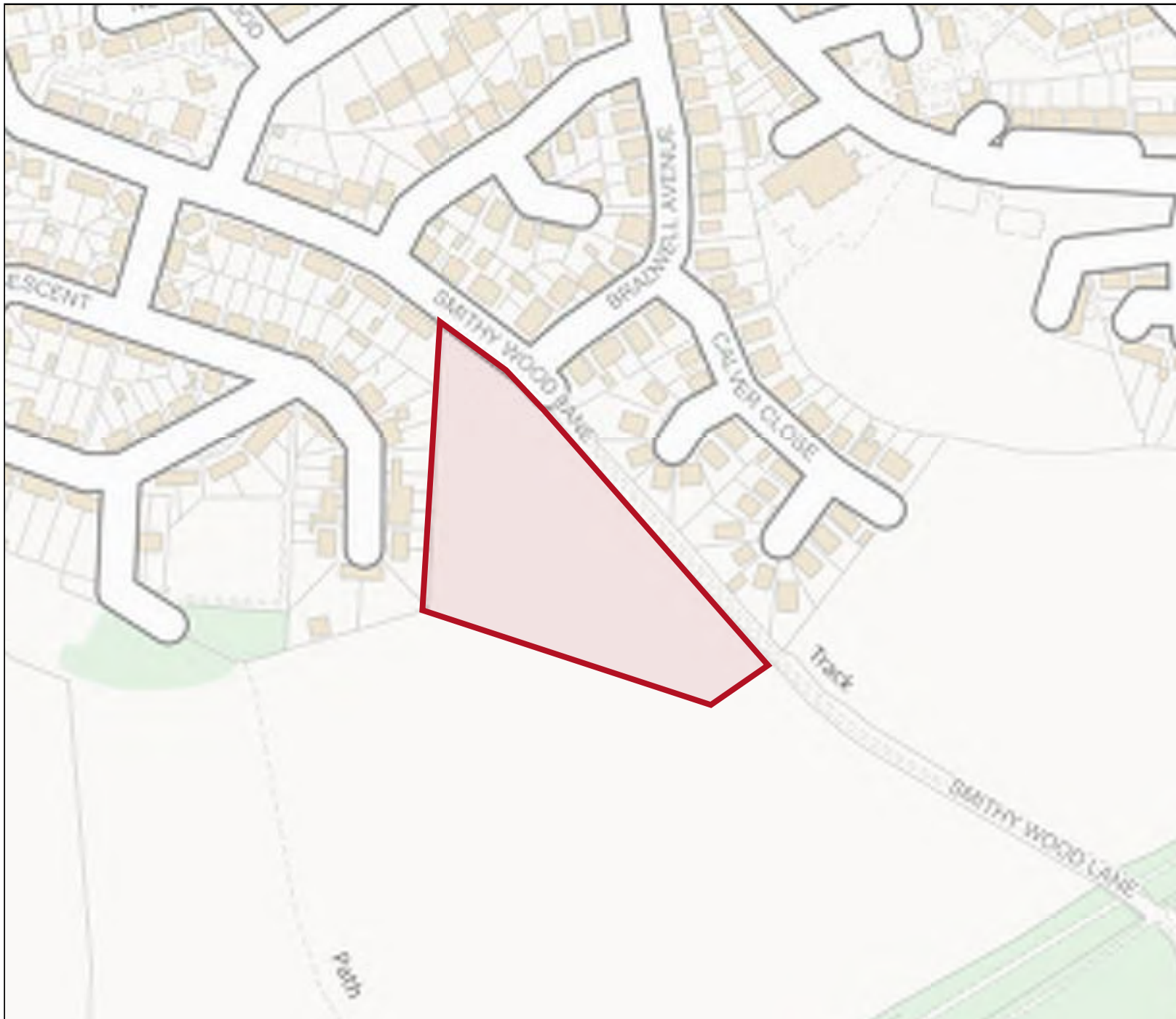
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage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

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Flood map for planning

Your reference
Dodworth west

Location (easting/northing)
432098/404434

Scale
1:2500

Created
7 Apr 2021 10:49

-  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 20 40 60m

Flood map for planning

Your reference
Dodworth east

Location (easting/northing)
432362/404370

Created
7 Apr 2021 10:53

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

This means:

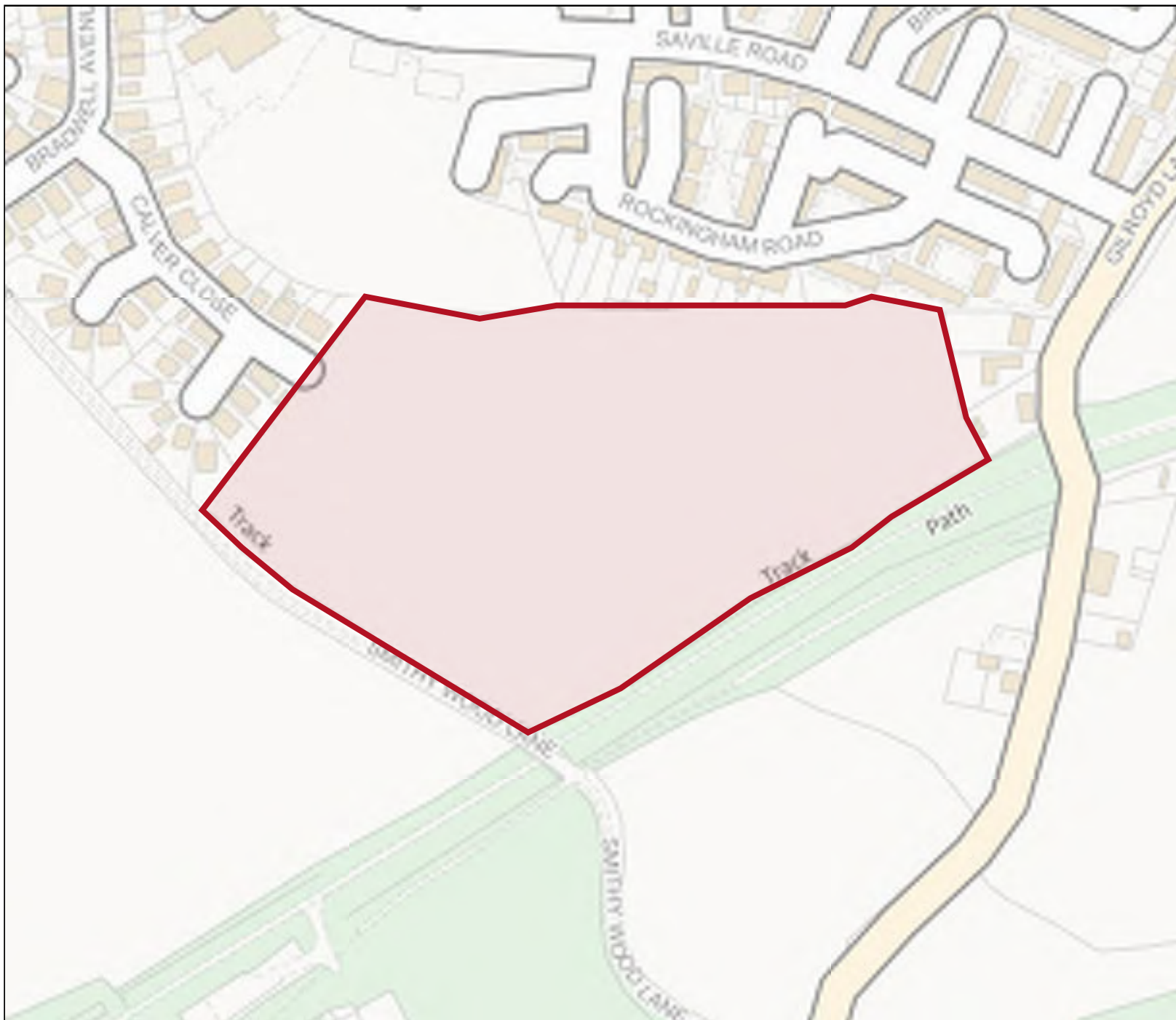
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage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

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<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Flood map for planning

Your reference
Dodworth east

Location (easting/northing)
432362/404370

Scale
1:2500

Created
7 Apr 2021 10:53

-  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

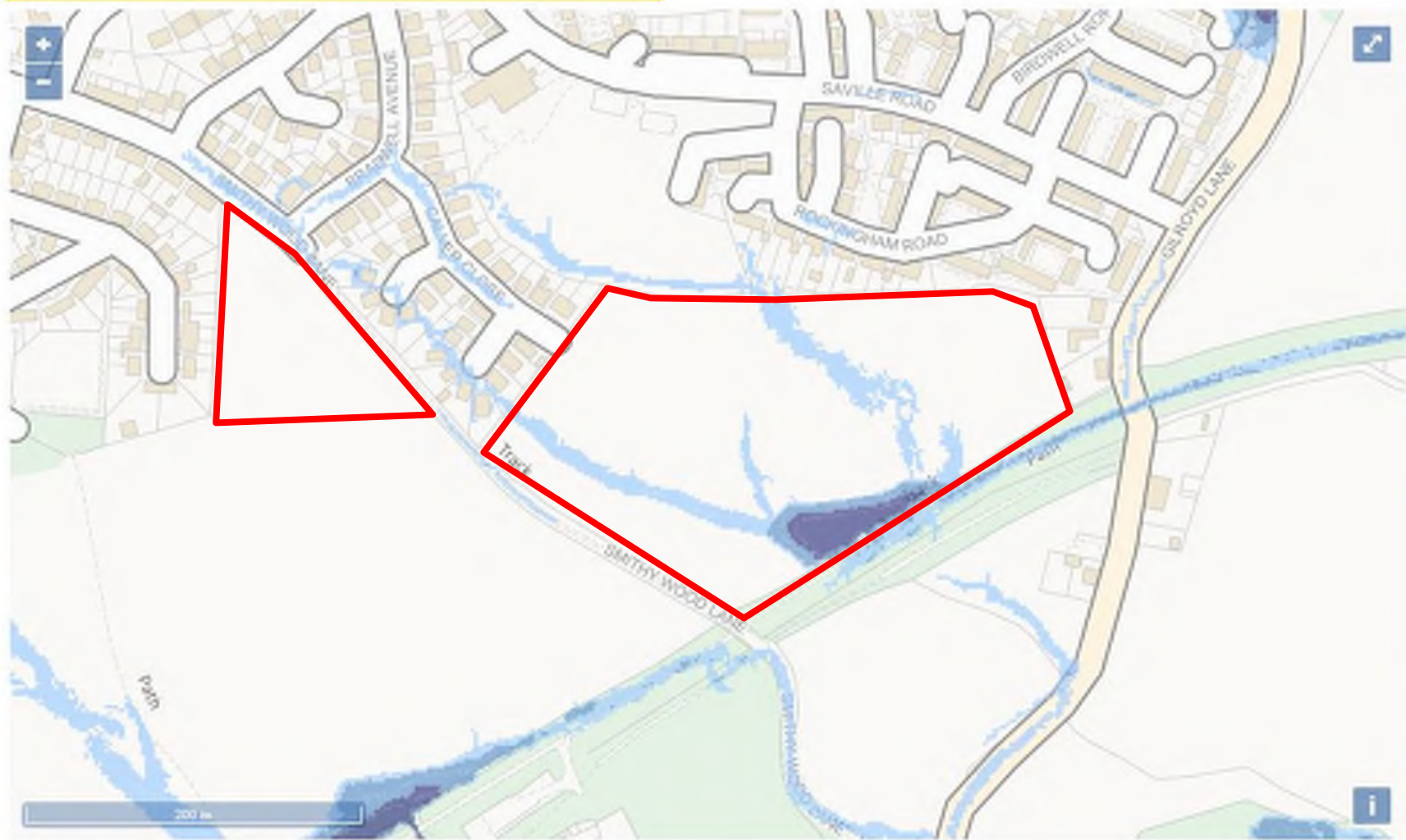
0 20 40 60m

Flood risk

Low risk: depth

Location

s75 3qw

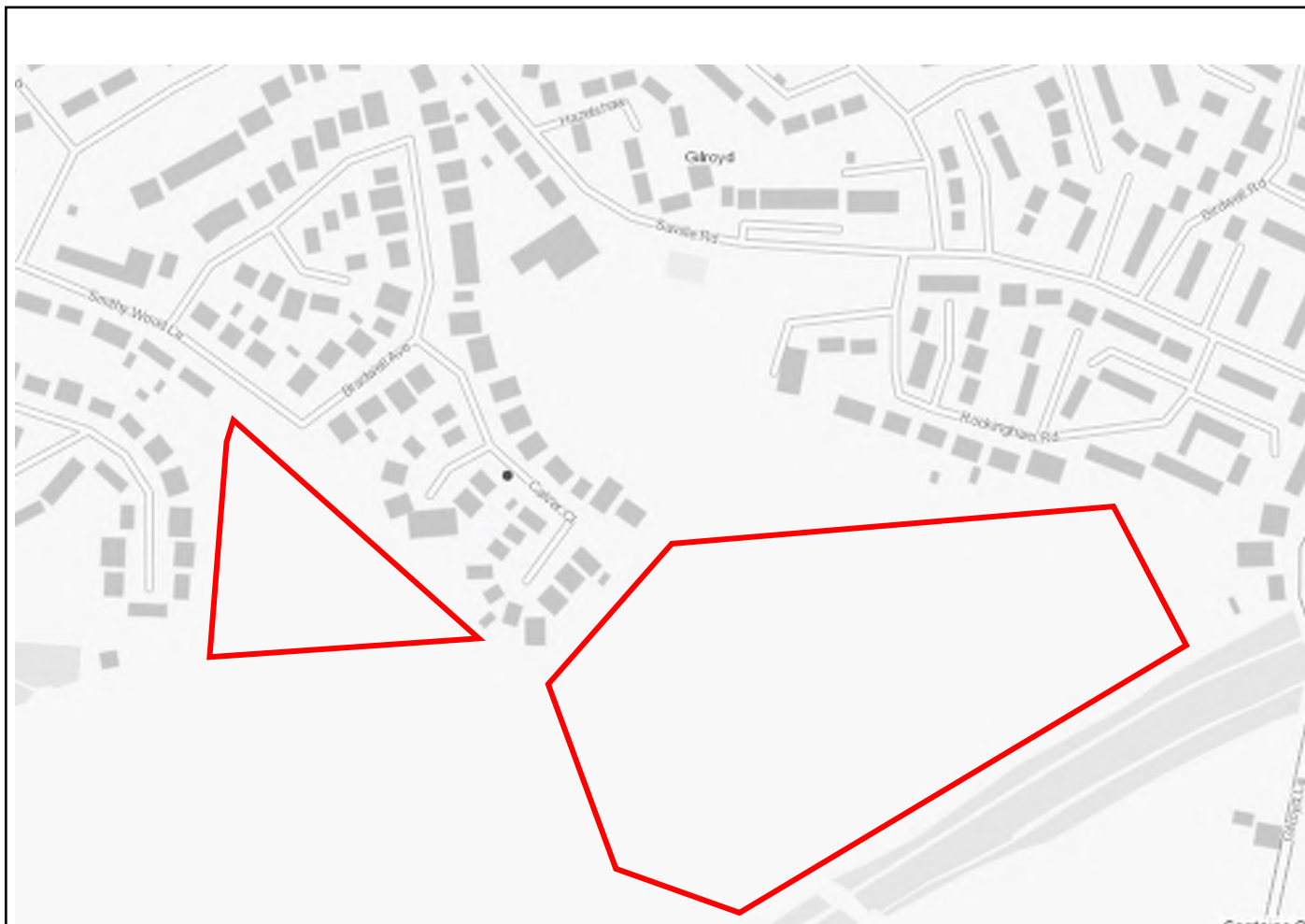


Surface water flood risk: water depth in a low risk scenario

Flood depth (millimetres)

Over 900mm 300 to 900mm Below 300mm

APPENDIX 5



Layer List

Operational layers

▼ ☒ HistoricFloodMap

▼ ☒ Historic_Flood_Map



APPENDIX 6

Jessica Stevenson-Steels

Subject: FW: Calver Lane/Smithy Wood Lane, Dodworth - Pre-Development Enquiry

From: Atkins , Wayne (ASSET MANAGER) <WayneAtkins@barnsley.gov.uk>

Sent: 01 April 2021 12:11

To: Gary Little <Gary.Little@avanthomes.co.uk>

Subject: [EXTERNAL] RE: Calver Lane/Smithy Wood Lane, Dodworth - Pre-Development Enquiry

This Message originated outside your organization.

Hi Gary,

Thanks for the information.

I agree that all the site would naturally fall towards the southern boundary. I can confirm that 23.41l/s is an agreeable peak 1-year discharge rate for our future development site and is acceptable to BMBC as Lead Local Flood Authority.

Unfortunately we do not currently allow for variable discharge rates, we would still require the 1 year baseline 23.41l/s for all return periods.

Hope this helps.

Regards

Wayne Atkins F.I.H.E.
Principal Engineer – Highways Asset Management
Environment & Transport
Place Directorate
Barnsley Metropolitan Borough Council

E-mail: wayneatkins@barnsley.gov.uk

From: Gary Little <Gary.Little@avanthomes.co.uk>

Sent: 24 March 2021 12:31

To: Atkins , Wayne (ASSET MANAGER) <WayneAtkins@barnsley.gov.uk>

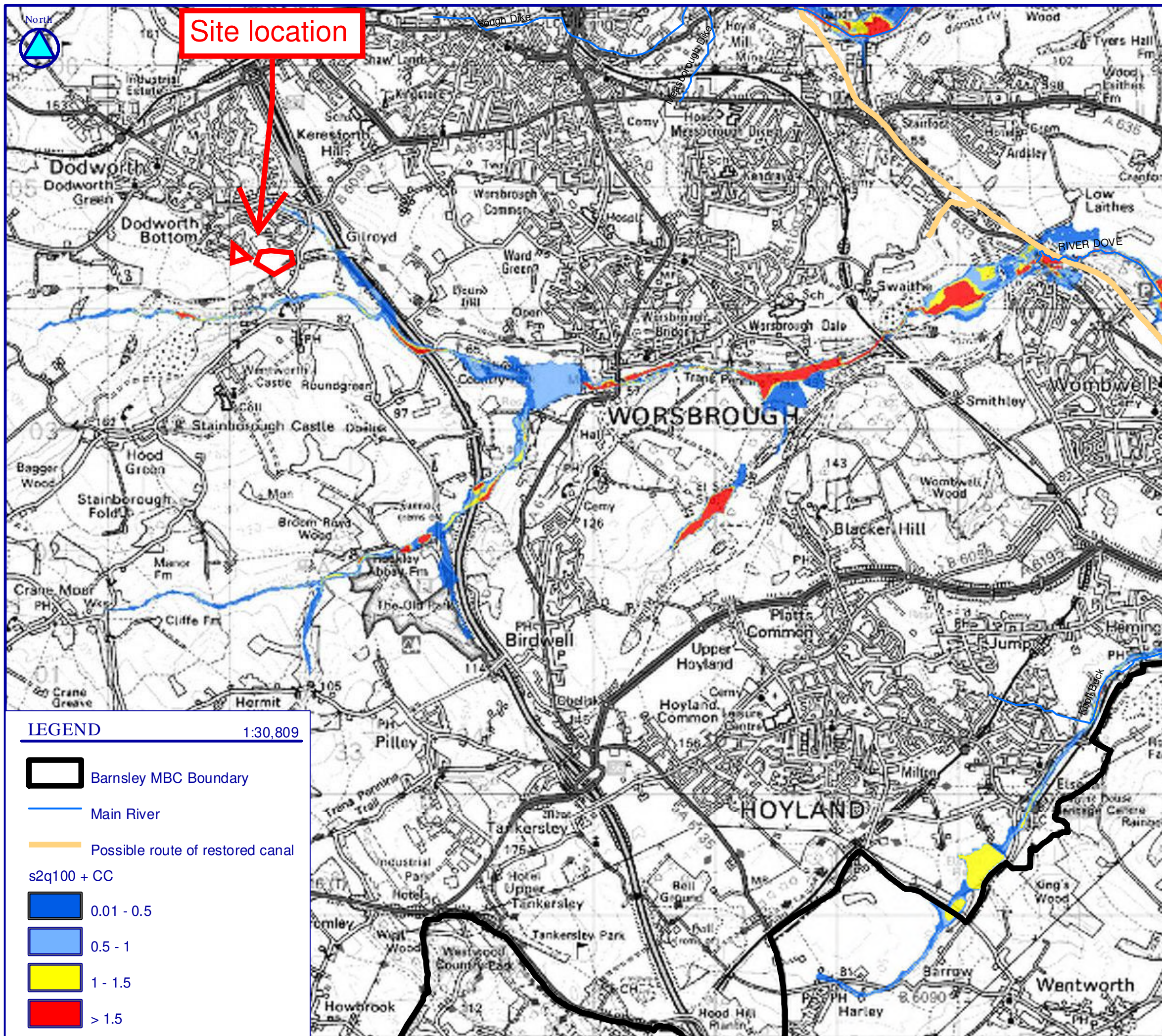
Subject: RE: Calver Lane/Smithy Wood Lane, Dodworth - Pre-Development Enquiry

Good afternoon Wayne - thanks again for your continued input here.

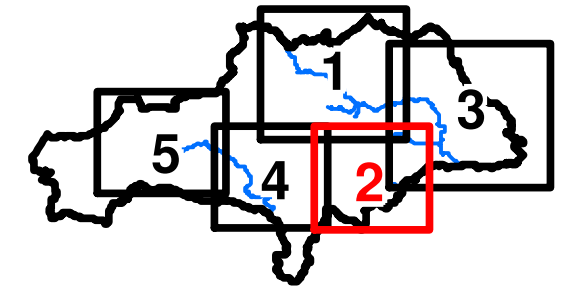
As discussed within the email trail below I have now had the opportunity to review the existing greenfield runoff rates and have undertaken the necessary IH124 calculations.

I have included copies of the topographical survey drawings to this email which you will note clearly demonstrate the ground levels all fall, relatively steeply, towards the southern boundary and direct overland flows towards the 'grill manhole'. Moreover, based upon the ground conditions on the site (gravelly clay overlying clayey and sandy gravel and mudstone, sandstone and siltstone bedrock) there is deemed to be relatively high runoff percentages.

The aerial photograph below summarises the areas we have considered in our assessment:



KEYPLAN



Note:
This map shows the potential scale of flood inundation for a range of severe overtopping flood events and different standards of flood defence. They do not include the impact of a breach or failure of these defences.

Typical range of defence standards for the River Don and Dearne is to protect up to a 1 in 30year (3%) return period.

s2 = 1 in 2year Standard of Defence
q100 = 1 in 100year or 1% probability flood event.
Climate Change scenario represents 20% increase of flood flow.

This map should be considered in support of the Environment Agency Flood Zone Maps to aid the Sequential and Exception Tests.
It should not be considered in isolation without reference to the other SFRA Flood Risk Maps.

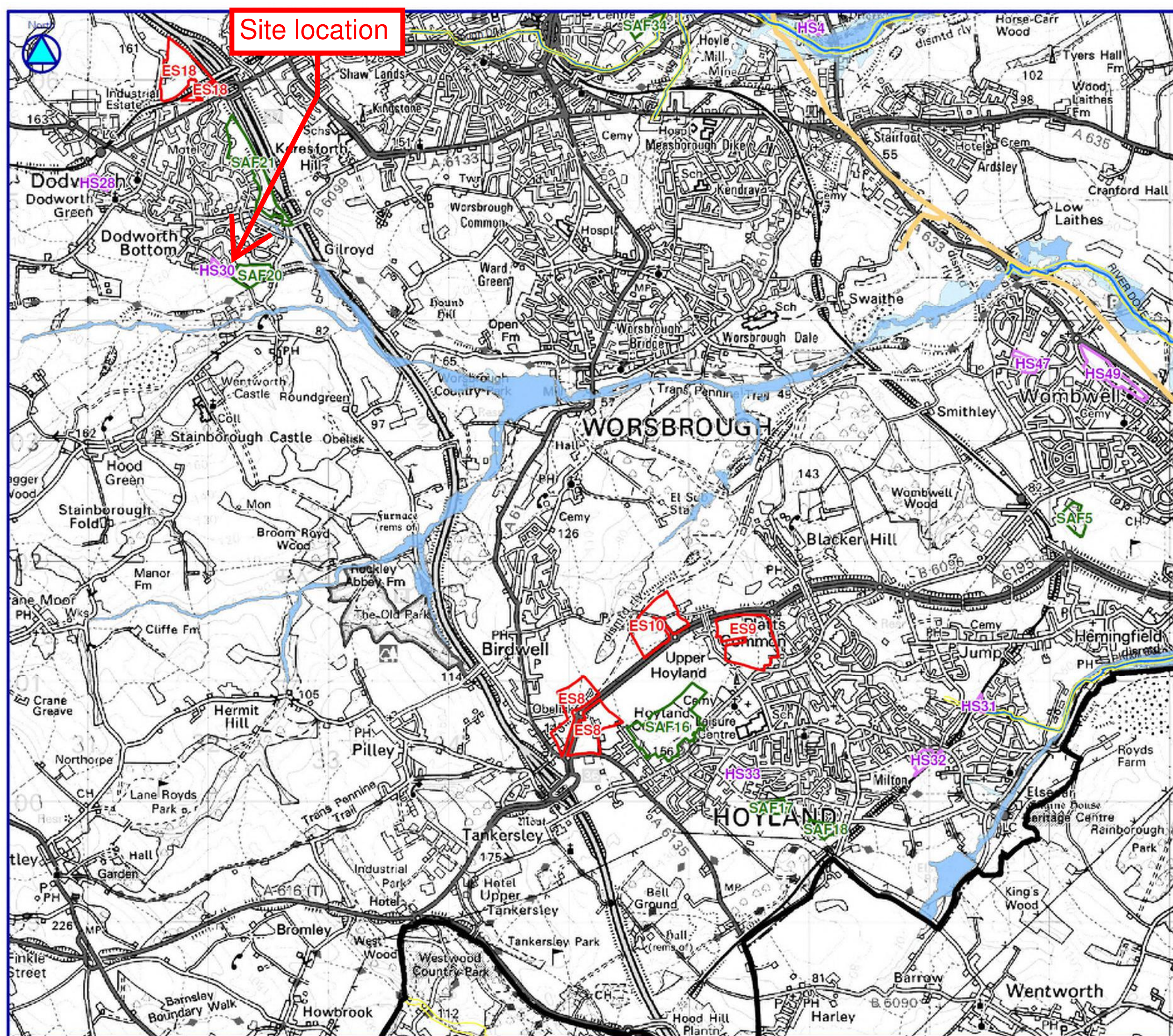
Please see the Section 6 of the SFRA for further details.

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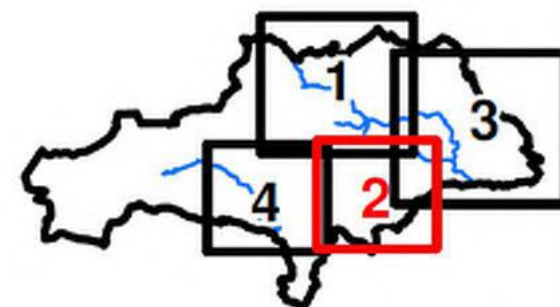
MAP H - 2

s2q100 + Climate Change



Site location

KEYPLAN



1:30,809

LEGEND

- Barnsley MBC Boundary
- Possible route of restored canal
- Main River
- Flood Zone 3
- Flood Zone 2

Proposed Development Sites

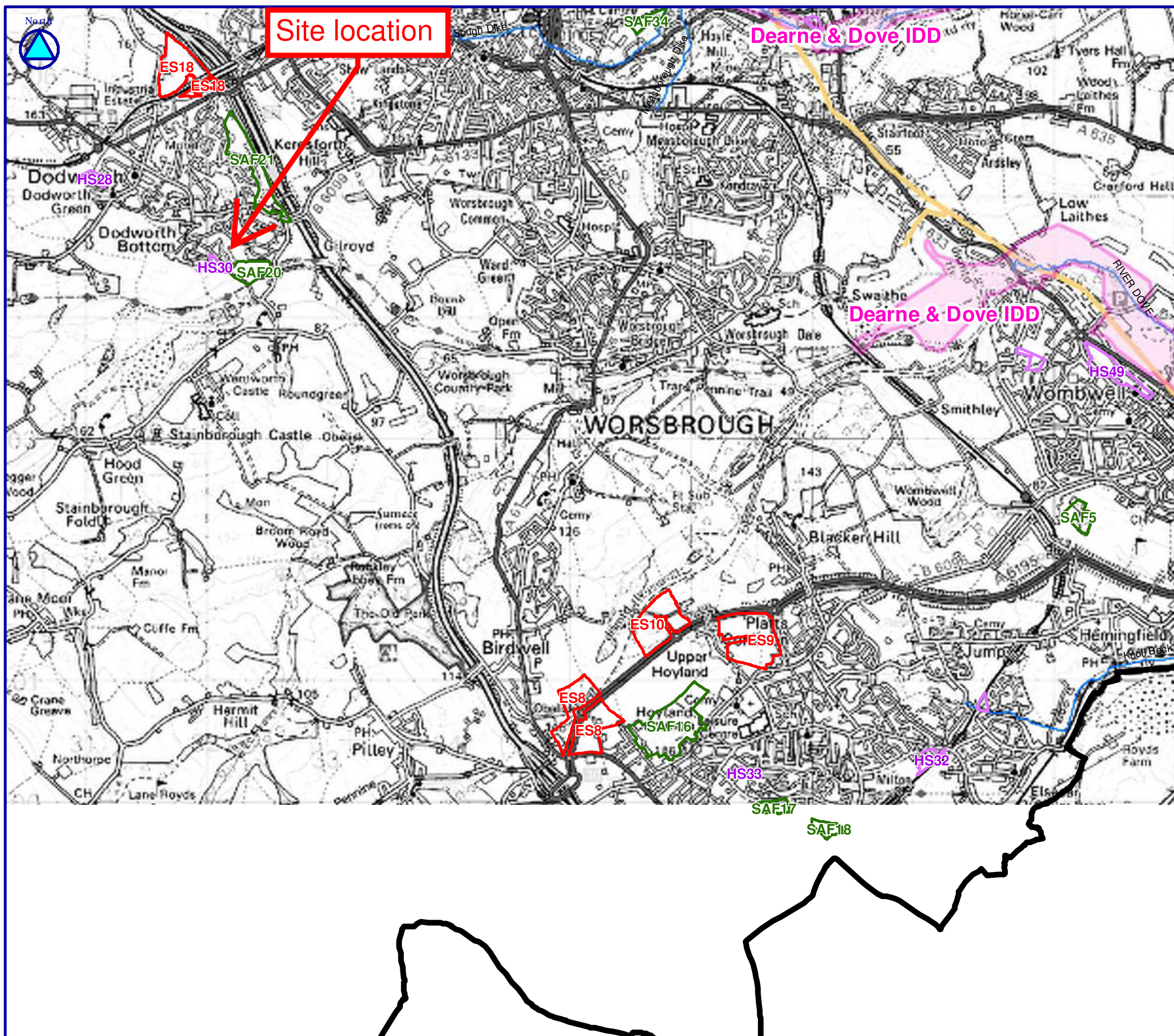
- Employment Sites
- Housing Sites
- UDP Sites
- Safeguarded Land

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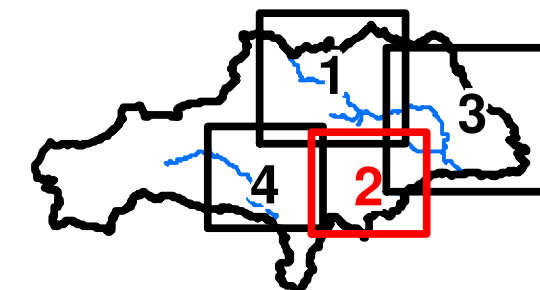


MAP A - 2

PROPOSED DEVELOPMENT SITES
AND FLOOD ZONES



KEYPLAN



LEGEND

1:30,809

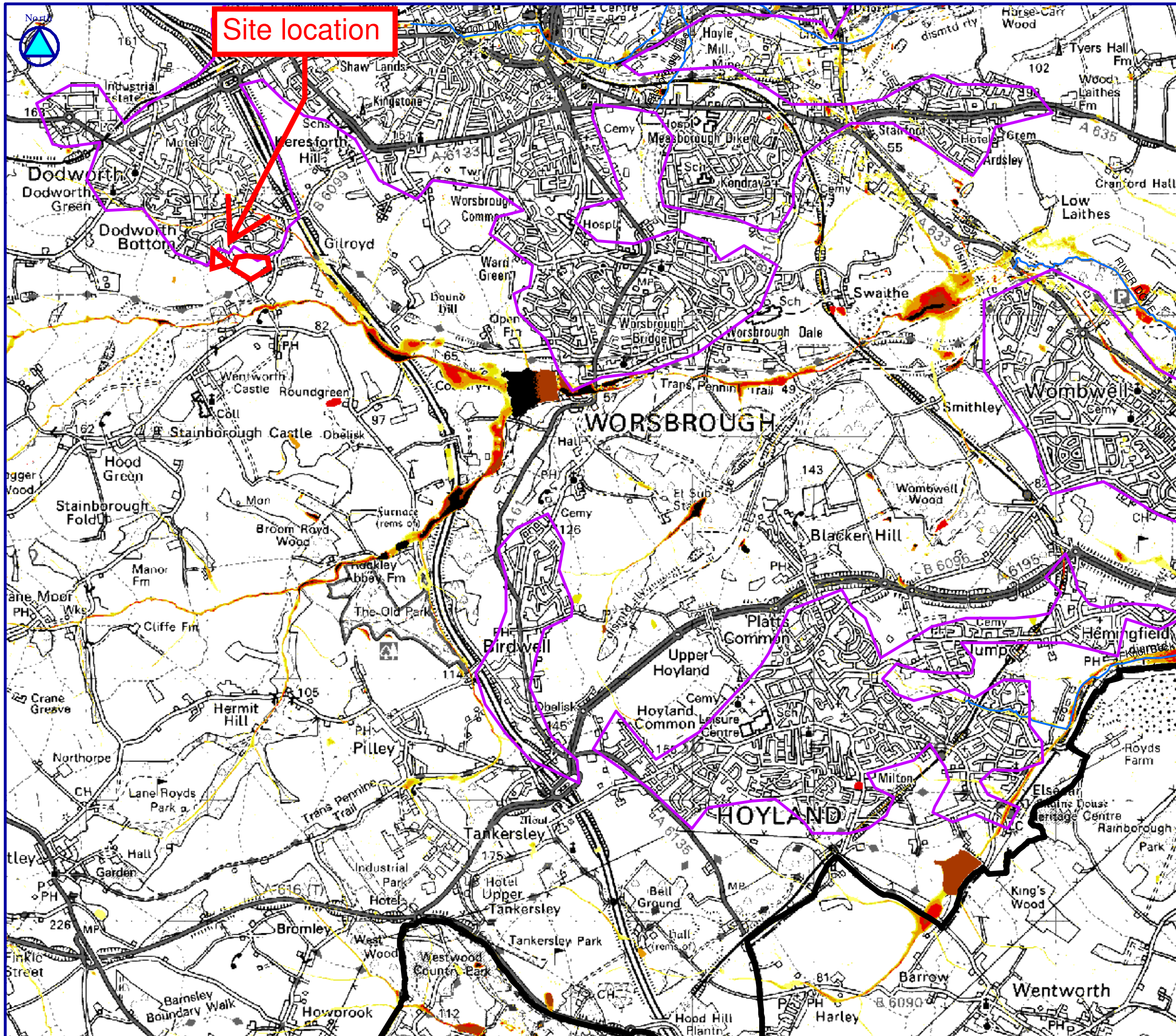
- Barnsley MBC Boundary
- IDB Boundaries
- Main River
- Possible route of restored canal
- Proposed Development Sites**
 - Employment Sites
 - Housing Sites
 - UDP Sites
 - Safeguarded Land

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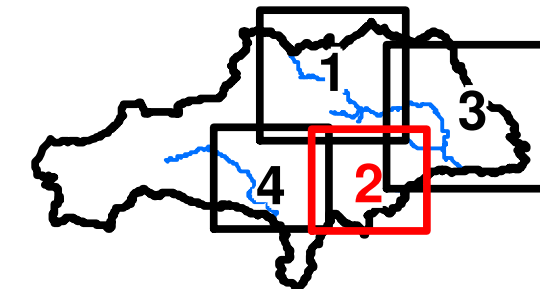


MAP B - 2

PROPOSED DEVELOPMENT SITES
AND IDB BOUNDARIES



KEYPLAN



LEGEND

1:30,809

-  Barnsley MBC Boundary
-  Urban Areas
-  Main River
- Surface Water Flooding
- Flood Depth (m)
 -  0.15 - 0.3
 -  0.3 - 0.5
 -  0.5 - 1
 -  1 - 1.5
 -  1 - 2
 -  > 2

Note:
Please see Section 5.8 of the SFRA
for further details.

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MAP C - 2

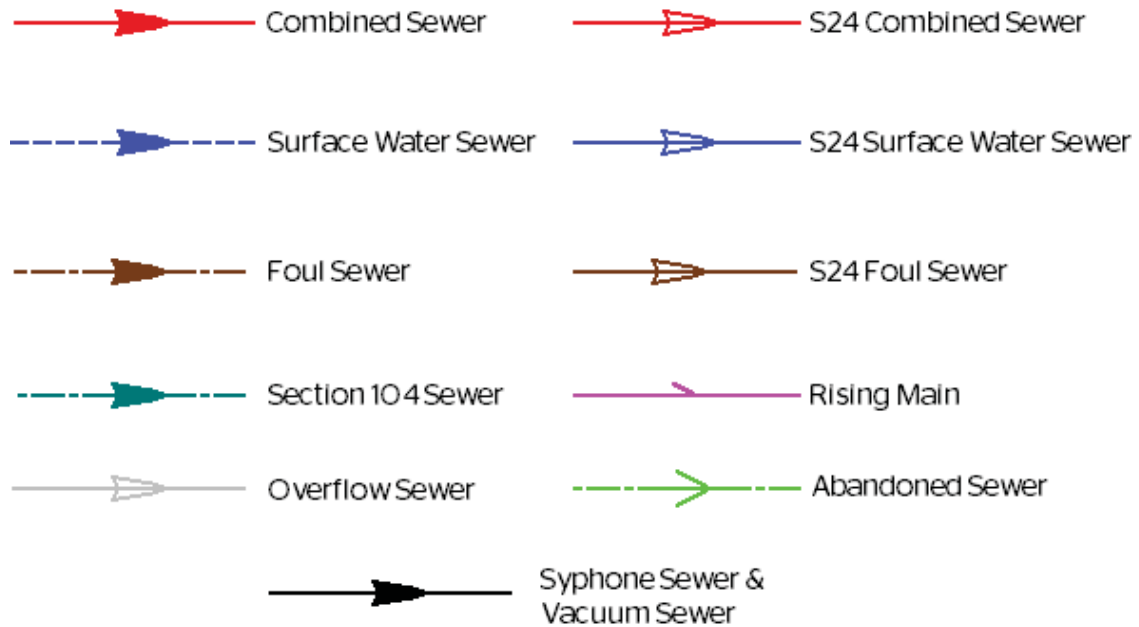
PLUVIAL FLOODING CAUSED BY
100YEAR RAINSTORM

APPENDIX 7

Property Identifier



Sewer Legend

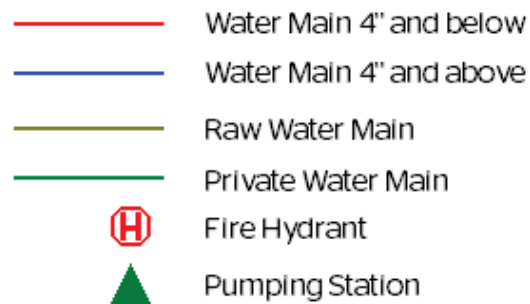


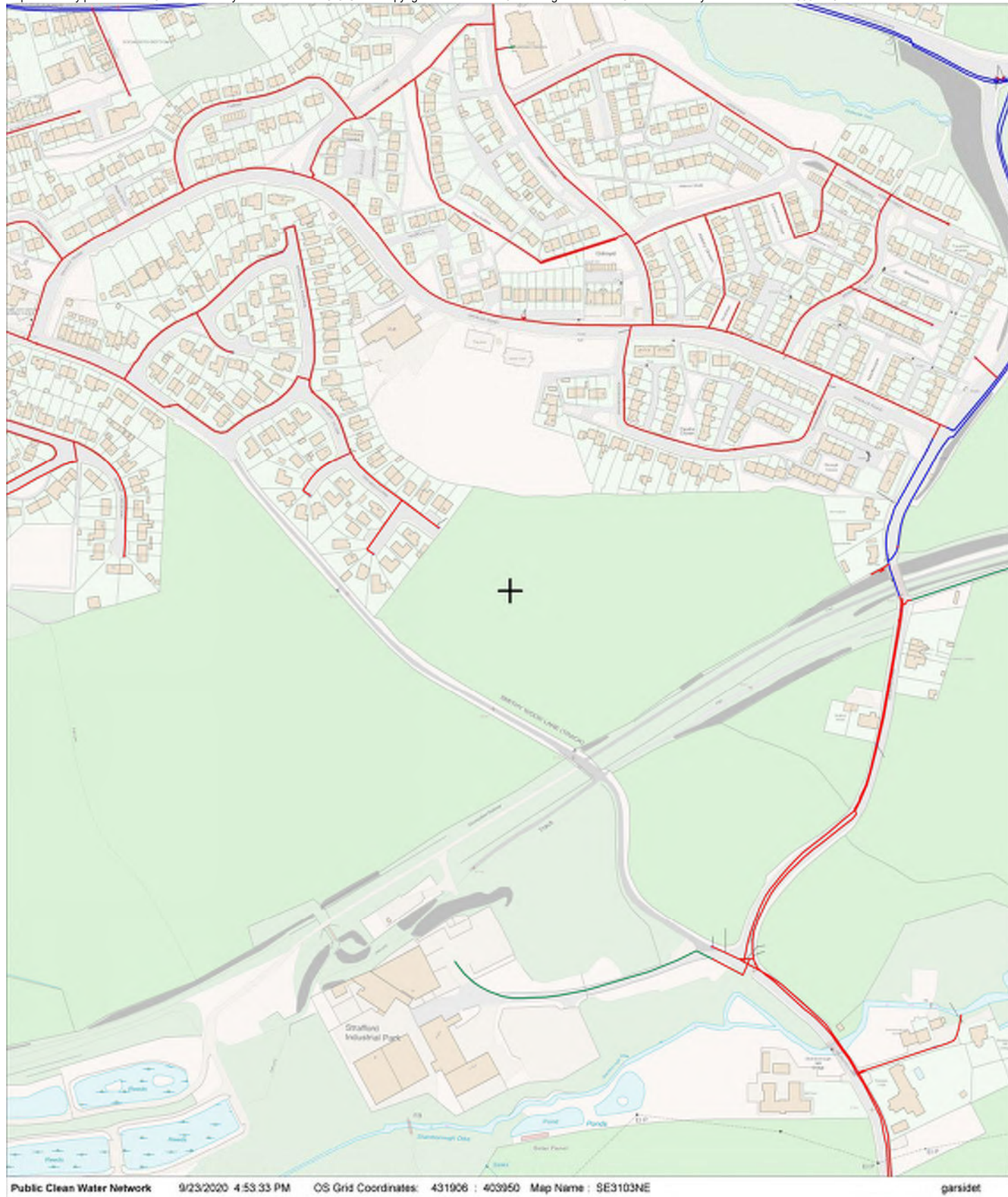
Pumping Station

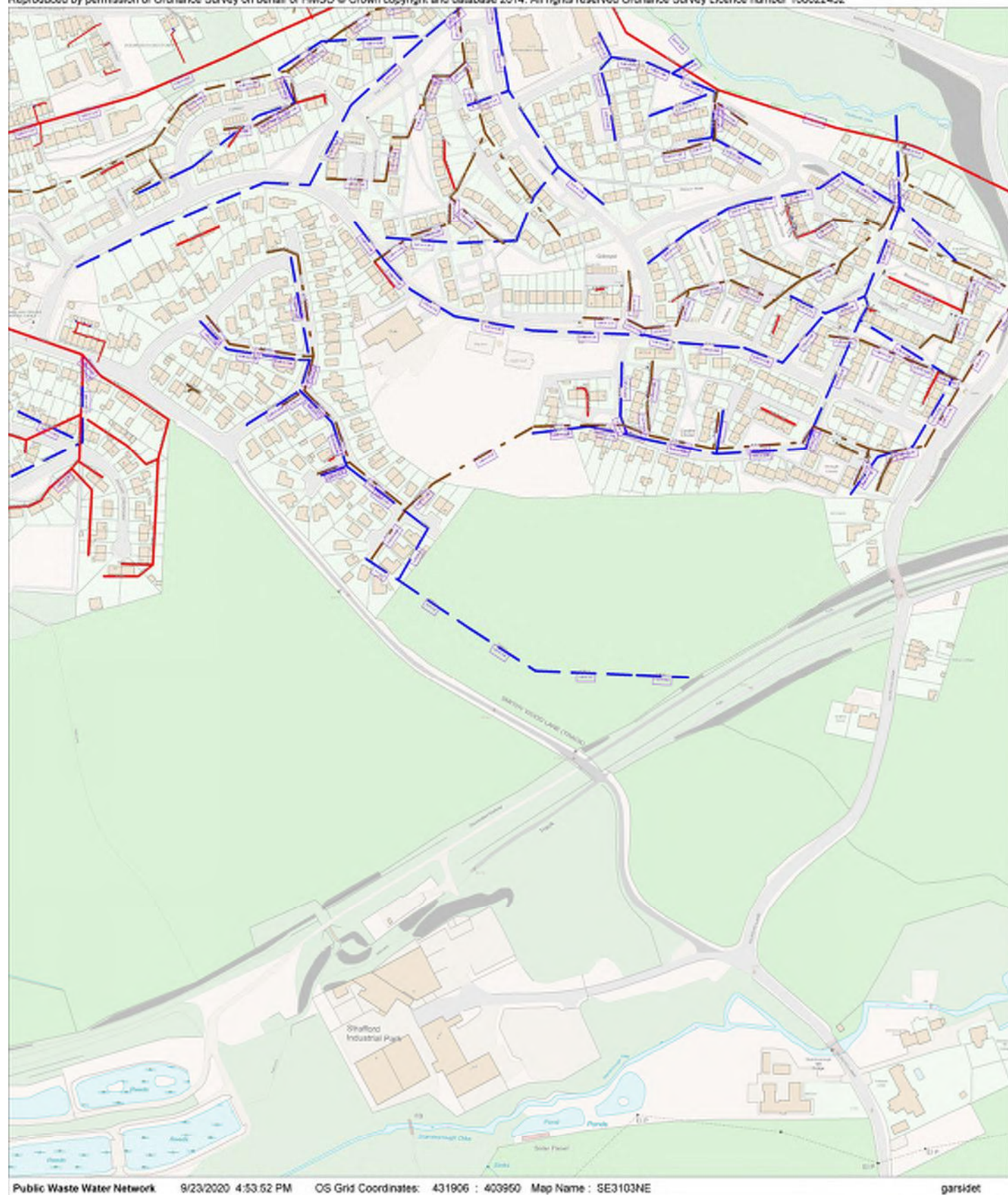


Public Sewer Treatment Works

Water Legend







Jessica Stevenson-Steels

From: Chris Roberts <Chris.Roberts@yorkshirewater.co.uk>
Sent: 24 March 2021 13:44
To: Gary Little
Cc: Technical Sewerage
Subject: RE: [EXTERNAL] Land Off Smithy Wood Lane/ Carver Lane, Dodworth, Barnsley, South Yorkshire, S75 3QW - Pre Planning Sewerage Enquiry U000734

This Message originated outside your organization.

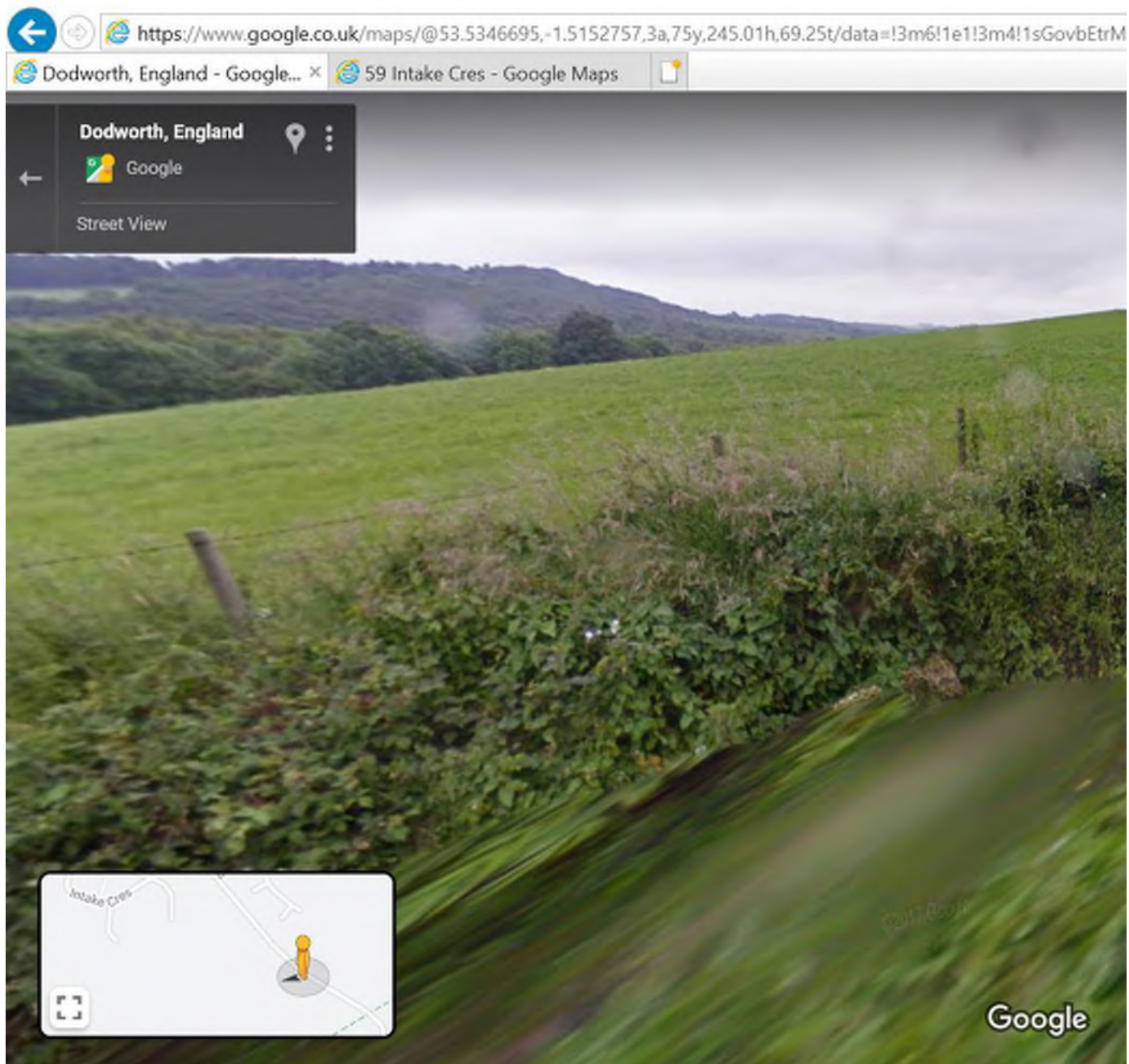
Hi Gary,

It would only be acceptable based on the 1 in 1 year at the most and I would also want to see a 30% betterment (see guidance in bold). It's a bit of a stretch that the western sites run off is managing get over the fields raised boarder banks (see pics below) to cross the track/footpath and trees that bisect the fields and find its way to the grate in the eastern site

If other methods of surface water disposal are not viable and subject to providing satisfactory evidence as to why they have been discounted, curtilage surface water discharges to the public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing use of the site less a 30% reduction in the existing discharge. Any discharge of surface water from the site should discharge to similar points of connection to that of the existing use of the site. You will need to demonstrate positive drainage, based on a 1 in 1 year storm, to the public sewer to Yorkshire Water by means of investigation and calculation carried out at your expense.

All things considered I would accept a maximum surface water rate of 16.5 to the Yorkshire Water 300/600 public surface water sewer or as advised before and as per part H3 you could go straight to the culverted watercourse.





Kind Regards



Chris Roberts
Pre-Development Technician
Developer Services
Tel: 0345 1 20 84 82

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

From: Gary Little <Gary.Little@avanthomes.co.uk>

Sent: 24 March 2021 12:35

To: Chris Roberts <Chris.Roberts@yorkshirewater.co.uk>

APPENDIX 8

SUDS Type	SUDS Technique	Description	Suitable	Comments
Source Control	Green roof	Vegetated roof that reduces runoff volume and rate	No	Expected planning requirement for traditional pitched roofs to match neighbouring housing.
	Rainwater harvesting/rainwater butts	Rainwater is stored and re-used	No	Individual storage tank capacity unlikely to meet volume required. Individual water butts can be used for garden watering.
	Permeable paving	Paving which allows inflow of rainwater into underlying construction/soil	Possible	May be suitable for private drives. Private permeable paving areas could provide limited infiltration within the underlying construction material.
Infiltration	Soakaway	Pit or trench which stores and disposes of water to the ground	No	Presence of impermeable ground (mudstone).
	Filter Drain	Trench which conveys and/or disposes of water to the ground.	No	Presence of impermeable ground (mudstone).
	Infiltration Basin	Shallow basin which stores and disposes of water to the ground	No	Presence of impermeable ground (mudstone).
Conveyance	Swale	Shallow vegetated depression which conducts and retains water	Possible	Could be used to convey surface water runoff.
Detention	Subsurface storage	Traditional underground pipes, tank storage, or modular systems	Yes	Area available within both land parcels for subsurface storage.
	Detention Basin	Normally dry but may have small permanent water pools at the inlet and outlet. They can function as POS	Yes	Area available within both land parcels for detention basins
	Pond	Permanent body of water	Possible	Area available within both land parcels for pond / wetland
	Wetland	Permanent body of shallow water or marsh	Possible	

Calculated by:	Ian Hopkinson
Site name:	Smithy Wood Lane (east)
Site location:	Dodworth

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.53511° N
Longitude:	1.51313° W
Reference:	3210265202
Date:	Mar 23 2021 11:06

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	4.52
-----------------------	------

Methodology

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

Soil characteristics

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

Hydrological characteristics

	Default	Edited
SAAR (mm):	702	702
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

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

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $\text{SPR/SPRHOST} \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q _{BAR} (l/s):	21.89	21.89
1 in 1 year (l/s):	18.83	18.83
1 in 30 years (l/s):	38.32	38.32
1 in 100 years (l/s):	45.54	45.54
1 in 200 years (l/s):	51.89	51.89

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Calculated by:	Ian Hopkinson
Site name:	Smith Wood Lane (west)
Site location:	Dodworth

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.53554° N
Longitude:	1.51753° W
Reference:	1195721523
Date:	Mar 23 2021 10:04

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	1.1
-----------------------	-----

Methodology

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

Soil characteristics

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

Hydrological characteristics

	Default	Edited
SAAR (mm):	702	702
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

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

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q _{BAR} (l/s):	5.33	5.33
1 in 1 year (l/s):	4.58	4.58
1 in 30 years (l/s):	9.32	9.32
1 in 100 year (l/s):	11.08	11.08
1 in 200 years (l/s):	12.63	12.63

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Project:	45944	Sheet	1.00
location	Smithy Wood Lane	Job No.	45944
town	Dodworth	Date	06.04.21
Subject:	Surface Water Drainage	Designed	JSS
	Storage Estimates	Checked	CH
		Revision	A

Site Details :

Information From Wallingford Maps :

Location :	Smithy Wood Lane, Dodworth	M5-60	19.0	mm
Grid Ref :	SE3224504392	r	0.35	
		SAAR	702	mm
Total Site Area	5.880	ha	UCWI	73 (Fig. 9.7)
Deduct areas to soakaways	0.000	ha	Soil Type	4
Effective Drainage Area	5.880	ha	SOIL	0.45 (Section 7.4)

Total Impermeable	3.234	ha	55%	assumed impermeable area
Allow for Urban Creep	0.000	ha		
Total Impermeable	3.234	ha		

PIMP	55.0%	
PR	41.9	Equation 7.3
Cv	0.76	Equation 7.21
Default Cv	1.00	Designer to insert to override calculated Cv

Design Return Period	100	Years	Max. Branch Length	400	metres
			Approx. Time of Flow	6.7	mins

Percentage Increase For Climate Change: **30%**

Details of Restricted Discharge :

Maximum Permitted Rate of Flow from the System	Litres/sec.ha
	23.4 Litres/sec
Assumed Average Flow as a Proportion (Estimate)	80 %
Average Rate of Flow	18.7 Litres/sec

Calculation of Critical Duration and Storage Volume Required :

Trial Durations (mins)	60	120	240	480	360	720	1440
Average Point Intensity (mm/hr)	38.4	23.8	14.3	8.4	10.5	6.2	3.6
Volume of Run-off for the period = Area x Cv x i x D (m3)	1242.3	1540.2	1848.5	2184.0	2038.3	2402.0	2811.6
With climate change	1615.0	2002.2	2403.1	2839.2	2649.8	3122.6	3655.0
Volume of Out-flow for the period = Ave. flow x (D+Tf)(m3)	74.9	142.3	277.1	546.6	411.8	816.2	1624.9
Storage Volume for this Duration (m3)	1540	1860	2126	2293	2238	2306	2030

Storage Volume Required for

100 Year Return Period = **2306** m³

Is this the worst case (ie. Critical Duration)? 1 (1 = Yes, 0 = No)