



Report No. 351/22

FLOOD RISK ASSESSMENT REPORT

ON THE SITE OF

**SUNNYMEAD
HUDDERSFIELD ROAD
PENISTONE**

ON BEHALF OF

JONES HOMES (NORTHERN) LTD

SEPTEMBER 2011

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1.0 INTRODUCTION

- 1.1 Jones Homes (Northern) Ltd are proposing to redevelop a disused site occupied previously by a detached dwelling, known as Sunnymead, with new residential development. It was decided that a Flood Risk Assessment Report should be carried out to assist in the viability of the project.
- 1.2 As part of the Planning Application, Planning Policy Statement 3 "Housing" clearly identifies flood risk as a specific material consideration in the allocation and release of sites for new housing. It is within the general development strategy of the Country for development in areas where there is a risk of flooding to be fully assessed to avoid unnecessary increase in the requirement of flood defence. Under Planning Policy Statement 25 "Development and Flood Risk" (PPS25), consultation should be undertaken with the Environment Agency, Land Drainage Authority and Water Authority and a Flood Risk Assessment Report should be prepared considering the development proposals.
- 1.3 ARP Associates have been appointed to carry out an assessment of the site, implement appropriate consultations and prepare a Flood Risk Assessment Report, in accordance with PPS25, to satisfy the requirements of the Planning Authority.
- 1.4 The consultations and walkover survey have been carried out in September 2011.
- 1.5 This assessment has been prepared for the sole use and reliance of Jones Homes (Northern) Ltd and shall not be relied upon or transferred to any other parties without the written authorisation of ARP Associates. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

2.0 WALKOVER SURVEY

General

- 2.1 The site is a rectangular piece of land extending to an area of approximately 0.238ha and located at Ordnance Survey Grid Reference SE244 037. The site is to the northern edge of Penistone town centre and is situated in a residential and commercial area.
- 2.2 A site location plan is presented in Appendix A.

Current Use

- 2.3 The site is currently unoccupied and overgrown, but formerly had a detached dwelling, known as Sunnymead, towards the northern boundary and a garden to the south. Accesses into the site for both pedestrian and vehicular use are present off Huddersfield Road.

Boundaries

- 2.4 The site is bounded by a small stone wall to the northwest, south and part of the eastern boundary. The remaining part of the eastern boundary is formed by a timber post and rail fence.
- 2.5 Huddersfield Road is adjacent to the east, Barnsley Road to the south and another large detached dwelling known as Netheroyd to the north. The eastern boundary is formed by commercial buildings, which are probably used for agricultural purposes.

Topography and Vegetation

- 2.6 The site falls from north to south following the alignment of Huddersfield Road, but the southern boundary is situated below the level of Barnsley Road and the stone wall acts as a slight retainer to the sloping grass verge.

- 2.7 A topographical survey is presented in Appendix B.
- 2.8 The site is overgrown with rye grass, lupins and small bushes, but there is evidence that this was a well kept garden at some time in the past.

Drainage

- 2.9 There is no obvious indication of a positive drainage system at this time, as the overgrown nature of the site prevents any manholes to the previous development from being visible. However, it is clear that the dwelling would have had both foul and surface water drainage at some time in the past, probably to adopted sewers in Huddersfield Road.
- 2.10 The River Don is flowing in a relatively shallow channel from west to east behind properties on the south side of Barnsley Road. The channel is well lined by trees and stone walls, but it is clear that, during times of storm, water is likely to flood out onto the forecourt areas and onto Barnsley Road. This section of Barnsley Road rises up to the west and also further down to the east. The junction with Huddersfield Road and Barnsley Road is near to a low spot at this particular area. However, to the west of the site, the river flows under a large arch and bends around towards the southeast. The arch under Barnsley Road, whilst relatively large, will cause a restriction to the general flow.
- 2.11 Whilst no direct measurement was taken at the location of the River at the end of Huddersfield Road, the river is approximately 2.5m below the yard area of the properties to the south of Barnsley Road.
- 2.12 Due to the sloping verge behind the northern footpath of Barnsley Road, water running off this very small area has the potential to run into the site, if the boundary wall is breached or allows water through the stonework.

3.0 ENVIRONMENT AGENCY CONSULTATION

- 3.1 A consultation was requested from the Environment Agency and a copy of their response, reference RFI/2011/20204 dated 27th September 2011, is presented in Appendix C for reference purposes.
- 3.2 The Environment Agency have provided a Flood History Map for the site, and this shows that the site did not flood from the watercourses surveyed after the main flood event.
- 3.3 The Flood Risk Map for the area shows that the lower southeastern part of the site falls within an area which has greater than a 0.1% chance of flooding each year, whilst the remaining northwestern part of the site falls within an area with a less than a 0.1% chance of flooding each year.
- 3.4 A detailed modelling study into the Upper Don, River Loxley, River Rivelin and the River Little Don has been undertaken by JBA Consulting in March 2007 on behalf of the Environment Agency. Extracts of the report were provided with the summary showing model water levels both downstream and upstream of the site adjacent to the River Don at five different annual probabilities. Whilst the exact location of the modelling points are difficult to assess, the 0.1% (1 in 100 year) annual probability gives an average flood level of 195.21m A.O.D. adjacent to the site.
- 3.5 Surface water discharge from the new development should not be greater than the pre-development situation less 30% reduction when compared with the existing site overflow, unless otherwise agreed with the relevant Drainage Authority. If the discharge is to watercourse, then the rates should be limited to acceptable greenfield run-off and it must be ensured that any additional volume of surface water to the receiving watercourse does not cause flooding problems. The greenfield run-off rate is normally 5l/s/ha, but consultation with the Local Flood Authority should be undertaken for any variances.
- 3.6 Surface water discharge should be attenuated on site for at least 1 in 30 year flow with the 1 in 100 year flow retained within the site (including an allowance for climatic change), without causing any flooding to buildings.

4.0 YORKSHIRE WATER CONSULTATION

- 4.1 A consultation has been obtained from Yorkshire Water, who are the Water Authority for this area, by Jones Homes (Northern) Ltd and a copy of the response, reference G002342 dated 23rd March 2006, is presented in Appendix D for reference purposes.
- 4.2 Foul water can discharge to the 150mm diameter public combined sewer in either Huddersfield or Barnsley Road adjacent to the site.
- 4.3 In respect of surface water, reference is made to Requirement H3 of Building Regulations 2000 and Sustainable Drainage Systems.
- 4.4 The local public sewers do not have the capacity to accept any additional surface water discharge from this development. Recommendation is made to either contact the Environment Agency/Land Drainage Authority with a view to connection to the River Don to the south or to prove, by an assessment of the existing sewer system, the rate of discharge from the existing site to an existing sewer, demonstrating the pipe size and gradients to justify the discharge.
- 4.5 However, a subsequent consultation was obtained from Yorkshire Water on the 18th April, 2006 under reference G003054, and a copy is presented in Appendix D for reference purposes.
- 4.6 This confirms that a discharge rate of 6l/sec for surface water to the combined sewer in Huddersfield Road is acceptable.

5.0 LAND DRAINAGE AUTHORITY CONSULTATION

- 5.1 A consultation was requested from Barnsley MDC, as Land Drainage Authority for this area, but at the time of writing the report, no response has been received.
- 5.2 However, the Drainage Authority will comment that the site falls within an area where potential flooding will occur and recommend that surface water discharge from the existing development is restricted to the calculation of the existing run-off, less 30% to satisfy the requirements of the Pitt Review.

6.0 MATERIAL CONSIDERATION IN RESPECT OF PPS25

Flood Classification

- 6.1 The consultation with the Environment Agency has identified that the site generally falls within land assessed as having less than a 1 in 1000 annual probability of river or sea flooding in any year (less than 0.1%), but partly within land assessed as having greater than a 1 in 1000 annual probability of flooding in any year. Therefore, in accordance with Table D1, Annex D of PPS25, the site has to be considered to be within Flood Zone 2 "medium probability" for the purposes of the Flood Risk Assessment Report.
- 6.2 Therefore, whilst all uses of land are generally appropriate within this Flood Zone, it will be necessary to reduce the overall level of flood risk in the area through the layout and form of the development and appropriate application of Sustainable Drainage techniques. Consideration should be made to relocate any new development into the land zones with the lower probability of flooding.

End Use

- 6.3 The development proposal is for the construction of residential development on the site. A proposed layout is presented in Appendix E.
- 6.4 When applying Table D2, Annex D of PPS25, the flood risk vulnerability classification shows that the proposed end use will fall into a "more vulnerable" classification.

Sequential Test

- 6.5 Annex D of PPS25 states that the risk based Sequential Test shall be applied at all stages of planning with a view to ensuring new development areas are located in the lowest probability of flooding (Zone 1).

6.6 When the site is evaluated in accordance with Table D3, Annex D of PPS25, the development shows that the Sequential Test is satisfied and the Exception Test is not required in this instance. However, consideration will be needed to be given to flood proofing techniques to prevent flooding of buildings, which may fall within Flood Zone 2.

Flood Sources

6.7 Flooding from Rivers - The River Don is located to the south of the site on the opposite side of Barnsley Road and the site is known to have the potential to flood without flood defences. An assessment of the modelled flood levels will need to be undertaken and any flooding on the site addressed within the report.

6.8 Flooding from Local Watercourses - There are no known local watercourses in the vicinity which would cause flooding on the development site.

6.9 Flood from the Sea - The site is not located near enough to the sea to cause a flooding from this source.

6.10 Flooding from Land - The site is situated adjacent to an existing residential development on the north site, which is located at a higher level than the development. However, this will have a positive drainage system and any surface water is unlikely to enter the site from this location. The remaining levels on the east and west boundaries are generally concordant and no run-off will enter the site from these locations. The southern boundary is formed by a stone wall which will prevent water run-off from Barnsley Road on the sloping verge down to the site. It is recommended that the land is raised at this bottom level to prevent any possibility of surface water running into the development from beyond the southern boundary. Subject to this condition, there will be no flooding on the site from adjacent land.

6.11 Flooding from Groundwater - Whilst there is no available ground investigation report, the local geological map shows that the site is underlain by undifferentiated mudstones,

siltstones and sandstones of the Lower Coal Measures with a drift cover of the River Terrace Deposits. These soils will prevent issues of groundwater on the site. Therefore, flooding from this source is considered to be low risk.

- 6.12 Flooding from Sewer - A new drainage system will need to be introduced onto the site and it is quite possible, therefore, that any blockage of the sewers will result in flooding from the lowest cover level of manhole or gullies, and this will need to be considered as part of any proposed development.
- 6.13 Flooding from Reservoirs, Canals or Artificial Sources - There are no other reservoirs, canals or artificial sources which will result in flooding on the site.

Climatic Change

- 6.14 Annex B of PPS25 indicates that winters will become wetter over the whole of the UK, by as much as 20% by the 2050s. A shift in the seasonable pattern of rainfall is also expected, with summers and autumns becoming much drier than at present. In making an assessment of the impact of climatic change on flooding from land, rivers and sea, Table B.2 indicates that the peak rainfall intensity, for developments likely to extend to between 2055 and 2085, is 20% and peak river flow between 2025 and 2115 is also expected to rise by 20%. If development is expected to extend past 2085, then a 30% peak rainfall intensity should be considered.
- 6.15 The only higher land is to the north where there is existing residential dwelling, which will have a positive drainage system preventing surface water run-off into the site. The lower area of the site to the south will need to be raised to reduce the possibility of any run-off from the sloping verge outside the southern boundary and levels are flush with the eastern and western boundaries. Therefore, any run-off from outside the site will be insignificant and, on this basis, only rainfall falling within the site boundaries will need to be considered in respect of climatic change.

- 6.16 The latest published figures in PPS25 show that, for an anticipated life of greater than 50 years for any new development, the expected increase in rainfall will be around 30%. It will be necessary to design any new positive drainage system with the 30% increase in capacity to accommodate this requirement.

Flood Mitigation

- 6.17 As the site falls within Flood Zones 1 and 2, and that the 1 in 100 year flood level at an anticipated 195.21m A.O.D. does have the potential to cause nominal flooding on the bottom of the proposed site, flood mitigation measures are required. Furthermore, in the event of a catastrophic storm or blockage of the proposed sewers on the site, some precautionary mitigation measures are also required as follows:-

- 6.17.1 Floor levels to the proposed properties shall be at a minimum of 600mm above the highest flood level at a minimum height of 195.81m A.O.D.
- 6.17.2 Properties shall be designed without basements and should be constructed with concrete ground floors to avoid any access to subfloor voids.
- 6.17.3 Incoming electricity supplies shall be raised above ground floor level and ground floor electric sockets shall be served by loops from first floor level.
- 6.17.4 It will be necessary to ensure there a route for flood water through the site to prevent any flooding of buildings. To achieve this, all external levels shall be a minimum 150mm, or preferably 300mm, below the finished floor level of the proposed dwellings and the proposed alignment across the site shall be designed to ensure that there is always a route for water through the site without causing ponding.

Sustainable Drainage

- 6.18 In order to comply with the requirements of PPS25, it will be necessary to consider aspects of Sustainable Drainage techniques of the new development. Whilst no intrusive investigation of ground conditions has been carried out, it is known from the geological maps that the site is located on the undifferentiated mudstones, siltstones and sandstones of the Lower Coal Measures with a drift cover of River Terrace Deposits. Therefore, it is highly unlikely that the natural soils will be permeable to allow infiltration techniques to be adopted and the presence of the River Don in close proximity to the site confirms this assessment. Therefore, soakaway or other similar Sustainable Infiltration systems are not considered to be suitable at this location. For the purposes of this report, it is assumed that a full positive drainage system will be required with discharge to the outfall of the existing development.

Drainage

- 6.19 It is a requirement to ensure that surface water run-off from any proposed development has negligible consequence on downstream areas within sewer capacity or discharge to watercourse.
- 6.20 Existing Surface Water Run-off - The original development on the site was a large detached building, which will have had positive drainage for both foul and surface water discharge from the development extending to the combined sewer in Huddersfield Road.
- 6.21 Proposed Surface Water Drainage

The proposed layout is presented in Appendix E, and this shows that the proposed impermeable area will be approximately 1.108ha. The discharge rate, agreed with Yorkshire Water is 6l/s. Making an allowance for 30% increase in rainfall for climatic change, the on-site storage is 20.2m³ for a 1 in 30 year storm. This can be achieved by several methods, including oversized pipes, underground tanks, balance ponds or cellular

storm units. Once such option would be to provide 18m of 1.2m diameter oversize pipe or equivalent to achieve the necessary attenuation. It will also be necessary to ensure that the drainage system can accommodate a 1 in 100 year storm without causing flooding of property or third party land. The indicative surface water calculations are presented in Appendix F, but detailed calculations and proposals will need to be prepared and submitted to the Planning Authority for approval prior to construction on site.

- 6.22 Foul Drainage - Foul drainage will discharge to the 150mm diameter pipe in Huddersfield Road.

Emergency Egress During Times of Flood

- 6.23 It is a requirement under PPS25 that occupants should be able to egress any building during times of flood, without being trapped by flood conditions.
- 6.24 As the northern part of the site falls within Flood Zone 1 and the southern part will be raised in level, with egress to the north, there are no mitigation measures required for emergency egress during times of flood.

7.0 COMMENT

- 7.1 The site falls partially within Flood Zones 1 and 2, but the Sequential Test is satisfied. In order to accommodate the possibilities of flooding from the nearby River Don or from blocked sewers, the following mitigation measures are recommended:-
- 7.1.1 Floor levels to the properties are to be constructed at 600mm above the highest flood level. This will result in a minimum finished floor level of 195.81m A.O.D.
 - 7.1.2 Properties shall be designed without any basements and be constructed with concrete ground floors to avoid access to subfloor voids.
 - 7.1.3 Incoming electricity supplies shall be raised above ground floor level and ground floor electric sockets shall be served by loops from first floor level.
 - 7.1.4 The proposed development shall be designed with external levels below proposed ground floor level in all circumstances and with a sufficient slope to ensure that any overland flood water from blocked sewers will pass through the site without causing flooding to buildings.
- 7.2 Climatic change for a 30% increase in rainfall shall be incorporated into any new positive drainage designs.
- 7.3 Sustainable Drainage Systems of infiltration techniques are considered to be unsuitable on this particular site.
- 7.4 Surface water discharge shall be restricted to the rate of discharge of the existing run-off and detailed proposals submitted to the Planning Authority for approval prior to construction on site.
- 7.5 The proposed surface water drainage system shall be designed for an allowance for climatic change and restricted to the agreed discharge rate with appropriate attenuation

proposals incorporated into the design for a 1 in 30 year storm. The system shall also accommodate a 1 in 100 year storm without causing flooding to buildings or run-off to third party land. The design, details and calculations shall be submitted to the Planning Authority for approval prior to construction on site.

- 7.6 No special mitigation measures are required for emergency egress during times of flood.
- 7.7 Subject to compliance with the above, the proposed development can satisfy the requirements of Planning Policy Statement 25 "Development and Flood Risk".

APPENDIX A

SITE LOCATION PLAN AND SITE PLAN



				Issued for approval		
Rev	By	Date				Chk

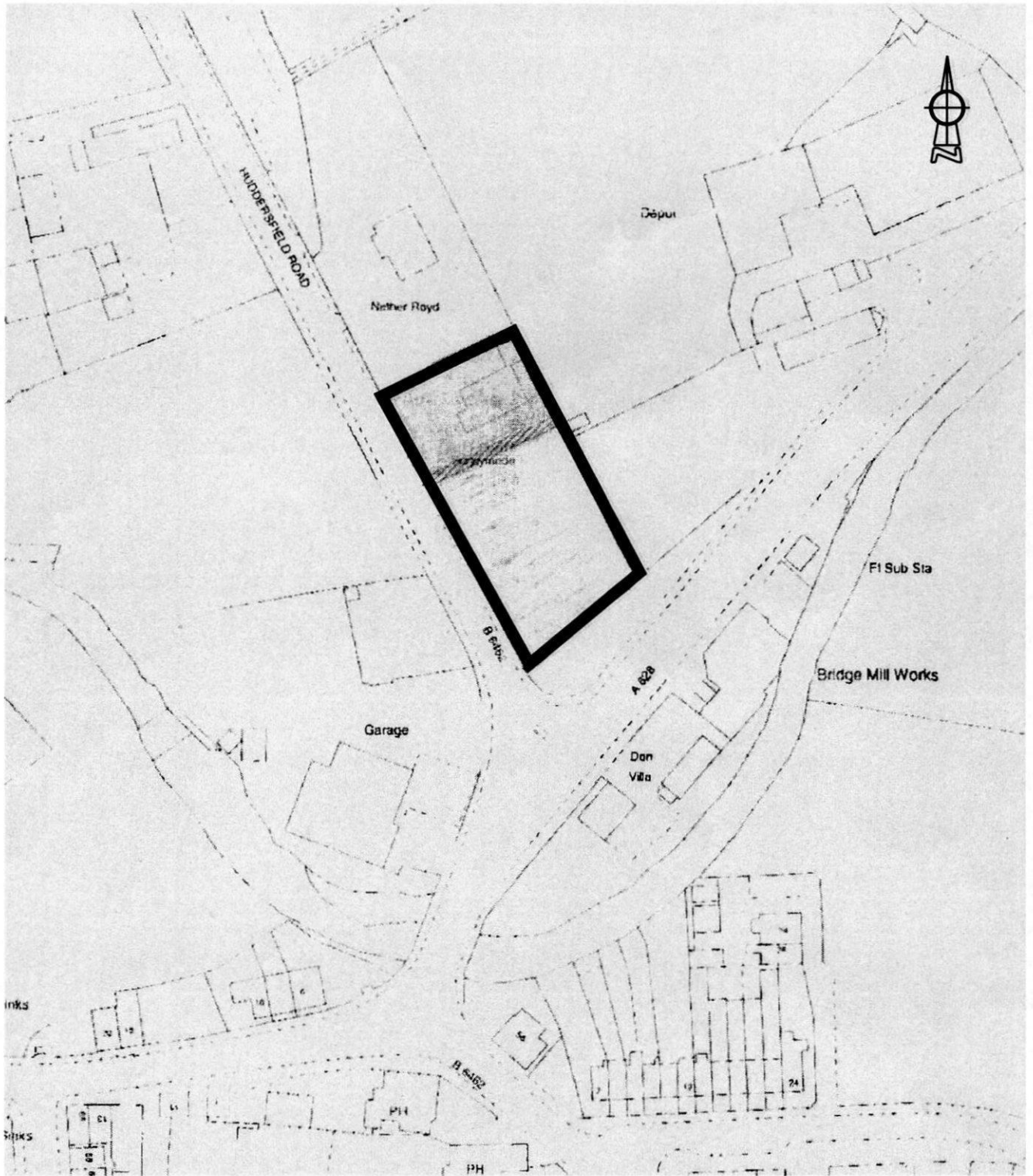
Title
SITE LOCATION PLAN

Project/Client
HUDDERSFIELD ROAD, PENISTONE.
JONES HOMES



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Amendment		Chk
Scale	NTS @ A4	MW
Date	SEPT 2011	Chk. ARP
Drg. No.	351/22/FR.01	Rev /



Rev	By	Date	Issued for approval	Amendment	Chk
/					

Title
SITE PLAN



Scale	NTS @ A4	Drawn	MW
Date	SEPT 2011	Chk.	ARP

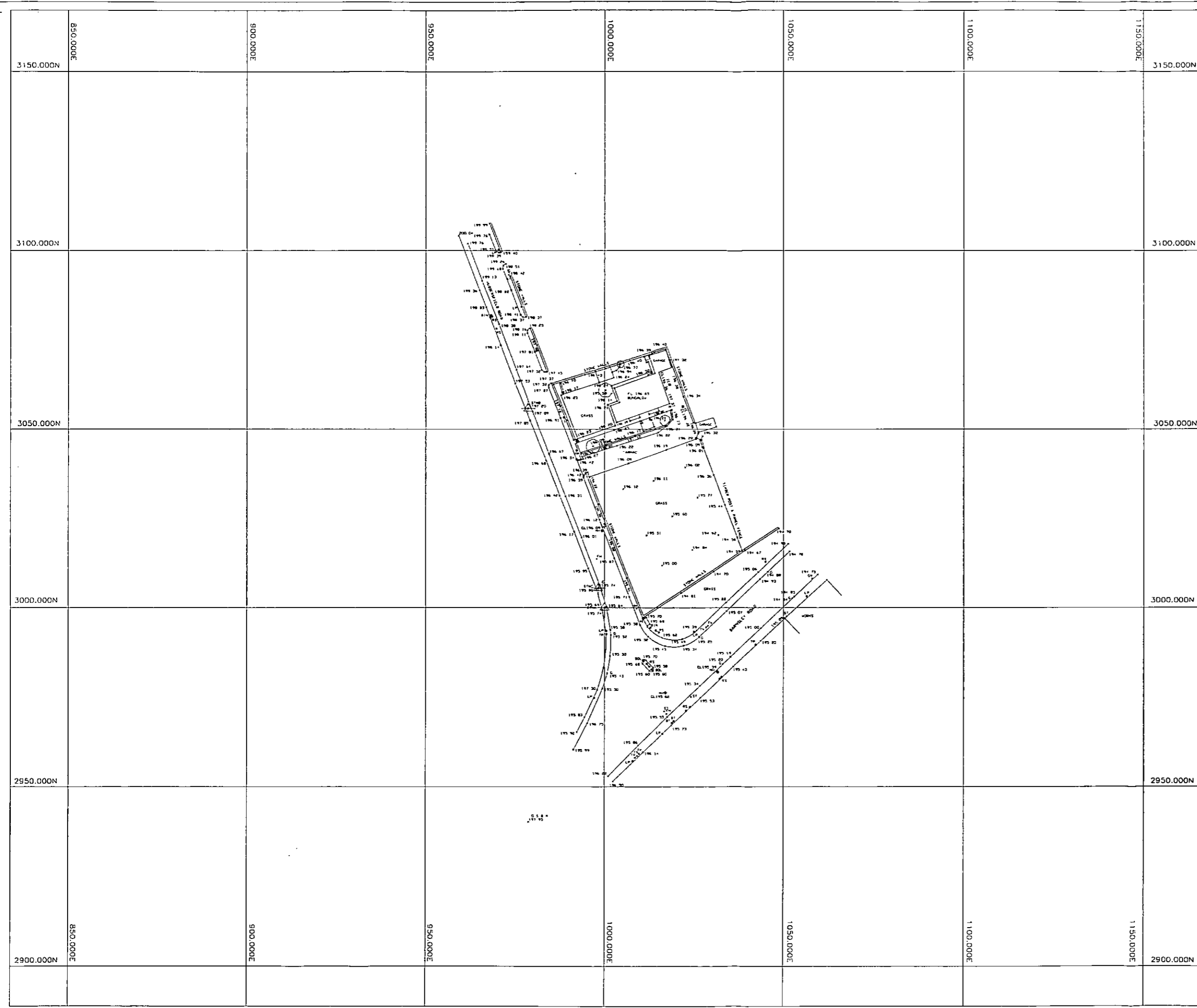
Project/Client
**HUDDERSFIELD ROAD, PENISTONE.
JONES HOMES**

Drg. No.
351/22/FR.02

Rev	/
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APPENDIX B

TOPOGRAPHICAL SURVEY



COORDINATED STATIONS

STATION	EASTING	NORTHING	LEVEL (m)
A	1000 000	3000 000	195 690
B	978 592	3055 817	197 201
C	988 251	3005 456	195 804

ABBREVIATIONS

AV	AIR VALVE/VENT	IC	INSPECT CHAMBER
BL	BOLLARD	IL	INVERT LEVEL
BB	BEYSHA BEADON	JKW	JAPANESE KNOTT WEED
BW	BENCH MARK	LH	LAMP HOLE
BL	BED LEVEL	LP	LAMP POST
BS	BUS STOP	NP	NAME PLATE
BT	BRITISH TELECOM	MH	MANHOLE
CL	COVER LEVEL	PS	POST/STCH POST
DA	DEAPMATED	PB	POST BOX
DW	DISUSED	PS	UNKNOWN SERVICE
EL	ELEC. JUNCT. BOX	RE	ROAD SIGN
EP	ELECTRICITY POLE	RE	ROAD SIGN
FM	FIRE HYDRANT	SI	STOP SIGN
FDS	FILL OF SEDIMENT	TH	TRIAL HOLE
FP	FLAG POLE	TL	TRAFFIC LIGHT
G	GULLY	TP	TELEGRAPH POLE
GM	GAS METER	TV	CABLE TV BOX
GV	GAS VALVE	UH	UNABLE TO LIFT
		WM	WATER METER

SYMBOLS

⊕	SURVEY STATION	⊗	TREE
—E—	OVN ELEC CABLE	⊕	BENCH MARK
—T—	OVN PHONE LINE	⊕	TRIAL PIT
⊕	CANDY/HEDGE	⊕	BORHOLE
⊗	JAPANESE KNOTT WEED		

- NOTES
- ONLY MAN-HOLES AND SERVICES VISIBLE AT TIME OF SURVEY SHOWN
 - LOCAL GRID USED AND ORIENTATED TO MAGNETIC NORTH
 - LEVELS IN METRES RELATED TO O.S.B.M. ON BRIDGE WALL ATA PUBLISHED VALUE OF 197.95m DATUM.
 - DRAINAGE INFORMATION TAKEN FROM LOCAL AUTHORITY RECORDS. INFORMATION MUST BE CHECKED PRIOR TO WORK COMMENCING

Rev	Description	Date
	PROPOSED DEVELOPMENT AT SUNNYMEDE, PENISTONE, SOUTH-YORKS	
	MICHAEL TITMAN ASSOCIATES	
	TOPOGRAPHICAL SURVEY	
MT001 / T00	Drawn S. FAIRHURST	
	Date FAB 2005	
	Scale 1:500	

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APPENDIX C

ENVIRONMENT AGENCY CONSULTATION

Allan Poyser

From: Andrew Radcliffe
Sent: Tuesday 27 September, 2011 9:27 am
To: Allan Poyser
Subject: FW: Your Enquiry: RFI/2011/20204
Attachments: Standard Notice.pdf; Advisory Text.pdf; VAT Receipt.pdf; RFI 20204 - Upper Don ISIS Hydraulic Model Summary Sheets.pdf; RFI 20204 - Flood Map.pdf; RFI 20204 - Flood History.pdf

From: Beech, Cheryl [mailto:Cheryl.Beech@environment-agency.gov.uk]
Sent: Tuesday 27 September, 2011 9:10am
To: Andrew Radcliffe
Subject: Your Enquiry: RFI/2011/20204

Our Ref: RFI/2011/

Your Ref: 351/22/ARPMjs

Dear Allan

RE: Huddersfield Road, Penistone

Thank you for your request of 5 September 2011 regarding the above.

Please see the enclosed extract from the Flood Map.

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

The Flood Map shows the following:

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

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

Flood History

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

Modelling – Upper Don Catchment – Flood Modelling

A more detailed modelling study into the Upper Don, River Loxley, River Rivelin and the River Little Don has been conducted. The Upper Don Flood Warning Improvements Report was produced by JBA Consulting in March 2007. See the enclosed ISIS Hydraulic Model Summary Sheets showing modelled water levels and flows for 5 different annual probabilities.

The site covered by this enquiry lies partly within Flood Zone 2. Any planning application for a site of this size would require the completion of a FRA. Advice on what this should cover given the scope of the development is given in the linked document.

<http://www.environment-agency.gov.uk/static/documents/Research/MoreVulnerable1.pdf>

When considering surface water drainage we offer the following advice:

Surface Water Runoff from Development Sites

Surface water discharge from new development should ideally 'mimic' the pre-development situation using a sustainable drainage system so that flow in watercourses is not increased. In normal circumstances surface water discharge from new development should be attenuated to the 'greenfield' 1 in 1 year flow from site, or lower than the existing rate of runoff for a pre-developed site.

Greenfield sites

The acceptable greenfield runoff rate is normally 5 litre/second/hectare, but you should consult with the Lead Local Flood Authority for variances in their district.

Brownfield sites

Surface water runoff should be attenuated to provide a minimum 30% reduction of surface water discharge when compared with the existing site outflow prior to redevelopment, unless otherwise agreed with the relevant drainage authority.

If a new discharge is required to a watercourse it should be limited to the acceptable greenfield runoff rate, also it must be ensured that any additional volume of surface water to the receiving watercourse will not cause flooding problems.

The attenuation system needs to be designed so there is no flooding to properties on or off site for rainfall events up to 1 in 100 year return period.

Any conventional adopted balancing facility should be designed to accommodate volume storage for at least the 1 in 30 year flow from the site below ground, with the 1 in 100 year flow retained within the site (including an allowance for climate change), without causing any flooding to buildings.

There are alternatives to conventional storage for the control of surface water run-off that are favoured by the Environment Agency where ground conditions are suitable.

Sustainable Urban Drainage techniques (SUDs) tackle surface water run-off problems at source using features such as soakaways, permeable pavements, grassed swales, infiltration trenches, ponds and wetlands to attenuate flood peak flows, produce water quality improvements and environmental enhancements. The Environment Agency seeks to promote the use of SUDs techniques to this site and expects the developer of the site to submit detailed investigations such that the use of SUDs has been fully explored.

More information on SUDs can be found at: <http://www.ciria.org.uk/suds/>

For information on Green Roofs in particular, please visit www.thegreenroofcentre.co.uk

This information is provided subject to the enclosed notice, which you should read.

If you have any queries or would like to discuss the content of this letter further please do not hesitate to contact us on the number below.

Yours sincerely

Cheryl Beech
External Relations Team
Direct Dial 0113 2134732
Email neyorkshire@environment-agency.gov.uk

<mailto:r@environment-agency.gov.uk>

Please note: I job share with Stacey Riley. I cover Tuesday, Wednesday & Thursday - Stacey covers Monday & Friday.

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Phoenix House
Global Avenue
Leeds LS11 8PG

Part of the Environment Agency's Yorkshire and North East Region

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

<https://web.questback.com/isa/gbv.dll/SQ?q=8w2Qkfx%2BivseokDpT0B1XBIMdadcYMuJJ8OUhDng6Hc%2Fbg%3D%3D>

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Flood History Map for Huddersfield Road, Penistone - dated 16/09/2011 [Ref: 20204]



www.environment-agency.gov.uk

Scale: 1:10,000

when reproduced @ A3



Flood Extents

Legend

- 2007 Flood Events Flood Extent
- Autumn 2000 Flood Event Flood Extent

Flood Map for Huddersfield Road, Penistone - Date Created 16/09/2011 [Ref: 20204]



www.environment-agency.gov.uk




Scale: 1:10,000



when reproduced @ A3

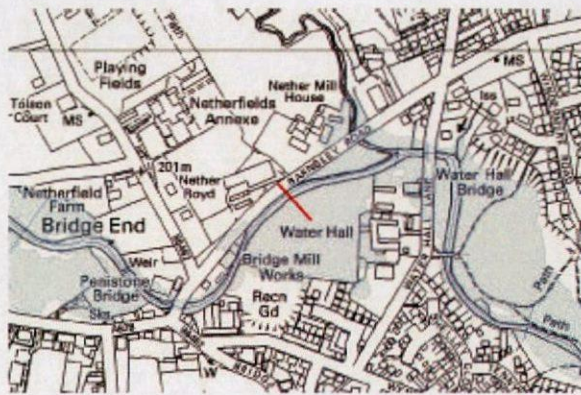


LEGEND

-  Main River
-  Flood Zone 3 (FZ3)
-  Flood Zone 2 (FZ2)



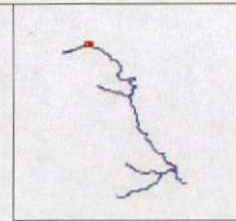
Location Plan



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Cross Section References

River: RIVER DON
 Reach: REACH 18
 Chainage: 27870
 Section Type: SECTION
 OS NGR: SE 24514 03802
 Survey Dwg Ref: N/A
 Photograph Ref: DON18_27870.JPG

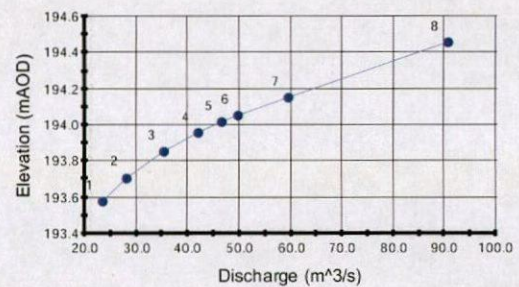


Next

Section d/s: 27718u
 Section u/s: 28100d



Rating Curve



Number represents model profile number

Summary of Results

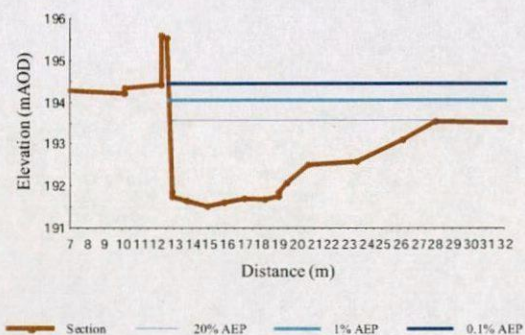
Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	20.0	23.5	193.582	1.32
2	10.0	28.1	193.709	1.32
3	4.0	35.4	193.856	1.32
4	2.0	42.0	193.959	1.32
5	1.3	46.5	194.019	1.32
6	1.0	49.7	194.054	1.32
7	0.5	59.4	194.152	1.32
8	0.1	90.4	194.457	1.32

Level of Left Bank 195.528 mAOD

Level of Right Bank 193.557 mAOD

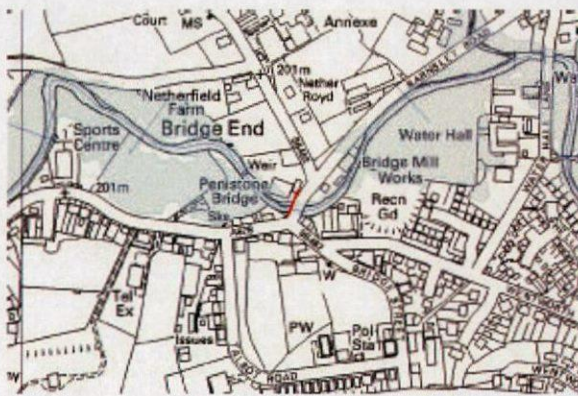
AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile



RIVER DON: REACH 18: CROSS SECTION NUMBER 27870

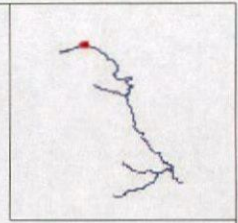
Location Plan



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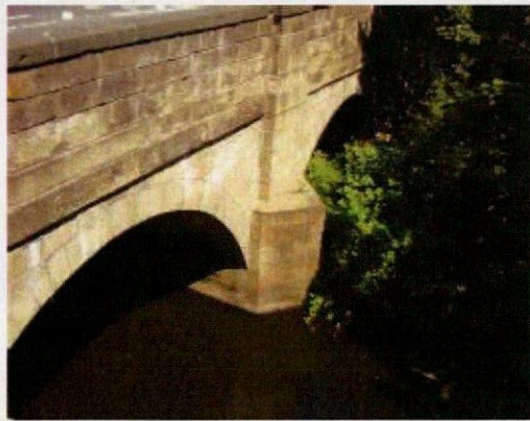
Cross Section References

River: RIVER DON
 Reach: REACH 18
 Chainage: 28100
 Section Type: BRIDGE, SECTION, SPILL
 OS NGR: SE 24356 03673
 Survey Dwg Ref: N/A
 Photograph Ref: DON18_28100us.JPG

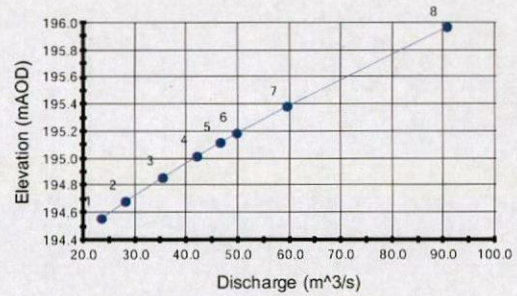


Next

Section d/s: 28100d
 Section u/s: 28180d



Rating Curve



Number represents model profile number

Summary of Results

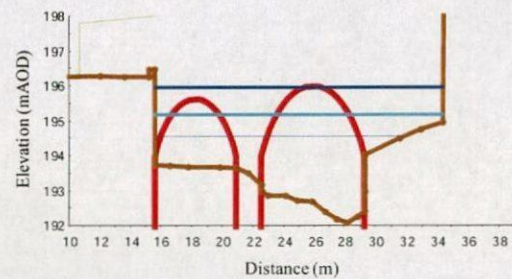
Profile No	AEP (%)	Flow (m ³ /s)	Water Level (mAOD)	Velocity (m/s)
1	20.0	23.5	194.564	1.16
2	10.0	28.1	194.690	1.26
3	4.0	35.4	194.862	1.40
4	2.0	42.0	195.019	1.49
5	1.3	46.5	195.121	1.54
6	1.0	49.7	195.188	1.58
7	0.5	59.4	195.384	1.69
8	0.1	90.4	195.966	1.84

Level of Left Bank 196.485 mAOD

Level of Right Bank 198.765 mAOD

AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile



Legend: Bridge (red), Section (brown), 20% AEP (blue), 1% AEP (light blue), 0.1% AEP (dark blue), Spill Level (green)

RIVER DON: REACH 18: CROSS SECTION NUMBER 28100U

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YorkshireWater

Jones Homes (Northern) Ltd
Green Bank House
Green Bank
CLECKHEATON
BD19 5LQ

For the attention of Steve Faram

Your Ref:
Our Ref: G002342 /sew/ndt/peh

Yorkshire Water
Waste Water - Sewerage
New Development Team
Knostrup WWTW
Knowsthorpe Lane
LEEDS
LS9 0PJ

Tel: (0113) 235 4148
Fax: (01274) 372 834

Email:
Planning.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:

Phillip Hoffmann on (0113) 235 4148

23rd March 2006

Dear Sir,

Land at Huddersfield Road, Panistone - Pre-Planning Sewerage Enquiry - Residential Development

Thank you for your enquiry of 21st March 2006. Our charge of £60.00 (plus VAT) will be added to your account with us, reference JHN-001. It has been noted that you have requested a response sent by fax and, if appropriate, our premium charge of £10.00 (plus VAT) will also be added to your account. You will receive an invoice for your account in due course.

Please find enclosed a complimentary extract from the Statutory Sewer Map. This indicates the recorded position of the public sewers. The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site:

The site should be developed with separate systems for foul and surface water drainage both on and off site. Foul water may discharge to the 150mm diameter public combined sewer recorded in Huddersfield and Barnsley Roads, at points adjacent to the site.

The developer's attention is drawn to Requirement H3 of the Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SUDS), for example the use of soakaways and/or permeable hardstanding etc., may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SUDS in this instance from the appropriate authorities.

Where appropriate, soakaways, swales and infiltration trenches (SUDS) may be adopted as part of the public sewer network. For general conditions for the adoption of SUDS please see the attached sheet. Further information may be seen in the DEFRA publication 'Interim Code of Practice for Sustainable Drainage Systems' (ISBN 0-88017-904-4). If the developer is considering adoption of SUDS he should contact the New Development Team at Sheffield on 0114 251 8321.

The local public sewers do not have capacity to accept any additional surface water discharge from this development. In the first instance, therefore, I would advise you to contact the

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Environment Agency/local Land Drainage Authority with a view to establishing a suitable watercourse for discharge. It is noted that a watercourse, River Don, is located close to the south of the site. This appears to be the obvious place for surface water disposal.

To prevent overloading of the existing public sewers, a storage tank - or some other means of flow attenuation - will be required to control the rate of discharge of surface water. Surface water discharge(s) to public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing/previous use of the site. To maintain the "status quo" in the public sewer network, any discharge of surface water from the site should take place with (a) similar rate(s) of flow and/or measured area(s) discharging to (a) similar point(s) of connection to that of the existing/previous use of the site. You will need to demonstrate this to Yorkshire Water by means of investigation and calculation carried out at your expense.

An off-site surface water sewer may be required which may be provided by the developer and considered for adoption under Section 104 of the Water Industry Act 1991. Please telephone 0114 251 8321 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0114 251 8321.

Prospectively adoptable sewers must be designed and constructed in accordance with the WRc publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition as supplemented by Yorkshire Water's requirements, pursuant to an agreement under Section 104 of the Water Industry Act 1991. An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our New Development Team at Sheffield (telephone 0114 251 8321, Fax 0114 251 8384) for further information.

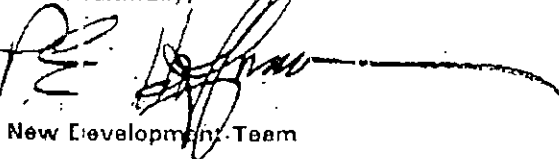
I would advise you to contact the Environment Agency for details of any flood levels affecting the site.

The public sewer network is for domestic sewage purposes. This generally means foul water for domestic purposes and, where a suitable surface water or combined sewer is available, surface water from the roofs of buildings together with surface water from paved areas of land appurtenant to those buildings. Land and highway drainage have no right of connection to the public sewer network. Land drainage will not be allowed into a public sewer. Highway drainage, however, may be accepted under certain circumstances; for instance, if SUDS are not a viable option and there is no highway drain available and if capacity is available within the public sewer network. In this event, the developer will be required to enter into a formal agreement with Yorkshire Water Services under Section 115 Water Industry Act 1991 to discharge non-domestic flows into the public sewer network.

Any new connection to an existing public sewer will require the approval of Yorkshire Water. You may obtain an application form by telephoning 0114 251 8321.

The above comments are based upon the information and records available at the present time. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not generally reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours faithfully,



New Development Team

Yorkshire Water

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.

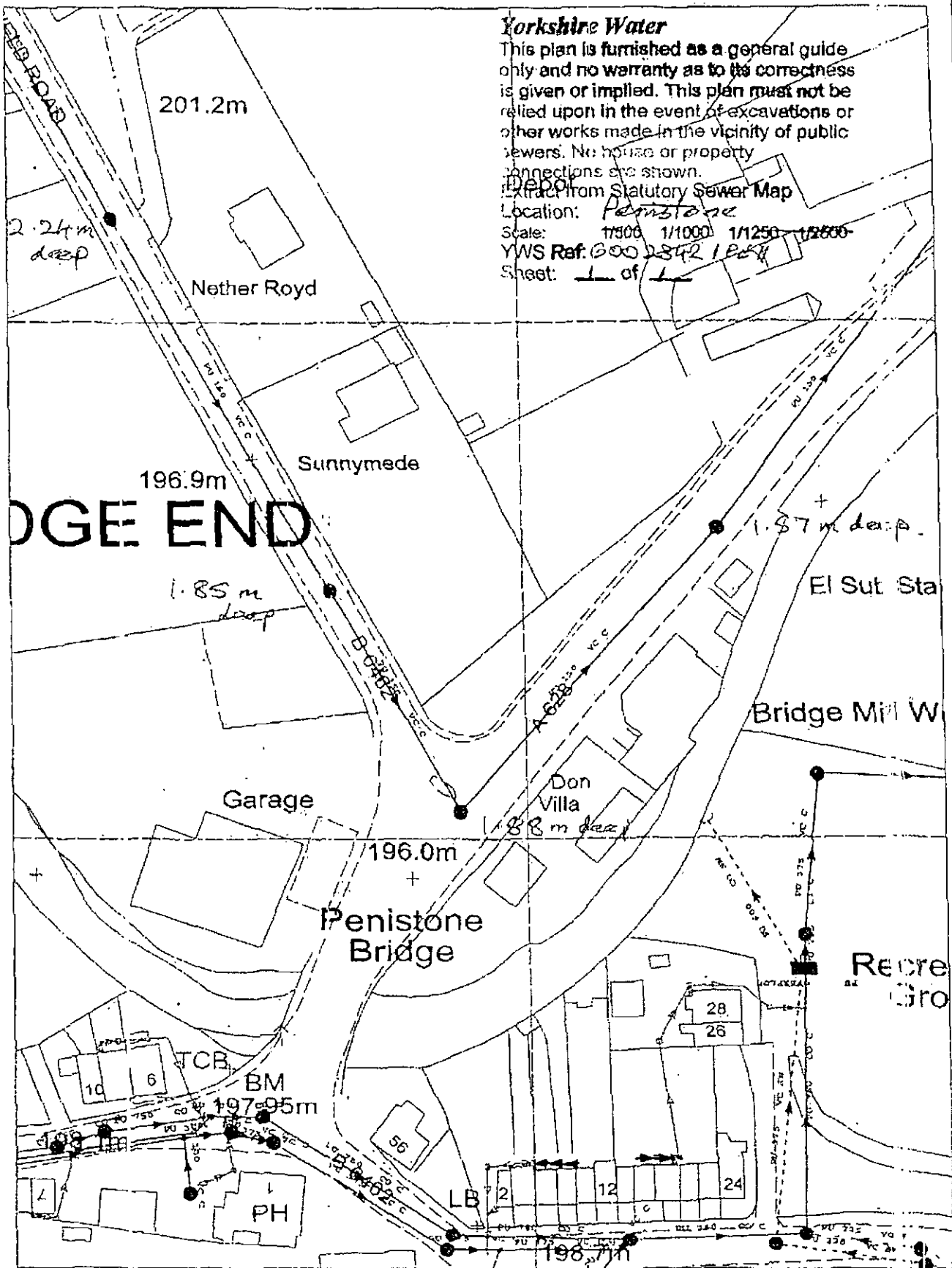
Extract from Statutory Sewer Map

Location: *Penstone*

Scale: 1/7500 1/10000 1/12500 1/25000

YWS Ref: 600 2342 1.854

Sheet: 1 of 1



Data Requested : 23/03/2006, 12:51:18

Date Generated : 23/03/2006, 12:51:35

Source :

UPN:

Originator:

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ATT00004

----- Forwarded by Peter Golightly/Waste Water/YWS/Yorkshire Water on
19/04/2006 13:43 -----

Philip James

philipjames@customnet.co.uk

Your Ref:
Our Ref: G003054

Yorkshire Water
Water - Sewerage
New Development Team
Knostrop WWTW
Knowsthorpe Lane
LEEDS
LS9 0PJ

Tel: (0113) 235 4152
Fax: (01274) 372 834

Email:
Planning.Sewerage@yorkshirewater.
co.uk
For telephone enquiries ring:
Peter Golightly on (0113) 235
4152

18th April 2006

Dear Sir,

Land at Huddersfield Road, Penistone - Sewerage Enquiry : Residential
Development

In response to your correspondence of the 11 April 2006, concerning the
surface water drainage of the above site..

Your attention is drawn to Requirement H3 of the Building Regulations 2000.
This establishes a preferred hierarchy for surface water disposal.
Consideration should firstly be given to discharge to soakaway,
infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SUDS), for example the use of soakaways
and/or permeable hardstanding etc., may be a suitable solution for surface
water disposal appropriate in this situation. You are advised to seek
comments on the suitability of SUDS in this instance from the appropriate
authorities.

where appropriate, soakaways, swales and infiltration trenches (SUDS) may
be adopted as part of the public sewer network. For general conditions for
the adoption of SUDS please see the attached sheet. Further information
may be seen in the DEFRA publication 'Interim Code of Practice for
Sustainable Drainage Systems' (ISBN 0-86017-904-4). If the developer is
considering adoption of SUDS he should contact our New Development Team at
Sheffield on 0114 251 8321.

There are local public sewers, however, these do not have capacity to
accept any additional surface water discharge from this development. In
the first instance, therefore, I would advise you to contact the
Environment Agency/local Land Drainage Authority with a view to
establishing a suitable watercourse for discharge.

Surface water discharge(s) to public sewer will be restricted to the level
of run-off - i.e. same rate of discharge - to that from the
existing/previous use of the site. To maintain the "status quo" in the
public sewer network, any discharge of surface water from the site should
take place with (a) similar rate(s) of flow and/or measured area(s)

Page 1

ATT00004

discharging to (a) similar point(s) of connection to that of the existing/previous use of the site. You will need to demonstrate this to Yorkshire water by means of investigation and calculation carried out at your expense. Otherwise surface water should be restricted as not to exceed 6 (six) litres per second.

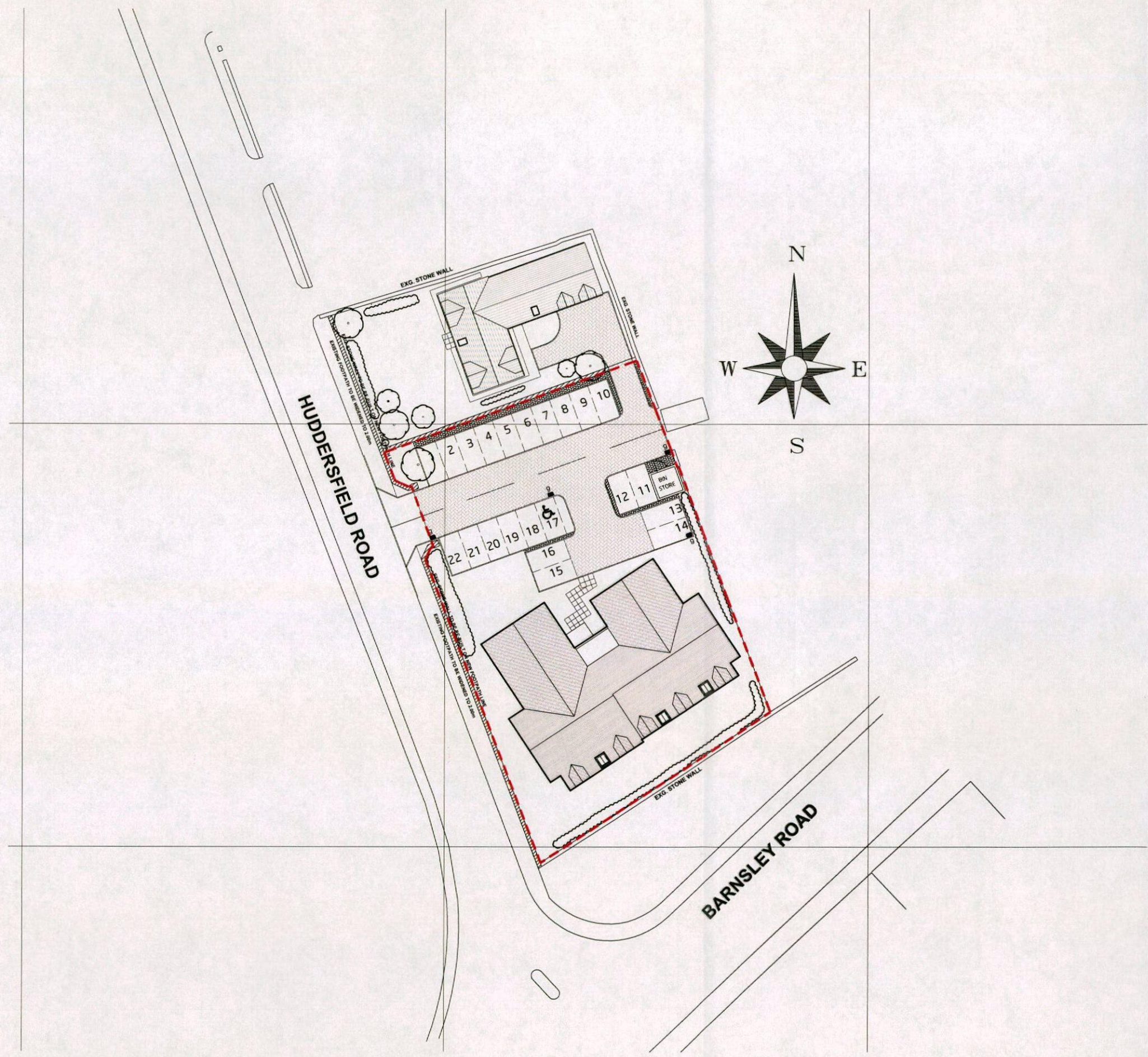
Prospectively adoptable sewers must be designed and constructed in accordance with the WRC publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition as supplemented by Yorkshire water's requirements, pursuant to an agreement under Section 104 of the Water Industry Act 1991. An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our New Development Team at Sheffield (telephone 0114 251 8321, Fax 0114 251 8384) for further information.

Yours faithfully

Peter Golightly
Senior New Development Engineer

APPENDIX E


SKETCH LAYOUT OF PROPOSED DEVELOPMENT



Huddersfield Rd, PENISTONE

DO NOT SCALE - ALL DIMENSIONS & LEVELS TO BE CHECKED ON SITE - THIS DRAWING IS COPYRIGHT

revision	date	contents	initials
project Huddersfield Road Penistone			
client Jones Homes			
title Site Layout			
date 10/06/11	scale 1:500@A3	drawn OMB	
drawing number 2416_100		checked 	



Niemen Architects
 Deck 2 The Waterscape
 42 Leeds & Bradford Road
 Kirkstall Leeds LS5 3EG
 Tel: 0113 239 5400
 Fax: 0113 239 5401
 office@niemen.co.uk
www.niemen.co.uk

APPENDIX F

INDICATIVE SURFACE WATER DRAINAGE CALCULATIONS

Northwest House
Servia Hill
Leeds LS6 2QH

Jones Homes
Huddersfield Rd
351/22PrelimStore30yr



Date 28-09-11
File 351-22PrelimStore30yr@6I-s.SRC

Designed By ARP
Checked By

Elstree Computing Ltd

Source Control W.11.2

Summary of Results for 30 year Return Period (+30%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Overflow (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Overflow Volume (m³)	Maximum Volume (m³)	Status
15 Summer	4.8	0.0	4.8	100.7553	0.7553	0.0	13.9	O K
30 Summer	5.1	0.0	5.1	100.8738	0.8738	0.0	16.4	O K
60 Summer	5.3	0.0	5.3	100.9253	0.9253	0.0	17.4	O K
120 Summer	5.2	0.0	5.2	100.8963	0.8963	0.0	16.9	O K
180 Summer	5.0	0.0	5.0	100.8313	0.8313	0.0	15.5	O K
240 Summer	4.8	0.0	4.8	100.7613	0.7613	0.0	14.0	O K
360 Summer	4.5	0.0	4.5	100.6328	0.6328	0.0	11.1	O K
480 Summer	4.5	0.0	4.5	100.5152	0.5152	0.0	8.5	O K
600 Summer	4.5	0.0	4.5	100.4032	0.4032	0.0	6.0	O K
720 Summer	4.5	0.0	4.5	100.3012	0.3012	0.0	4.0	O K
960 Summer	4.4	0.0	4.4	100.1937	0.1937	0.0	2.0	O K
1440 Summer	3.4	0.0	3.4	100.1288	0.1288	0.0	1.1	O K
2160 Summer	2.6	0.0	2.6	100.0868	0.0868	0.0	0.6	O K
2880 Summer	2.1	0.0	2.1	100.0697	0.0698	0.0	0.4	O K
4320 Summer	1.5	0.0	1.5	100.0518	0.0517	0.0	0.2	O K
5760 Summer	1.2	0.0	1.2	100.0417	0.0417	0.0	0.1	O K
7200 Summer	1.0	0.0	1.0	100.0352	0.0352	0.0	0.1	O K
8640 Summer	0.9	0.0	0.9	100.0307	0.0307	0.0	0.1	O K
10080 Summer	0.8	0.0	0.8	100.0277	0.0277	0.0	0.1	O K
15 Winter	5.0	0.0	5.0	100.8483	0.8483	0.0	15.9	O K
30 Winter	5.5	0.0	5.5	101.0118	1.0118	0.0	19.0	O K
60 Winter	5.7	0.0	5.7	101.0818	1.0818	0.0	20.2	O K
120 Winter	5.5	0.0	5.5	101.0023	1.0023	0.0	18.9	O K
180 Winter	5.1	0.0	5.1	100.8858	0.8858	0.0	16.6	O K
240 Winter	4.8	0.0	4.8	100.7743	0.7743	0.0	14.3	O K
360 Winter	4.5	0.0	4.5	100.5772	0.5772	0.0	9.9	O K
480 Winter	4.5	0.0	4.5	100.3772	0.3772	0.0	5.5	O K
600 Winter	4.5	0.0	4.5	100.2148	0.2147	0.0	2.4	O K
720 Winter	4.1	0.0	4.1	100.1732	0.1732	0.0	1.7	O K
960 Winter	3.3	0.0	3.3	100.1247	0.1248	0.0	1.0	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	87.45	20
30 Summer	58.87	32
60 Summer	38.01	50
120 Summer	23.82	84
180 Summer	17.91	118
240 Summer	14.54	152
360 Summer	10.84	218
480 Summer	8.79	280
600 Summer	7.47	340
720 Summer	6.53	394
960 Summer	5.28	496
1440 Summer	3.91	738
2160 Summer	2.89	1104
2880 Summer	2.33	1472
4320 Summer	1.72	2200
5760 Summer	1.39	2928
7200 Summer	1.17	3632
8640 Summer	1.02	4392
10080 Summer	0.91	4976
15 Winter	87.45	20
30 Winter	58.87	34
60 Winter	38.01	52
120 Winter	23.82	90
180 Winter	17.91	128
240 Winter	14.54	162
360 Winter	10.84	230
480 Winter	8.79	290
600 Winter	7.47	328
720 Winter	6.53	380
960 Winter	5.28	496

Northwest House
 Servia Hill
 Leeds LS6 2QH

Jones Homes
 Huddersfield Rd
 351/22PrelimStore30yr



Date 28-09-11
 File 351-22PrelimStore30yr@6l-s.SRC
 Elstree Computing Ltd

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 Checked By
 Source Control W.11.2

Summary of Results for 30 year Return Period (+30%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Overflow (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Overflow Volume (m ³)	Maximum Volume (m ³)	Status
1440 Winter	2.5	0.0	2.5	100.0847	0.0848	0.0	0.5	O K
2160 Winter	1.9	0.0	1.9	100.0628	0.0628	0.0	0.3	O K
2880 Winter	1.5	0.0	1.5	100.0508	0.0508	0.0	0.2	O K
4320 Winter	1.1	0.0	1.1	100.0372	0.0372	0.0	0.1	O K
5760 Winter	0.9	0.0	0.9	100.0303	0.0302	0.0	0.1	O K
7200 Winter	0.8	0.0	0.8	100.0257	0.0257	0.0	0.1	O K
8640 Winter	0.7	0.0	0.7	100.0222	0.0222	0.0	0.0	O K
10080 Winter	0.6	0.0	0.6	100.0202	0.0203	0.0	0.0	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
1440 Winter	3.91	738
2160 Winter	2.89	1108
2880 Winter	2.33	1432
4320 Winter	1.72	2152
5760 Winter	1.39	2856
7200 Winter	1.17	3584
8640 Winter	1.02	4456
10080 Winter	0.91	5032

Northwest House
 Servia Hill
 Leeds LS6 2QH

Jones Homes
 Huddersfield Rd
 351/22PrelimStore30yr



Date 28-09-11
 File 351-22PrelimStore30yr@6l-s.SRC
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 Checked By
 Source Control W.11.2

Rainfall Details

Region	ENG+WAL	Cv (Summer)	0.750	Summer Storms	Yes
Return Period (years)	30	Cv (Winter)	0.840	Winter Storms	Yes
M5-60 (mm)	19.000	Shortest Storm (mins)	15	Climate Change %	+30
Ratio-R	0.327	Longest Storm (mins)	10080		

Time / Area Diagram

Total Area (ha) = 0.108

Time	(mins)	Area	Time	(mins)	Area	
from:	to:	(ha)	from:	to:	(ha)	
	0	4	0.000	4	8	0.108

Northwest House
 Servia Hill
 Leeds LS6 2QH

Jones Homes
 Huddersfield Rd
 351/22PrelimStore30yr



Date 28-09-11
 File 351-22PrelimStore30yr@6l-s.SRC
 Elstree Computing Ltd

Designed By ARP
 Checked By
 Source Control W.11.2

Circular Pipe Details

Diameter (m) 1.200 Length (m) 18.000 Cover Level (m) 103.000
 Slope (1:x) 500.0 Invert Level (m) 100.000

Hydro-Brake Outflow Control

Design Head (m) 1.236 Hydro-Brake Type MD6 Invert Level (m) 100.000
 Design Flow (l/s) 6.0 Diameter (mm) 98

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.10	2.9	0.60	4.4	1.60	6.9	2.60	8.8	5.00	12.2	7.50	14.9
0.20	4.5	0.80	4.9	1.80	7.3	3.00	9.4	5.50	12.8	8.00	15.4
0.30	4.3	1.00	5.5	2.00	7.7	3.50	10.2	6.00	13.4	8.50	15.9
0.40	4.1	1.20	6.0	2.20	8.1	4.00	10.9	6.50	13.9	9.00	16.4
0.50	4.2	1.40	6.5	2.40	8.4	4.50	11.6	7.00	14.4	9.50	16.8

Weir / Flume Overflow Control

Discharge Coef 0.544 Width (m) 2.100 Crest Level (m) 101.236