Report No.

374/19

FLOOD RISK ASSESSMENT REPORT

ON SITE OF

WOMBWELL MILLS
WOMBWELL
BARNSLEY

ON BEHALF OF

STRATA GROUP LIMITED

MAY 2010

ARP ASSOCIATES
CHARTERED CONSULTING ENGINEERS
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APPENDICES

1.0 INTRODUCTION

1.1 Strata Group Limited are proposing to redevelop the former Wombwell Mills site at Wombwell with residential development. It was decided that a Flood Risk Assessment Report should be prepared to assist in the viability of the project and supplement the planning submission.

1.2 As part of the Planning Application, Planning Policy Statement PPS3 "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 PPS25 "Development and Flood Risk", 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 were carried out, originally in March 2006, but have subsequently been reassessed in April and May 2010.

2.0 WALKOVER SURVEY

General

2.1 The site is situated on the northwest edge of Wombwell town centre and is located at Ordnance Survey Grid Reference SE 388 042. The site is basically rectangular and equates to an area of around 2ha.

2.2 A site location plan and site layout is presented in Appendix A.

Current Use

2.3 The site was formerly occupied by a large disused factory building with associated offices and concrete and bituminous hardpaving throughout, apart from a grass banking to the rear southern part of the site. However, the buildings have been recently demolished apart from a very small section towards the northwestern side and the whole area has been "capped" with a brick rubble cover.

Boundaries

2.4 The site is surrounded by a metal post and chain-link fence on the northern and western boundaries, whilst there are timber fencing, walls and hedges forming the southern and eastern boundaries adjacent to residential property beyond. The site is bounded by Barnsley Road to the north and Aldham House Lane to the west.

Topography and Vegetation

2.5 The site is basically level with a slight fall from south to north but there is a steep banking on the southern boundary and part of the eastern boundary up to the level of residential development beyond. Barnsley Road falls from southeast to northwest by around 1m, but the original factory had a level floor and adjacent hardstanding. A retaining wall is

located on the southeastern corner and Aldham House Lane is slightly above the ground level on the northwestern corner.

2.6 The main site has a rubble finish with no vegetation, but, on the grass banking, there are some semi-mature trees and bushes, which become more dense on the eastern boundary.

Drainage

2.7 During the inspection in March 2006, positive gutters and rainwater downpipes were noted on the buildings and gullies were present on the concrete hardstanding which clearly discharged to a positive drainage system. There was a series of manholes around the site, but it was not possible to confirm the point of discharge at that time. Since demolition of the buildings, the concrete hardstandings have been removed and the drainage system is now defunct.

2.8 Any natural run-off from the site will fall from south to north towards Barnsley Road.

2.9 There are no watercourses on the site and the River Dove, which is located beyond a dismantled railway, is approximately 200m to the north.

3.0 ENVIRONMENT AGENCY CONSULTATION

3.1 A consultation was requested from the Environment Agency, and a copy of their response, reference RFI/2010/13834 dated 13th April 2010, is presented in Appendix B for reference.

3.2 The site is located within Flood Zone 1, which is land outside the flood plain as shown on the flood zone maps.

3.3 Any flooding from other sources, such as small or culverted watercourses, public sewers, highway drains or overland surface water flow will need to be assessed and reference is made to a watercourse near to the site, which is maintained by the Local Authority.

4.0 WATER AUTHORITY CONSULTATION

4.1 A consultation was requested from Yorkshire Water, who are the Water Authority for this area, and a copy of their response, reference G000535 dated 27th April 2010, is presented in Appendix C for reference.

4.2 There is a 375mm diameter public combined/water sewer crossing the site. No buildings are to be erected within 3m, nor trees planted within 5m of the public sewer. Levels above the sewer may also need to be maintained and any diversion will need to be undertaken in accordance with Section 185 of the Water Industry Act 1991, and be subject to an Application made in writing.

4.3 Foul water can discharge to the 375mm diameter public combined sewer crossing the site.

4.4 In respect of surface water, reference is made to Requirement H3 of Building Regulations 2000 and sustainable drainage systems.

4.5 The local public sewer network does not have capacity to accept any additional discharge of surface water from the proposal site. Therefore, any curtilage surface water discharging to the public sewer will be restricted to the existing level run-off and take into account a 30% reduction in discharge from the site and climatic change. It will be necessary for the Developer to carry out an investigation of the existing and proposed drainage layout with pipe sizes, gradients and connection points, measure impermeable areas of the present and proposed use of the site, along with calculations to show that the existing and proposed discharge rate from the site to the public sewer before agreeing to any outfall connection.

4.6 No land drainage is to be connected or discharged to the public sewer.

5.0 LAND DRAINAGE AUTHORITY CONSULTATION

5.1 A consultation was requested from Barnsley Metropolitan Borough Council, who are the Land and Drainage Authority for this area, and a copy of their response, reference EMDRD/SK dated 6th May 2010, is presented in Appendix D for reference purposes.

5.2 Reference is made to the Barnsley MBC original letter of the 27th January 2006 and a copy is also presented in Appendix D for reference purposes.

5.3 There is no record of any flooding incidents in this area and there is no recommendation with regard to finished floor levels of any future development.

5.4 The only watercourse is the River Dove which is 220m northwest along the A633 trunk road. This is classified as a main river and, as such, consultations should be undertaken with the Environment Agency.

5.5 In recent times, the paved area and associated on site drainage system have been stripped from the site. This has caused flooding on the northeastern boundary resulting in water being shed onto the A68 Wombwell Lane. As a result, a temporary bund has been installed by the former Owner to reduce this incidence of flooding.

6.0 MATERIAL CONSIDERATION IN RESPECT OF PPS25

Flood Classification

6.1 The consultation with the Environment Agency has identified that the site falls within land assessed as having a 1 in 1000 annual probability of river or sea flooding in any one year (less than 0.1%). In accordance with Table D1, Annex D of PPS25, the site falls within Flood Zone 1 "low probability".

6.2 Therefore, all uses of land are appropriate within this Flood Zone, but an assessment of the effect of surface water run-off will need to be incorporated in any Flood Risk Assessment.

End Use

6.3 The development proposal is for the construction of residential development on the site. A copy of the proposed development layout is presented in Appendix E for reference purposes.

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" category.

Sequential Test

6.5 Annex D of PPS25 states that the risk based Sequential Test should 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 of Annex D PPS25, the development shows that the Sequential Test is satisfied and the Exception Test is not required in this instance.

Flood Sources

6.7 Flooding from Rivers - The nearest River is the River Dove over 200m to the northwest of the site and this is maintained by the Environment Agency. The consultation from the Environment Agency confirms that there is no flooding from this source and the site is unaffected from this source of flooding.

6.8 Flooding from Local Watercourses - The consultation with the Land Drainage Authority (Barnsley MDC) has identified that there are no local watercourses in the vicinity of the site, and that the nearest watercourse is the River Dove maintained by the Environment Agency. Therefore, there would be no flooding from this source.

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

6.10 Flooding from Land - The site is situated adjacent to residential and industrial built up development with hardpaved areas serviced by positive drainage systems throughout, and it is highly unlikely that flooding will occur from overland run-off. Whilst the land to the south is raised above the level of the site, this is relatively level with only gentle fall towards the north and there is unlikely to be significant run-off at the southern boundary. There is a steep grass banking within the site and it may be necessary to accommodate cut-off drains along the bottom of the embankment to prevent significant run-off and flooding of houses, but this will need to be assessed when the final levels of the houses and external works have been determined. This will need to be considered as part of the Flood Risk Assessment.

6.11 Flooding from Groundwater - Whilst there is no ground investigation, it is known that the site falls within the Middle Coal Measures natural strata, which are likely to be cohesive in nature. These soils will prevent issues of groundwater on the site and, 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 there is an existing sewer crossing the proposed development. It is quite possible, therefore, that any blockage of the sewers will result in flooding from the lowest cover level of manholes or gullies, and this will need to be considered as part of any proposed development.

6.13 Flooding from Reservoirs, Canal 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 site is basically level, but the surrounding land falls from south to north and gardens to the houses fronting onto Aldham House Lane are raised above the level of the site. However, there is only gentle fall towards the boundary. 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 shows that, for an anticipated life of 50 years for any new development, the anticipated increase in rainfall will be around 20%. It will be necessary to design any new positive drainage system with a 20% increase in capacity to accommodate this requirement.

Flood Mitigation

6.17 As the site falls within Flood Zone 1, there are no requirements for mitigation measures for this particular site. However, in the event of a catastrophic storm or blockage of the existing or proposed sewers, it will be necessary to consider some precautionary measures, as follows:-

6.17.1 Ground floor levels to the proposed properties should be set at a minimum of 150mm above the external ground levels, and preferably 300mm above the ground level, where possible.

6.17.2 Properties should be designed without any underfloor basements and shall be constructed with concrete ground floors to avoid any sub floor voids.

6.17.3 Incoming electricity supplies shall be raised above ground level and ground floor electric sockets should be served by loops from first floor level.

6.17.4 It will be necessary to ensure that there is a route for floodwater through the site without causing flooding of buildings. To achieve this, all external levels shall be a minimum of 150mm, or preferably 300mm below the ground floor level of properties and the proposed alignment across the site shall be designed to ensure that there is always a route for water without causing ponding.

6.17.5 Finished levels and external ground levels towards the southern boundary will need to be designed carefully to accommodate the existing steep embankment at this location. If the banking is to be retained for any significant height, it is possible that surface water run-off, during times of heavy storm, will need to be controlled. Any such controls will need to form part of the external works design and divert water away from buildings to prevent flooding.

Sustainable Drainage

6.18 In order to comply with the requirements of PPS25, it will be necessary to consider aspects of sustainable drainage techniques for the new development. Whilst no intrusive investigation has been carried out, the geological map shows that the site is located on the Oaks Rock sandstone outcrop of the Middle Coal Measures with no evidence of drift cover, although the upper few metres are likely to be weathered to a stoney clay material. This material is likely to be impermeable and the sandstone would only have medium permeability. Furthermore, there are coal seams close to the surface which may have been worked and the discharge of surface water in these areas is considered to be unacceptable. Therefore, soakaway or other similar sustainable infiltration systems are not considered to be suitable at this location and, for the purposes of this report, it is assumed that a full drainage system will be required with discharge to the existing sewers in the vicinity of the site.

Drainage

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

6.20 Existing Surface Water Run-Off - The site is presently derelict, but, until recently, there was a large factory building with associated offices and concrete and bituminous hardpaving throughout. The roof and hard paved areas discharged into a positive surface water and combined systems running around the building. These systems either discharge into the public sewer crossing the site or the public surface water sewer within Barnsley Road. A plan was obtained from Barnsley Metropolitan Council in 2006 showing how the drainage system around the building and hardstandings were formed, and a copy of the plan is presented in Appendix F for reference purposes. The combined drainage system around the building covers an impermeable area of approximately 5,040m², which, using a standard 50mm/hr storm, equates to a discharge rate of 70l/s. This connects to the 375mm diameter public combined sewer crossing the site. The

remaining impermeable area of 8,630m², generating a flow of 120l/s using a 50mm/hr storm, connects to the 300m diameter surface water sewer in Barnsley Road, via the onsite surface water drains. However, the existing 300mm diameter water system within Barnsley Road is laid at a gradient of approximately 1 in 200, which gives a maximum flow capacity of 78l/s, which is far less than the calculated discharge rate of 120l/s. Therefore, it is concluded that the existing on-site surface water system goes into surcharge and that the maximum discharge rate should not be greater than 78l/s to this location.

6.21 Proposed Surface Water Drainage - The existing buildings and hardpaving areas have been shown to discharge to both the 375mm diameter combined sewer at a rate of 70l/s and the existing surface water sewer in Barnsley Road at a rate of no greater than 78l/s. Taking into account the Yorkshire Water requirement of a 30% reduction in existing surface water discharges from the site, the allowable discharge rates are 49l/s to the combined sewer and 54l/s to the surface water sewer in Barnsley Road. Assuming that the proposed impermeable area on the site equates to around 50% of the total site area and that the outfalls are split equally to the combined sewer and the surface water sewer, indicative calculations have been carried out using the WinDES Source Control Program to assess the relative attenuations. Making an allowance for 20% increase in rainfall for climatic change and restricting discharge to the levels stated above, on site storage of 59.0m³ will be required to the combined sewer and 54.9m³ to the surface water sewer for a 1 in 30 year storm. This can be achieved by several methods, including oversized pipes, underground tanks or balance ponds. One such option would be to provide 51m of 1.2m diameter oversized pipe or equivalent to the combined sewer and 48m of 1.2m diameter oversized pipe or equivalent to the surface water sewer. The indicative surface water drainage calculations are presented in Appendix G. 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. Due to the site layout, it is possible that the above attenuations may need to be increased to prevent the 1 in 100 year storm water running off site. 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 375mm diameter public combined sewer crossing the site.

6.23 Existing Sewers - The existing sewer crossing the site will need to be retained and the existing levels maintained above the sewer, or an application made for diversion under Section 185 of the Water Industry Act 1991.

Emergency Egress During Times of Flood

6.24 It is a requirement under Planning Policy Statement PPS25 that occupants should be able to egress any building during times of flood, without being trapped by flood conditions.

6.25 *As the site falls within Flood Zone 1, there are no mitigation measures required for* emergency egress during times of flood.

7.0 COMMENT

7.1 The site falls within Flood Zone 1 and the Sequential Test is satisfied. Therefore, there are no mitigation measures required in respect of flooding on the site. However, in order to accommodate the possibilities of flood from extreme storm or blocked sewers, then the following mitigation measures are recommended:-

7.1.1 Ground floors to the properties are to be constructed at a minimum level of 150mm above existing ground levels and preferably 300mm wherever possible.

7.1.2 The properties are to be designed without any below ground basements and ground floors should be constructed using solid concrete slabs without sub floor voids.

7.1.3 Incoming electricity supplies shall be raised above ground level and ground floor electric sockets shall be served by loops from first floor level.

7.1.4 The proposed development will be designed with external levels below proposed ground floor levels to properties in all circumstances and with a sufficient slope to ensure that any overland floodwater from blocked sewers will pass through the site without causing ponding or flooding to building.

7.1.5 External levels and floors levels shall be designed to accommodate the steep sloping embankment within the site near to the southern boundary. If the slope is to be retained as part of the external levels, then it will be necessary to consider any significant run-off of surface water from the banking during times of storm. Precautionary measures, such as cut-off drains, will need to be considered in this event. Details shall be submitted to the Planning Authority for approval.

7.2 Climatic change for a 20% increase in rainfall shall be incorporated into any new positive drainage design.

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 existing rates of run-off, less an allowance for 30% to meet Yorkshire Water requirements, and detailed calculations shall be submitted to the Planning Authority and Yorkshire Water for approval prior to construction on site. Indicative calculations show that discharge rates of 49l/s to the existing combined sewer on the site and 54l/s to the surface water sewer in Barnsley Road will be appropriate.

7.5 The proposed surface water drainage system shall be designed with an allowance for climatic change, and restricted to the agreed discharge rates with appropriate attenuation proposals incorporated into the design. The design, detail and calculations shall be submitted to the Planning Authority for approval prior to construction on site.

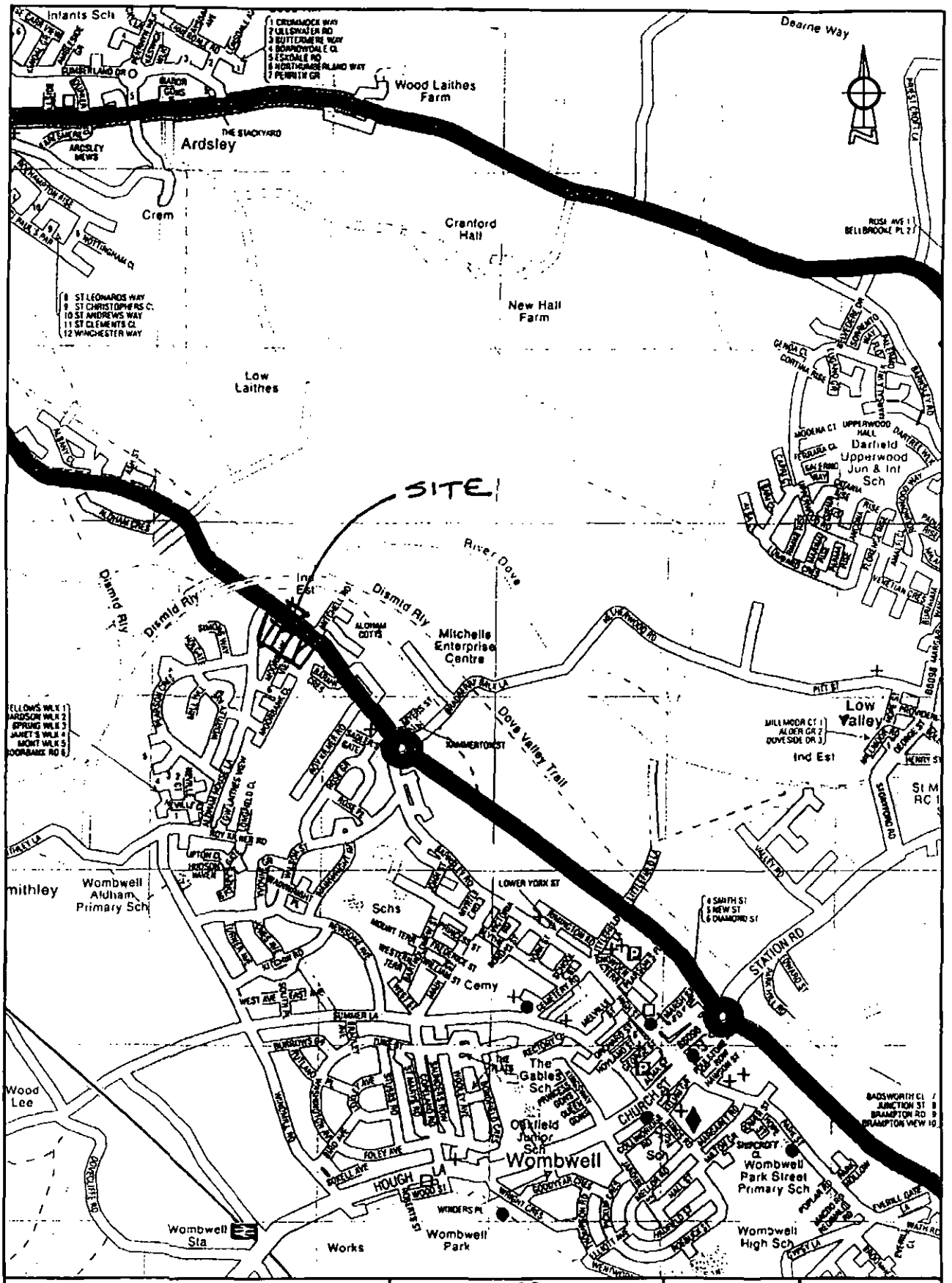
7.6 The existing sewer shall either remain in place with ground levels unchanged, or be diverted under Section 185 Agreement of the Water Industry Act 1991, in agreement with Yorkshire Water.

7.7 No special mitigation measures are required for emergency egress during times of flood.

7.8 Subject to compliance with the above, the proposed development can satisfy the requirements of Planning Policy Statement PPS25 "Development and Flood Risk".

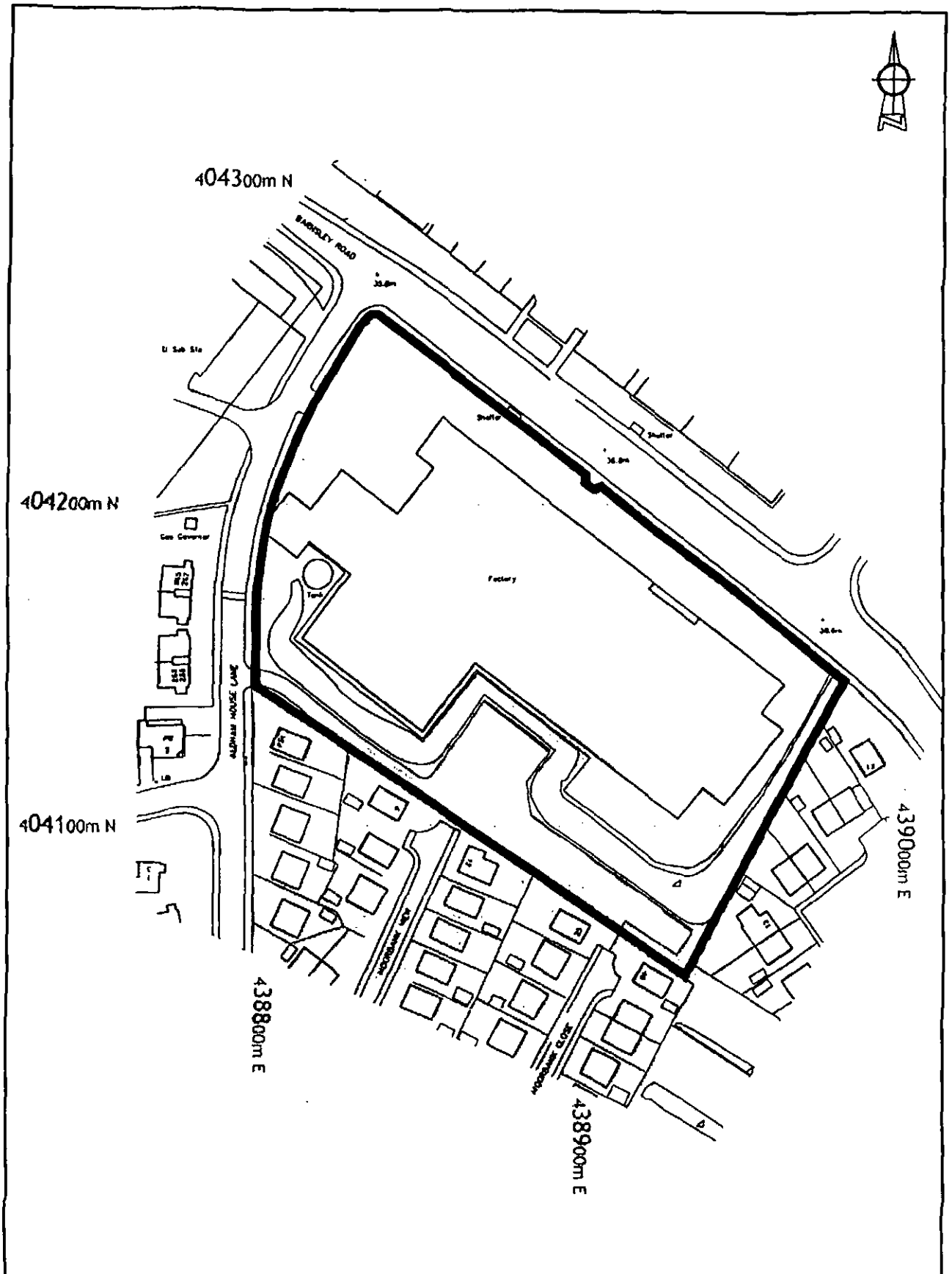
APPENDIX A

SITE LOCATION PLAN AND SITE PLAN



Title: SITE LOCATION PLAN		Scale: NTS	Drawn: MW
		Date: APR 10	Chk.: ARP
Project/ Client: WOMBWELL MILLS, WOMBWELL STRATA GROUP		Drg. No.: 374/19/FR.01	Rev.: /

ARP ASSOCIATES
CHARTERED CONSULTING ENGINEERS
Northwest House • 5/6 Northwest Business Park
Servia Hill • Leeds LS6 2QH
Telephone : 0113 245 8498 • Fax : 0113 244 3864
E-Mail : leeds@arpassociates.co.uk



Title: SITE LAYOUT	ARP ASSOCIATES CHARTERED CONSULTING ENGINEERS Northwest House • 5/6 Northwest Business Park Servia Hill • Leeds LS6 2QH Telephone : 0113 245 8498 • Fax : 0113 244 3864 E-Mail : leeds@arpassociates.co.uk	Scale: NTS	Drawn: MW
		Date: APR 10	Chk.: ARP
Project/ Client: WOMBWELL MILLS, WOMBWELL STRATA GROUP		Drg. No.: 374/19/FR.02	Rev.: /

APPENDIX B

ENVIRONMENT AGENCY CONSULTATION

Allan Poyser

From: Andrew Radcliffe
Sent: Tuesday 13 April, 2010 2:52 pm
To: Allan Poyser
Subject: FW: Your Enquiry: RFI/2010/13834

From: Riley, Stacey [mailto:stacey.riley@environment-agency.gov.uk]
Sent: 13 April 2010 2:19 pm
To: Andrew Radcliffe
Subject: Your Enquiry: RFI/2010/13834

Our Ref: RFI/2010/13834

Your Ref: 374/19/ARPJC

Dear Mr Poyser

RE: Wombwell Mills, Wombwell

Thank you for your enquiry dated 8th April 2010.

The site is located in Flood Zone 1, which is land outside the floodplain as shown on our Flood Zone Maps. I have attached a map which shows this. The site may be subject to flooding from a number of different sources (small or culverted watercourses, public sewers, highway drains, overland surface water flow). The responsible drainage authority for the watercourse near the site is the Local Authority, they would have any information concerning the history of any watercourses and I would suggest that you contact them direct.

Whilst the site is outside the floodplain, any development over a hectare could generate significant volumes of surface water. A flood risk assessment must be submitted with a planning application on any proposed development over 1ha, to assess the existing and proposed surface water drainage from the site.

If you would like to discuss with our **Development and Flood Risk Engineer** for Barnsley. You can speak to Lesley Slaney on 01132134779

This information is based on data that is currently available to the Environment Agency and is subject to our standard notice. The Agency accepts no liability for any loss or damage arising from its use. The interpretation of the information is your responsibility.

If you require any further help, please do not hesitate to contact me.

Yours sincerely,

Stacey Riley
External Relations Officer (Yorkshire Area)

Tel: 0113 395 4506 (Internal 7 28 4506)

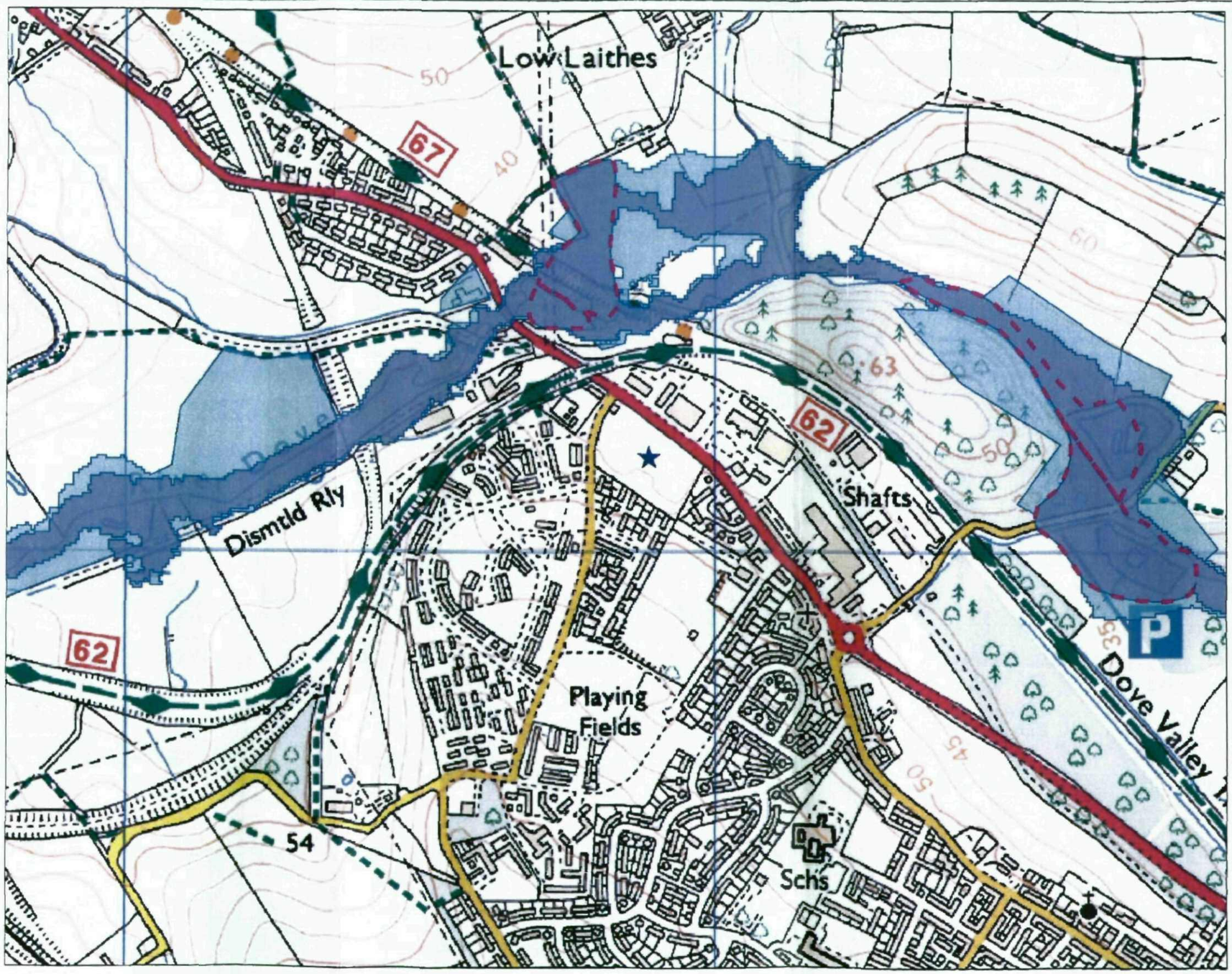
13/04/2010

Email: neyorkshire@environment-agency.gov.uk

Environment Agency
Phoenix House
Global Avenue
Leeds LS11 8PG

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

Flood Map centred at Wombwell Mills, Wombwell (Created 13/04/2010)



Environment Agency

Scale 1:10,001

N W E S

- Flood Map - Defences
- Areas Benefiting from Flood Defences
- Flood Map - Flood Storage Areas
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be *affected by flooding*:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

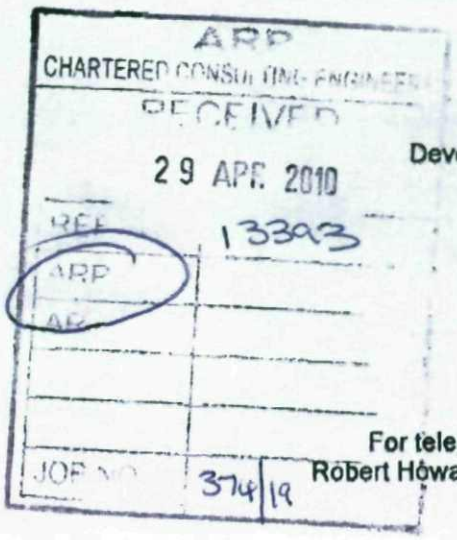
Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

APPENDIX C

WATER AUTHORITY CONSULTATION

YorkshireWater



Yorkshire Water
Developer Services Team
Western House
Halifax Road
PO Box 500
Bradford
BD6 2SZ

Tel: 0845 120 8482
Fax:

For telephone enquiries ring:
Robert Howard on 0845 120 8482

ARP Associates
Northwest House
5/6 Northwest Business Park
Servia Hill
LEEDS
LS6 2QH

For the attention of Mr AR Poyser

Your Ref: 374/19/ARPjc
Our Ref: G000535

27th April 2010

Dear Sir,

Land at Wombwell Mills, Barnsley Road, Wombwell - Pre-Planning Sewerage Enquiry for Residential

I refer to your letter dated 8th April 2010 regarding the above proposed development. Please find below an updated response:-

The PPSE dated 23rd January 2006 addressed to ARP Associates is no longer valid.

There is a 375mm diameter public combined/ water sewer recorded crossing the site. No buildings are to be erected within 3 (three) metres, nor trees planted within 5 (five) metres of this public sewer. It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0845 120 84 82.

Development of the site should take place with separate systems for foul and surface water drainage. The separate system should preferably extend to the public sewer.

Foul water should discharge to the 375mm diameter public combined sewer recorded crossing 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 0-86017-904-4). If the developer is considering adoption of SUDS they should contact our Developer Services Team on 0845 120 84 82.

The local public sewer network does not have capacity to accept any additional discharge of surface water from the proposal site. The developer is advised to contact the Environment Agency/local Land Drainage Authority with a view to establishing a suitable watercourse (if any nearby) for discharge.

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. To maintain the "status quo" in the public sewer network, any discharge of surface water from the site should take place with similar rates of flow and/or measured areas discharging to similar points of connection to that of the existing use of the site. You will need to demonstrate positive drainage to the public sewer to Yorkshire Water by means of investigation and calculation carried out at your expense. Also discharges to the public sewer must take into account a 30% reduction in existing surface water discharges from the site and climate change..

To do this, Yorkshire Water requires to see existing and proposed drainage layouts with pipe sizes, gradients and connection points, measured impermeable areas of the present and proposed use of the site, along with the calculations that show the existing and proposed discharge rate from the site to the public sewer.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from 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. Highway drainage, however, may be accepted under certain circumstances; for instance, if SUDS are not a viable option, there is no highway drain available, if there is available capacity, and if it is not detrimental to the public sewer network and the aquatic environment. 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.

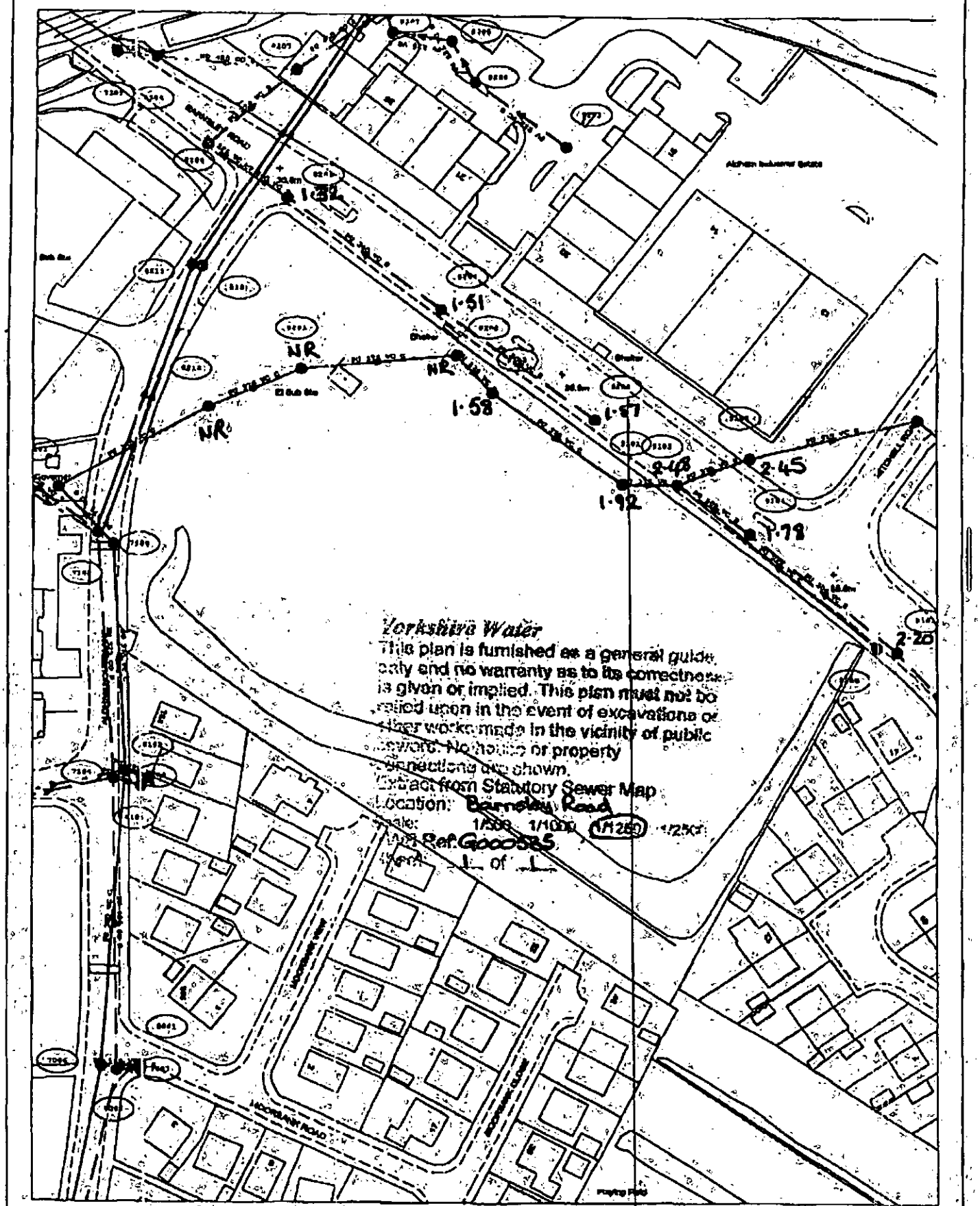
No land drainage to be connected/discharged to public sewer.

Any new connection to an existing public sewer will require the approval of Yorkshire Water. You may obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0845 120 84 82.

All 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 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

Robert Howard
for : Developer Services Team



Date Requested : 29/04/2010, 12:01:22

Date Generated : 29/04/2010, 12:01:22

Scale : 1:1250

The position and depth of any 'nil' apparatus shown on this map are approximate only.

UPN: Undefined

Originator: R Howard, Sewerage, 7186 - 8243

NR = No Recorded Depth

APPENDIX D

LAND DRAINAGE AUTHORITY CONSULTATION

BARNSLEY
Metropolitan Borough Council

Highways, Engineering & Waste Management
Assistant Director: D. A. Richardson, BSc, M.C.I.O.B, M.I.H.T.
PO Box 601 Barnsley S70 9FA

Mr. A.R. Poyser
ARP Associates
5/6 Northwest Business
Park
Servia Hill
Leeds
LS6 2HQ

My Ref: EMDRD/SK
Your Ref. 374/19/ARPjc
Enquiries To: Mr. S. Kilner
Dial Direct (01226) 772116
Fax (01226): 772196
Date: 6th May, 2010

Dear Sir,

STRATA HOMES, WOMBWELL MILLS, WOMBWELL, BARNSLEY

I refer to your letter dated 8th April, 2010 and would apologies for the delay in my response.

The points raised in my original letter dated 27th January, 2006 with respect to watercourse location and floor levels still apply.

However, I am aware that since the paved area and associated on site drainage system have been stripped from this site, it has flooded on the north east boundary resulting in water being shed onto the A633 Wombwell Lane. A temporary bund has been installed by a former owner to reduce the incidence of this flooding.

As this site is over 1 Hectare in area a Flood Risk Assessment in accordance with Planning Policy Statement No.25 will need to be submitted with any application.

Yours faithfully

Mr. S. Kilner

Planning, Policy, Drainage and Highways Engineer
Strategic Highways Maintenance

BARNSLEY
Metropolitan Borough Council

Highways and Engineering
Assistant Director: A. J. Carnall, BSc, M.Eng, M.I.C.E., M.I.H.T.
Central Offices, Kendray Street, Barnsley, S70 2TN

My Ref. EMDRD/SK/55/300 Your Ref. 684/03/TMDsa

Enquiries to Mr. S. Kilner Dial Direct (01226)772116 Fax (01226)772196

Date 27th January, 2006

Dear Sir,

WOODFORD CONSULTING ENGINEERS LTD
WOMBWELL MILLS, WOMBWELL, BARNSLEY

I refer to your letter dated the 19th January, 2006.

I would inform you that I have no record of any flooding incidents in this area, and consequently have no recommendation with regard to finished floor levels of any future development on this site.

The only watercourse in the vicinity of your site I am aware of is the River Dove, which is situated some 220 metres north west along the A633 trunk road.

I would add that at this point the River Dove is classifled as a main river, and as such any requests with respect to outfall discharge rates should be referred to the Environment Agency at Leeds.

Yours faithfully,

S. Kilner
Drainage and Highways Engineer

20 JAN 2006

86623
ARP

ARP Associates
5/6 Northwest Business Park
Servia Hill
LEEDS
LS6 2QH

Beacon Council 2003-2004
Streetscene Highway Works
Rethinking Construction

APPENDIX E

SKETCH LAYOUT OF PROPOSED DEVELOPMENT

All work to be carried out in accordance with the requirements of the Building Regulations, Water Authority and the Construction (Design and Management) Regulations currently in force.

Do not scale from this drawing. Architect to be notified of any discrepancies.

Verify relevant dimensions on site before commencing work or preparing shop drawings. This drawing is copyright.

Rev:	Date:	Action:	Init:
A	12.10	Substation position and adjacent parking amended	
B	16.01.11	Blocks updated and plots 20–24 amended, square footage updated	
C	25.01.11	Plots 28,36,41, 74 & 75 amended	
D	07.02.11	Plots 11–13 amended	
E	08.02.11	Plots 8,10,13–18 amended,rear adjacent plots 9 & 10 amended	

homes by strata

strata homes limited quay point lakeside doncaster DN4 5PL
T 01302 308508 F 01302 308501 www.homesbystrata.co.uk

scale 1/500 | drawn by IKC | date 01.08.10

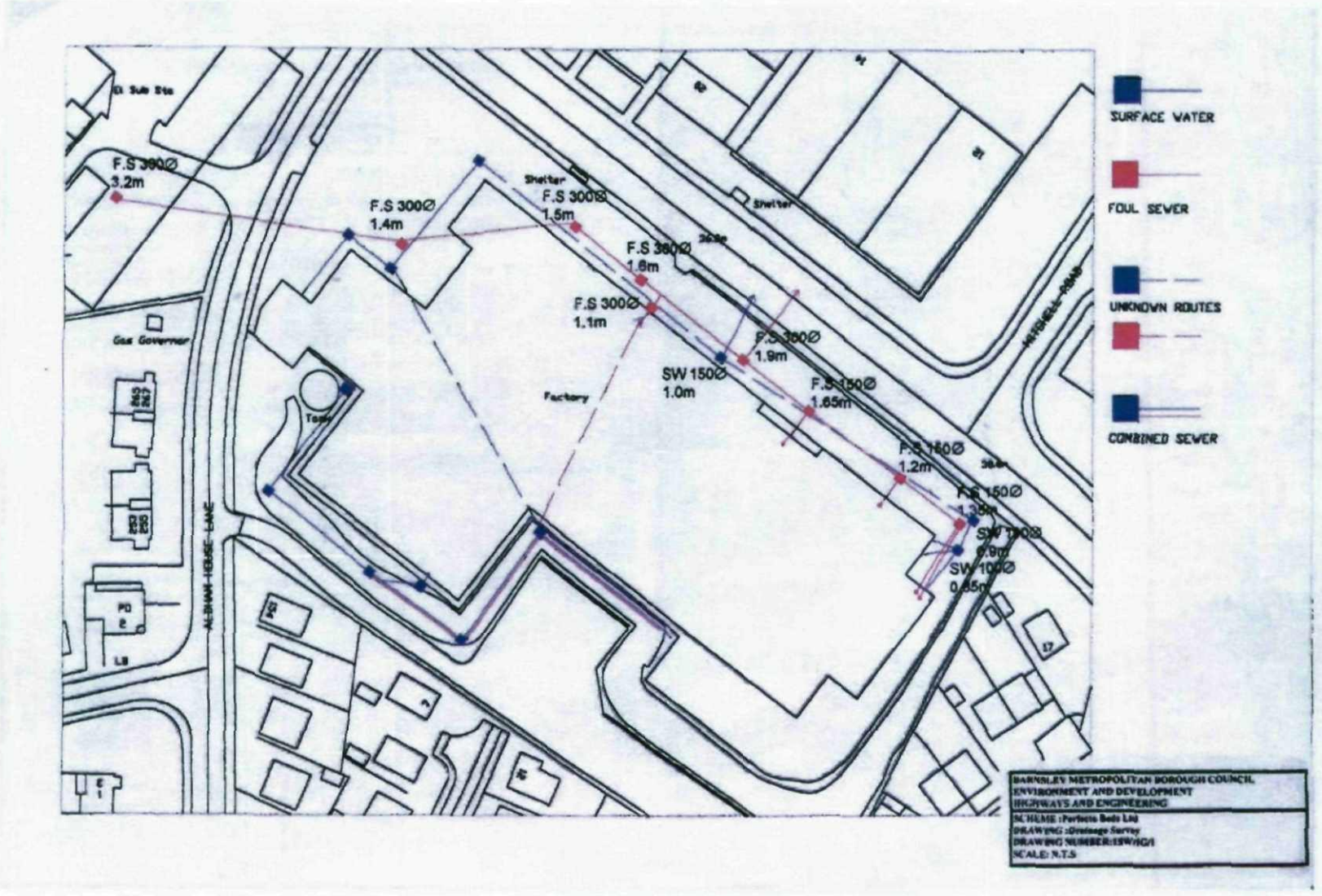
Project Barnsley Road
Wombwell

Drawing Site Layout

Drawing Number BR/WW/SK03 | Revision E

APPENDIX F

EXISTING ON-SITE DRAINAGE SYSTEM



APPENDIX G

INDICATIVE SURFACE WATER DRAINAGE CALCULATIONS

Summary of Results for 30 year Return Period (+20%)

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	45.4	0.0	45.4	100.9743	0.9743	0.0	48.6	O K
30 Summer	45.9	0.0	45.9	101.0403	1.0403	0.0	51.9	O K
60 Summer	45.2	0.0	45.2	100.9473	0.9473	0.0	47.2	O K
120 Summer	45.2	0.0	45.2	100.7048	0.7048	0.0	32.9	O K
180 Summer	45.0	0.0	45.0	100.5202	0.5202	0.0	21.5	O K
240 Summer	42.7	0.0	42.7	100.4072	0.4072	0.0	14.8	O K
360 Summer	35.9	0.0	35.9	100.2952	0.2952	0.0	8.8	O K
480 Summer	29.8	0.0	29.8	100.2448	0.2447	0.0	6.4	O K
600 Summer	25.6	0.0	25.6	100.2103	0.2102	0.0	4.8	O K
720 Summer	22.5	0.0	22.5	100.1878	0.1877	0.0	3.9	O K
960 Summer	18.1	0.0	18.1	100.1582	0.1583	0.0	2.8	O K
1440 Summer	13.3	0.0	13.3	100.1257	0.1258	0.0	1.7	O K
15 Winter	47.1	0.0	47.1	101.1453	1.1453	0.0	56.3	O K
30 Winter	49.1	0.0	49.1	101.2997	1.2997	0.0	59.0	O K
60 Winter	45.5	0.0	45.5	101.0063	1.0063	0.0	50.2	O K
120 Winter	45.2	0.0	45.2	100.6172	0.6173	0.0	27.4	O K
180 Winter	42.5	0.0	42.5	100.3987	0.3987	0.0	14.3	O K
240 Winter	36.6	0.0	36.6	100.3018	0.3017	0.0	9.1	O K
360 Winter	27.5	0.0	27.5	100.2257	0.2257	0.0	5.5	O K
480 Winter	22.2	0.0	22.2	100.1858	0.1857	0.0	3.8	O K
600 Winter	18.8	0.0	18.8	100.1628	0.1627	0.0	3.0	O K
720 Winter	16.4	0.0	16.4	100.1462	0.1463	0.0	2.4	O K
960 Winter	13.1	0.0	13.1	100.1243	0.1243	0.0	1.7	O K
1440 Winter	9.7	0.0	9.7	100.1008	0.1008	0.0	1.0	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	84.78	18
30 Summer	55.74	27
60 Summer	35.09	44
120 Summer	21.45	76
180 Summer	15.92	104
240 Summer	12.83	132
360 Summer	9.42	190
480 Summer	7.57	250
600 Summer	6.38	310
720 Summer	5.55	370
960 Summer	4.45	492
1440 Summer	3.25	736
15 Winter	84.78	19
30 Winter	55.74	28
60 Winter	35.09	46
120 Winter	21.45	78
180 Winter	15.92	104
240 Winter	12.83	132
360 Winter	9.42	190
480 Winter	7.57	250
600 Winter	6.38	310
720 Winter	5.55	368
960 Winter	4.45	492
1440 Winter	3.25	734

Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	30	Longest Storm (mins)	1440
M5-60 (mm)	19.000	Summer Storms	Yes
Ratio-R	0.378	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+20
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 0.500

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.500

Circular Pipe Details

Diameter (m) 1.200 Length (m) 51.000 Cover Level (m) 103.000
Slope (1:x) 510.0 Invert Level (m) 100.000

Hydro-Brake Outflow Control

Design Head (m) 1.300 Diameter (mm) 265
Design Flow (l/s) 49.0 Invert Level (m) 100.000
Hydro-Brake Type MD5

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	9.5	0.80	44.6	2.00	59.7	4.00	84.3	7.00	111.5
0.20	24.3	1.00	45.5	2.20	62.5	4.50	89.4	7.50	115.4
0.30	36.5	1.20	47.7	2.40	65.3	5.00	94.2	8.00	119.2
0.40	42.6	1.40	50.6	2.60	67.9	5.50	98.8	8.50	122.8
0.50	44.9	1.60	53.6	3.00	73.0	6.00	103.2	9.00	126.4
0.60	45.2	1.80	56.7	3.50	78.8	6.50	107.4	9.50	129.9

Weir / Flume Overflow Control

Discharge Coef 0.544 Width (m) 2.100 Crest Level (m) 101.300

Summary of Results for 30 year Return Period (+20%)

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	50.6	0.0	50.6	100.9793	0.9793	0.0	46.2	O K
30 Summer	50.9	0.0	50.9	101.0348	1.0348	0.0	48.8	O K
60 Summer	50.6	0.0	50.6	100.9108	0.9108	0.0	42.7	O K
120 Summer	50.6	0.0	50.6	100.6478	0.6478	0.0	27.8	O K
180 Summer	49.1	0.0	49.1	100.4722	0.4722	0.0	17.6	O K
240 Summer	44.9	0.0	44.9	100.3742	0.3742	0.0	12.3	O K
360 Summer	36.5	0.0	36.5	100.2787	0.2787	0.0	7.6	O K
480 Summer	30.1	0.0	30.1	100.2312	0.2312	0.0	5.5	O K
600 Summer	25.8	0.0	25.8	100.2002	0.2002	0.0	4.2	O K
720 Summer	22.5	0.0	22.5	100.1793	0.1792	0.0	3.5	O K
960 Summer	18.2	0.0	18.2	100.1517	0.1518	0.0	2.5	O K
1440 Summer	13.3	0.0	13.3	100.1208	0.1208	0.0	1.5	O K
15 Winter	52.2	0.0	52.2	101.1568	1.1568	0.0	53.5	O K
30 Winter	52.9	0.0	52.9	101.2133	1.2133	0.0	54.9	O K
60 Winter	50.5	0.0	50.5	100.9433	0.9433	0.0	44.4	O K
120 Winter	50.2	0.0	50.2	100.5378	0.5377	0.0	21.4	O K
180 Winter	43.8	0.0	43.8	100.3587	0.3587	0.0	11.5	O K
240 Winter	37.0	0.0	37.0	100.2817	0.2817	0.0	7.8	O K
360 Winter	27.5	0.0	27.5	100.2127	0.2127	0.0	4.8	O K
480 Winter	22.3	0.0	22.3	100.1777	0.1777	0.0	3.4	O K
600 Winter	18.8	0.0	18.8	100.1557	0.1558	0.0	2.6	O K
720 Winter	16.4	0.0	16.4	100.1403	0.1403	0.0	2.1	O K
960 Winter	13.1	0.0	13.1	100.1198	0.1198	0.0	1.5	O K
1440 Winter	9.6	0.0	9.6	100.0963	0.0963	0.0	0.9	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	84.78	18
30 Summer	55.74	26
60 Summer	35.09	44
120 Summer	21.45	74
180 Summer	15.92	102
240 Summer	12.83	132
360 Summer	9.42	190
480 Summer	7.57	250
600 Summer	6.38	310
720 Summer	5.55	370
960 Summer	4.45	490
1440 Summer	3.25	738
15 Winter	84.78	18
30 Winter	55.74	28
60 Winter	35.09	46
120 Winter	21.45	76
180 Winter	15.92	102
240 Winter	12.83	130
360 Winter	9.42	190
480 Winter	7.57	250
600 Winter	6.38	310
720 Winter	5.55	370
960 Winter	4.45	492
1440 Winter	3.25	740

Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	30	Longest Storm (mins)	1440
M5-60 (mm)	19.000	Summer Storms	Yes
Ratio-R	0.378	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+20
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 0.500

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	4	8	0.500

Circular Pipe Details

Diameter (m) 1.200 Length (m) 48.000 Cover Level (m) 103.000
Slope (1:x) 500.0 Invert Level (m) 100.000

Hydro-Brake Outflow Control

Design Head (m) 1.296 Diameter (mm) 277
Design Flow (l/s) 54.0 Invert Level (m) 100.000
Hydro-Brake Type MD5

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	10.0	0.80	49.9	2.00	65.3	4.00	92.3	7.00	122.1
0.20	25.8	1.00	50.5	2.20	68.5	4.50	97.9	7.50	126.3
0.30	39.5	1.20	52.7	2.40	71.5	5.00	103.2	8.00	130.5
0.40	46.8	1.40	55.6	2.60	74.4	5.50	108.2	8.50	134.5
0.50	50.0	1.60	58.8	3.00	79.9	6.00	113.0	9.00	138.4
0.60	50.6	1.80	62.1	3.50	86.3	6.50	117.6	9.50	142.2

Weir / Flume Overflow Control

Discharge Coef 0.544 Width (m) 2.100 Crest Level (m) 101.296