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Woodhead Road, Honley

BMS Group

STAGE 1 – Flood Risk Assessment

December 2013

P1244 Rev 02

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Revision History			
Initial Issue	20 December 2013		
Prepared By:		Checked:	
	Timothy Davis Director		Graham Helme Director

Rev No	Date	Description	By	Checked
0	19.12.13	Initial Issue	TD	GH
01	15.07.14	Report update to match planning layout	TD	GH
02	19.07.17	Report update to match planning layout	TD	GH

Contents

1 INTRODUCTION

Avie Consulting Ltd has been commissioned by the BMS Group to carry out a STAGE 1 Flood Risk Assessment for the development of a Greenfield area off Woodhead Road Honley in order to support an Outline Planning Application.

The aim of this report is to allow Kirklees Council to assess the site in accordance with the National Planning Policy Framework published by the Department of Communities and Local Government.

The site lies in **Flood Zone 1**, the proposed site area is in excess of 1Ha therefore a Flood Risk Assessment is required as part of the site evaluation.

The following published reports have been utilised while undertaking the FRA:

Calder Valley SFRA undertaken by JBA Ltd November 2008

2 PROPOSED DEVELOPMENT

The site is located 1.2km South East of Honley along the Woodhead Road A6024 South East of Melton at Ordnance Survey grid reference SE146 111

The site is bounded to the West by Woodhead Road A6024

The site is bounded to the North by a wooded area.

The site is bounded to the East Tree belt and an open field beyond

The site is bounded to the south by Robinson Lane an unmade access track / footpath

The site falls East to West , the topography of the site varies between 134.01 and 113.09 AOD

The site is shown on the location plan in Appendix A, the site is approximately 2.6 Hectares in size, the topographical survey of the site is presented in Appendix H.

3 FLOOD RISK ASSESSMENT CRITERIA

The site under consideration is within Flood Zone 1 according to the latest version of the Indicative Floodplain Map (IFM) produced by the Environment Agency. As the site area exceeds 1Ha there is a need to carry out a flood risk assessment of the site.

The EA Indicative Floodplain Map is enclosed in Appendix B, also enclosed in Appendix B is the Flood Map Risk from the Calder Valley SFRA report undertaken in November 2008 by JBA which also indicates the site is not at risk of flooding and is in Flood Zone 1.

Zone 1 is defined as land assessed as having less than a 1 in 1000 annual probability of river or sea flooding in any year (0.1%).

As the site lies within Flood Zone 1 the flood risk assessment needs to consider the following:

- Flooding from other sources such as rivers ,tidal, sewers and overland flooding
- The potential for the development to increase flooding elsewhere through the addition of hard surfaces
- The effect of the new development on surface water run-off

4 HISTORICAL FLOODING

The SFRA undertaken by JBA did not highlight any historical flooding in the vicinity of the site and this was also confirmed by the email from the Kirkless Land Drainage department presented in Appendix C.

The risk of flooding from historical flood event affecting the site in future is **LOW**.

5 SOURCES OF FLOODING

As part of the flood risk assessment consideration should be given to the following sources of flooding and what effect these could have on the development.

5.1 Flooding from Rivers / Watercourses

The River Holme (EA Main River) exists to the east approx. 1.2km from the nearest site boundary site.

The River Home is approximately 8m below the eastern boundary of the site and therefore the risk of flooding from this source is considered to be **LOW**.

An existing watercourse potentially exists on the site and may be the cause due to blockage of some standing water on and near to the site.

Further investigation is required to fully understand the existing land drainage features on the site and appropriate mitigation to be proposed.

5.2 Flooding from the Sea

The site is approximately 85Km form the sea, as such the risk if flooding from this source is considered to be **LOW**.

5.3 Flooding from Land

The effect of intense rainfall needs to be considered and the local Topography of the land assessed.

The development area falls East to West by 21metres with the adjoining land falling towards the River Holme. Overland water from a westerly direction is intercepted by Woodhead Road with other adjoining areas either falling away from the site, therefore the risk of flooding from adjoining land is considered to be **LOW**.

5.4 Flooding from Groundwater

Groundwater flooding occurs when water levels in the ground rise above surface elevations, particularly in low lying areas.
From our site inspection we did observed a wet area to the centre of the site and this could be a spring which will require incorporating onto the drainage scheme

The risk of flooding from this source is considered to be **MEDIUM.**

5.5 Flooding From Sewers

The site is a greenfield development and has NO existing sewers serving the site, the nearest Public Sewer is a combined 225 dia sewer is Banks Road, the risk of flooding from this source is considered to be **LOW.**

YW records are presented in Appendix D.

6 FLOOD RISK SUMMARY

Sources of Flooding	Risk			Control Measures
	High	Medium	Low	
Rivers:			X	None
Watercourses			X	None
Sea			X	None
Land			X	None
Groundwater		X		Ensure flood routes are maintained and houses are min 150mm above existing ground levels
Existing sewers			X	

7 INCREASE TO OFFSITE FLOODING

New development should be designed to limit the surface water run-off to existing surface water discharge flows rates or better.

Current industry practice is to reduce off site flows from brownfield developments by 30% so as to reduce the impact of the development and new drainage systems.

Therefore by reducing off site flows the risk of increasing flooding off site is mitigated.

8 FLOOD RISK VULNERABILITY

The vulnerability of the proposed development is assessed in accordance with the Technical Guidance to the National Planning Policy Framework published by the Department for Communities and Local Government in March 2012.

The report should consider if the development is acceptable for the Flood Zone Classification in accordance with Table 3 within the NPPF.

The proposed development is residential and is therefore classified as “More vulnerable”

Table 3: Flood Risk Vulnerability and Flood Zone ‘Compatibility’

Flood Risk Vulnerability Classification (from Table 2)		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b	Exception Test required	✓	×	×	×

✓ Development is appropriate
× Development should not be permitted

Utilising the Flood Zone Compatibility Table above, the development is deemed appropriate for the site and flood risk classification

As part of the assessment the following development constraints require consideration and recommendation made as to how to mitigate any flood risk appropriately.

8.1 Finished Floor Levels

We recommend to mitigate against localised flooding caused by heavy / intense rainfall events, that the internal ground floor level of the residential units is set a minimum of 150mm above existing ground levels and a minimum of 300mm above road levels.

8.2 Existing Flood Volumes

No loss of existing flood volume will be experienced due to the redevelopment of the site.

8.3 Flood Routing

The site is bounded to the south west by Woodhead Road, this road is bounded on the southern kerb with a boundary wall and beyond this woodland and residential properties as such overland flows from above the site will be limited.

The site falls initially to the east towards Smithy Place then changes direction to a north westerly direction please refer to Plan 1 Appendix I. The proposed site levels will generally follow the existing gradients however properties will be 300mm above proposed road levels.

The site attenuation system will be designed to accommodate a 1 in 100 yr storm plus climate change however during exceedance events the highways and drainage easements will be used as overland flood routes thereby maintaining existing flow routes and protecting properties, please refer to Plan 2 Appendix I

Should any overland flows enter the site from Smith Place a land drainage system is proposed on the boundary should it be deemed necessary however with the site levels being maintained we do not feel this is a major concern.

8.4 Emergency Access

The site is in flood zone 1 and as such emergency access is not an issue.

9 EXISTING SITE DRAINAGE

The site does not have a formal drainage system, however Kirklees Council have commented that a possible well and watercourse adjacent to Woodhead Road possibly heads in the direction of the site.
This will require further investigation and diversion if the route affects the development.

Yorkshire Water (YW) have been consulted with respect to existing drainage system in the area and their full response is presented in Appendix D.

YW have confirmed that the only available pubic sewer is a 225 dia public combined sewer recorded in Banks Road some 55 metres way from the site.

10 PROPOSED DRAINAGE

10.1 Surface Water

The proposed re development of the site will be residential, it is recommended and in accordance with good practice that the offsite surface water flows are reduced by the introduction of an attenuation system following the hierarchy as laid out in the approved document H of Building Regulations with respect to Sustainable Urban Drainage Systems (SUDS).

The use of soakaways will require investigating however from our onsite inspection standing water was evident which would suggest that the ground is not free draining however this will require verifying via an intrusive site investigation.
Should infiltration rates prove to be adequate then infiltration drainage will require incorporating into the drainage scheme and the FRA updating at the detailed design stage.

YW have commented that the site should be developed using on site separate foul and surface water systems up to the public sewer. The public sewerage network does not have capacity to accept surface discharge. Therefore with the River Holme being in closed proximity connection to this will be pursued either by a requisition agreement, private easement agreement or connection to as yet unidentified existing land drainage systems, the discharge to the River Holme will be limited to 1 in 2yr greenfield discharge.

During detailed design further consultation with respect to the connection point will be undertaken and the FRA updated appropriately.

The site total area is 2.60 Ha, with a proposed impermeable area of 0.891Ha making an impermeable area for greenfield calculations of 0.891Ha, the proposed site layout is presented is Appendix E.

Utilising the Micodrainage Windes suite of programs to calculate the "Greenfield " runoff rate produces a discharge rate of 6.1 litres per second I in 2 yr return period**.**

However Kirklees Council have commented that due to more efficient land drainage system the discharges should be restricted to 5 l/s/Ha meaning that a discharge rate of 4.455 l/s would be applicable.

It is intended to offer the onsite drainage to Yorkshire Water for Adoption and as such YW will require the outlet to be 100mm in diameter therefore the Attenuation System for the site should be designed so as to ensure no surcharging for a 1 in 2 yr storm, no flooding on site for a 1 in 30 yr plus 30% climate change utilising a restricted discharge of 5 litres per second and any flooding for a 1 in 100 yr storm plus climate change to remain on site but not to affect plots.
Please refer to Appendix F for runoff calculation's, methods used IH124, ICPSUDS and ADAS 345.

10.2 Outline of Attenuation Requirements

Assuming that Infiltration techniques are not appropriate then the following can be used as a guideline for the for the attenuation requirements .The Attenuation could be undertaken via a combination of different structures from swales, porous paving, soakaways, ponds and underground attenuation tanks.

Due to the excessive gradient swales would not be practicable as means of attenuation therefore an underground storage tank seems the most obvious deliverable proposal. The attenuation system will be designed to accommodate a 1 in 30 yr storm plus climate change with flood water above 1 in 30 and upto 1 in 100 yr plus climate change being contained on site.

The worst case scenario attenuation is presented in Appendix G along with the supporting calculations.

The drainage proposals will include for providing a land drain to prevent overland flows affecting Smithy Place connecting to the offsite easement pipework which discharges to the River Holme.

10.3 Foul Water

YW have indicated that the foul flows should be discharged to the 225 mm diameter combined sewer recorded in Banks Road,

Due to the site levels a foul pumping station will be required with a limited discharge of 5 litres per second. The compound for the pumping station will be 8m x 10m and at least 15m from the nearest habitable dwelling.

11 DRAINAGE IMPACT

Utilising the surface water discharge rate of 5 litres per second per hectare discharging to the River Holme will not increase flood risk significantly within the watercourse system as the flows match the pre development run off situation.

12 GENERAL REMARKS

This report is for the sole use of BMS Group and their immediate advisors in connection with the development of the subject site for residential use. It shall not be reproduced in whole or in part or relied upon by third parties for any use whatsoever without the express permission of Avie Consulting Ltd. Avie Consulting Ltd shall have no liability for any use of this report other than for the purposes for which it was originally prepared.

We recognise that FSR data has been utilised in the Stage 1 FRA and not FEH data , however the design package used is industry standard and accepted by Sewerage Regulators to model site flows and adoptable storage requirements and therefore we consider the calculations are robust and appropriate for the purposes intended to support a STAGE 1 FRA.

13 RECOMMENDATIONS

- The site under consideration is located in Zone 1 latest version of the Indicative Floodplain Map (IFM) produced by the Environment Agency and the flood Zone map produced by JBA as presented in the SFRA dated November 2008.

- There are no recorded historical flooding directly on or adjacent to the site. The risk of flooding to the site / residential units is considered to be **LOW**.

- Residential Development is classified as “More Vulnerable” and is appropriate under the National Planning Policy Framework on this redevelopment site in terms of Flood Risk in flood zone 1 areas.

- It is recommended that finished floor levels to the new residential dwelling are set at a minimum of 150mm above existing ground levels in order to mitigate against localised flooding caused by heavy / intense rainfall and 300mm above road levels.

- Surface water flows from the development are to be connected to the River Holme at 5 litres per second for storm profiles up to a 1 in 30 yr plus climate change event, with any flooding above this event remaining on site up to a 1 in 100 yr storm plus climate change.

- The proposed development will not affect flood routing, and as such flows/ flood routing will be maintained as per the pre-development layout.

- Should infiltration rates prove to be adequate then infiltration drainage will require incorporating into the drainage scheme and the FRA updating at the detailed design stage.

- The River Holme is not directly situated next to the proposed site boundary and as such a connection to the watercourse will be provided by either a private easement agreement or a requisitioned sewer.

- Foul water discharge will require further consideration to incorporate one of the following solutions.

    1. Connection to the Yorkshire Water Sewer in Banks Road via a onsite pumping station with appropriate compound area and stand off from residential dwellings.

- Consideration needs to be given to overland flood routing and proof to be provided at detailed design via cross sections and levels directing water away from residential properties.

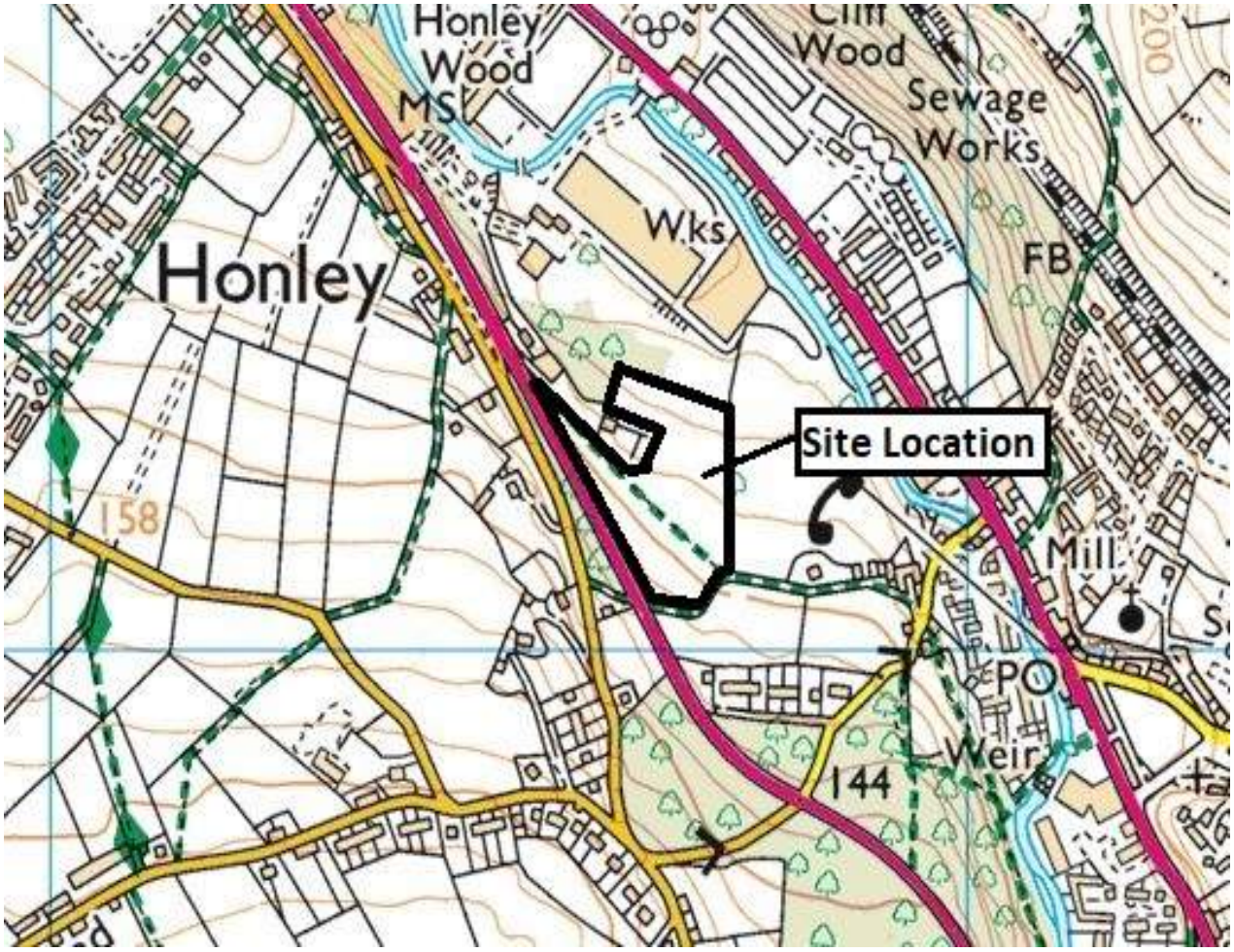
- Utilising the surface water discharge rate of 5 litres per Second discharging to the River Holme will not increase flood risk significantly within the watercourse system as the flows match the pre development run off situation.

- The Attenuation System for the site should be designed so as to ensure no surcharging for a 1 in 2 yr storm, no flooding for a 1 in 30 yr plus 30% climate change and any flooding for a 1 in 100 yr storm plus climate change to remain on site but not to affect plots.

- The drainage proposals will include for providing a land drain to prevent overland flows affecting Robinson Lane connecting to the offsite easement pipework which discharges to the River Holme.

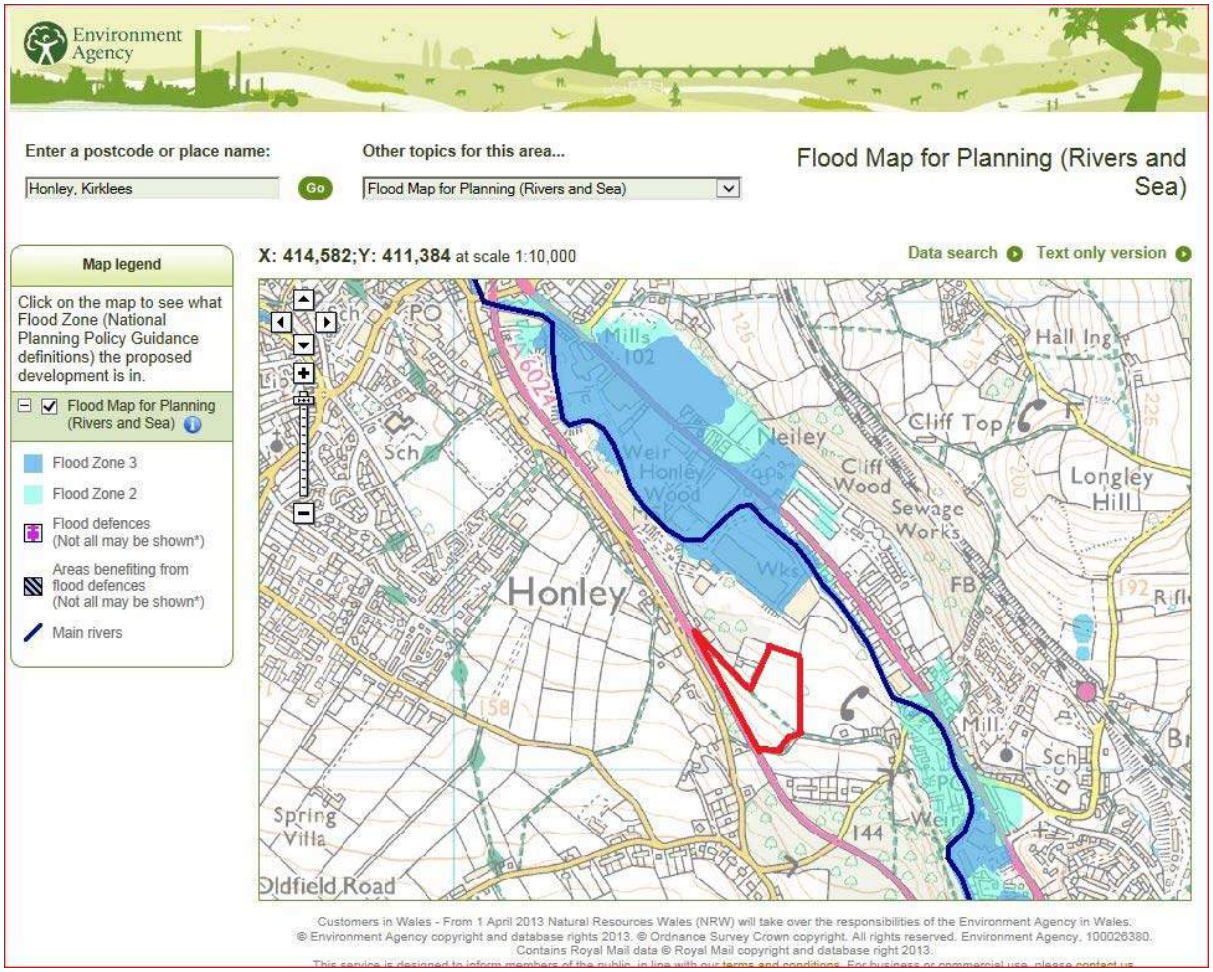
APPENDIX A

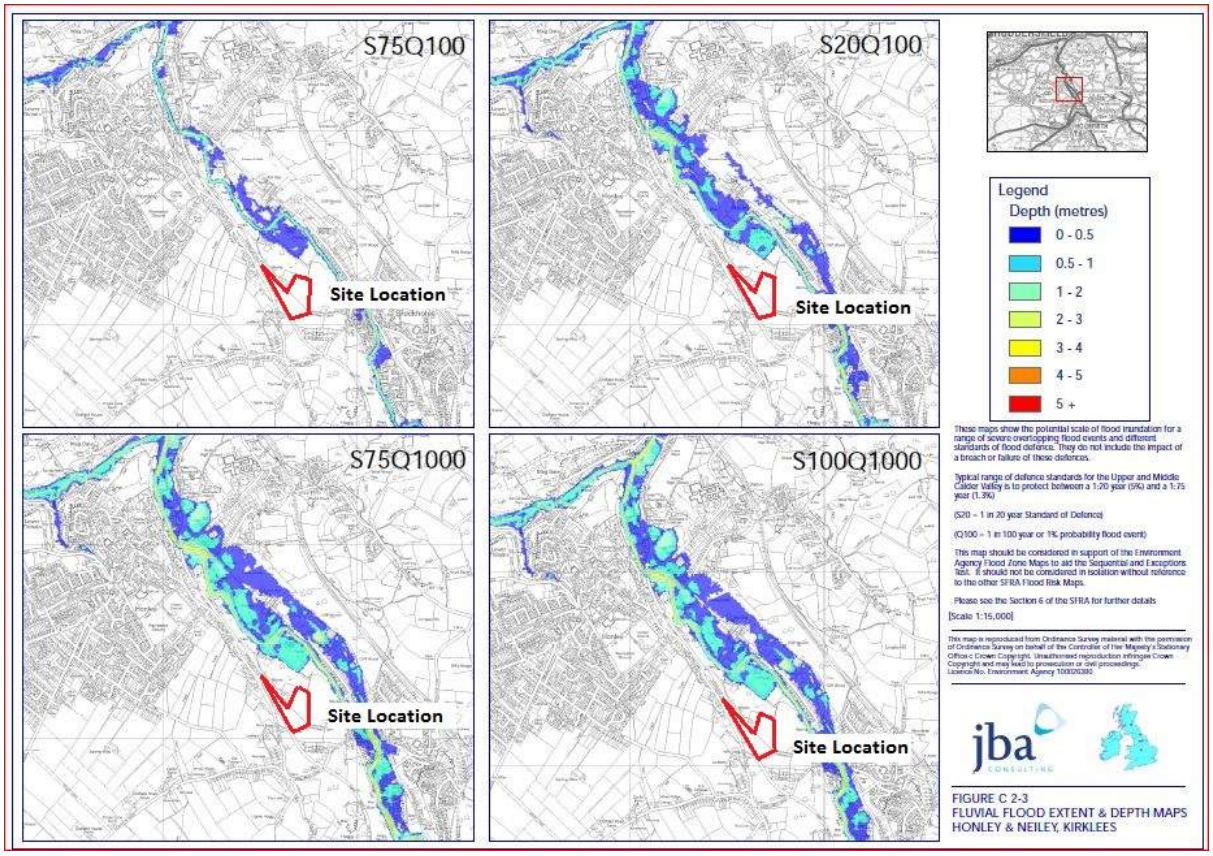
Location Plan



APPENDIX B

EA Flood Maps/ SFRA Flood Zones




S75Q100
Site Location
S20Q100
Site Location
S75Q1000
Site Location
S100Q1000
Site Location
Legend
Depth (metres)
0 - 0.5
0.5 - 1
1 - 2
2 - 3
3 - 4
4 - 5
5 +
These maps show the potential scale of flood inundation for a range of severe overtopping flood events and different standards of flood defence. They do not include the impact of a breach or failure of these defences.
Typical range of defence standards for the Upper and Middle Calder Valley is to protect between a 1:20 year (5%) and a 1:75 year (1.3%)
(S20 – 1 in 20 year Standard of Defence)
(Q100 – 1 in 100 year or 1% probability flood event)
This map should be considered in support of the Environment Agency Flood Zone Maps to aid the Sequential and Exceptions Test. It should not be considered in isolation without reference to the other SFRA Flood Risk Maps.
Please see the Section 6 of the SFRA for further details
[Scale 1:15,000]
jba
FIGURE C 2-3
FLUVIAL FLOOD EXTENT & DEPTH MAPS
HONLEY & NEILEY, KIRKLEES

APPENDIX C

Historical Flooding / Kirklees Council Response

Hello Tim,

The site is in Flood Zone 1. Everything falls to the river. It will be ok in principle to discharge to the river at 5l/s per hectare, i.e. the parts you are making impermeable in hectares x 5. If any perimeter drainage is required, this will have to be off-set within the road/house drainage restriction (3.5l/s/ha is suggested)

Just a note that whoever owns the land at the bank has a say in the right to discharge. Never been a problem until last week but I've found that crossing 3rd party land via sewer requisition doesn't cover the outfall within YW's powers, if you need to go down this route (had the landowner object).

No known flood incidents on site but don't take this as a comprehensive report as the Council is unlikely to be contacted for flooding in fields.

We have some records of minor flooding incidents to driveways and gardens from the public highway on Smithy Place Lane and Banks Road in extreme rainfall conditions. We have concluded that these incidents have not directly affected the site in question.

1st and second generation surface water flood maps do not indicate any potential issues on site. Historical plans do show a mill race running through land to the north. A mill pond was located to the north-west of the red line boundary 1893 and latterly 1907 what appears to be a boating like for a tourist destination. A mill race/watercourse from the outfall from these features crossed land to the north in an open section. Part of this section is still visible on the 1955 plans with the outfall section still showing on modern day plans.

There are some wells shown on historical plans in the vicinity of the site. The 1893 plan shows a well and possible watercourse adjacent to Woodhead Road heading in the direction of the site (and possibly beyond to features described above). Further investigation is advised. The 1854 plan shows an uneven field boundary in this area which can be associated with a natural feature, i.e. minor watercourse. This could of course now be culverted. Suitable routing any ordinary watercourse will have to be agreed with the Council.

The site layout will have to accommodate a flood routing plan for blockage scenarios for any minor watercourse and the on site designed drainage. 2D modelling will not be required but the I would expect the FRA to clearly evidence that this has been considered in the layout so the flood route avoids property for certain and gardens if practicable. Detailed sections involving kerbs etc can of course come later. We basically need to know the principle is workable. Future development to the north will have to be taken into account for flood routing.

An assessment of the drainage on the unadopted road, Smithy Place, which is a public right of way will have to form part of the report incorporating how this may affect or be affected by the development.

Please note this is a desktop study and additional comments may arise from any site visit when an application has been submitted.

Regards,

Paul Farndale
Principal Engineer
Flood Management & Drainage
Investment & Regeneration Service
Kirklees Council
01484 225377

APPENDIX D

Yorkshire Water consultation

YorkshireWater

18 DEC 2013

Yorkshire Water Services
Developer Services
Sewerage Technical Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0845 120 8482
Fax: (01274) 372 834

Email:
Technical.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:

Kashif Khan on (0845)120 8482

17th December 2013

Avie Consulting Ltd
The Sugar Refinery; Suite 55 Oakhurst Avenue
Dewsbury Road
Leeds
LS11 7HL

FAO Tim Davis

Your Ref:
Our Ref: P017806

Dear Sir,

Woodhead Road, Honley - Pre-Planning Sewerage Enquiry on P282595

Thank you for your enquiry received 3rd December 2013. Our charge of £67.00 (plus VAT) will be added to your account with us, reference ACE105. You will receive an invoice for your account in due course. Please find enclosed a complimentary extract from the Statutory Sewer Map which 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:

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

Foul water domestic waste should discharge to the 225 mm diameter public combined sewer recorded in Banks Road, at a point approximately 55 metres from the site.

From the information supplied, it is not possible to determine if the whole site will drain by gravity to the public sewer network. If the site, or part of it, will not drain by gravity, then it is likely that a sewage pumping station will be required to facilitate connection to the public sewer network. If sewage pumping is required foul water discharge must not exceed 5 (five) litres per second.

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. 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 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 for discharge.

It is understood that a watercourse is located to the east of the site. This appears to be the obvious place for surface water disposal.

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, with regard to surface water disposal from the site.

Prospectively adoptable sewers and pumping stations 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 Developer Services Team (telephone 0845 120 84 82) for further information.

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

As a last resort, highway drainage may be accepted under certain circumstances. If it can be demonstrated, through satisfactory evidence, that SUDS are not a viable option, there are no watercourses or highway drains available and if capacity is available within the public sewer network, highway drainage discharges to the public sewer network may be permitted. In this event, the developer may 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 prior 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

Developer Services Team

GP

125.9m

Phoenix Works

NR

BANKS ROAD

1.51m deep

Hope Bank

Honeysucckle Cottage

Ashlea

1.53m deep

1.48m deep

Holly Edge

Larkfield

A 6024

Longmead

The Spinney

Haggroyd Cottage

Oakwood

414507 : 411021

Map Name : SE1410NW

Yorkshire Water,
PO Box 500,
Halifax Road,
Bradford BD6 2LZ
Contact Name :
K KHAN
Contact Tel :

YorkshireWater

Title

Notes

NR = No Recorded depth

Partial Key

Foul Sewer = F

Combined Sewer = C

Surface Water Sewer = SW

Trade Sewer = TD

Partially Separate = PS

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.

18 DEC 2013

Date Req : 17/12/2013, 11:41:06

Date Gen : 17/12/2013, 11:41:15

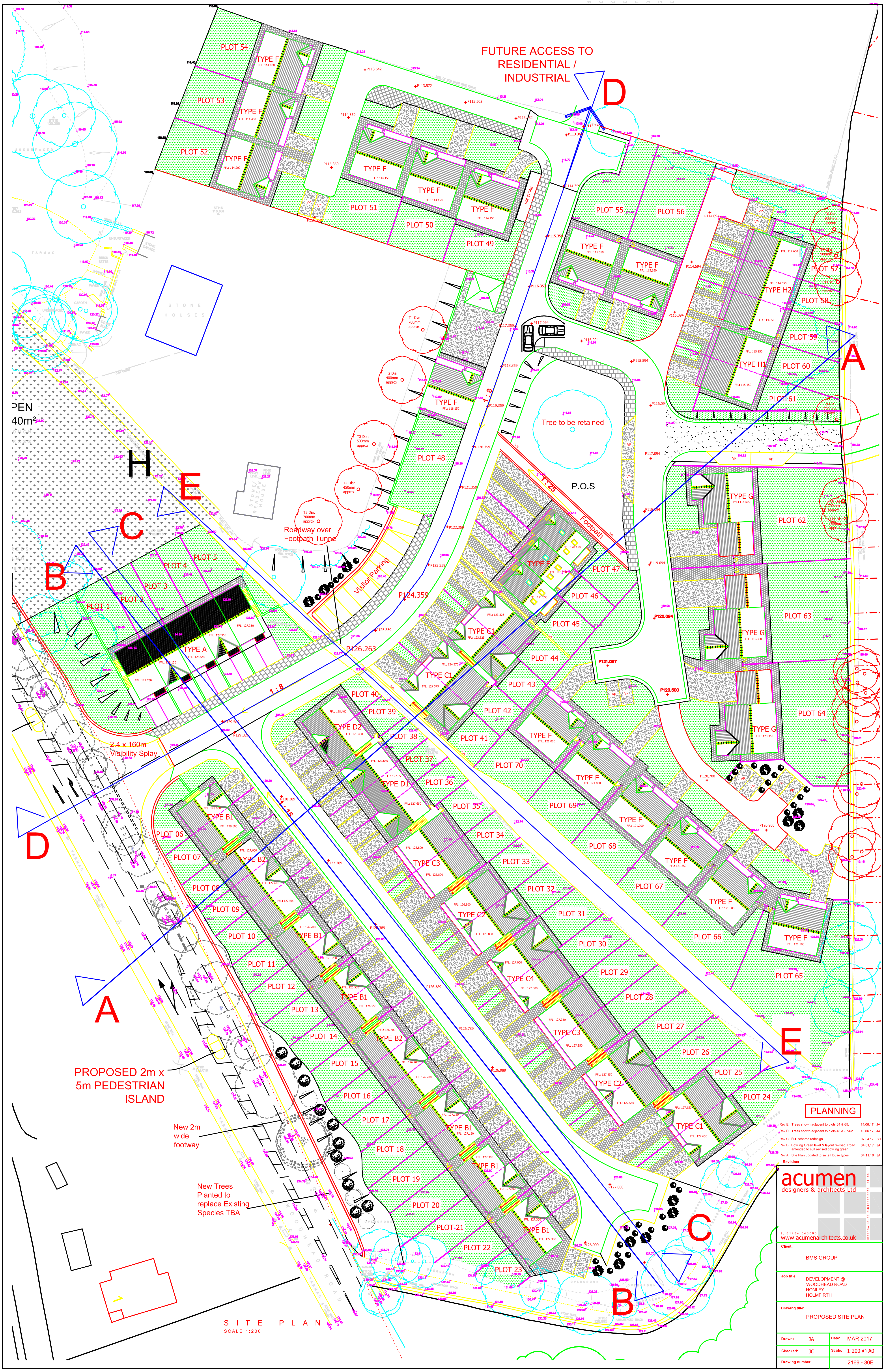
Source : Sewer Network Enquiry

UPN: Undefined

Originator: K KHAN, New Development - Waste Water,

APPENDIX E

Proposed Site layout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RESIDENTIAL /
INDUSTRIAL
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PLOT 47
TYPE A
TYPE B1
TYPE B2
TYPE C1
TYPE C2
TYPE C3
TYPE C4
TYPE D1
TYPE D2
TYPE E
TYPE F
TYPE G
TYPE H1
TYPE H2
Tree to be retained
P.O.S
Footpath
1 : 25
1 : 8
1 : 15
Roadway over
Footpath Tunnel
Visitor Parking
BIN STORE
P124.359
P126.263
STONE HOUSES
2.4 x 160m
Visibility Splay
PROPOSED 2m x
5m PEDESTRIAN
ISLAND
New 2m
wide
footway
New Trees
Planted to
replace Existing
Species TBA
WOODHEAD ROAD
SITE PLAN
SCALE 1:200
PLANNING
Rev E Trees shown adjacent to plots 64 & 65. 14.06.17 JA
Rev D Trees shown adjacent to plots 48 & 57-62. 13.06.17 JA
Rev C Full scheme redesign. 07.04.17 SH
Rev B Bowling Green level & layout revised, Road amended to suit revised bowling green. 04.01.17 JA
Rev A Site Plan updated to suite House types. 04.11.16 JA
Revision:
acumen
designers & architects Ltd
HEADROW HOUSE, OLD LEEDS ROAD, HD1 1SG
t: 01484 546000
www.acumenarchitects.co.uk
Client:
BMS GROUP
Job title:
DEVELOPMENT @
WOODHEAD ROAD
HONLEY
HOLMFIRTH
Drawing title:
PROPOSED SITE PLAN
Drawn: JA
Date: MAR 2017
Checked: JC
Scale: 1:200 @ A0
Drawing number: 2169 - 30E

APPENDIX F

Greenfield Run off rates

Avie Consulting Ltd		Page 1
Suite 55 The Sugar Refinery Leeds LS11 7HL	WOODHEAD ROAD	Micro Drainage
Date 19/12/2013 15:45 File	Designed by User Checked by	
Micro Drainage	Source Control 2013.1.1	

IH 124 Mean Annual Flood

Input

Return Period (years)	2	Soil	0.500
Area (ha)	50.000	Urban	0.000
SAAR (mm)	882	Region Number	Region 3

Results	l/s
QBAR Rural	361.8
QBAR Urban	361.8
Q2 years	341.4
Q1 year	311.1
Q2 years	341.4
Q5 years	452.3
Q10 years	524.6
Q20 years	594.2
Q25 years	617.2
Q30 years	636.0
Q50 years	685.3
Q100 years	752.5
Q200 years	853.9
Q250 years	886.4
Q1000 years	1099.9

PRO RATA TO 0.891 HA

∴ FLOW IS 6.1 l/s

Avie Consulting Ltd		Page 1
Suite 55 The Sugar Refinery Leeds LS11 7HL	WOODHEAD LD	
Date 19/12/2013 15:48 File	Designed by User Checked by	
Micro Drainage	Source Control 2013.1.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	2	Soil	0.500
Area (ha)	0.890	Urban	0.000
SAAR (mm)	882	Region Number	Region 3

Results l/s

QBAR Rural	6.4
QBAR Urban	6.4
Q2 years	6.1
Q1 year	5.5
Q30 years	11.3
Q100 years	13.4

Avie Consulting Ltd		Page 1
Suite 55 The Sugar Refinery Leeds LS11 7HL	WOODHEAD RD	Micro Drainage
Date 19/12/2013 15:49 File	Designed by User Checked by	
Micro Drainage	Source Control 2013.1.1	

ADAS 345 Mean Annual Flood

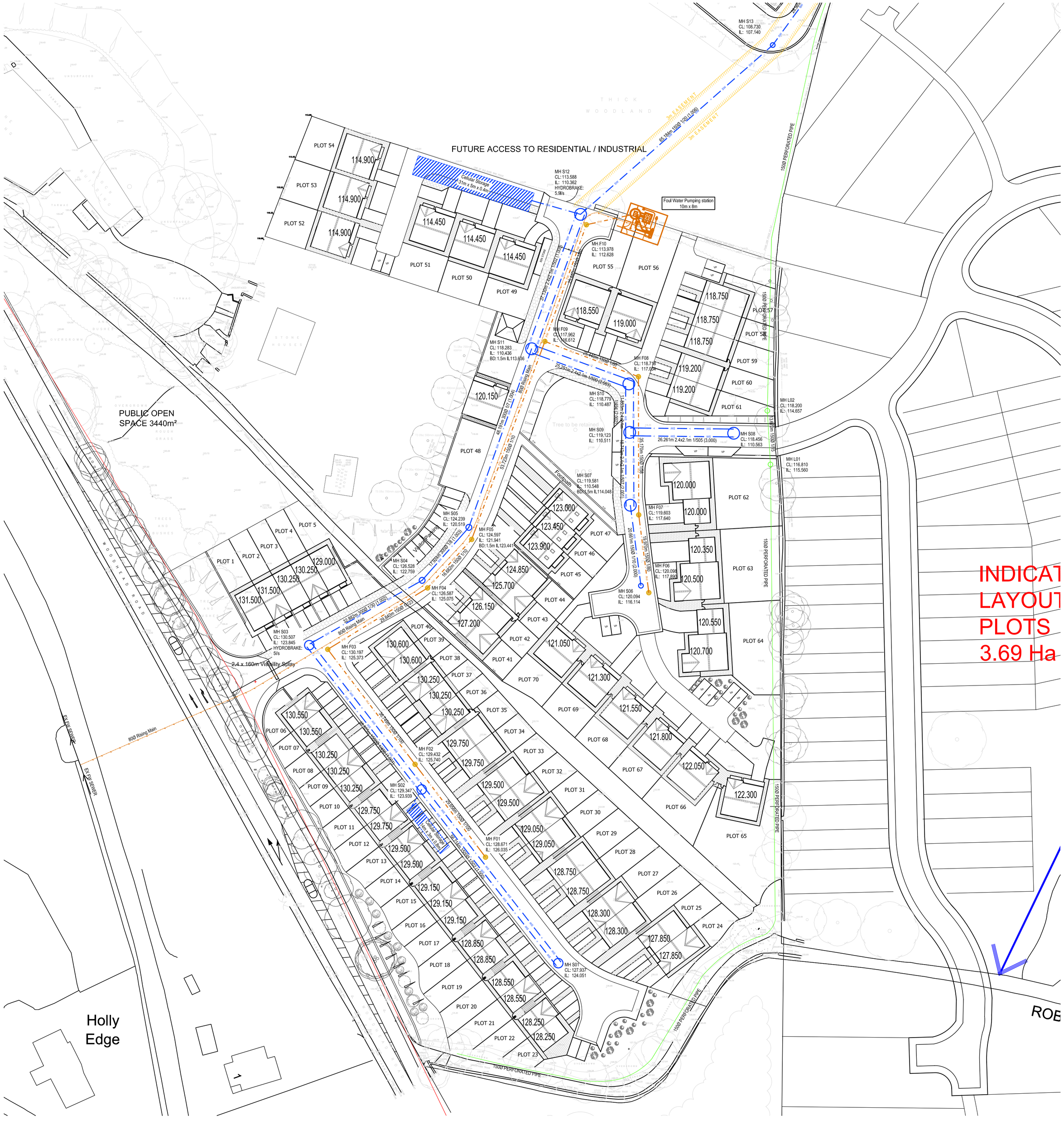
Input

Area (ha)	0.890	Soil Type Factor (St)	0.500
Length (m)	182.000	Paved Area (%)	0.000
Average Slope (1:X)	9.0	Region Number	Region 3
AAR (mm)	882		

Results	**l/s**
Q0 - Peak Flood Flow	6.5
Total Q0	6.5
QBAR	6.9
Q2 years	6.5
Q1 year	5.9
Q2 years	6.5
Q5 years	8.6
Q10 years	10.0
Q20 years	11.3
Q25 years	11.8
Q30 years	12.1
Q50 years	13.1
Q100 years	14.3
Q200 years	16.3
Q250 years	16.9
Q1000 years	21.0

APPENDIX G

Indicative Drainage Layout / Storage Calculations



Notes-

All dimensions are in millimetres unless noted otherwise

DO NOT SCALE THIS DRAWING - IF IN DOUBT ASK

1. All dimensions & levels to be checked by the contractor prior to commencement of work, any discrepancy shall be reported immediately to Avie Consulting Ltd
2. All work shall be carried out in accordance with Local Authority, statutory authority, health & safety requirements and regulations.
3. The drawings shall be read in accordance with all other contract documents relevant at that time of issue and during the period of the contract.
4. The contractor must ensure the overall stability of the works is adequate at all stages of the construction.
5. No allowance has been made for cutouts, holes, notches, etc. for services. All of these are to be agreed prior to the start of the works.

ADOPTABLE DRAINAGE KEY-

- PROPOSED ADOPTABLE SURFACE WATER SEWER/MANHOLE
- PROPOSED ADOPTABLE FOUL WATER SEWER
- PROPOSED LAND DRAINAGE
- PROPOSED ADOPTABLE COMBINED SEWER
- EXISTING FOUL WATER
- EXISTING SURFACE WATER
- EXISTING PRIVATE COMBINED SEWER TO BE RETAINED
- PROPOSED GULLY WITH 150Ø CONNECTION PIPE
- PROPOSED SECTION 104 BOUNDARY
- XXX.XXX PROPOSED GROUND FLOOR SLAB LEVELS

Rev	Details	By	Chk	Date
-	Initial Issue	JJB	TMD	20.07.2017

AVIE CONSULTING LTD
6 Killingbeck Court,
Killingbeck Office Village,
Killingbeck Drive,
Leeds LS14 6FD.
Tel: 0113 249 7416
www.avie-consulting.co.uk

Client: Acumen

Project: Woodhead Road

Title: Proposed Drainage Layout

Drawn:	Checked:	Date:	Scale:	Original dwg size
JJB	TMD	Jul 2017	1:500	A1

Drawing Number: P1244-SK01 Rev: -

Notes-

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2. All work shall be carried out in accordance with Local Authority, statutory authority, health & safety requirements and regulations.
3. The drawings shall be read in accordance with all other contract documents relevant at that time of issue and during the period of the contract.
4. The contractor must ensure the overall stability of the works is adequate at all stages of the construction.
5. No allowance has been made for cutouts, holes, notches, etc. for services. All of these are to be agreed prior to the start of the works.

ADOPTABLE DRAINAGE KEY-

- MH S02 CL: 184.316 IL: 182.216 — PROPOSED ADOPTABLE SURFACE WATER SEWER/MANHOLE
- MH F02 CL: 184.260 IL: 182.830 — PROPOSED ADOPTABLE FOUL WATER SEWER
- MH L02 CL: 184.260 IL: 182.830 — PROPOSED LAND DRAINAGE
- PROPOSED ADOPTABLE COMBINED SEWER
- EXISTING FOUL WATER
- EXISTING SURFACE WATER
- EXISTING PRIVATE COMBINED SEWER TO BE RETAINED
- PROPOSED GULLY WITH 150Ø CONNECTION PIPE
- PROPOSED SECTION 104 BOUNDARY
- XXX.XXX — PROPOSED GROUND FLOOR SLAB LEVELS

Rev	Details	By	Chk	Date
-	Initial issue	JJB	TMD	20.07.2017

AVIE CONSULTING LTD
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Leeds LS14 6FD.
Tel: 0113 249 7416
www.avie-consulting.co.uk

Client: Acumen

Project: Woodhead Road

Title: Drainage Outfall Location

Drawn:	Checked:	Date:	Scale:	Original dwg size
JJB	TMD	Jul 2017	1:500	A1

Drawing Number: P1244-SK08

Rev: -

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type	
1.000	56.214	0.112	501.9	0.228	3.00	0.600	o	1500	Pipe/Conduit	
1.001	46.825	0.094	498.1	0.155	0.00	0.600	o	1500	Pipe/Conduit	
1.002	32.882	1.086	30.3	0.111	0.00	0.600	o	300	Pipe/Conduit	
1.003	17.924	2.241	8.0	0.000	0.00	0.600	o	300	Pipe/Conduit	
1.004	48.191	6.583	7.3	0.108	0.00	0.600	o	300	Pipe/Conduit	
2.000	20.661	2.066	10.0	0.179	3.00	0.600	o	150	Pipe/Conduit	
2.001	18.743	0.037	506.6	0.000	0.00	0.600	[]	-8	Pipe/Conduit	2.4x2.1
3.000	26.261	0.052	505.0	0.020	3.00	0.600	[]	-8	Pipe/Conduit	2.4x.2.1
2.002	11.853	0.024	493.9	0.027	0.00	0.600	[]	-8	Pipe/Conduit	2.4x2.1
2.003	25.291	0.051	495.9	0.018	0.00	0.600	[]	-8	Pipe/Conduit	2.4x2.1
1.005	37.130	0.074	501.8	0.080	0.00	0.600	[]	-8	Pipe/Conduit	2.4x2.1
1.006	65.184	3.222	20.2	0.195	0.00	0.600	o	150	Pipe/Conduit	
1.007	28.989	0.950	30.5	0.000	0.00	0.600	o	150	Pipe/Conduit	
1.008	35.530	0.203	175.0	0.000	0.00	0.600	o	150	Pipe/Conduit	
1.009	36.497	1.363	26.8	0.000	0.00	0.600	o	150	Pipe/Conduit	

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
1.000	1	127.937	124.051	2.386	129.374	123.939	3.935		2400
1.001	2	129.374	123.939	3.935	130.507	123.845	5.162		2400
1.002	3	130.507	123.845	6.362	126.528	122.759	3.469	Hydro-Brake®	2400
1.003	4	126.528	122.759	3.469	124.359	120.518	3.541		1200
1.004	5	124.359	120.518	3.541	118.283	113.935	4.048		1200
2.000	6	120.094	116.114	3.830	119.581	114.048	5.383		1200
2.001	7	119.581	110.548	6.933	119.123	110.511	6.512		3000
3.000	8	118.456	110.563	5.793	119.123	110.511	6.512		3000
2.002	9	119.123	110.511	6.512	118.779	110.487	6.192		3000
2.003	10	118.779	110.487	6.192	118.283	110.436	5.747		3000
1.005	11	118.283	110.436	5.747	113.588	110.362	1.126		3000
1.006	12	113.588	110.362	3.076	108.730	107.140	1.440	Hydro-Brake®	3000
1.007	13	108.730	107.140	1.440	107.198	106.190	0.858		1200
1.008	14	107.198	106.190	0.858	107.166	105.987	1.029		1200
1.009	15	107.166	105.987	1.029	105.000	104.624	0.226		1200

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Storm Duration (mins)	30
Ratio R	0.281		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 3, DS/PN: 1.002, Volume (m³): 108.6

Unit Reference	MD-SHE-0098-5000-1500-5000
Design Head (m)	1.500
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	98
Invert Level (m)	123.845
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.0
Flush-Flo™	0.431	4.9
Kick-Flo®	0.878	3.9
Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	1.200	4.5	3.000	6.9	7.000	10.3
0.200	4.4	1.400	4.8	3.500	7.4	7.500	10.7
0.300	4.8	1.600	5.1	4.000	7.9	8.000	11.0
0.400	4.9	1.800	5.4	4.500	8.4	8.500	11.3
0.500	4.9	2.000	5.7	5.000	8.8	9.000	11.6
0.600	4.8	2.200	6.0	5.500	9.2	9.500	11.9
0.800	4.3	2.400	6.2	6.000	9.6		
1.000	4.1	2.600	6.5	6.500	10.0		

Hydro-Brake Optimum® Manhole: 12, DS/PN: 1.006, Volume (m³): 194.8

Unit Reference	MD-SHE-0089-5000-2300-5000
Design Head (m)	2.300
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	89
Invert Level (m)	110.362
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Hydro-Brake Optimum® Manhole: 12, DS/PN: 1.006, Volume (m³): 194.8

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.300	5.0
Flush-Flo™	0.384	3.8
Kick-Flo®	0.790	3.1
Mean Flow over Head Range	-	3.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.7	1.200	3.7	3.000	5.7	7.000	8.4
0.200	3.6	1.400	4.0	3.500	6.1	7.500	8.7
0.300	3.8	1.600	4.2	4.000	6.5	8.000	9.0
0.400	3.8	1.800	4.5	4.500	6.8	8.500	9.3
0.500	3.8	2.000	4.7	5.000	7.2	9.000	9.5
0.600	3.7	2.200	4.9	5.500	7.5	9.500	9.8
0.800	3.1	2.400	5.1	6.000	7.8		
1.000	3.4	2.600	5.3	6.500	8.1		

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	30
Climate Change (%)	30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	360 Winter	30	+30%	30/240 Winter			
1.001	2	360 Winter	30	+30%	30/180 Winter			
1.002	3	360 Winter	30	+30%	30/15 Summer			
1.003	4	360 Winter	30	+30%				
1.004	5	15 Summer	30	+30%				
2.000	6	15 Summer	30	+30%	30/15 Summer			
2.001	7	2880 Winter	30	+30%	30/2880 Winter			
3.000	8	2880 Winter	30	+30%	30/2880 Winter			
2.002	9	2880 Winter	30	+30%	30/2160 Winter			
2.003	10	2880 Winter	30	+30%	30/2160 Winter			
1.005	11	2880 Winter	30	+30%	30/1440 Winter			
1.006	12	2880 Winter	30	+30%	30/15 Summer			
1.007	13	2880 Winter	30	+30%				
1.008	14	2880 Winter	30	+30%				
1.009	15	2880 Winter	30	+30%				

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	125.635	0.084	0.000	0.01		14.8	SURCHARGED	
1.001	2	125.635	0.196	0.000	0.00		9.6	SURCHARGED	
1.002	3	125.635	1.490	0.000	0.03		5.4	SURCHARGED	
1.003	4	122.782	-0.277	0.000	0.02		5.4	OK	
1.004	5	120.589	-0.229	0.000	0.13		49.7	OK	
2.000	6	117.605	1.341	0.000	1.25		66.7	SURCHARGED	
2.001	7	112.686	0.038	0.000	0.00		2.6	SURCHARGED	
3.000	8	112.686	0.023	0.000	0.00		0.2	SURCHARGED	
2.002	9	112.686	0.075	0.000	0.00		2.7	SURCHARGED	
2.003	10	112.686	0.099	0.000	0.00		2.4	SURCHARGED	
1.005	11	112.687	0.151	0.000	0.00		5.4	SURCHARGED	
1.006	12	112.687	2.175	0.000	0.13		5.0	SURCHARGED	
1.007	13	107.180	-0.110	0.000	0.16		5.0	OK	
1.008	14	106.255	-0.085	0.000	0.39		5.0	OK	
1.009	15	106.026	-0.111	0.000	0.15		5.0	OK	

1 IN 100yr + 30%.

Avie Consulting Ltd		Page 1
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD	Woodhead Road Surface Water	
Date July 2017 File P1244 Woodhead Road 29....	Designed by TMD Checked by	
Micro Drainage	Network 2016.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Storm Duration (mins)	30
Ratio R	0.281		

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	360 Winter	100	+30%	100/60 Winter	100/180 Winter		
1.001	2	180 Winter	100	+30%	100/60 Winter			
1.002	3	180 Winter	100	+30%	100/15 Summer			
1.003	4	240 Winter	100	+30%				
1.004	5	15 Summer	100	+30%				
2.000	6	15 Summer	100	+30%	100/15 Summer			
2.001	7	1440 Winter	100	+30%	100/480 Winter			
3.000	8	1440 Winter	100	+30%	100/480 Winter			
2.002	9	1440 Winter	100	+30%	100/480 Winter			
2.003	10	1440 Winter	100	+30%	100/480 Winter			
1.005	11	1440 Winter	100	+30%	100/480 Winter			
1.006	12	1440 Winter	100	+30%	100/15 Summer	100/960 Winter		
1.007	13	1440 Winter	100	+30%				
1.008	14	1440 Winter	100	+30%				
1.009	15	1440 Winter	100	+30%				

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	127.968	2.417	32.170	0.01		21.3	FLOOD	7
1.001	2	128.194	2.755	0.000	0.01		17.5	SURCHARGED	
1.002	3	128.201	4.056	0.000	0.04		8.0	SURCHARGED	
1.003	4	122.790	-0.269	0.000	0.02		8.0	OK	
1.004	5	120.598	-0.220	0.000	0.16		62.7	OK	
2.000	6	118.945	2.681	0.000	1.48		79.2	SURCHARGED	
2.001	7	113.648	1.000	0.000	0.00		5.4	SURCHARGED	
3.000	8	113.648	0.985	0.000	0.00		2.1	SURCHARGED	
2.002	9	113.648	1.037	0.000	0.00		5.1	SURCHARGED	
2.003	10	113.648	1.061	0.000	0.00		4.4	SURCHARGED	
1.005	11	113.648	1.112	0.000	0.00		9.6	SURCHARGED	
1.006	12	113.648	3.136	60.069	0.15		5.9	FLOOD	6
1.007	13	107.184	-0.106	0.000	0.19		5.9	OK	
1.008	14	106.261	-0.079	0.000	0.46		5.9	OK	
1.009	15	106.029	-0.108	0.000	0.18		5.9	OK	

ADDITIONAL CELLULAR STORAGE ON THE FOLLOWING LEG'S TO BE PROVIDED

LEG 1.000 - 33M³

LEG 1.006 - 61M³

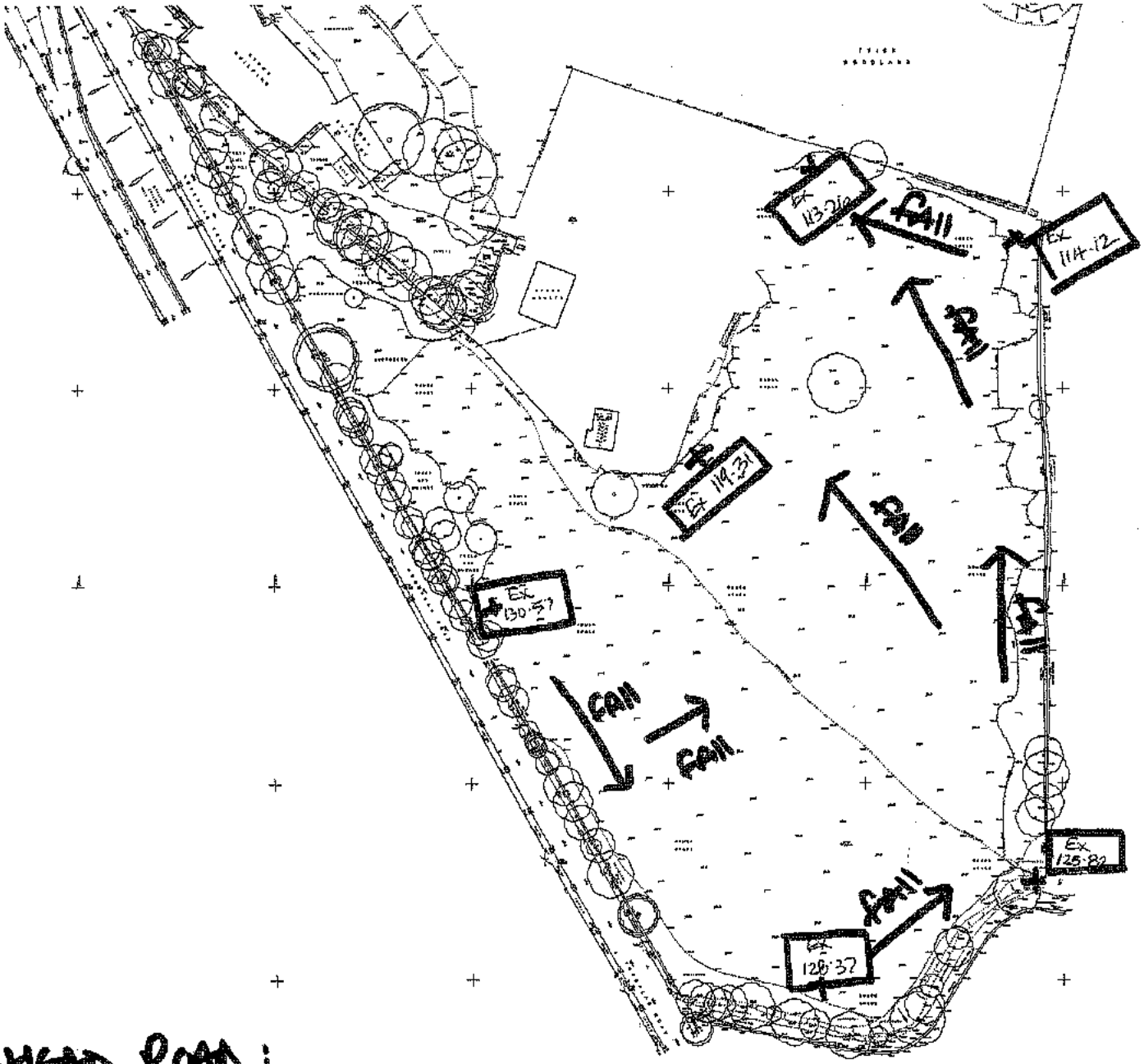
APPENDIX H

Topographical Survey


WOODHEAD ROAD
TARMAC
GRASS
BANKING COVERED WITH TREES
STONE RET. WALL
TREES AND BUSHES
OVERGROWN
ROUGH GRASS
STONE BUILDING
BRICK BUILDING
PLANT
SHELVING
CONC
UNSURFACED
GARDEN
PAVED
BRICK SETTS
STONE GARAGE
STONE HOUSES
STONE/RENDERED HOUSE
UNSURFACED FOOTPATH
UNSURFACED TRACK
WOOD POST AND WIRE FENCE HT1M
LINE OF OLD BARB WIRE FENCE
TIPPING
CANOPY
STONE WALL HT0.9M
CHAIN LINK FENCE HT 2.2
THICK WOODLAND
414500E
414550E
414600E
414650E
414700E
414750E
414800E

APPENDIX I

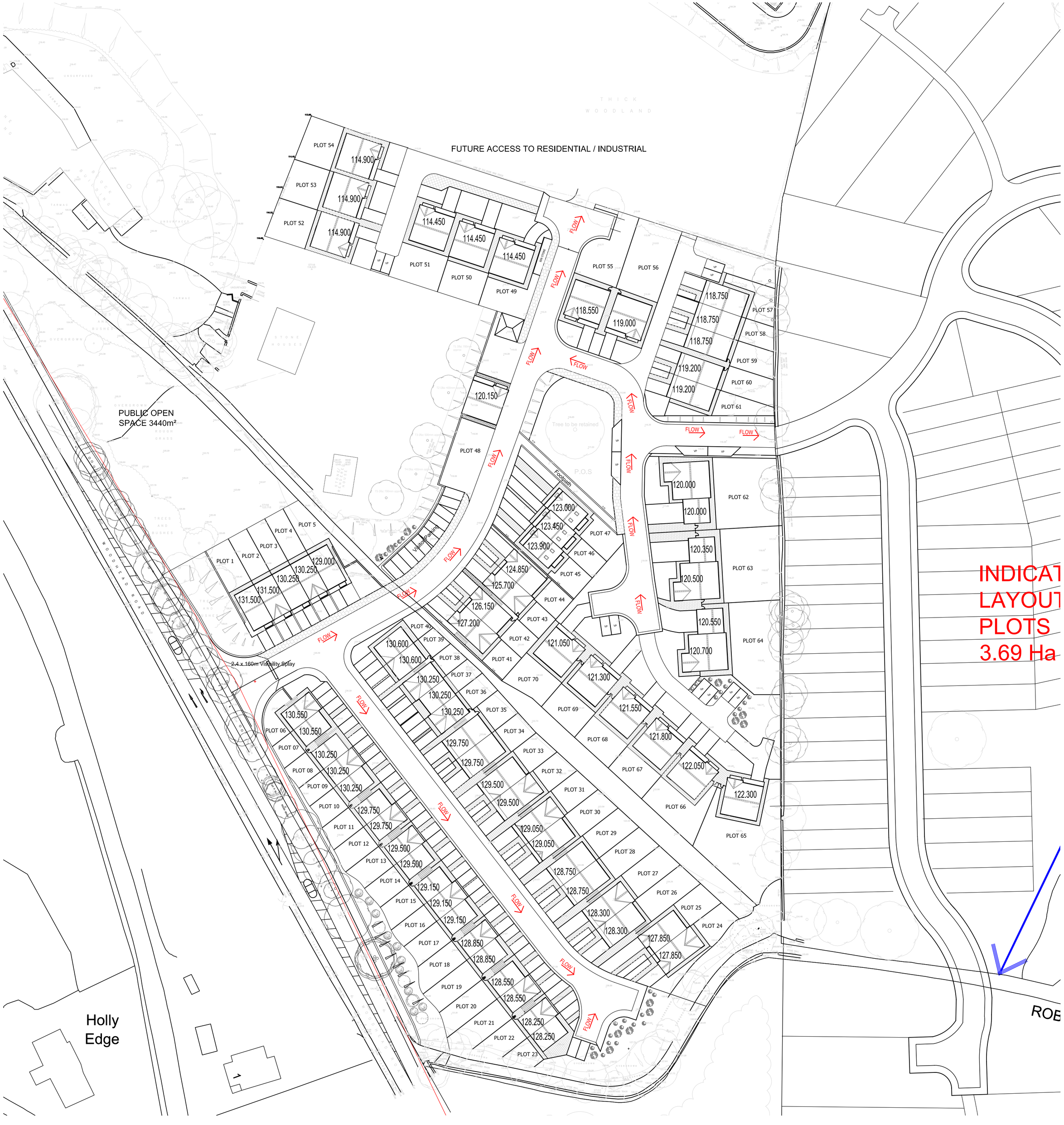
Flood Routing Plan and Existing Site Falls Plan



WOODHEAD ROAD :

NOT TO SCALE

PLAN 1



Notes-

All dimensions are in millimetres unless noted otherwise

DO NOT SCALE THIS DRAWING - IF IN DOUBT ASK

1. All dimensions & levels to be checked by the contractor prior to commencement of work, any discrepancy shall be reported immediately to Avie Consulting Ltd
2. All work shall be carried out in accordance with Local Authority, statutory authority, health & safety requirements and regulations.
3. The drawings shall be read in accordance with all other contract documents relevant at that time of issue and during the period of the contract.
4. The contractor must ensure the overall stability of the works is adequate at all stages of the construction.
5. No allowance has been made for cutouts, holes, notches, etc. for services. All of these are to be agreed prior to the start of the works.

Rev	Details	By	Chk	Date
-	Initial issue	JJB	TMD	20.07.2017

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Client: Acumen

Project: Woodhead Road

Title: Flood Routing Plan

Drawn:	Checked:	Date:	Scale:	Original dwg size
JJB	TMD	Jul 2017	1:500	A1

Drawing Number: P1244-SK01 Rev: -