



john newton & partners  
**jnp group**  
Consulting Engineers

[www.jnpgroup.co.uk](http://www.jnpgroup.co.uk)

# Report

## Addendum to Flood Risk Assessment

**Project:** Land off Woodhead Road,  
Honley,  
Holmfirth

**Client:** Acumen Designers & Architects Ltd

**Reference:** B22938-R100

**Date:** November 2018

### Leamington Spa

**telephone**

01926 889955

**email**

[leamingtonspa@jnpgroup.co.uk](mailto:leamingtonspa@jnpgroup.co.uk)

- Civil Engineering
- Consulting
- Flood Risk
- Geo-Environmental
- Green Energy
- Rail
- Structural Engineering
- Transport Planning

**Offices at:**

Brighouse

Chesham

Hartlepool

Leamington Spa

Sheffield

**DOCUMENT CONTROL SHEET**

**Addendum to Flood Risk Assessment**



Prepared by.....  
**Karl Malik BEng (Hons)**  
**Civil Engineer**



Approved by.....  
**Khai Tran BEng (Hons)**  
**Associate**

**FOR AND ON BEHALF OF JNP GROUP**

**Date:** November 18

**Document Issue Record**

Rev	Date	Description	Prepared	Checked	Approved
~	09.11.2018	First Issue	KM	KT	KT

*This document is for the sole use and reliance of **jnp group**'s client and has been prepared in accordance with the scope of the appointment of **jnp group** and is subject to the terms of that appointment.*

***jnp group** accepts no liability for any use of this document other than by its client and only for the purposes for which it has been prepared.*

*No person other than the client may copy (in whole or in part) or use the contents of this document, without the prior written permission of **jnp group**.*

*Any advice, opinions or recommendations within this document should be read and relied upon only in the context of this document as a whole.*

*Any comments given within this document are based on the understanding that the proposed works to be undertaken will be as described in the introduction. The information referred to and provided by others and will be assumed to be correct and will not have been checked by **jnp group**, **jnp group** will not accept any liability or responsibility for any inaccuracy in such information.*

*Any deviation from the recommendations or conclusions contained in this document should be referred to **jnp group** in writing for comment and **jnp group** reserve the right to reconsider their recommendations and conclusions contained within. **jnp group** will not accept any liability or responsibility for any changes or deviations from the recommendations noted in this document without prior consultation and our full approval.*

## Contents Page

<b>1</b>	<b>INTRODUCTION .....</b>	<b>3</b>
1.1	TERMS OF REFERENCE .....	3
1.2	SITE DESCRIPTION.....	3
<b>2</b>	<b>BACKGROUND TO ADDENDUM .....</b>	<b>3</b>
2.1	LLFA COMMENTS .....	3
2.2	AVIE FRA.....	4
<b>3</b>	<b>UPDATED SURFACE WATER FLOOD RISK.....</b>	<b>4</b>
3.1	SURFACE WATER FLOOD RISK (OVERLAND FLOWS).....	4
<b>4</b>	<b>PROPOSED DRAINAGE STRATEGY.....</b>	<b>5</b>
4.1	FOUL WATER.....	5
4.2	SURFACE WATER .....	5

### List of Appendices

Appendix A	Topographical Survey
Appendix B	Proposed Site Plan
Appendix C	LLFA Comments
Appendix D	Proposed Drainage Strategy
Appendix E	Surface Water Calculations
Appendix F	Flood Route Plan

## 1 INTRODUCTION

### 1.1 Terms of Reference

- 1.1.1 **jnp group** were commissioned by Acumen Designers & Architects Ltd to produce an addendum and updated drainage strategy to the Flood Risk Assessment (FRA) undertaken by Avie Consulting.
- 1.1.2 The addendum and drainage strategy have been produced in support of a planning application for a residential development comprising of 62 residential dwellings and associated infrastructure.
- 1.1.3 The addendum seeks to satisfy the comments from Kirklees Council as the acting Lead Local Flood Authority and provide an updated drainage strategy to suit the latest site layout.
- 1.1.4 This addendum and drainage strategy should be viewed in conjunction with the FRA produced separately by Avie Consulting referenced P1244 Rev 02 and dated 19.07.2017, upon which this addendum is based.

### 1.2 Site Description

- 1.2.1 The site is located approximately 1.2km south-east of the centre of Honley, east of Woodhead Road.
- 1.2.2 The site approximately 2.6ha in size and greenfield in nature. The site is bounded to the west by a treeline and Woodhead Road. The northern, southern and eastern perimeter of the site is bounded by existing treelines. Existing properties are located north-west of the site.
- 1.2.3 An existing public right of way crosses through the site in a south-easterly direction.
- 1.2.4 The ground based topographical survey by Ellam Land Surveys indicates that general site levels fall from west to north-east, ranging from approximately 134m AOD to 113m AOD. Average site gradients are calculated to be in the region of 1 in 10 from west to north-east.
- 1.2.5 Refer to Appendix A for the Topographical Survey.
- 1.2.6 A Proposed Site Plan is provided in Appendix B.

## 2 BACKGROUND TO ADDENDUM

### 2.1 LLFA Comments

- 2.1.1 Kirklees Council, as acting LLFA, previously objected to the planning application on the basis that the FRA required updating to reflect the proposed layout alterations and to demonstrate that space has been provided for surface water management and flood routing.
- 2.1.2 The LLFA's comments are contained in Appendix C.
- 2.1.3 The surface water drainage design has now been updated to suit the latest site layout and is discussed in detail in Section 4.2.
- 2.1.4 The flood routing has now been assessed against the proposed plot finished floor levels and overland surface water flow paths have been indicated on the Flood Route Plan contained in Appendix F.

## 2.2 Avie FRA

- 2.2.1 Reference should be made to the findings and recommendations in Avie's Flood Risk Assessment which forms the basis of this addendum and drainage strategy.
- 2.2.2 The site is noted as being within Flood Zone 1 and reference to the EA's online flood map for planning indicates this to still be the case. Flood Zone 1 is defined within the NPPF as: *land assessed as having a less than 1 in 1000 (0.1%) annual probability of river or sea flooding in any year.*
- 2.2.3 The FRA undertaken by Avie Consulting summarised that the site is at low risk of flooding from all sources, with the exception of groundwater which has been categorised as medium risk.
- 2.2.4 Avie recommended that mitigation against groundwater flooding is provided by: *"Ensuring flood routes are maintained and houses are min 150mm above existing ground levels"*

## 3 UPDATED SURFACE WATER FLOOD RISK

### 3.1 Surface Water Flood Risk (Overland Flows)

- 3.1.1 In the period between Avie's FRA being produced and the writing of this addendum, the Environment Agency's (EA) flood mapping service has been updated.
- 3.1.2 The EA's updated Flood Map for Surface Water (uFMfSW) shows a low risk of surface water flooding on the eastern boundary of the site. Refer to Figure 1 below.

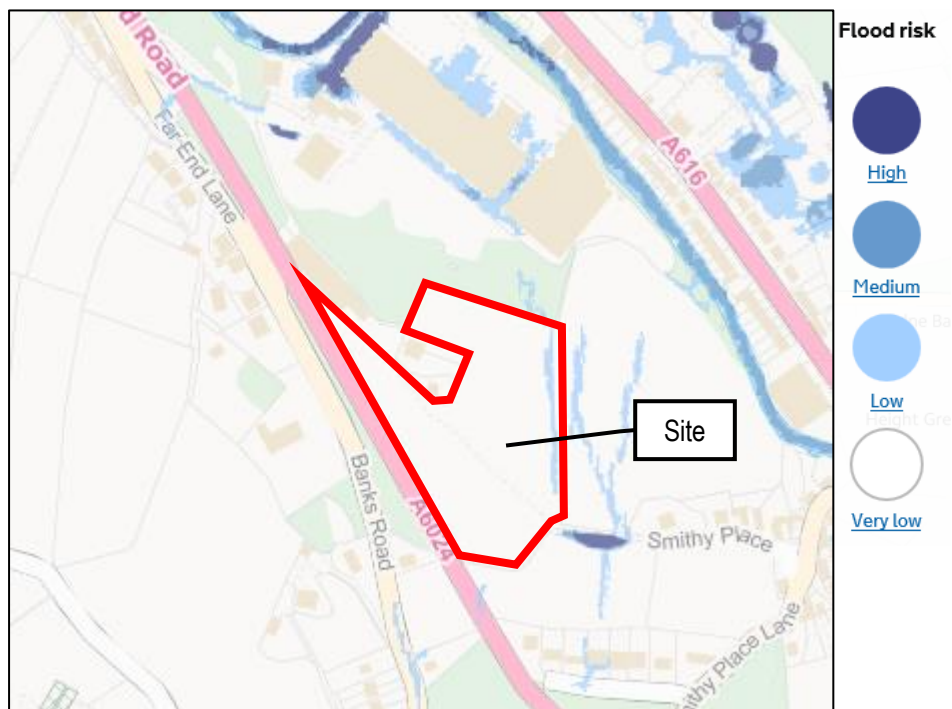


Figure 1: Environment Agency updated Flood Map for Surface Water (uFMfSW)

- 3.1.3 There are no depressions indicated on the topographical survey, however there may have been a land drainage system installed at this location following the completion of the survey.

- 3.1.4 There are no houses proposed in the immediate area in which the flooding is indicated, and the EA maps confirm the risk of flooding as low. Therefore, the risk of surface water flooding to the site is still deemed to be low.

## **4 PROPOSED DRAINAGE STRATEGY**

### **4.1 Foul Water**

- 4.1.1 Avie's consultations with Yorkshire Water (YW) indicated that foul water flows from the development should discharge to an existing 225mm diameter public combined sewer in Banks Road.
- 4.1.2 Due to the site levels, a foul water pumping station will be required. YW have advised that pumped foul flows into their sewer network should be restricted to 5l/s.
- 4.1.3 The updated drainage strategy indicates the location of the proposed foul sewers serving the development. A foul water pumping station has been indicated at the lowest lying area of the site. The pumping station compound dimensions are 10m wide x 14m long, in accordance with YW's 'Design Specification for the Adoption of Small Submersible Foul and Surface Water Pumping Stations' document, dated June 2017.
- 4.1.4 In accordance with Sewers for Adoption, a 15m 'cordon sanitaire' standoff is required between the perimeter of the pumping station and any habitable building. The extent of this standoff has been indicated on the Proposed Drainage Strategy drawing.
- 4.1.5 Refer to Appendix D for the Proposed Drainage Strategy.

### **4.2 Surface Water**

- 4.2.1 As per Avie's drainage strategy, infiltration techniques have been assumed to not be appropriate for this development. YW have confirmed that there is insufficient capacity to accept surface water flows from the development. It is therefore proposed that surface water runoff from the site will outfall to the River Holme north-east of the site.
- 4.2.2 Avie's drainage strategy is based on ensuring no surcharging for the 1 in 2 year storm event, no flooding on-site for the 1 in 30 year storm event utilising a restricted discharge of 5 l/s and any flooding for a 1 in 100 year storm event plus a 30% allowance for climate change to remain on-site but not to affect any plots.
- 4.2.3 Due to the sites steep topography, the proposed drainage strategy features a multi-staged attenuation system designed to minimise the depth of excavations required for the drainage features. This consists of 3 flow control chambers with Hydrobrakes and upstream attenuation in the form of oversized pipework, box culverts and cellular storage tanks.
- 4.2.4 The final discharge rate from the site has been restricted to 5 l/s up to the 1:30 year storm return period. Exceedance flows for all return periods up to and including the 1 in 100 year storm return period plus a 30% allowance for climate change have been restricted to 5.3 l/s.
- 4.2.5 Surface water calculations have been provided in Appendix E.

- 4.2.6 A land drain has been indicated on the western and eastern boundaries of the site to prevent overland flows affecting the existing properties to the west and Smithy Place to the east. The land drains will be routed to the north of the site and through third party land before discharging to the River Holme via a new headwall. Laying of the land drains through the land outside of the site ownership boundary would need to be agreed with the relevant land owners, refer to point 4.2.6 above.
- 4.2.7 Due to the steep topography of the site, it is likely that some plots will be located downslope of steep gardens or open space. At detailed design stage, it is recommended that land drains are provided in gardens to intercept flows before they reach plots that may be at risk.
- 4.2.8 Refer to Appendix D for the Proposed Drainage Strategy and Appendix F for the Flood Route Plan indicating overland flow paths.

# Appendix A

## Topographical Survey

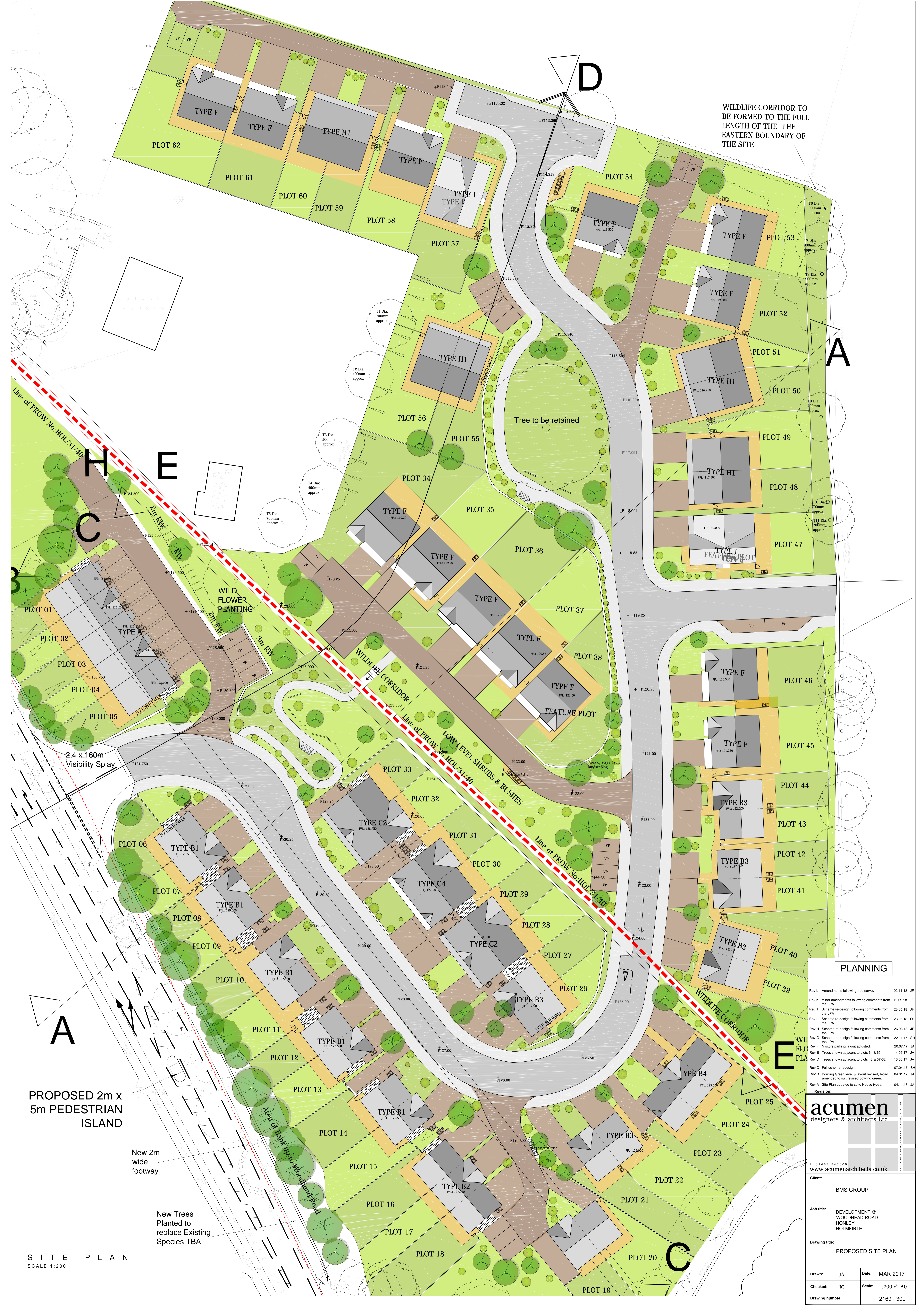




# Appendix B

## Proposed Site Plan





WILDLIFE CORRIDOR TO BE FORMED TO THE FULL LENGTH OF THE THE EASTERN BOUNDARY OF THE SITE

Line of PROW No. HOL/31/140

PROPOSED 2m x 5m PEDESTRIAN ISLAND

New 2m wide footway

New Trees Planted to replace Existing Species TBA

SITE PLAN  
SCALE 1:200

**PLANNING**

Rev L	Amendments following tree survey.	02.11.18	JF
Rev K	Minor amendments following comments from the LPA	19.09.18	JF
Rev J	Scheme re-design following comments from the LPA	23.05.18	JF
Rev I	Scheme re-design following comments from the LPA	23.05.18	OT
Rev H	Scheme re-design following comments from the LPA	26.03.18	JF
Rev G	Scheme re-design following comments from the LPA	22.11.17	SH
Rev F	Visitors parking layout adjusted.	20.07.17	JA
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

**acumen**  
designers & architects Ltd

Client: BMS GROUP

Job title: DEVELOPMENT @ WOODHEAD ROAD HOLNLEY HOLMFIRTH

Drawing title: PROPOSED SITE PLAN

Drawn: JA Date: MAR 2017

Checked: JC Scale: 1:200 @ A0  
Drawing number: 2169 - 30L

# Appendix C

## LLFA Comments



## Karl Malik

---

**From:** Paul Farndale <Paul.Farndale@kirklees.gov.uk>  
**Sent:** 13 October 2018 12:45  
**To:** DCAdmin  
**Cc:** Matthew Woodward  
**Subject:** FW: Attached letter from Kirklees Council regarding application number 2017/92568 at location Land off Woodhead Road, Honley, Holmfirth  
**Attachments:** Consultation Request 14 Days\_691.docx.pdf

Hello Matthew,

Further to my email of 27<sup>th</sup> June 2018, Kirklees Flood Management as LLFA maintain our objection. The FRA requires updating to reflect the proposed layout alterations in particular so it can be demonstrated that space has been made for water, i.e. for attenuation systems and for safe flood routing.

We note alterations and proposed road levels that indicate a safe flood route is now possible but need detailed examination given the design shows some properties floor levels and therefore driveways much lower than the adjacent highway. There are some flattish areas around plots 23-35 where water may enter curtilage without appropriate mitigation. Properties and driveways may need to be raised. Road gullies on the near side of bends may need to be considered. However care should be made so that the private drive serving plot 38 amongst others does not become the prime flood route.

There are no levels given around plot 48 to be able to make a detmination. Also the road is again flat around plot 57 whose ffl is lower than the road.

Risk must be avoided where possible and with a blank canvas we expect this to be achieved.

**We continue to object to this application until further information is received.**

Kind regards,

Paul Farndale  
LLFA

---

**From:** Floodmanagement  
**Sent:** 03 October 2018 15:31  
**To:** Paul Farndale <Paul.Farndale@kirklees.gov.uk>  
**Subject:** FW: Attached letter from Kirklees Council regarding application number 2017/92568 at location Land off Woodhead Road, Honley, Holmfirth

Hi,  
Sending to you as you dealt with it previously.  
Alex

---

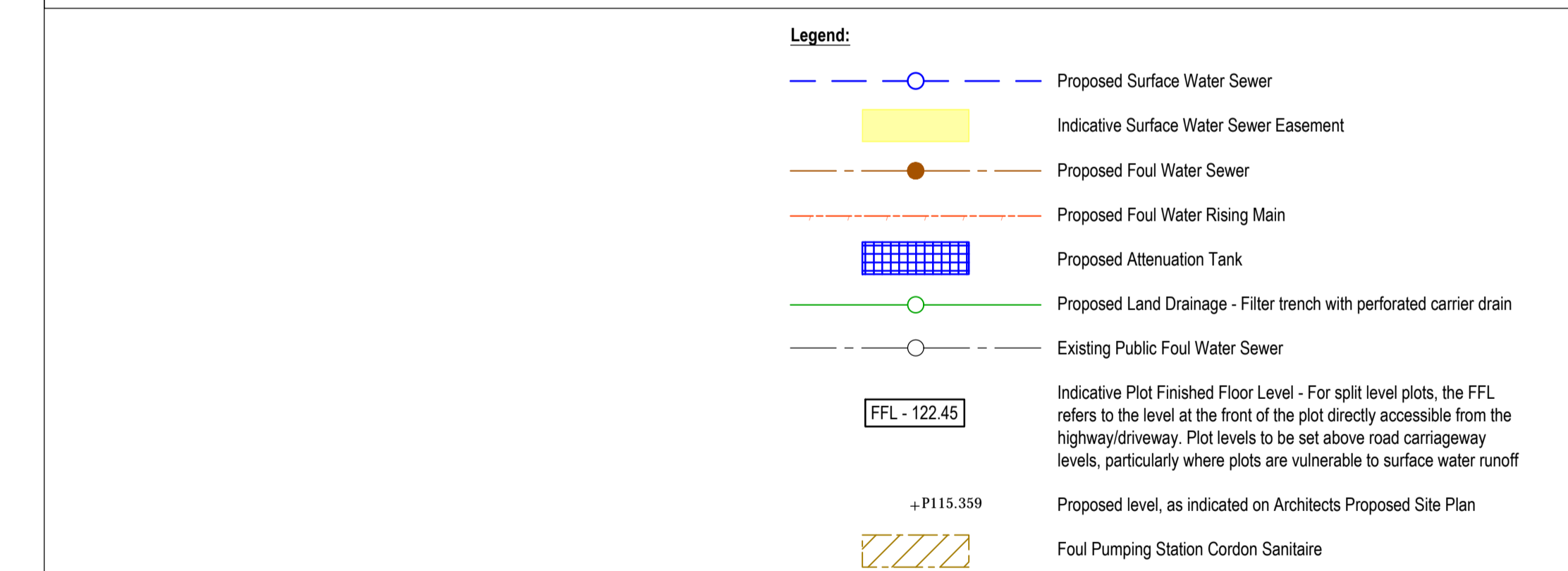
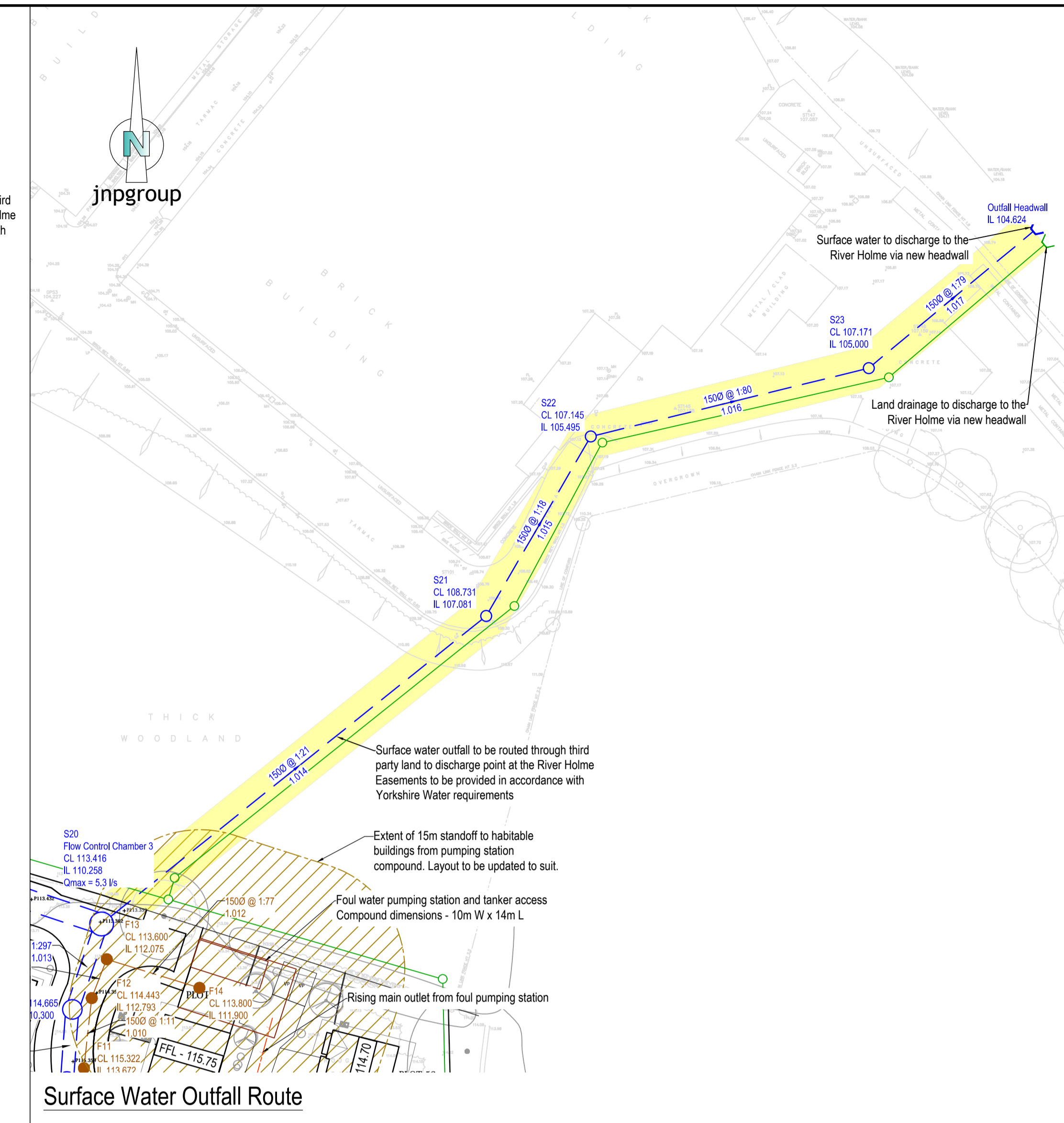
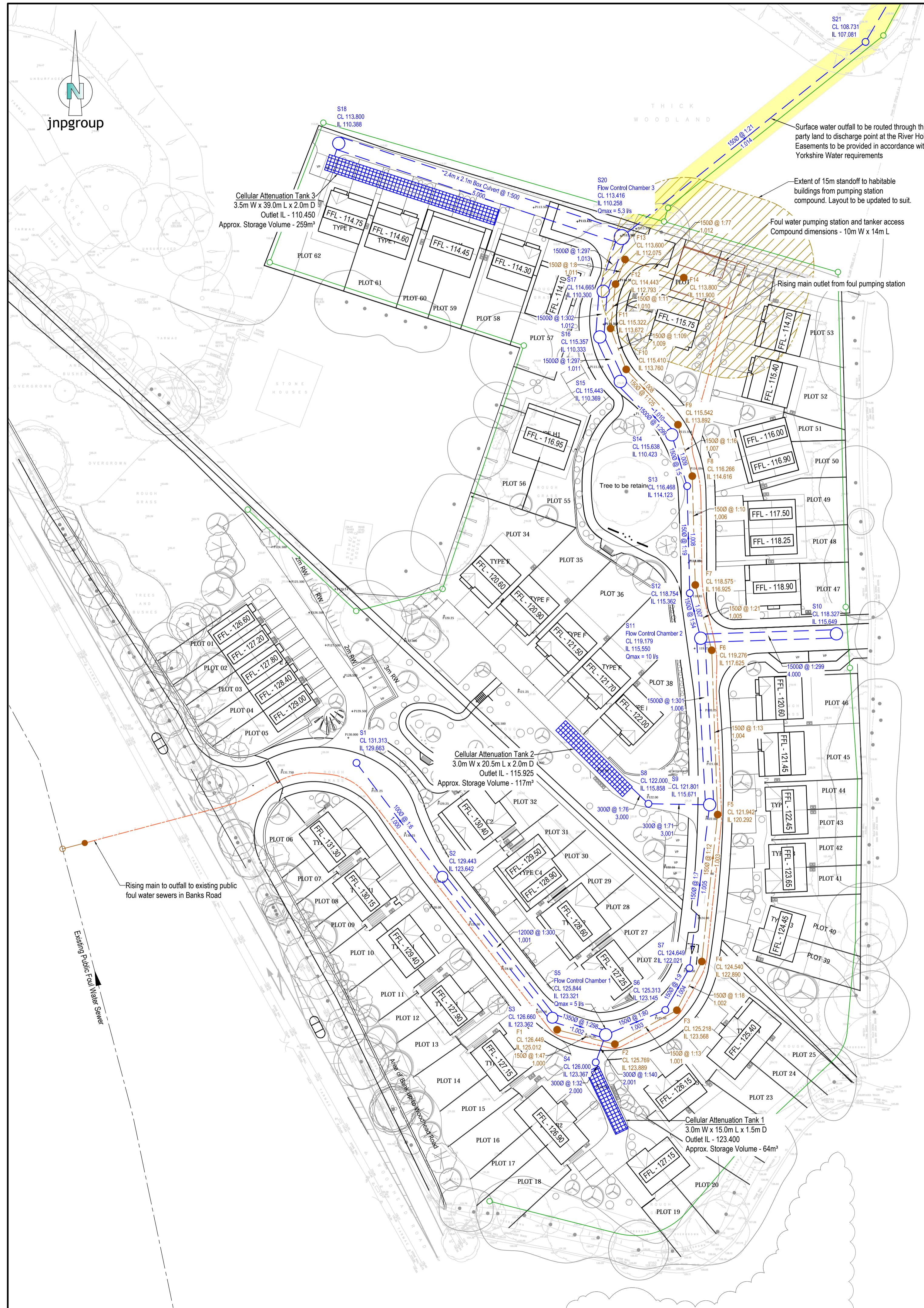
**From:** Planning ContactCentre  
**Sent:** 27 September 2018 08:45  
**To:** Floodmanagement <[Floodmanagement@kirklees.gov.uk](mailto:Floodmanagement@kirklees.gov.uk)>  
**Subject:** Attached letter from Kirklees Council regarding application number 2017/92568 at location Land off Woodhead Road, Honley, Holmfirth

Please open attached letter regarding a planning matter.

# Appendix D

## Proposed Drainage Strategy





The information contained on this drawing is indicative only and provided in good faith based on information provided by other. This information does not infer or constitute a detailed design.

This drawing is based on the following information provided by others:

- Proposed Site Plan by Acumen Designers & Architects Ltd, drawing ref. 2169 - 30L, dated 2<sup>nd</sup> November 2018.
- Topographical Survey undertaken by Eilam Land Surveys, ref. 6606A/1, dated August 2013.

**Drainage Strategy Notes**

This drainage strategy has been undertaken in accordance with the principles set out in the Stage 1 Flood Risk Assessment by Avie Consulting Ltd.

**Surface Water**

Surface water to discharge from site to the River Holme. Flows are to be limited to 5.0 l/s up to the 1:30 year storm return period. Exceedance flows up to and including the 1:100 year storm event plus 30% allowance for climate change to be limited to 5.3 l/s.

Surface water attenuation to be provided in the form of box culverts, large diameter pipes and cellular tanks for storm periods up to and including the 1:100 year plus 30% climate change.

**Foul Water**

Foul drainage from plots are to connect to foul water sewers located within the site roads and conveyed to a foul water pumping station at the lowest lying area of the site. Foul flows to be pumped via a rising main and discharge to the existing public foul water sewers in Banks Road. Pumped flows to be limited to 5l/s in accordance with Yorkshire Water requirements.

This drawing is to be read in conjunction with the Addendum to Flood Risk Assessment by JNP Group Ref. B22938-R100, dated November 2018 and Stage 1 - Flood Risk Assessment by Avie Consulting Ltd ref. P1244 Rev 02, dated 19<sup>th</sup> July 2017.

- Notes:-
- Where this drawing has been issued in electronic .dwg format it has been done so in good faith. jnpgroup do not take any responsibility for any inaccuracies in the electronic data, which should be checked against the paper (or .pdf) drawing issue. Any apparent discrepancies should be immediately reported to jnpgroup. The electronic .dwg file should not be assumed to be to scale and should not be used for 'overlying', setting out or checking of any third party information. All dimensions should be taken from the paper (or .pdf) version of the drawing. Electronic drawings may contain third party information, jnpgroup take no responsibility for this information, which should be checked against the originators paper drawing(s).
  - All working dimensions to be checked on site.
  - Do not scale.
  - Any discrepancies between drawings of different scales, and between drawings and specification where appropriate to be notified to The Engineer for decision.
  - Copyright reserved. This drawing may only be used for The Client and location specified in the title block. It may not be copied or disclosed to any third party without the prior written consent of jnpgroup.
  - This drawing should only be used for construction if the drawing status is "Construction". jnpgroup take no responsibility for construction works undertaken to drawings which are not marked with this status.

**Health and Safety Note:**  
The details on this drawing have been prepared on the assumption that a competent contractor will be carrying out the works. If the contractor(s) considers that there is insufficient Health and Safety information on this drawing, this should immediately be brought to the attention of the designer.

Rev.	Date	Amendment	By	Chk.

Status: Preliminary

**john newton & partners**  
jnpgroup  
Consulting Engineers  
www.jnpgroup.co.uk  
Chesham • Brighouse • Hartlepool • Leamington Spa • Sheffield  
Tel: 01926 899955 E-mail: leamingtonspa@jnpgroup.co.uk

Client: Acumen Designers & Architects Ltd  
Job: Land off Woodhead Road, Honley, Holmfirth  
Title: Proposed Drainage Strategy

Scale: 1:500  
Date: November 2018  
Drawn by: KM  
Checked by: [ ]  
Approved by: [ ]


Drawing No: B22938-SK100  
Rev: -

QA Ref: Q0019 Rev 0

# Appendix E

## Surface Water Calculations



JNP Group		Page 0
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for JNP Pipe Network - Storm











Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.700	Add Flow / Climate Change (%)	0
Ratio R	0.281	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	0	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	300


Designed with Level Soffits

Network Design Table for JNP Pipe Network - Storm

















PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	31.082	4.971	6.3	0.050	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	39.000	0.130	300.0	0.182	0.00	0.0	0.600	o	1200	Pipe/Conduit	
1.002	12.199	0.041	297.5	0.076	0.00	0.0	0.600	o	1350	Pipe/Conduit	
2.000	5.000	0.033	150.0	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	
2.001	5.000	0.046	108.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	14.060	0.176	79.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	10.545	1.124	9.4	0.013	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	35.904	5.000	7.2	0.084	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	10.000	0.067	150.0	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	
3.001	5.000	0.187	26.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	5.13	129.663	0.050	0.0	0.0	0.0	4.06	71.7	0.0
1.001	0.00	5.43	123.642	0.232	0.0	0.0	0.0	2.15	2437.0	0.0
1.002	0.00	5.52	123.362	0.308	0.0	0.0	0.0	2.33	3329.8	0.0
2.000	0.00	5.07	123.400	0.000	0.0	0.0	0.0	1.28	90.6	0.0
2.001	0.00	5.12	123.367	0.000	0.0	0.0	0.0	1.51	106.6	0.0
1.003	0.00	5.72	123.321	0.308	0.0	0.0	0.0	1.13	19.9	0.0
1.004	0.00	5.78	123.145	0.321	0.0	0.0	0.0	3.31	58.5	0.0
1.005	0.00	5.94	122.021	0.405	0.0	0.0	0.0	3.78	66.9	0.0
3.000	0.00	5.13	115.925	0.000	0.0	0.0	0.0	1.28	90.6	0.0
3.001	0.00	5.16	115.858	0.000	0.0	0.0	0.0	3.05	215.8	0.0


JNP Group		Page 1
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

Network Design Table for JNP Pipe Network - Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
1.006	36.366	0.121	300.5	0.227	0.00	0.0	0.600	o	1500	Pipe/Conduit		
4.000	29.591	0.099	298.9	0.044	5.00	0.0	0.600	o	1500	Pipe/Conduit		
1.007	10.106	0.188	53.8	0.088	0.00	0.0	0.600	o	150	Pipe/Conduit		
1.008	23.349	1.239	18.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
1.009	11.772	2.350	5.0	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit		
1.010	16.244	0.054	300.8	0.094	0.00	0.0	0.600	o	1500	Pipe/Conduit		
1.011	10.695	0.036	297.1	0.039	0.00	0.0	0.600	o	1500	Pipe/Conduit		
1.012	9.978	0.033	302.4	0.018	0.00	0.0	0.600	o	1500	Pipe/Conduit		
1.013	12.492	0.042	297.4	0.018	0.00	0.0	0.600	o	1500	Pipe/Conduit		
5.000	65.000	0.130	500.0	0.155	5.00	0.0	0.600	[ ]	-1	Pipe/Conduit		
6.000	5.000	0.096	52.1	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit		
6.001	5.000	0.096	52.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
1.014	68.109	3.177	21.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
1.015	28.719	1.586	18.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
1.016	39.582	0.495	80.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
1.017	29.562	0.376	78.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.006	0.00	6.18	115.671	0.632	0.0	0.0	0.0	2.47	4363.2	0.0
4.000	0.00	5.20	115.649	0.044	0.0	0.0	0.0	2.48	4375.3	0.0
1.007	0.00	6.30	115.550	0.764	0.0	0.0	0.0	1.38	24.3	0.0
1.008	0.00	6.47	115.362	0.764	0.0	0.0	0.0	2.33	41.2	0.0
1.009	0.00	6.51	114.123	0.773	0.0	0.0	0.0	4.53	80.1	0.0
1.010	0.00	6.62	110.423	0.867	0.0	0.0	0.0	2.47	4361.3	0.0
1.011	0.00	6.70	110.369	0.906	0.0	0.0	0.0	2.48	4388.7	0.0
1.012	0.00	6.76	110.333	0.924	0.0	0.0	0.0	2.46	4350.0	0.0
1.013	0.00	6.85	110.300	0.942	0.0	0.0	0.0	2.48	4386.2	0.0
5.000	0.00	5.44	110.388	0.155	0.0	0.0	0.0	2.49	12428.2	0.0
6.000	0.00	5.04	110.450	0.000	0.0	0.0	0.0	2.18	154.3	0.0
6.001	0.00	5.08	110.354	0.000	0.0	0.0	0.0	2.18	154.3	0.0
1.014	0.00	7.37	110.258	1.097	0.0	0.0	0.0	2.18	38.6	0.0
1.015	0.00	7.57	107.081	1.097	0.0	0.0	0.0	2.38	42.0	0.0
1.016	0.00	8.15	105.495	1.097	0.0	0.0	0.0	1.13	19.9	0.0
1.017	0.00	8.59	105.000	1.097	0.0	0.0	0.0	1.13	20.1	0.0

JNP Group		Page 2
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

Conduit Sections for JNP Pipe Network - Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table


Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m <sup>2</sup> )
-1	[]	2400	2100	90.0	150	2.310	4.995

JNP Group		Page 3
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP		Land off Woodhead Road Honley, Holmfirth Surface Water Calculations
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...		Designed by KM Checked by KT
Micro Drainage		Network 2018.1



Manhole Schedules for JNP Pipe Network - Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backd (mm)
1	131.313	1.650	Open Manhole	1200	1.000	129.663	150				
2	129.443	5.801	Open Manhole	2100	1.001	123.642	1200	1.000	124.692	150	
3	126.660	3.298	Open Manhole	2100	1.002	123.362	1350	1.001	123.512	1200	
Tank 1	126.500	3.100	Open Manhole	1200	2.000	123.400	300				
4	126.000	2.633	Open Manhole	1200	2.001	123.367	300	2.000	123.367	300	
5 - FCC 1	125.844	2.523	Open Manhole	2400	1.003	123.321	150	1.002	123.321	1350	
6	125.313	2.168	Open Manhole	1200	1.004	123.145	150	2.001	123.321	300	
7	124.677	2.656	Open Manhole	1200	1.005	122.021	150	1.003	123.145	150	
Tank 2	122.000	6.075	Open Manhole	1200	3.000	115.925	300	1.004	122.021	150	
8	122.000	6.142	Open Manhole	1200	3.001	115.858	300	3.000	115.858	300	
9	121.801	6.130	Open Manhole	2400	1.006	115.671	1500	1.005	117.021	150	
10	118.327	2.678	Open Manhole	2400	4.000	115.649	1500	3.001	115.671	300	
11 - FCC 2	119.179	3.629	Open Manhole	2400	1.007	115.550	150	1.006	115.550	1500	
12	118.754	3.392	Open Manhole	1200	1.008	115.362	150	4.000	115.550	1500	
13	116.468	2.345	Open Manhole	1200	1.009	114.123	150	1.007	115.362	150	
14	115.643	5.220	Open Manhole	2400	1.010	110.423	1500	1.008	114.123	150	
15	115.443	5.074	Open Manhole	2400	1.011	110.369	1500	1.009	111.773	150	
16	115.357	5.024	Open Manhole	2400	1.012	110.333	1500	1.010	110.369	1500	
17	114.665	4.365	Open Manhole	2400	1.013	110.300	1500	1.011	110.333	1500	
18	113.800	3.412	Open Manhole	3000	5.000	110.388	-1	1.012	110.300	1500	
Tank 3	114.000	3.550	Open Manhole	1200	6.000	110.450	300				
19	114.000	3.646	Open Manhole	1200	6.001	110.354	300	6.000	110.354	300	
20 - FCC 3	113.416	3.158	Open Manhole	3000	1.014	110.258	150	1.013	110.258	1500	
21	108.731	1.650	Open Manhole	1200	1.015	107.081	150	5.000	110.258	-1	
22	107.145	1.650	Open Manhole	1200	1.016	105.495	150	6.001	110.258	300	
23	107.171	2.171	Open Manhole	1200	1.017	105.000	150	1.014	107.081	150	
16	104.988	0.364	Open Manhole	675		OUTFALL		1.015	105.495	150	
								1.016	105.000	150	
								1.017	104.624	150	

JNP Group		Page 4
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	


PIPELINE SCHEDULES for JNP Pipe Network - Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	1	131.313	129.663	1.500	Open Manhole	1200
1.001	o	1200	2	129.443	123.642	4.601	Open Manhole	2100
1.002	o	1350	3	126.660	123.362	1.948	Open Manhole	2100
2.000	o	300	Tank 1	126.500	123.400	2.800	Open Manhole	1200
2.001	o	300	4	126.000	123.367	2.333	Open Manhole	1200
1.003	o	150	5 - FCC 1	125.844	123.321	2.373	Open Manhole	2400
1.004	o	150	6	125.313	123.145	2.018	Open Manhole	1200
1.005	o	150	7	124.677	122.021	2.506	Open Manhole	1200
3.000	o	300	Tank 2	122.000	115.925	5.775	Open Manhole	1200
3.001	o	300	8	122.000	115.858	5.842	Open Manhole	1200
1.006	o	1500	9	121.801	115.671	4.630	Open Manhole	2400
4.000	o	1500	10	118.327	115.649	1.178	Open Manhole	2400
1.007	o	150	11 - FCC 2	119.179	115.550	3.479	Open Manhole	2400
1.008	o	150	12	118.754	115.362	3.242	Open Manhole	1200
1.009	o	150	13	116.468	114.123	2.195	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	31.082	6.3	2	129.443	124.692	4.601	Open Manhole	2100
1.001	39.000	300.0	3	126.660	123.512	1.948	Open Manhole	2100
1.002	12.199	297.5	5 - FCC 1	125.844	123.321	1.173	Open Manhole	2400
2.000	5.000	150.0	4	126.000	123.367	2.333	Open Manhole	1200
2.001	5.000	108.7	5 - FCC 1	125.844	123.321	2.223	Open Manhole	2400
1.003	14.060	79.9	6	125.313	123.145	2.018	Open Manhole	1200
1.004	10.545	9.4	7	124.677	122.021	2.506	Open Manhole	1200
1.005	35.904	7.2	9	121.801	117.021	4.630	Open Manhole	2400
3.000	10.000	150.0	8	122.000	115.858	5.842	Open Manhole	1200
3.001	5.000	26.7	9	121.801	115.671	5.830	Open Manhole	2400
1.006	36.366	300.5	11 - FCC 2	119.179	115.550	2.129	Open Manhole	2400
4.000	29.591	298.9	11 - FCC 2	119.179	115.550	2.129	Open Manhole	2400
1.007	10.106	53.8	12	118.754	115.362	3.242	Open Manhole	1200
1.008	23.349	18.8	13	116.468	114.123	2.195	Open Manhole	1200
1.009	11.772	5.0	14	115.643	111.773	3.720	Open Manhole	2400

JNP Group		Page 5
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP		Land off Woodhead Road Honley, Holmfirth Surface Water Calculations
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...		
Micro Drainage		
		Network 2018.1

PIPELINE SCHEDULES for JNP Pipe Network - Storm

Upstream Manhole


PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.010	o	1500	14	115.643	110.423	3.720	Open Manhole	2400
1.011	o	1500	15	115.443	110.369	3.574	Open Manhole	2400
1.012	o	1500	16	115.357	110.333	3.524	Open Manhole	2400
1.013	o	1500	17	114.665	110.300	2.865	Open Manhole	2400
5.000	[ ]	-1	18	113.800	110.388	1.312	Open Manhole	3000
6.000	o	300	Tank 3	114.000	110.450	3.250	Open Manhole	1200
6.001	o	300	19	114.000	110.354	3.346	Open Manhole	1200
1.014	o	150	20 - FCC 3	113.416	110.258	3.008	Open Manhole	3000
1.015	o	150	21	108.731	107.081	1.500	Open Manhole	1200
1.016	o	150	22	107.145	105.495	1.500	Open Manhole	1200
1.017	o	150	23	107.171	105.000	2.021	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.010	16.244	300.8	15	115.443	110.369	3.574	Open Manhole	2400
1.011	10.695	297.1	16	115.357	110.333	3.524	Open Manhole	2400
1.012	9.978	302.4	17	114.665	110.300	2.865	Open Manhole	2400
1.013	12.492	297.4	20 - FCC 3	113.416	110.258	1.658	Open Manhole	3000
5.000	65.000	500.0	20 - FCC 3	113.416	110.258	1.058	Open Manhole	3000
6.000	5.000	52.1	19	114.000	110.354	3.346	Open Manhole	1200
6.001	5.000	52.1	20 - FCC 3	113.416	110.258	2.858	Open Manhole	3000
1.014	68.109	21.4	21	108.731	107.081	1.500	Open Manhole	1200
1.015	28.719	18.1	22	107.145	105.495	1.500	Open Manhole	1200
1.016	39.582	80.0	23	107.171	105.000	2.021	Open Manhole	1200
1.017	29.562	78.6	16	104.988	104.624	0.214	Open Manhole	675

Simulation Criteria for JNP Pipe Network - Storm


Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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	3
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	3	Number of Real Time Controls	0

JNP Group		Page 6
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

Simulation Criteria for JNP Pipe Network - Storm

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		

JNP Group		Page 7
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

Online Controls for JNP Pipe Network - Storm

Non Return Valve Manhole: 4, DS/PN: 2.001, Volume (m<sup>3</sup>): 3.2

Hydro-Brake® Optimum Manhole: 5 - FCC 1, DS/PN: 1.003, Volume (m<sup>3</sup>): 25.9

Unit Reference MD-SHE-0092-5000-1950-5000  
 Design Head (m) 1.950  
 Design Flow (l/s) 5.0  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Application Surface  
 Sump Available Yes  
 Diameter (mm) 92  
 Invert Level (m) 123.321  
 Minimum Outlet Pipe Diameter (mm) 150  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.950	5.0
Flush-Flo™	0.403	4.2
Kick-Flo®	0.821	3.4
Mean Flow over Head Range	-	4.0


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	2.9	1.200	4.0	3.000	6.1	7.000	9.1
0.200	3.9	1.400	4.3	3.500	6.6	7.500	9.4
0.300	4.1	1.600	4.6	4.000	7.0	8.000	9.7
0.400	4.2	1.800	4.8	4.500	7.4	8.500	10.0
0.500	4.1	2.000	5.1	5.000	7.8	9.000	10.3
0.600	4.0	2.200	5.3	5.500	8.1	9.500	10.6
0.800	3.5	2.400	5.5	6.000	8.5		
1.000	3.7	2.600	5.7	6.500	8.8		

Non Return Valve Manhole: 8, DS/PN: 3.001, Volume (m<sup>3</sup>): 7.6

Hydro-Brake® Optimum Manhole: 11 - FCC 2, DS/PN: 1.007, Volume (m<sup>3</sup>): 124.5

Unit Reference MD-SHE-0125-1000-2450-1000  
 Design Head (m) 2.450  
 Design Flow (l/s) 10.0  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage

JNP Group		Page 8
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

Hydro-Brake® Optimum Manhole: 11 - FCC 2, DS/PN: 1.007, Volume (m³): 124.5

Application Surface  
Sump Available Yes  
Diameter (mm) 125  
Invert Level (m) 115.550  
Minimum Outlet Pipe Diameter (mm) 150  
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.450	10.0
Flush-Flo™	0.543	8.7
Kick-Flo®	1.113	6.9
Mean Flow over Head Range	-	8.1

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	4.5	1.200	7.1	3.000	11.0	7.000	16.5
0.200	7.4	1.400	7.7	3.500	11.8	7.500	17.0
0.300	8.2	1.600	8.2	4.000	12.6	8.000	17.6
0.400	8.6	1.800	8.6	4.500	13.3	8.500	18.1
0.500	8.7	2.000	9.1	5.000	14.0	9.000	18.6
0.600	8.7	2.200	9.5	5.500	14.7	9.500	19.1
0.800	8.4	2.400	9.9	6.000	15.3		
1.000	7.7	2.600	10.3	6.500	15.9		

Non Return Valve Manhole: 19, DS/PN: 6.001, Volume (m³): 4.4

Hydro-Brake® Optimum Manhole: 20 - FCC 3, DS/PN: 1.014, Volume (m³): 349.5

Unit Reference MD-SHE-0089-5000-2200-5000  
Design Head (m) 2.200  
Design Flow (l/s) 5.0  
Flush-Flo™ Calculated  
Objective Minimise upstream storage  
Application Surface  
Sump Available Yes  
Diameter (mm) 89  
Invert Level (m) 110.258  
Minimum Outlet Pipe Diameter (mm) 150  
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.200	5.0
Flush-Flo™	0.391	3.9
Kick-Flo®	0.801	3.1

JNP Group		Page 9
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	


Hydro-Brake® Optimum Manhole: 20 - FCC 3, DS/PN: 1.014, Volume (m³): 349.5

**Control Points                      Head (m)    Flow (l/s)**

Mean Flow over Head Range                      -                      3.9

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	2.8	1.200	3.8	3.000	5.8	7.000	8.6
0.200	3.6	1.400	4.0	3.500	6.2	7.500	8.9
0.300	3.9	1.600	4.3	4.000	6.6	8.000	9.2
0.400	3.9	1.800	4.5	4.500	7.0	8.500	9.4
0.500	3.9	2.000	4.8	5.000	7.3	9.000	9.7
0.600	3.8	2.200	5.0	5.500	7.7	9.500	10.0
0.800	3.1	2.400	5.2	6.000	8.0		
1.000	3.5	2.600	5.4	6.500	8.3		

JNP Group		Page 10
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

Offline Controls for JNP Pipe Network - Storm

Weir Manhole: 5 - FCC 1, DS/PN: 1.003, Loop to PN: 2.001


Discharge Coef 0.544 Width (m) 3.000 Invert Level (m) 124.875

Weir Manhole: 9, DS/PN: 1.006, Loop to PN: 3.001

Discharge Coef 0.544 Width (m) 2.400 Invert Level (m) 117.300

Weir Manhole: 20 - FCC 3, DS/PN: 1.014, Loop to PN: 6.001

Discharge Coef 0.544 Width (m) 3.000 Invert Level (m) 112.510

JNP Group		Page 11
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

Storage Structures for JNP Pipe Network - Storm

Cellular Storage Manhole: Tank 1, DS/PN: 2.000

Invert Level (m) 123.400 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	49.0	42.0	1.501	0.0	93.0
1.500	49.0	93.0			

Cellular Storage Manhole: Tank 2, DS/PN: 3.000


Invert Level (m) 115.925 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	63.0	63.0	2.100	0.0	159.0
2.000	63.0	159.0			

Cellular Storage Manhole: Tank 3, DS/PN: 6.000

Invert Level (m) 110.450 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	136.5	136.5	2.100	0.0	306.5
2.000	136.5	306.5			

JNP Group		Page 12
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for JNP Pipe Network - Storm

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins)                      0                      MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm)                      0                      Inlet Coefficient 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 3  
Number of Online Controls 6      Number of Time/Area Diagrams 0  
Number of Offline Controls 3      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  
Analysis Timestep 2.5 Second Increment (Extended)  
DTS Status                      OFF  
DVD Status                      ON  
Inertia Status                      ON


Profile(s)                      Summer and Winter  
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440  
Return Period(s) (years)                      2, 30, 100  
Climate Change (%)                      0, 0, 30

PN	US/MH Name	Event	US/CL (m)	Water Surcharged			Flow / Cap.
				Level (m)	Depth (m)	Volume (m <sup>3</sup> )	
1.000	1	15 minute 2 year Winter I+0%	131.313	129.697	-0.116	0.000	0.11
1.001	2	120 minute 2 year Winter I+0%	129.443	124.103	-0.739	0.000	0.01
1.002	3	120 minute 2 year Winter I+0%	126.660	124.103	-0.609	0.000	0.01
2.000	Tank 1	60 minute 2 year Winter I+0%	126.500	123.400	-0.300	0.000	0.00
2.001	4	60 minute 2 year Winter I+0%	126.000	123.367	-0.300	0.000	0.00
1.003	5 - FCC 1	120 minute 2 year Winter I+0%	125.844	124.102	0.631	0.000	0.23
1.004	6	15 minute 2 year Winter I+0%	125.313	123.178	-0.117	0.000	0.11
1.005	7	15 minute 2 year Winter I+0%	124.677	122.074	-0.097	0.000	0.27
3.000	Tank 2	60 minute 2 year Winter I+0%	122.000	115.925	-0.300	0.000	0.00
3.001	8	60 minute 2 year Winter I+0%	122.000	115.858	-0.300	0.000	0.00
1.006	9	240 minute 2 year Winter I+0%	121.801	116.307	-0.864	0.000	0.01
4.000	10	240 minute 2 year Winter I+0%	118.327	116.306	-0.843	0.000	0.00
1.007	11 - FCC 2	240 minute 2 year Winter I+0%	119.179	116.306	0.606	0.000	0.40
1.008	12	240 minute 2 year Winter I+0%	118.754	115.410	-0.102	0.000	0.22
1.009	13	30 minute 2 year Winter I+0%	116.468	114.159	-0.114	0.000	0.13
1.010	14	960 minute 2 year Winter I+0%	115.643	111.425	-0.498	0.000	0.00
1.011	15	960 minute 2 year Winter I+0%	115.443	111.425	-0.444	0.000	0.01
1.012	16	960 minute 2 year Winter I+0%	115.357	111.425	-0.408	0.000	0.01
1.013	17	960 minute 2 year Winter I+0%	114.665	111.425	-0.375	0.000	0.00

JNP Group		Page 13
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for JNP Pipe Network - Storm


PN	US/MH Name	Overflow (l/s)	Maximum Vol (m <sup>3</sup> )	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
1.000	1		0.033	2.7	7.9	OK
1.001	2		1.578	0.3	12.9	OK
1.002	3		17.569	0.1	8.4	OK
2.000	Tank 1		0.000	0.0	0.0	OK
2.001	4		0.000	0.0	0.0	OK
1.003	5 - FCC 1	0.0	10.414	0.9	4.2	SURCHARGED
1.004	6		0.043	2.0	5.9	OK
1.005	7		0.056	3.1	17.2	OK
3.000	Tank 2		0.000	0.0	0.0	OK
3.001	8		0.000	0.0	0.0	OK
1.006	9	0.0	3.081	0.2	16.0	OK
4.000	10		2.951	0.0	1.1	OK
1.007	11 - FCC 2		44.016	1.3	8.7	SURCHARGED
1.008	12		0.059	1.8	8.7	OK
1.009	13		0.039	2.9	9.7	OK
1.010	14		4.512	0.1	10.1	OK
1.011	15		20.058	0.1	9.7	OK
1.012	16		14.513	0.1	9.3	OK
1.013	17		14.188	0.1	9.0	OK

JNP Group		Page 14
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for JNP Pipe Network - Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Cap.
5.000	18	960 minute 2 year Winter I+0%	113.800	111.425	-1.063	0.000	0.00
6.000	Tank 3	60 minute 2 year Winter I+0%	114.000	110.450	-0.300	0.000	0.00
6.001	19	60 minute 2 year Winter I+0%	114.000	110.354	-0.300	0.000	0.00
1.014 20 - FCC 3	960 minute 2 year Winter I+0%	113.416	111.425	1.017	0.000	0.10	
1.015	21	960 minute 2 year Winter I+0%	108.731	107.112	-0.119	0.000	0.10
1.016	22	1440 minute 2 year Winter I+0%	107.145	105.541	-0.104	0.000	0.20
1.017	23	960 minute 2 year Winter I+0%	107.171	105.046	-0.104	0.000	0.20

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m <sup>3</sup> )	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
5.000	18		7.294	0.0	2.2	OK
6.000	Tank 3		0.000	0.0	0.0	OK
6.001	19		0.000	0.0	0.0	OK
1.014 20 - FCC 3	960 minute 2 year Winter I+0%	0.0	161.035	1.4	3.9	SURCHARGED
1.015	21		0.033	1.5	3.9	OK
1.016	22		0.050	0.9	3.9	OK
1.017	23		0.063	0.9	3.9	OK

JNP Group		Page 15
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for JNP Pipe Network - Storm

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins)                    0    MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm)                0    Inlet Coefficient 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 3  
Number of Online Controls 6      Number of Time/Area Diagrams 0  
Number of Offline Controls 3      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  
Analysis Timestep 2.5 Second Increment (Extended)  
DTS Status    OFF  
DVD Status    ON  
Inertia Status    ON


Profile(s)    Summer and Winter  
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440  
Return Period(s) (years)    2, 30, 100  
Climate Change (%)    0, 0, 30

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )
1.000	1	15 minute 30 year Winter I+0%	131.313	129.710	-0.103	0.000
1.001	2	240 minute 30 year Winter I+0%	129.443	124.868	0.026	0.000
1.002	3	240 minute 30 year Winter I+0%	126.660	124.868	0.156	0.000
2.000	Tank 1	60 minute 30 year Winter I+0%	126.500	123.400	-0.300	0.000
2.001	4	60 minute 30 year Winter I+0%	126.000	123.367	-0.300	0.000
1.003	5 - FCC 1	240 minute 30 year Winter I+0%	125.844	124.868	1.397	0.000
1.004	6	15 minute 30 year Summer I+0%	125.313	123.185	-0.110	0.000
1.005	7	15 minute 30 year Summer I+0%	124.677	122.100	-0.071	0.000
3.000	Tank 2	60 minute 30 year Winter I+0%	122.000	115.925	-0.300	0.000
3.001	8	60 minute 30 year Winter I+0%	122.000	115.858	-0.300	0.000
1.006	9	240 minute 30 year Winter I+0%	121.801	117.269	0.098	0.000
4.000	10	240 minute 30 year Winter I+0%	118.327	117.269	0.120	0.000
1.007	11 - FCC 2	240 minute 30 year Winter I+0%	119.179	117.269	1.569	0.000
1.008	12	1440 minute 30 year Summer I+0%	118.754	115.410	-0.102	0.000
1.009	13	15 minute 30 year Winter I+0%	116.468	114.163	-0.110	0.000
1.010	14	1440 minute 30 year Winter I+0%	115.643	112.509	0.586	0.000
1.011	15	1440 minute 30 year Winter I+0%	115.443	112.509	0.640	0.000
1.012	16	1440 minute 30 year Winter I+0%	115.357	112.509	0.676	0.000
1.013	17	1440 minute 30 year Winter I+0%	114.665	112.509	0.709	0.000

JNP Group		Page 16
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for JNP Pipe Network - Storm


PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Maximum Vol (m <sup>3</sup> )	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
1.000	1	0.22		0.048	3.2	14.9	OK
1.001	2	0.01		4.238	0.3	15.5	SURCHARGED
1.002	3	0.01		46.253	0.1	8.2	SURCHARGED
2.000	Tank 1	0.00		0.000	0.0	0.0	OK
2.001	4	0.00		0.000	0.0	0.0	OK
1.003	5 - FCC 1	0.25	0.0	21.297	0.9	4.5	SURCHARGED
1.004	6	0.16		0.052	2.2	8.2	OK
1.005	7	0.54		0.087	3.7	35.1	OK
3.000	Tank 2	0.00		0.000	0.0	0.0	OK
3.001	8	0.00		0.000	0.0	0.0	OK
1.006	9	0.01	0.0	7.452	0.2	25.2	SURCHARGED
4.000	10	0.00		7.305	0.0	1.9	SURCHARGED
1.007	11 - FCC 2	0.40		114.828	1.3	8.7	SURCHARGED
1.008	12	0.22		0.059	1.8	8.7	OK
1.009	13	0.16		0.043	3.1	11.6	OK
1.010	14	0.00		9.461	0.1	10.5	SURCHARGED
1.011	15	0.01		34.121	0.1	10.0	SURCHARGED
1.012	16	0.01		24.478	0.1	9.6	SURCHARGED
1.013	17	0.00		23.361	0.1	9.1	SURCHARGED

JNP Group		Page 17
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for JNP Pipe Network - Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )
5.000	18	1440 minute 30 year Winter I+0%	113.800	112.509	0.021	0.000
6.000	Tank 3	60 minute 30 year Winter I+0%	114.000	110.450	-0.300	0.000
6.001	19	60 minute 30 year Winter I+0%	114.000	110.354	-0.300	0.000
1.014	20 - FCC 3	1440 minute 30 year Winter I+0%	113.416	112.509	2.101	0.000
1.015	21	1440 minute 30 year Winter I+0%	108.731	107.116	-0.115	0.000
1.016	22	1440 minute 30 year Winter I+0%	107.145	105.547	-0.098	0.000
1.017	23	1440 minute 30 year Winter I+0%	107.171	105.052	-0.098	0.000

PN	US/MH Name	Flow / Overflow Cap.	Maximum Velocity (1/s)	Maximum Vol (m <sup>3</sup> )	Maximum Pipe Velocity (m/s)	Pipe Flow (1/s)	Status
5.000	18	0.00		14.956	0.0	2.8	SURCHARGED
6.000	Tank 3	0.00		0.000	0.0	0.0	OK
6.001	19	0.00		0.000	0.0	0.0	OK
1.014	20 - FCC 3	0.13	0.0	329.063	1.5	5.0	SURCHARGED
1.015	21	0.13		0.038	1.6	5.0	OK
1.016	22	0.26		0.058	0.9	5.0	OK
1.017	23	0.26		0.073	0.9	5.0	OK

JNP Group		Page 18
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for JNP Pipe Network - Storm

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins) 0      MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
Hot Start Level (mm) 0      Inlet Coefficient 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 3  
Number of Online Controls 6      Number of Time/Area Diagrams 0  
Number of Offline Controls 3      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  
Analysis Timestep 2.5 Second Increment (Extended)  
DTS Status      OFF  
DVD Status      ON  
Inertia Status      ON


Profile(s)      Summer and Winter  
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440  
Return Period(s) (years)      2, 30, 100  
Climate Change (%)      0, 0, 30

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )
1.000	1	15 minute 100 year Winter I+30%	131.313	129.726	-0.087	0.000
1.001	2	240 minute 100 year Winter I+30%	129.443	125.198	0.356	0.000
1.002	3	240 minute 100 year Winter I+30%	126.660	125.198	0.486	0.000
2.000	Tank 1	240 minute 100 year Winter I+30%	126.500	125.198	1.498	0.000
2.001	4	240 minute 100 year Winter I+30%	126.000	125.198	1.532	0.000
1.003	5 - FCC 1	240 minute 100 year Winter I+30%	125.844	125.199	1.728	0.000
1.004	6	15 minute 100 year Winter I+30%	125.313	123.191	-0.104	0.000
1.005	7	15 minute 100 year Summer I+30%	124.677	122.129	-0.042	0.000
3.000	Tank 2	480 minute 100 year Winter I+30%	122.000	118.222	1.997	0.000
3.001	8	480 minute 100 year Winter I+30%	122.000	118.397	2.239	0.000
1.006	9	480 minute 100 year Winter I+30%	121.801	118.076	0.905	0.000
4.000	10	480 minute 100 year Winter I+30%	118.327	117.823	0.674	0.000
1.007	11 - FCC 2	480 minute 100 year Winter I+30%	119.179	117.820	2.120	0.000
1.008	12	480 minute 100 year Winter I+30%	118.754	115.412	-0.100	0.000
1.009	13	15 minute 100 year Summer I+30%	116.468	114.167	-0.106	0.000
1.010	14	1440 minute 100 year Winter I+30%	115.643	112.764	0.841	0.000
1.011	15	1440 minute 100 year Winter I+30%	115.443	112.764	0.895	0.000
1.012	16	1440 minute 100 year Winter I+30%	115.357	112.764	0.931	0.000
1.013	17	1440 minute 100 year Winter I+30%	114.665	112.764	0.964	0.000

JNP Group		Page 19
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP		Land off Woodhead Road Honley, Holmfirth Surface Water Calculations
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...		
Micro Drainage		
		Designed by KM Checked by KT Network 2018.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for JNP Pipe Network - Storm

PN	US/MH Name	Flow / Overflow Cap.	Maximum Vol (m <sup>3</sup> )	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status	
1.000	1	0.36	0.065	3.6	25.1	OK	
1.001	2	0.02	5.418	0.2	28.0	SURCHARGED	
1.002	3	0.02	48.077	0.1	37.1	SURCHARGED	
2.000	Tank 1	0.05	71.869	0.0	3.1	SURCHARGED	
2.001	4	0.05	2.335	0.0	3.2	SURCHARGED	
1.003	5 - FCC 1	0.27	32.5	22.940	0.9	4.9	SURCHARGED
1.004	6	0.20	0.062	2.3	10.5	OK	
1.005	7	0.86	0.121	4.1	55.7	OK	
3.000	Tank 2	0.17	124.287	0.3	10.7	SURCHARGED	
3.001	8	0.58	3.488	1.0	62.7	SURCHARGED	
1.006	9	0.01	105.0	11.201	0.2	28.2	SURCHARGED
4.000	10	0.00	9.812	0.0	5.6	SURCHARGED	
1.007	11 - FCC 2	0.44	118.321	1.3	9.5	SURCHARGED	
1.008	12	0.24	0.062	1.8	9.5	OK	
1.009	13	0.19	0.047	3.2	13.5	OK	
1.010	14	0.01	10.637	0.1	11.9	SURCHARGED	
1.011	15	0.01	35.278	0.1	13.2	SURCHARGED	
1.012	16	0.01	25.635	0.1	13.5	SURCHARGED	
1.013	17	0.01	24.517	0.1	13.2	SURCHARGED	

JNP Group		Page 20
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	Land off Woodhead Road Honley, Holmfirth Surface Water Calculations	
Date 09/11/2018 10:54 File SURFACE WATER NETWORK C...	Designed by KM Checked by KT	
Micro Drainage		Network 2018.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for JNP Pipe Network - Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )
5.000	18	1440 minute 100 year Winter I+30%	113.800	112.764	0.276	0.000
6.000	Tank 3	1440 minute 100 year Winter I+30%	114.000	112.764	2.014	0.000
6.001	19	1440 minute 100 year Winter I+30%	114.000	112.764	2.110	0.000
1.014	20 - FCC 3	1440 minute 100 year Winter I+30%	113.416	112.764	2.356	0.000
1.015	21	1440 minute 100 year Winter I+30%	108.731	107.117	-0.114	0.000
1.016	22	1440 minute 100 year Winter I+30%	107.145	105.548	-0.097	0.000
1.017	23	1440 minute 100 year Winter I+30%	107.171	105.053	-0.097	0.000

PN	US/MH Name	Flow / Overflow Cap.	Maximum Vol (m <sup>3</sup> )	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
5.000	18	0.00	16.762	0.0	4.6	SURCHARGED
6.000	Tank 3	0.03	266.284	0.0	2.2	SURCHARGED
6.001	19	0.03	2.989	0.0	2.3	SURCHARGED
1.014	20 - FCC 3	0.14	9.6 343.703	1.5	5.3	SURCHARGED
1.015	21	0.13	0.039	1.6	5.3	OK
1.016	22	0.28	0.059	0.9	5.3	OK
1.017	23	0.28	0.075	0.9	5.3	OK

# Appendix F

## Flood Route Plan





- Notes:-
- Where this drawing has been issued in electronic .dwg format it has been done so in good faith. jnpgroup do not take any responsibility for any inaccuracies in the electronic data, which should be checked against the paper (or .pdf) drawing issue. Any apparent discrepancies should be immediately reported to jnpgroup. The electronic .dwg file should not be assumed to be to scale and should not be used for 'overlying', setting out or checking of any third party information. All dimensions should be taken from the paper (or .pdf) version of the drawing. Electronic drawings may contain third party information, jnpgroup take no responsibility for this information, which should be checked against the originators paper drawing(s).
  - All working dimensions to be checked on site.
  - Do not scale.
  - Any discrepancies between drawings of different scales, and between drawings and specification where appropriate to be notified to The Engineer for decision.
  - Copyright reserved. This drawing may only be used for The Client and location specified in the title block. It may not be copied or disclosed to any third party without the prior written consent of jnpgroup.
  - This drawing should only be used for construction if the drawing status is "Construction". jnpgroup take no responsibility for construction works undertaken to drawings which are not marked with this status.

**Health and Safety Note:**  
 The details on this drawing have been prepared on the assumption that a competent contractor will be carrying out the works. If the contractor(s) considers that there is insufficient Health and Safety information on this drawing, this should immediately be brought to the attention of the designer.

**Legend:**

- Proposed Surface Water Sewer
- Proposed Attenuation Tank
- Proposed Land Drainage - Filter trench with perforated carrier drain
- Indicative Plot Finished Floor Level - For split level plots, the FFL refers to the level at the front of the plot directly accessible from the highway/driveway. Plot levels to be set above road carriageway levels, particularly where plots are vulnerable to surface water runoff
- Proposed level, as indicated on Architects Proposed Site Plan
- Route of overland flow

The information contained on this drawing is indicative only and provided in good faith based on information provided by other. This information does not infer or constitute a detailed design.

This drawing is based on the following information provided by others:

- Proposed Site Plan by Acumen Designers & Architects Ltd, drawing ref. 2169 - 30L, dated 2<sup>nd</sup> November 2018.
- Topographical Survey undertaken by Ellam Land Surveys, ref. 6606A/1, dated August 2013.

This drawing is to be read in conjunction with the Addendum to Flood Risk Assessment by JNP Group ref. B22938-R100, dated November 2018 and Stage 1 - Flood Risk Assessment by Avie Consulting Ltd ref. P1244 Rev 02, dated 19<sup>th</sup> July 2017.

Rev.	Date	Amendment	By	Chk.

Status: **Preliminary**

john newton & partners  
**jnpgroup**  
 Consulting Engineers  
[www.jnpgroup.co.uk](http://www.jnpgroup.co.uk)  
 Chesham • Brighthelm • Hartlepool • Leamington Spa • Sheffield  
 Tel: 01926 89955 E-mail: leamingtonspa@jnpgroup.co.uk

Client: Acumen Designers & Architects Ltd  
 Job: Land off Woodhead Road, Honley, Holmfirth  
 Title: Flood Route Plan

Scale: 1:500 @ A1 Date: November 2018  
 Drawn by: KM Checked by: Approved by:



Drawing No: **B22938-SK101** Rev: -

QA Ref: Q0019 Rev 0



john newton & partners

**jnp group**

Consulting Engineers

[www.jnpgroup.co.uk](http://www.jnpgroup.co.uk)

**Brighouse**

Woodvale House  
Woodvale Road  
Brighouse  
West Yorkshire  
HD6 4AB

**telephone**

01484 400691

**email**

[brighouse@jnpgroup.co.uk](mailto:brighouse@jnpgroup.co.uk)

**Chesham (HQ)**

Link House  
St Mary's Way  
Chesham  
Buckinghamshire  
HP5 1HR

**telephone**

01494 771221

**email**

[chesham@jnpgroup.co.uk](mailto:chesham@jnpgroup.co.uk)

**Hartlepool**

The Innovation Centre  
Venture Court  
Queens Meadow Business Park  
Hartlepool  
TS25 5TG

**telephone**

01429 239539

**email**

[hartlepool@jnpgroup.co.uk](mailto:hartlepool@jnpgroup.co.uk)

**Leamington Spa**

Marlborough House  
48 Holly Walk  
Leamington Spa  
Warwickshire  
CV32 4XP

**telephone**

01926 889955

**email**

[leamingtonspa@jnpgroup.co.uk](mailto:leamingtonspa@jnpgroup.co.uk)

**Sheffield**

No.1 Meadowhall Riverside  
Meadowhall Road  
Sheffield  
South Yorkshire  
S9 1BW

**telephone**

0114 244 3500

**email**

[sheffield@jnpgroup.co.uk](mailto:sheffield@jnpgroup.co.uk)

