Eastwood
CONSULTING ENGINEERS

Drainage Assessment

WOODWARD COURT, MIRFIELD

BELLWAY HOMES LTD (YORKSHIRE)

26/11/2025

Eastwood
CONSULTING ENGINEERS

St Andrew's House
23 Kingfield Road
Sheffield, S11 9AS
mail@eastwoodce.com
0114 255 4554
eastwoodce.com

DRAINAGE ASSESSMENT

WOODWARD COURT, MIRFIELD

FOR

BELLWAY HOMES LTD (YORKSHIRE)

49653-ECE-XX-XX-RP-C-0002

26 November 2025

DRAINAGE ASSESSMENT

WOODWARD COURT, MIRFIELD

FOR

BELLWAY HOMES LTD (YORKSHIRE)

Job No.	:	49653
Report Status	:	Issue 3
Document Date	:	26 November 2025
Approved	:	

Chris Hodge

CONTENTS

APPENDICES

Appendix 1 –	Location plan
Appendix 2 – Haycock+Todd	Topographical survey
Appendix 3 – Parker Peel Architectural	Site plan
Appendix 4 – Yorkshire Water	Sewer assets plans
	Pre-development response
Appendix 5 – Kirklees Council	LLFA email correspondence
	Pre-application consultation response
Appendix 6 – Lithos	Email correspondence
Appendix 7 – Eastwood CE	SuDS checklist
	Live SuDS maintenance checklist
	UKSuDS greenfield runoff calculation
	Proposed Drainage Strategy
	Flow drainage calculations
	Flood routing plan

Issue 1:15 October 2025
Issue 2: 13 November 2025 *Updated with revised site layout (Rev: F).*
Issue 3: 26 November 2025 *Proposed SuDS features updated.*

EXECUTIVE SUMMARY

The project comprises the development of a 4.73-hectare greenfield site for residential use.

Surface water disposal is considered in accordance with the drainage hierarchy in Building Regulations Part H 2015 and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 080 reference ID 7-080-20150323.

Surface water disposal will be via gravity to an infiltration basin in the southern portion of the site, subject to approval from the Lead Local Flood Authority.

In line with the Lithos Geoenvironmental Appraisal (Ref: 1668/1F) and subsequent email correspondence, the development should ensure that no dwelling is built within 10 m of the basin crest due to potential ground stability issues as a result of focussed sustained water flows in shallow mine workings. The Kirklees Council Lead Local Flood Authority pre-application advice also notes a hydro-geological study is required to confirm the suitability of an infiltration basin.

The infiltration basin has been sized using the lowest recorded infiltration rate on site of 3.87×10^{-5} m/s. The basin has been sized for the 1 in 100 year plus 45% climate change rainfall event. An approximate basin volume of 1,260 m^3 will be required, subject to detailed design.

The proposed infiltration basin will provide water quality treatment and attenuation as well as adding biodiversity and amenity value to the site. The proposed SuDS features are subject to approval by the Lead Local Flood Authority and detailed design.

Foul effluent should discharge via gravity to the 225 mm public combined sewer south of the site in Hepworth Lane. This is subject to formal approval from Yorkshire Water.

Maintenance of the surface water drainage system will be in accordance with the recommendations provided by suppliers and product specifications. Maintenance of the potential SuDS systems for this site will also be in accordance with the recommendations within The SuDS Manual.

Method statements will be provided prior to construction. These will include details on how contaminated water, erosion and sediment control will be dealt with during construction

Both the surface and foul water drainage systems will be offered for adoption to Yorkshire Water or a NAV (New Appointments and Variations).

1.0 THE DEVELOPMENT

1.1 Introduction

This Drainage Assessment has been prepared on the instruction of Bellway Homes Ltd (Yorkshire). This Drainage Assessment is to be read in conjunction with the Flood Risk Assessment (Ref:49653-ECE-XX-XX-RP-C-0001).

The project comprises the development of a 4.73-hectare greenfield site for residential use.

1.2 Site Location and Description

The site is located within Mirfield and is centred on coordinates 444080, 432740 (Appendix 1).

The site is bounded by residential properties to the south and west, Woodward Court to the north-west, Hepworth Lane to the south, a school and playing fields to the north, with agricultural fields and a building to the east. The site is currently occupied by open ploughed farmland boarded by hedgerows and wooden fences.

The site falls from approximately 98.34 mAOD in the north-east to approximately 84 mAOD in the south at an average gradient of 1 in 24 (Appendix 2).

Proposals are for 75 household properties with access from Woodward Court in the north-west (Appendix 3).

2.0 DRAINAGE STRATEGY

2.1 Consultation with Statutory Bodies

2.1.1 Kirklees Council (LLFA)

Kirklees Council were contacted to discuss options for surface water disposal (Appendix 5) given that the Geoenvironmental appraisal conducted by Lithos (Ref: 1668/1F) noted there is potential for ground stability issues if soakaways are used.

A response received from the LLFA on 12th May 2025 notes that soakaways were previously tested and used in a design. A competent person would need to rule this out by critiquing the previous submission and identify why the proposal has changed. It is noted that there is a 150 mm surface water sewer near the site, therefore Yorkshire Water would need to provide a statement with a recommended connection point if proposals are to discharge to a sewer.

A further response was received from the LLFA on 21st May 2025 noting that the depth of the closest surface water sewer should be examined and pre-application advice should be requested from Yorkshire Water. Discharge to a surface water sewer would be the more favourable option as opposed to smaller combined sewers closer to the site.

A copy of the Kirklees Council LLFA pre-application advice received on 12th August 2025 is included in Appendix 5.

2.1.2 Yorkshire Water

Pre-planning advice has been received from Yorkshire Water; their reference A007933 dated 9th May 2025 (Appendix 4). The main points of the advice are summarised below.

Foul water:

- Development should take place with separate systems for foul and surface water.
- The closest practicable point of discharge for foul water will be the 225 mm public combined sewer in Hepworth Lane south of the site. At present, it does not have adequate capacity available to accommodate the anticipated foul water discharge from the proposed site. Subject to the submission of a formal planning application, a robust build plan and start date, Yorkshire Water will carry out a feasibility study to determine

suitable foul connection points, any available capacity in the public sewer network and timescales for any potential upgrading works required.

- The cost for any feasibility / modelling / update works will be at Yorkshire Water's cost up-front and recouped via the site's eventual infrastructure charges.

Surface water:

- Surface water disposal should follow the discharge hierarchy.
- The public sewer network does not have capacity available to accept any discharge of surface water from the proposed development. If SuDS are not viable, the developer is advised to contact the Environment Agency / Local Land Drainage Authority with a view to establish a suitable watercourse for discharge.
- Further restrictions on surface water disposal from the site may be imposed by other parties.

2.2 Ground Conditions

The British Geological Survey map shows the bedrock geology across the site as Sandstone-Falhouse Rock. There is no online record available for the superficial deposits on site.

A Geoenvironmental Appraisal was conducted by Lithos (Ref: 1668/1F) in December 2022. Localised areas of made ground were encountered. The site is underlain by Falhouse Rock a Lower Coal Measures sandstone. Most trail pits encountered topsoil to depths of around 0.4 m, underlain by sandstone. No significant groundwater was encountered during excavations. Groundwater monitoring was undertaken over a 3 month period and it was noted at depths in excess of 3.5 m.

A British Geology Survey historical borehole record located within the northern portion of the site (Ref: SE22SW790) notes 0.2 m topsoil over sandstone. Another historical borehole log within the northern portion of the site (Ref: SE22SW792) records 0.2 m topsoil, 8 m sandstone overlying mudstone. No groundwater was recorded on these borehole logs.

2.3 Greenfield Calculations

The greenfield runoff for the site is calculated using the FEH statistical rainfall run-off method on the UKSuDS greenfield runoff estimation tool (Appendix 7).

Table 1 below summarises the runoff rates for varying return periods. These figures relate to the 2.64 ha developable area and runoff per unit area.

Greenfield runoff				
Catchment	**Return period**			
	1 in 1 yr	**1 in 2 yr**	**1 in 30 yr**	**1 in 100 yr**
Calder Lower Operational Catchment	9.9 l/s	10.8 l/s	20.1 l/s	23.9 l/s
	3.8 l/s/ha	4.1 l/s/ha	7.6 l/s/ha	9.1 l/s/ha

Table 1: Greenfield runoff rates

2.4 Drainage Hierarchy

Surface water disposal should be in accordance with the drainage hierarchy in Building Regulations Part H 2015[1] and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 080. Disposal via SuDS methods should be considered as the first option. Disposal to the public sewer should be considered only when SuDS methods and disposal to the watercourse are shown to be unsuitable.

2.4.1 Sustainable Drainage Systems (SuDS)

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

Infiltration tests have been undertaken by Lithos (Ref: 1668/1F) and BRE365 infiltration rates were recorded on site between 5.66 x 10^{-4} to 3.87 x 10^{-5} m/s. The report notes that due to the potential impact on ground stability as a result of focussed sustained water flows in shallow

[1]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/442889/BR_PDF_AD_H_2015.pdf

mine workings, it is recommended that soakaways are restricted to public open space (POS) only where an alternative is not available.

Following correspondence with the Lead Local Flood Authority (Section 2.1.1) regarding the viability of soakaway testing, further information was provided by Lithos (Appendix 6). Lithos note that they do not see a problem with proposals for the infiltration basin to be located within the POS in the southern portion of the site as the site investigation suggests that coal lies at about 15 m below ground level in this area. The development should ensure that no dwelling is built within 10 m of the basin crest.

Based on the advice from Lithos, infiltration type SuDS in the POS within southern portion of the site are deemed to be viable. Infiltration type SuDS across the remaining areas of the site are not deemed to be viable due to potential ground stability issues.

The Kirklees Council pre-application advice response (Appendix 5) notes that the Lead Local Flood Authority expects a competent person to assess the contribution of previous coal mining works on soakaway tests and any remediation such as grouting that could affect infiltration. Re-emergence where there is shallow bedrock should also be assessed. The Kirklees Council Lead Local Flood Authority pre-application advice also notes a hydro-geological study is required to confirm the suitability of an infiltration basin.

An assessment of SuDS methods and their applicability to this site is included in Appendix 7.

For the development to achieve the benefits noted in the National Standards for SuDS[2], an infiltration basin is proposed to provide water quality treatment and attenuation as well as adding biodiversity and amenity value to the site. The proposed SuDS features are subject to approval by the Lead Local Flood Authority and detailed design.

2.4.2 Watercourse

The nearest watercourse is an unnamed watercourse located approximately 300 m east of the northern portion of the site. This is a tributary of Canker Dyke which ultimately discharges to the River Calder (main river) at a point 2.4 km south-east of the site. Discharge to watercourse would require crossing third party land and is therefore discounted.

[2] https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems/national-standards-for-sustainable-drainage-systems-suds

2.4.3 Public Sewer

There is a 150 mm public surface water sewer located in Hepworth Lane south of the site. Discharge to the sewer will require approval from Yorkshire Water.

2.5 Proposals for Surface Water Disposal

The final design will need the approval of the relevant statutory bodies but will broadly follow these principles:-

- Surface water disposal will be via gravity to an infiltration basin in the southern portion of the site, subject to approval from the Lead Local Flood Authority.
- In line with the Lithos Geoenvironmental Appraisal (Ref: 1668/1F) and subsequent email correspondence, the development should ensure that no dwelling is built within 10 m of the basin crest due to potential ground stability issues as a result of focussed sustained water flows in shallow mine workings.
- The infiltration basin has been sized using the lowest recorded infiltration rate of 3.87 x 10^{-5} m/s.
- The basin has been sized for the 1 in 100 year plus 45% climate change rainfall event. An approximate basin volume of 1,260 m^3 will be required, subject to detailed design. Calculations and the drainage layout are provided in Appendix 7.
- The proposed infiltration basin will provide water quality treatment and attenuation as well as adding biodiversity and amenity value to the site. The proposed SuDS features are subject to approval by the Lead Local Flood Authority and detailed design.
- The surface water drainage system will be offered for adoption to Yorkshire Water or a NAV (New Appointments and Variations).

2.6 SuDS Maintenance

Maintenance of the SuDS systems proposed for this site will be in accordance with the recommendations within The SuDS Manual (CIRIA C753, 2015) as stipulated in Table 2, along with any recommendations provided by suppliers and product specifications.

Table 2 summarises maintenance actions and frequency for each component of the drainage system. Additional maintenance to that scheduled will also be required after a flood event.

Maintenance access requirements such as vehicle and machinery access (where applicable) will also need consideration.

Features adopted by authorities, such as drainage authorities, will be maintained under their normal regime of inspection and maintenance.

The maintenance schedules below should be followed to ensure flood risk on site does not increase through system blockages or poor maintenance and the drainage features remain functional for the lifetime of the development.

Method statements will be provided prior to construction. These will include details on how contaminated water, erosion and sediment control will be dealt with during construction.

SuDS SYSTEM	**ACTION**	**FREQUENCY***
Infiltration basin	Remove litter and debris	Monthly
	Cut grass - for landscaped areas and access routes	Monthly or as required
	Cut grass – meadow grass in and around basin	Half yearly: spring (before nesting season) and autumn
	Manage other vegetation and remove nuisance plants.	Monthly at start, then as required
	Reseed areas of poor vegetation growth	Annually, or as required
	Prune and trim trees and remove cuttings	As required
	Remove sediment from pre-treatment system when 50% full	As required

Infiltration basin	Repair erosion or other damage by reseeding or re-turfing	As required
	Repair or rehabilitate inlets, outlets and overflows	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates.	As required
	Relevel uneven surface and reinstate design levels.	As required
	Inspect inlets, outlets and overflows for blockages and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical barriers.	Monthly
	Inspect inlets and pre-treatment systems for silt accumulations; establish appropriate silt removal frequencies.	Half yearly
	Inspect infiltration surfaces for compaction and ponding.	Monthly
Guttering, gullies and piped drainage system	General removal of litter and debris.	6 monthly, after autumn leaf fall (or as required)
	Cleaning of gullies, drainage channel and drainage channel sump units to remove debris and silt.	6 monthly, after autumn leaf fall (or more frequently if necessary)
	Cleaning of manholes to remove debris and silt.	Annually, after autumn leaf fall (or more frequently if necessary)
	If the system allows rainfall infiltration from above, check filter surface for blockages. Remove and replace infiltration material if deemed necessary.	Annually
	Remove sediment from pre-treatment structures.	Annually or as required
	Inspection of all access chambers, inspection chambers, manholes and proprietary storage units to identify and make good any defects as necessary.	Annually
	Inspect inlets, outlets, vents and overflows to ensure they are operating as designed.	Annually
Inlets	Inspection for debris and sediment build up.	Annually (and following poor performance)
	Inspect inlets for blockages and clear if required.	Monthly

Inlets	Inspect inlet pipework for blockages, clogging, standing water and structural damage.	Monthly
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate.	As required

Table 2: SuDS Maintenance

2.7 Proposals for Foul Water Disposal

Foul effluent should discharge via gravity to the 225 mm public combined sewer south of the site in Hepworth Lane. This is subject to formal approval from Yorkshire Water.

The foul drainage system may be offered for adoption to Yorkshire Water or a NAV (New Appointments and Variations).

2.8 Residual Flood Risk

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

2.9 Mitigation Measures

The proposed surface water drainage system is designed to current best practice and to the standards laid out in the publication ‘Design and Construction Guidance for foul and surface water sewers’ and Building Regulations Part H 2015.

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

3.0 CONCLUSIONS

1. Surface water disposal is considered in accordance with the drainage hierarchy in Building Regulations Part H 2015 and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 080 reference ID 7-080-20150323.

2. Surface water disposal will be via gravity to an infiltration basin in the southern portion of the site, subject to approval from the Lead Local Flood Authority.

3. In line with the Lithos Geoenvironmental Appraisal (Ref: 1668/1F) and subsequent email correspondence, the development should ensure that no dwelling is built within 10 m of the basin crest due to potential ground stability issues as a result of focussed sustained water flows in shallow mine workings. The Kirklees Council Lead Local Flood Authority pre-application advice also notes a hydro-geological study is required to confirm the suitability of an infiltration basin.

4. The infiltration basin has been sized using the lowest recorded infiltration rate on site of 3.87×10^{-5} m/s. The basin has been sized for the 1 in 100 year plus 45% climate change rainfall event. An approximate basin volume of 1,260 m^3 will be required, subject to detailed design.

5. The proposed infiltration basin will provide water quality treatment and attenuation as well as adding biodiversity and amenity value to the site. The proposed SuDS features are subject to approval by the Lead Local Flood Authority and detailed design.

6. Foul effluent should discharge via gravity to the 225 mm public combined sewer south of the site in Hepworth Lane. This is subject to formal approval from Yorkshire Water.

7. Maintenance of the surface water drainage system will be in accordance with the recommendations provided by suppliers and product specifications. Maintenance of the potential SuDS systems for this site will also be in accordance with the recommendations within The SuDS Manual.

8. Method statements will be provided prior to construction. These will include details on how contaminated water, erosion and sediment control will be dealt with during construction

9. Both the surface and foul water drainage systems will be offered for adoption to Yorkshire Water or a NAV (New Appointments and Variations).

Eastwood
CONSULTING ENGINEERS

APPENDICES

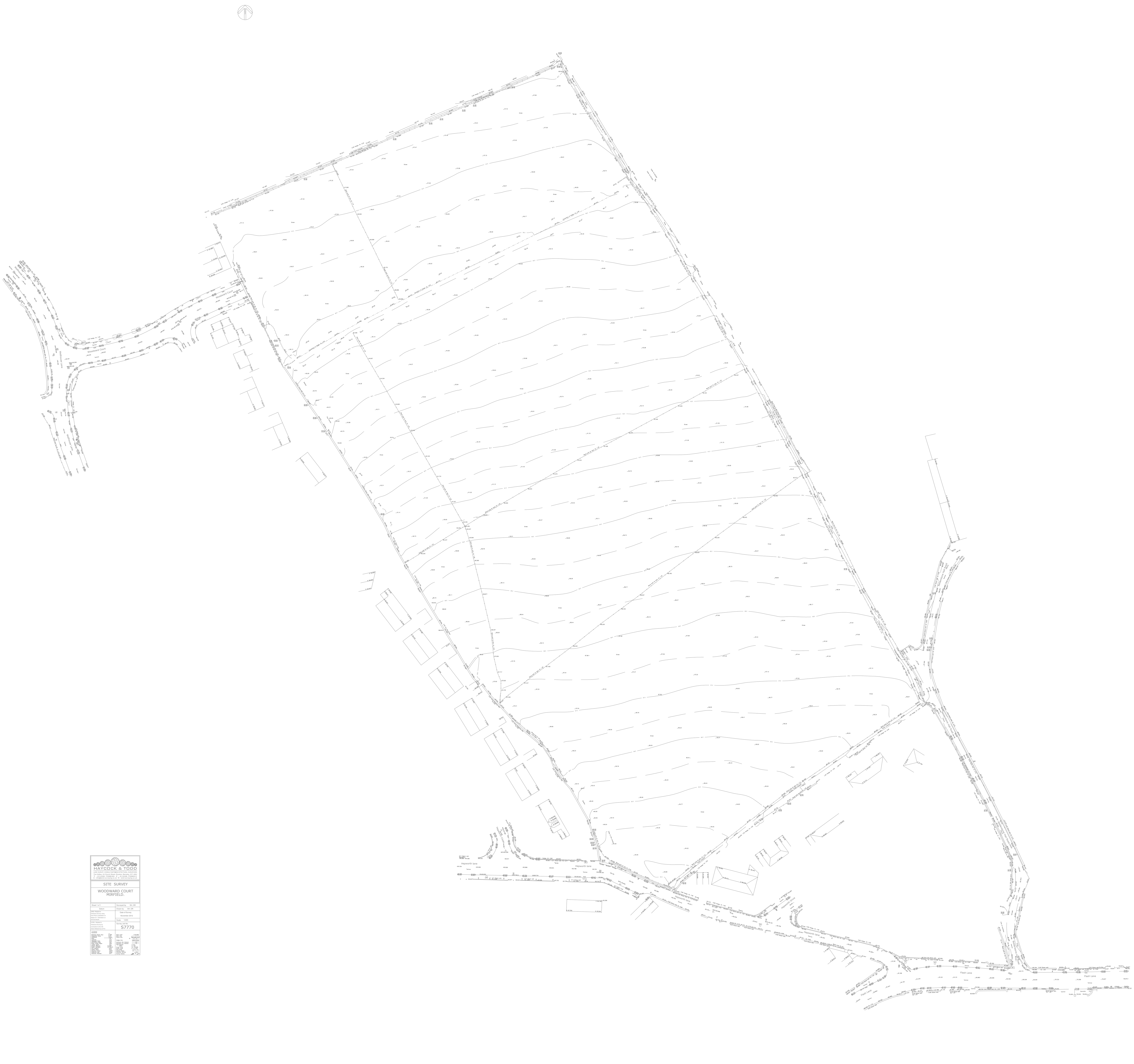
Eastwood
CONSULTING ENGINEERS

APPENDIX 1

Site location plan

Eastwood
CONSULTING ENGINEERS

APPENDIX 2



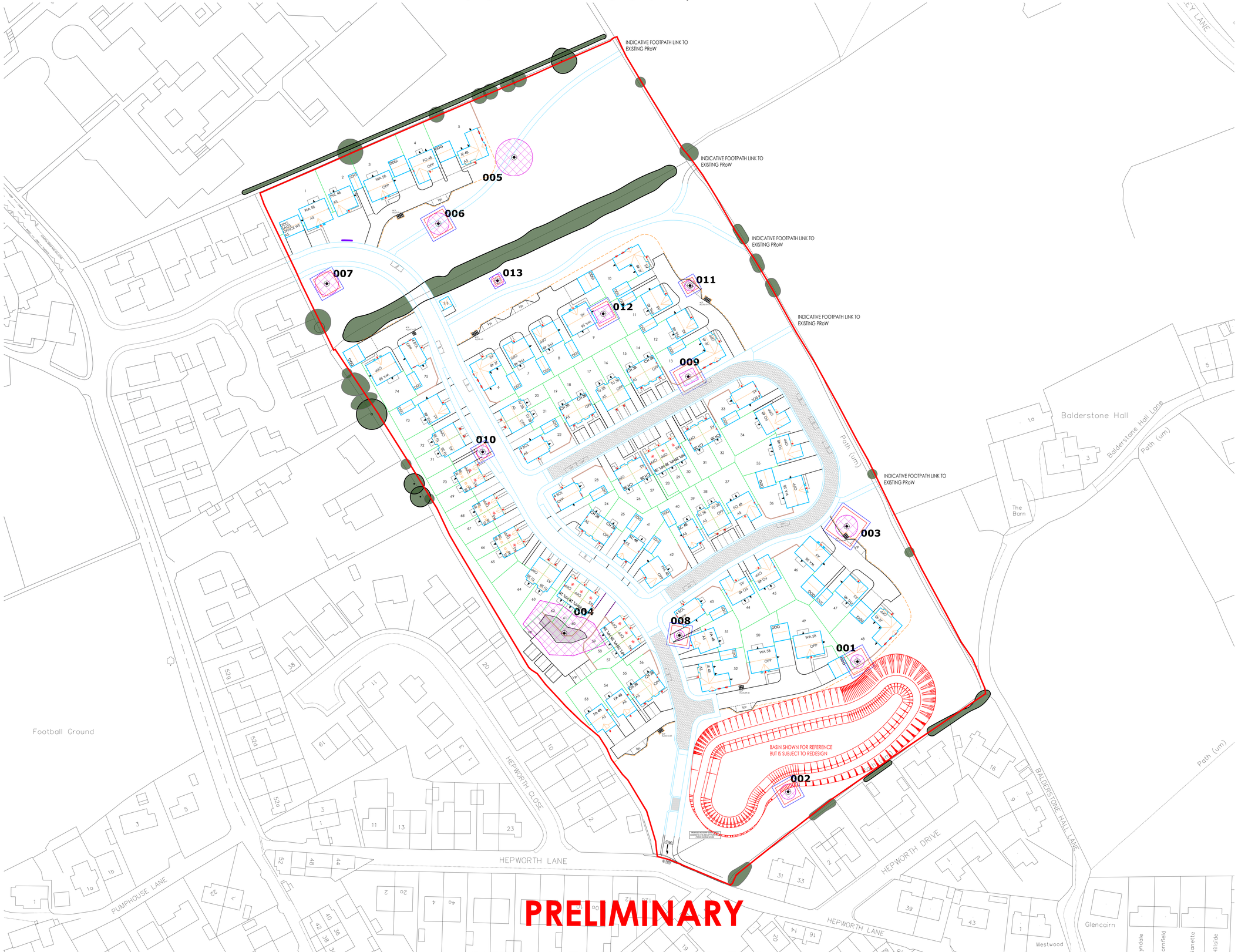
HAYCOCK & TODD
LAND SURVEY CONSULTANTS • ARCHITECTURAL SURVEYORS
The Hollies, 43 Church Street, Royston, Barnsley, S71 4QU
T : 01226 709630 F : 01226 709631
E : info@land-surveying.co.uk W : land-surveying.co.uk
SITE SURVEY
WOODWARD COURT MIRFIELD.
Sheet 1 of 1
Surveyed by SH, DR
Datum
Drawn by SH, DR
GRID- Related to Ordnance Survey using One Point Localisation on Station S1. Orientation at OS Grid North.
Date of Survey November 2012
Scale 1/200
LEVEL- Related to Ordnance Survey by connection to the OS Active Network by G.P.S
Survey Job No. S7770
LEGEND
Manhole shown thus MH
Inspection Cover IC
Lamphole LH
Gully G
Lampost LP
Telegraph Post TP
Electricity Poles EP
Road Traffic Signs RS
Traffic Lights TL
British Telecom BT
Cable Television CATV
Fire Hydrant FH
Safety Valve SV
Stopcock Water SCW
Stopcock Gas Gas
Unknown Stoptap ST
Spot Level +123.562
Kerb Line
Fence Line Wood post & rail Or
Hedge Line
Contours 5m Interval 105
Contours 1m Interval 33
Tree Spread S 5.0
Girth G 1.30
Cover Level CL 112.335
Invert Level IL 111.733
Foul Drain
Surface Water
Unknown Service Serv
Survey Station S3 Or S3

Eastwood
CONSULTING ENGINEERS

APPENDIX 3

WOODWARD COURT, **MIRFIELD**

Bellway



DRAWING LEGEND:

- RED LINE BOUNDARY
- AFFORDABLE UNITS
- EXISTING TREES/HEDGEROWS TO BE RETAINED
- TREES/HEDGEROWS TO BE REMOVED
- LANDSCAPE - PLEASE REFER TO LANDSCAPE ARCHITECTS DRAWINGS
- VISITOR PARKING BAY
- ON STREET VISITOR PARKING SPACE
- BIN COLLECTION POINTS FOR SHARED DRIVES
- INDICATIVE CONNECTIONS TO PUBLIC RIGHT OF WAY (PRoW)

WOODWARD COURT, MIRFIELD
SCHEDULE OF ACCOMMODATION

House Type	Bed No./Storey	Building Regs	Type	Parking	Sq.ft	No. Units	Total Sq.ft	%
Freesale								
Chandler	3B/2	M4(1)	End	PS	937	12	11244	20%
Turner	3B/2	M4(1)	End	PS	906	10	9060	17%
Farrier	3B/2	M4(1)	Det	PS	1152	3	3456	8%
Scrivener	3B/2	M4(1)	Det	PS	1197	2	2394	3%
Bowyer Lite	4B/2	M4(2)	Det	SG	1336	5	6680	8%
Philosopher Lite	4B/2	M4(2)	Det	SG	1489	8	11912	13%
Forester	4B/2	M4(1)	Det	IG	1502	6	9012	10%
Jeweller	4B/2	M4(1)	Det	SG	1713	6	10278	10%
Watchmaker	5B/2	M4(1)	Det	SG	1880	8	15040	13%
			Freesale Total			**60**	**79,076**	**100%**
Affordable								
Hooper Lite	2B/2	M4(2)	End	PS	776	6	4656	40%
Hooper Lite	2B/2	M4(2)	Mid	PS	776	3	2328	20%
Bailister	3B/2.5	M4(1)	End	PS	1038	6	6228	40%
			Affordable Total			**15**	**13,212**	**100%**
			Affordable Site Percentage					**20%**
				Total		**75**	**92,288**	
Gross Area							**11.70 acres**	**4.73 ha**
Nett Area							**6.55 acres**	**2.65 ha**
Open Space (Exc. Attenuation and BNG habitat zone)							**4.52 acres**	**1.83 ha**
Nett Density	**28**	**dph**		**Nett Coverage**		**14,090**	**sq.ft/acre**	
Single Garage	19		Double Garage		9	Twin Garage	0	
Visitor Parking Bay	9		On Street Visitor Parking		13			

0m 10m 20m 30m 40m 50m

F	Road alignment adjusted infront of plots 37-40. Additional space for soft landscaping in front of plots 26-32. Footpath links shown indicatively to PRoW on eastern boundary.	Nov 25
E	Plot 12 garage pulled forward.	Nov 25
D	Garages to plots 3,5 and 48 moved forward. Plot 5 and 48 moved to accommodate.	Nov 25
C	Garages to plots 5 and 48 moved forward.	Nov 25
B	Layout updated to clients markup.	Oct 25
A	One way junction and road included. Turning head adjacent to plots 42, 50-55 redesigned and plots changed to utilise space gained from amended turning head design.	Oct 25

PRELIMINARY

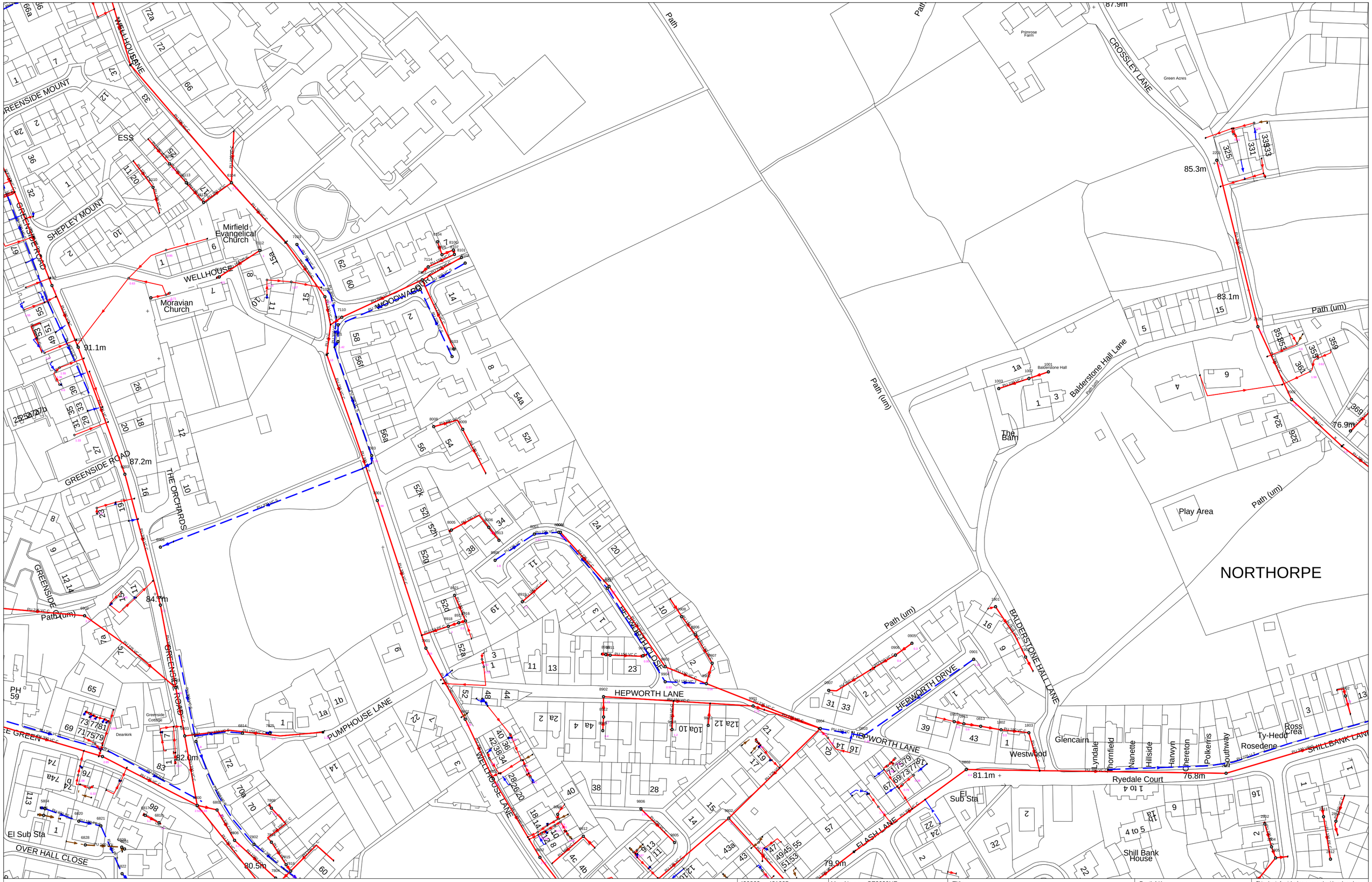
SITE LAYOUT PLAN - 1:500

SITE LAYOUT - 2520-SL-02F
WOODWARD COURT, MIRFIELD
BELLWAY HOMES
SCALE:1:500@A0 - OCTOBER 2025

PARKER PEEL ARCHITECTURAL
e info@parkerpeel.co.uk w www.parkerpeel.co.uk t 01924 921 860

Eastwood
CONSULTING ENGINEERS

APPENDIX 4



420862 : 421005	Map Name : SE2020NE	Title	Partial Key
YorkshireWater	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : G Mullaney Contact Tel :	Notes	Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS
		(Oct) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2024. All rights reserved Ordnance Survey Licence number AC0000813445	Date Req : 09/05/2025, 14:08:35
			Source : Sewer Network Enquiry

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.

Date Gen : 09/05/2025, 14:15:32

UPN: Undefined Originator: G Mullaney, ,

YorkshireWater

Yorkshire Water Services
Land and Property
Western House
Western Way
Halifax Road
Bradford
BD6 2SZ

Tel: 0345 120 8482
Fax:

Email:
technical.sewerage@yorkshirewater.co.uk

Eastwood Consulting Engineers
St Andrew's House; 23 Kingfield Road
Sheffield
S11 9AS

Your Ref:
Our Ref: A007933

For telephone enquiries ring:
George Mullaney on 0345 120 8482

9th May 2025

Dear Ms Stevenson-Steels,

Woodward Court (land off) Mirfield WF14 0PY - Pre-Planning Sewerage Enquiry V881026

Thank you for your recent enquiry. Our charge of £488.00 plus VAT will be added to your account with us, reference EPL039. 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. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records. The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months:

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

The closest practicable point of discharge for foul will be the 225mm diameter combined public sewer in Hepworth Lane, to the south of the site, but at present it does not have

adequate capacity available to accommodate the anticipated foul water discharge from the proposed site. Subject to the submission of a Formal Planning Application and robust build plan and start date, Yorkshire Water will carry out a feasibility study to determine suitable foul connection points, any available capacity in the public sewer network, together with timescales for any potential upgrading works required.

The cost for any feasibility/modelling/upgrade works will be at Yorkshire Waters cost up-front and recouped via the sites eventual infrastructure charges.

What are infrastructure charges?

We levy infrastructure charges for all newly connected properties that have not been connected to our water or sewer network before. The charges are calculated to recover the cost of reinforcing our existing water and sewer networks needed to serve new developments. The charges are set to recover the costs over the whole of the Yorkshire Water area to increase capacity.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2010. 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.

The public sewer network does not have any capacity available to accept any discharge of surface water from the proposal. If SuDS are not viable, the developer is advised to contact the Environment Agency/local Land Drainage Authority with a view to establishing a suitable watercourse for discharge.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply online or obtain an application form from our website (www.yorkshirewater.com/developers/sewerage/sewerage-connections/) or by telephoning 0345 120 84 82.

YorkshireWater

Under the provisions of section 111 of the Water Industry Act 1991 it is unlawful to pass into any public sewer (or into any drain or private sewer communicating with the public sewer network) any items likely to cause damage to the public sewer network or interfere with the free flow of its contents or affect the treatment and disposal of its contents. Amongst other things this includes fat, oil, nappies, bandages, syringes, medicines, sanitary towels and incontinence pants. Contravention of the provisions of section 111 is a criminal offence.

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for Code for Adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Code for Adoption, pursuant to an agreement under Section 104 of the Water Industry Act 1991. We are happy to offer pre-development technical advice on any prospective sites that you would like to put forward for adoption, prior to submission of your adoption application.

An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Sewer Adoption, Diversion and Requisition (telephone 0345 120 84 82) or email technical.sewerage@yorkshirewater.co.uk or visit - https://www.yorkshirewater.com/developers/sewerage/sewer-adoptions/ for further information.

All the above comments are based upon the information and records available at the present time and are valid for a period of 12 months. 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 sincerely

George Mullaney
Town Planning Technician

Eastwood
CONSULTING ENGINEERS

APPENDIX 5

Jessica Steels-Crotty

From: Paul Farndale <Paul.Farndale@kirklees.gov.uk> on behalf of Paul Farndale
Sent: 12 May 2025 09:33
To: Jessica Stevenson-Steels
Subject: RE: 49653- Woodward Court, Mirfield - Drainage Strategy

Please be aware that soakaways were previously tested and the applicant went ahead with a design. If you are going to have 'a competent person' rule it out, can I politely suggest the look at the previous submission and critique it, for any omission on their part. This will be picked up in an official response and I suspect town or district Councillors will want to know why it has changed.

I think the sewer in the area is 150mm so I would get try and get a statement from YW as to which point of connection they would recommend. You may well have to upsize for some distance or chase a larger diameter sewer to a suitable connection point.

Kind regards,

Paul Farndale
Team Leader (Acting)
Flood Management & Drainage (LLFA)
Kirklees Council

From: Jessica Stevenson-Steels
Sent: 12 May 2025 09:27
To: Paul Farndale <Paul.Farndale@kirklees.gov.uk>
Subject: RE: 49653- Woodward Court, Mirfield - Drainage Strategy

Good morning Paul,

Please can you advise when we should expect to receive a response to the email below.

Kind regards,

Jessica Stevenson-Steels BSc MCIWEM
Environmental Engineer
DD: 0114 399 4504
T: 0114 255 4554
www.eastwoodce.com

From: Jessica Stevenson-Steels
Sent: 02 May 2025 13:54
To: 'Paul.Farndale@kirklees.gov.uk' <Paul.Farndale@kirklees.gov.uk>
Subject: 49653- Woodward Court, Mirfield - Drainage Strategy [Filed 02 May 2025 13:54]

Good afternoon Paul,

I hope you are well.

It is understood that there have been previous discussions regarding the drainage strategy for a site off Woodward Court, Mirfield (location plan attached).

Following a Site Investigation (Lithos report, ref: 1668/1F), surface water discharge via infiltration has been discounted due to potential ground stability issues as a result of focussed sustained water reaching shallow mining workings.

Given that there are no watercourses nearby, revised proposals are for surface water to discharge to a public sewer near the site.
Please can you confirm that this is acceptable in principle. Feel free to call should you wish to discuss the revised proposals further.

Kind regards,

Jessica Stevenson-Steels BSc MCIWEM
Environmental Engineer
DD: 0114 399 4504
T: 0114 255 4554
www.eastwoodce.com

Eastwood CONSULTING ENGINEERS

Jessica Steels-Crotty

From: Paul Farndale <Paul.Farndale@kirklees.gov.uk> on behalf of Paul Farndale
Sent: 21 May 2025 10:33
To: Jessica Stevenson-Steels
Subject: RE: 49653- Woodward Court, Mirfield - Drainage Strategy
Attachments: Woodward Ct.pdf

Hello Jessica,

Further to my previous email regarding previous approval of soakaways and how you are going to counter their findings (coal mine presence - with official response from relevant authority?), please find attached a plan of the public sewer network with watercourses over. I would suggest you examine the depth of the closest surface water system and apply for pre-application advice at Yorkshire Water. This would appear favourable as opposed to smaller combined sewers closer to the site.

Kind regards,

Paul Farndale
Team Leader (Acting)
Flood Management & Drainage (LLFA)
Kirklees Council

From: Jessica Stevenson-Steels
Sent: 02 May 2025 13:54
To: Paul Farndale <Paul.Farndale@kirklees.gov.uk>
Subject: 49653- Woodward Court, Mirfield - Drainage Strategy

Good afternoon Paul,

I hope you are well.

It is understood that there have been previous discussions regarding the drainage strategy for a site off Woodward Court, Mirfield (location plan attached).

Following a Site Investigation (Lithos report, ref: 1668/1F), surface water discharge via infiltration has been discounted due to potential ground stability issues as a result of focussed sustained water reaching shallow mining workings.

Given that there are no watercourses nearby, revised proposals are for surface water to discharge to a public sewer near the site.
Please can you confirm that this is acceptable in principle. Feel free to call should you wish to discuss the revised proposals further.

Kind regards,

Jessica Stevenson-Steels BSc MCIWEM
Environmental Engineer
DD: 0114 399 4504
T: 0114 255 4554
www.eastwoodce.com

Kirklees Council
Planning and Development Service
PO Box 1720
Huddersfield

Pre-Application Consultation Request

Town and Country Planning Act 1990

Observations By:	**KC, Lead Local Flood Authority**

Application No.	**2025/20746**
Proposed Development:	**Pre application for residential development**
Location:	**Land off, Woodward Court, Mirfield, WF14 0PY**
Applicant/Agent:	**Paul Butler PB Planning Ltd**
Planning Officer	**Katie Chew**

Your comments on the above proposal are requested. Please e-mail your comments to the DC Admin in either a Microsoft Word or PDF Document to DC.Admin@kirklees.gov.uk by 26-Aug-2025.

The submitted plans and documents for the application can be viewed using Documents from Anite or Anite, please use the application number above.

If I do not receive your response by 26-Aug-2025 then the application may be decided without the benefit of your views.

Dated: 12-Aug-2025

Mathias Franklin
Head of Planning and Development

Kirklees Council
Planning and Development Service
PO Box 1720
Huddersfield

Consultation Response from KC, Lead Local Flood Authority		
2025/20746 at Land off, Woodward Court, Mirfield, WF14 0PY		
Pre application for residential development		
Date Responded: 19th September 2025	**Responding Officer: Paul Farndale**	**Responding Ref:**

Contours

The site falls roughly north to south with a gradient of 1 in 20 to 1 in 23.

Main River Flood Risk

This site is in main river flood zone 1 – low risk.

Sequential Test/Flood Risk Assessment

A sequential test is not necessary. The site is greater than 1 hectare and therefore an official 'full' flood risk assessment is required. We expect this will concentrate on the use of infiltration techniques (see comments in later sections) and flood routing.

Water Features

There are no known watercourses or ponds etc shown on site and in the immediate vicinity of the site.

Surface Water Flood Risk

3rd generation surface water flood risk mapping does not identify any concerns for the site in the 1 in 30 and 1 in 100 return periods which are relevant to lifespan of a site for housing development. The 1 in 1000-year return period does show a linear pattern north to south which suggests a shallow valley that may collect run off from an undeveloped site. The FRA should examine flood routing before a layout is designed so that it can manage blockage scenarios and exceedance events by routing water along roads and open space, avoiding property curtilage.

4th generation surface water flood risk mapping shows some ponding of water at the southern border. Given previous applications on this site we believe that some protection to existing properties along the boundaries of the site to hold exceedance flows and blockage scenarios in safe places on site and any overspill onto Hepworth Lane is expected.

Flood Incidents

Although we have no significant flood incidents recorded on our database. The LLFA is aware of water ingress at a property on Hepworth Lane that we believe was caused by flows along the highway adjacent to the property and not the development site.

Kirklees Council
Planning and Development Service
PO Box 1720
Huddersfield

Surface Water Disposal

In line with the hierarchy of disposal, infiltration techniques should be examined before a direct or indirect connection to watercourse. Only when these have been discounted and agreed with the LLFA can a connection to public sewer be considered.

Infiltration Techniques

This site is shown as category 1 in the British Geological Survey (highly likely to be suitable). The indicative layout provided shows and attenuation basin, so we assume soakaways are not intended.

However previous application on this site had extensive soakaway testing using triple test techniques with bowsers at several locations and submitted information that demonstrated soakaways were viable in accordance with recognised testing procedures.

The above application is available to view on planning portal. We expect these test results to be analysed in the new flood risk assessment and a demonstration alongside any new testing that has taken place as to why conclusions are different and a robust defence of said conclusion.

Due to the age of the previous testing and other such projects in the district subsequently, Kirklees LLFA would also seek a competent person to assess the contribution of previous coal mining works on soakaway tests and any remediation such as grouting that could affect infiltration techniques testing on the undeveloped site to the developed site.

We also expect a competent person to look at re-emergence where there is shallow bedrock. There is a possibility that testing runs laterally along bedrock but may not re-emerge, whereas the volumes of water on a fully developed site may re-emerge if fissures are relied upon rather than free draining strata. Cross sections of strata based on boreholes and trial pits are now expected to be presented and analysed by a geo-hydrologist. Where fissures are relied upon and given experience within the district, soakaways should consist of wide linear trenches where practicable or manhole styled soakaways with linear spokes to spread flows over a wide area. This could also be achieved by connecting individual soakaways.

We are aware that for the statutory undertaker to adopt soakaways there need to be accessible and therefore those in back gardens would remain private. For the long-term viability of soakaways, a management company must be set up to with a maintenance/management and replacement programme under section 106 of the Town and Country Planning Act. Any such agreement can be null and void upon adoption.

Highway drainage soakaways may need to be separated. Early discussion with Yorkshire Water or NAV and the Highways Authority are necessary as space will be required that is not considered in the indicative layout plan.

Watercourse

There are no known watercourses in the immediate vicinity of the site.

Kirklees Council
Planning and Development Service
PO Box 1720
Huddersfield

Public Sewers

Although there are surface water sewers located in Hepworth Close and Hepworth Drive, these appear to be transitional sewers, i.e. they connect to a combined system downstream.

A 150mm and a 225mm public combined sewer is located immediately to the site's southern border with Hepworth Lane. We advise the applicant to contact Yorkshire Water for pre-planning advice to see if these sewers are suitable for a restricted 3.5l/s connection from site given they are small diameter. A 300mm combined sewer is located 100m from the site in Flash Lane and maybe Yorkshire Water's preferred connection point. A 225mm surface water sewer is also located in Flash Lane. This is shown 170m from the site but there is a possibility that unmapped section may run closer. This surface water sewer appears to connect to a 300mm combined sewer in Shillbank Lane but I would suggest this is verified as another surface water sewer is positioned metres away from the connection point shown.

Flood Routing

We expect the layout to be designed with flood routing in mind. This could be an exceedance event or blockage scenario where water is surcharging the drainage system and running overland. Main flow routes should avoid property curtilage and use roads and open space. Where water would go if a storm event hit a saturated undeveloped field needs to be considered in this design, i.e. the southern border. Where existing houses can be better protected without making it worse for others, as safe off-site route into the highway should be considered.

Section 106 – Management Company

Under NPPF there is an obligation for the LPA to ensure the adequate management of SUDS (surface water drainage) for the lifetime of the site. This includes from installation. A management company should be set up under Section 106 of the Town and Country Planning Act 1990 with a maintenance and management plan based on the latest CIRIA guide to SUDS but bespoke to the site, agreed by condition. The Section 106 agreement will have a breakout clause for when surface water infrastructure is adopted by Highways Authority, Statutory Undertaker and/or NAV equivalent.

Eastwood
CONSULTING ENGINEERS

APPENDIX 6

Jessica Steels-Crotty

From: Reg
Sent: 15 May 2025 09:33
To: Liam Clarke
Subject: 1668, Balderstone Hall, Mirfield - Queries

Morning Liam

We've recommended proof drilling (and grouting) of Plots 5, 10 to 12, 20, 42, 50, 56 (assuming layout hasn't been revised since our Report issue) which are located close to 6 of the mine entries. It would be sensible (from a cost perspective) to drill all the mine entries in 'one hit'.

We could draft a Specification for investigation & treatment of the entries (& affected plots) to enable you to obtain prices. When do you anticipate these works will be required?

With respect to the infiltration basin in POS in the SW corner, our PH4 suggests coal lies at about 15m bgl . So, we don't see a problem with this strategy, although it would be prudent to ensure no dwelling is built within 10m of the basin crest.

Regards

Mark Perrin
Director
Lithos Consulting Ltd
M 07703 396 635
DD 01937 545 331

LITHOS CONSULTING
www.lithos.co.uk

From: Liam Clarke
Sent: Thursday, May 15, 2025 8:42 AM
To: Re
Subje

Hi Reg

Thanks for the below.

Please could you provide a quotation for the drilling investigation required? I have asked the architect to try and avoid the entries being beneath the highway to reduce complications but could do with firming everything up really.

Re soakaways, if restricting to POS it would make sense to me to limit this to an infiltration basin in the South of the site, would you be happy that this would not have any detrimental effect on workings beneath the site?

Kind Regards

Liam

Liam Clarke
Engineering Manager

0113 3900 800
Bellway Homes Limited (Yorkshire)

2150 Century Way
Thorpe Park
Leeds
West Yorkshire
LS15 8ZB
www.bellway.co.uk

Bellway | 5 for 25 Giving to build better lives Help raise £5million for 2025 | Supporting CANCER RESEARCH UK

From: Reg <reg@lithos.co.uk>
Sent: 14 May 2025 17:10
To: Liam Clarke <Liam.Clarke@bellway.co.uk>
Subject: 1668, Balderstone Hall, Mirfield - Queries

Hi Liam

So, we think **MF003** is likely a partly collapsed bell pit. When the Report was written, this feature was shown in POS, but now it is expected to underlie a new highway. We've already recommended (in Section 15.2), that all 12 mine entries be drilled to confirm their depth and that they are completely infilled (not blocked several meters below ground levels with open voids below).

Section 15.2 also includes recommendations for treatment. For highways I'd ordinarily expect a cap at rockhead to suffice but given the large diameter here (c. 5m), it'd probably be better to grout on say a 2m grid. Geogrid could also be incorporated within the road construction locally. Treatment proposals will need to be agreed with the highway adopting authority (best done after drilling).

With respect to **LLFA** comments in their e-mail of 12th May, it is true that in 2018 (followed some further testing) we suggested that soakaways "do provide a suitable drainage solution for the discharge of surface water run-off at the site". However, CIRIA C758D (Abandoned mine workings manual) was issued in 2019 and this noted that "*Conventional SuDS often involve soakaways, meaning careful assessment of impacts on workings' stability or of extra flows reaching a conducting void are required*."

Partly as a consequence of this, but also on review of our updated report by a Director who joined Lithos in 2022, we felt it prudent to refine our advice wrt soakaways. Our latest Report (1668/1F, Dec. '22) now states "due to the potential impact on ground stability as a result focused sustained water flows reaching shallow mine workings, it is recommended that where an alternative is not available, and soakaways have to be used, that they are restricted to POS only". We believe refinement of our advice regarding soakaways is prudent and justified.

Hope the above helps.

Regards

Mark Perrin
Director
Lithos Consulting Ltd
M 07703 396 635
DD 01937 545 331

LITHOS CONSULTING
www.lithos.co.uk

From: Liam Clarke <
Sent: 14 May 2025 15:12
To: Reg
Subject:

Hi Reg

As discussed, having difficulty with the zone of influence for MF003 due to not reaching rockhead in the SI, appears to also be the case for MF004.

It looks like we will be having a good go at this site now, could you therefore please provide a quotation for:

- Any further proof drilling required to firm up requirements for shafts and entries. Appreciate this may be subject to the layout but if you could provide a budget that would be appreciated.
- Specification for treatment of shafts/workings

In addition, Eastwoods have contacted the LLFA officer regarding SW disposal, and he has provided a response pushing soakaways, I'll forward the correspondence separately so you have the attachments etc, but may need a bit more of a steer here and/or letter report with a bit more detail on what we can/can't do.

Kind Regards

Liam
Liam Clarke
Engineering Manager

0113 3900 800
Bellway Homes Limited (Yorkshire)
2150 Century Way
Thorpe Park
Leeds
West Yorkshire
LS15 8ZB
www.bellway.co.uk

Eastwood
CONSULTING ENGINEERS

APPENDIX 7

SUDS Type	SUDS Technique	Description	Suitable	Comments
Source Control	Green roof	Vegetated roof that reduces runoff volume and rate	No	Expected planning requirement for traditional pitched roofs to match neighbouring housing.
	Rain garden/ bio retention area	Small depressions in the ground that can act as infiltration points.	No	Limited space for rain gardens to be developed.
	Rainwater harvesting/rainwater butts	Rainwater is stored and re-used	Possible	Low volumes of water are likely to be required by the development. Individual water butts can be used for garden watering.
	Permeable paving	Paving which allows inflow of rainwater into underlying construction/soil	No	Permeable paving is not proposed due to the site topography. Other SuDS features are proposed.
Infiltration	Soakaway	Pit or trench which stores and disposes of water to the ground	No	Infiltration type SuDS across the majority of the site is not viable due to potential ground stability as a result of focussed sustained water flows in shallow mine workings.
	Filter Drain	Trench which conveys and/or disposes of water to the ground.	No	
	Infiltration Basin	Shallow basin which stores and disposes of water to the ground	Yes	An infiltration basin is proposed in the south-western portion of the site in POS. It should be ensured that no dwelling is built within 10 m of the basin crest due to potential ground stability issues.
Conveyance	Swale	Shallow vegetated depression which conducts and retains water	No	Lack of suitable space.
Detention	Subsurface storage	Traditional underground pipes, tank storage, or modular systems	Yes	Area available on the site for an attenuation tank/ crates.
	Detention Basin	Normally dry but may have small permanent water pools at the inlet and outlet. They can function as POS	No	Inefficient use of POS.

Detention	Pond	Permanent body of water	No	Lack of suitable public open space.
	Wetland	Permanent body of shallow water or marsh	No	

General Information			
Site ID			
Site Location and co-ordinates			
Elements forming the SUDs scheme		Approved drawing reference	
Inspection Frequency		Approved specification reference	
Type of Development		Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
General Inspection Items								
Evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance								
Evidence of poor water quality								

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
Silt/Sediment Accumulation								
Id there any sediment accumulation at inlets/outlets								
If yes, state the depth in mm								
Removal required? State waste disposal requirements have been compiled with environmental regulator								
Is surface clogging visible								

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
Blockages/Litter Build up								
Is there evidence of litter build up (if yes, has this been removed)								
Is there evidence of clogging or blockages (if yes, has this been removed)								
Vegetation								
Is vegetation in the basin/swales satisfactory (density, weed growth, coverage)								
Does any area need weeding, mowing or pruning (if yes, has this been undertaken)								
Is there evidence of invasive species becoming established (state action required								

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
Infrastructure								
Is the flow control in good condition (silt, damages, evidence of tampering) – if yes, please provide details								
Is there evidence of unauthorised inflows?								
Is the inflow/outflow structures in a suitable condition – please provide information								
Are there any other matters that could affect the performance of the system – if yes give details								

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
Other Observations								
Information appended (photos etc)								
Suitability of current maintenance regime								
Continue as current Increase maintenance Decrease maintenance								
Next Inspection								
Proposed date for next inspection								

Further Comments	

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

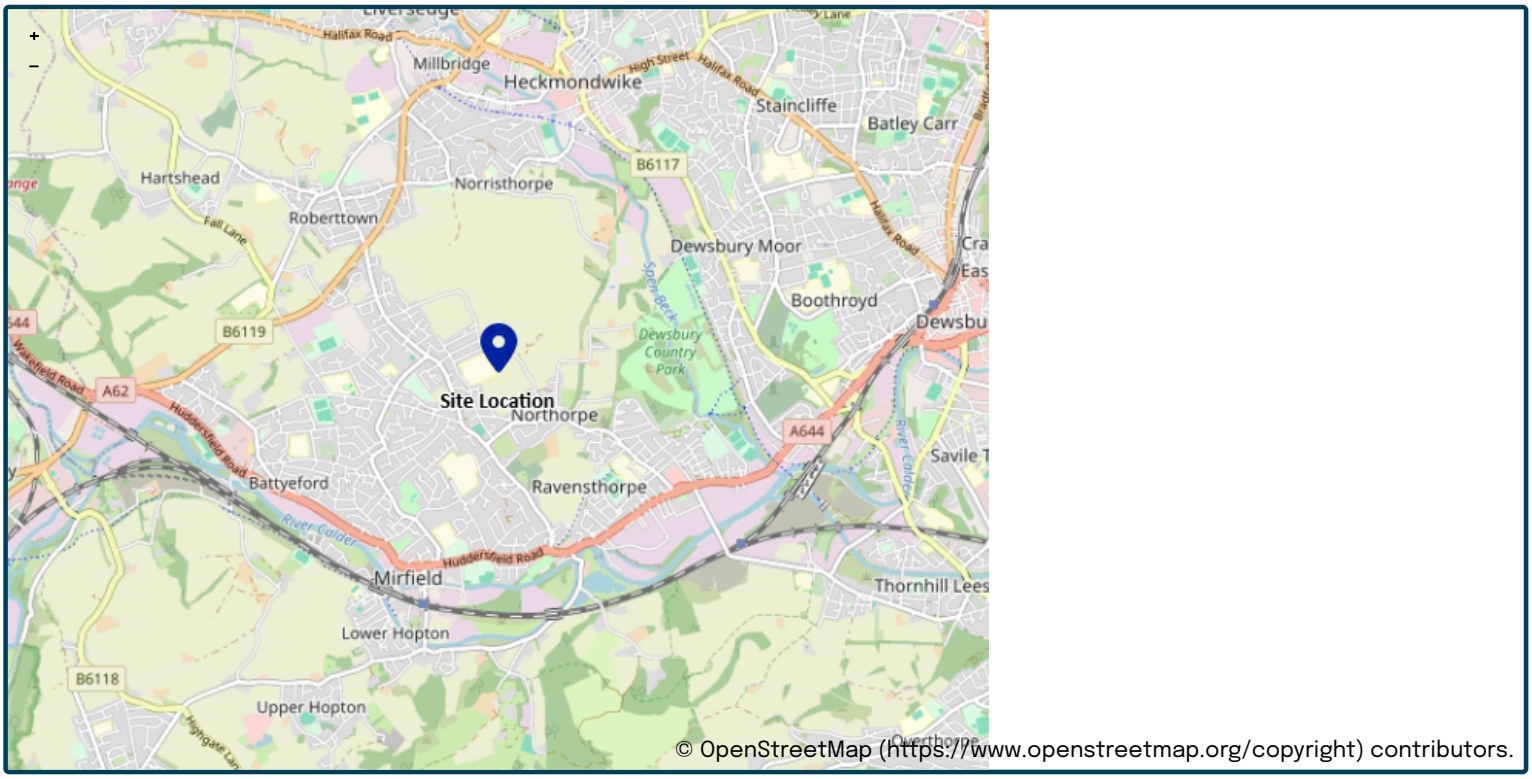
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	13/10/2025
Calculated by	
Reference	
Model version	2.2.1

Location

Site name	Woodward Court
Site location	Mirfield



Site easting (British National Grid)	420959
Site northing (British National Grid)	421089

Site details

Total site area (ha)	2.64 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	737 mm		
BFIHOST19scaled	0.41		
QMed-QBar conversion	1.064		1.064
QMed (l/s)	10.8 l/s		
QBar (FEH statistical 2025) (l/s)	11.5 l/s		

Growth curve factors

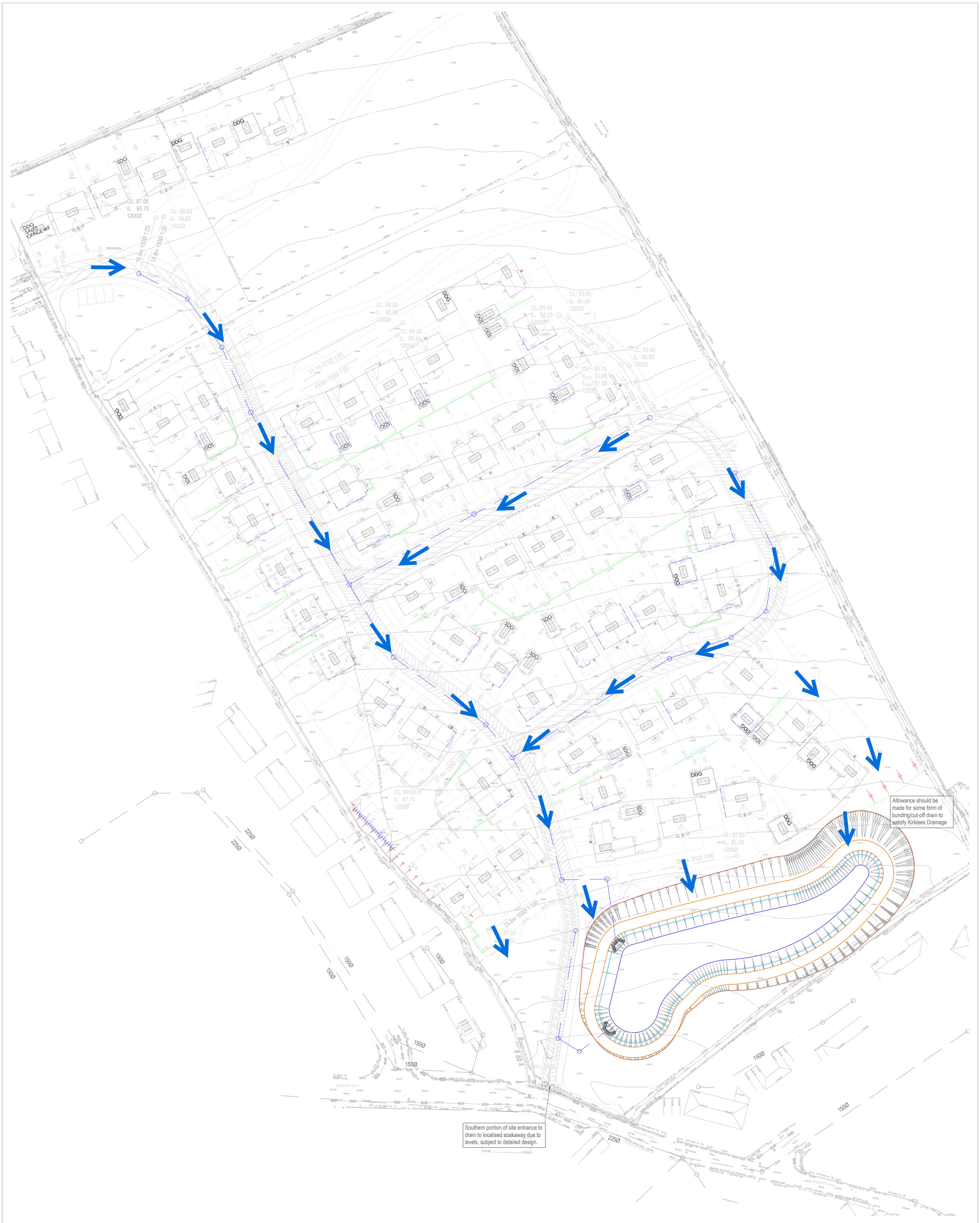
	My value		Map value
Hydrological region	3		3
1 year growth factor	0.86		
2 year growth factor	0.94		
10 year growth factor	1.45		
30 year growth factor	1.75		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	9.9 l/s
Flow rate 2 year (l/s)	10.8 l/s
Flow rate 10 years (l/s)	16.6 l/s
Flow rate 30 years (l/s)	20.1 l/s
Flow rate 100 years (l/s)	23.9 l/s
Flow rate 200 years (l/s)	27.2 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer



Exceedance flow route

REV	DESCRIPTION	SIG	CHK	DATE
P01	First issue.	JSS	IH	15.10.2025
P02	Updated to suit latest site layout (Rev: F)	JSS	CH	13.11.2025

BELLWAY HOMES LTD (YORKSHIRE)

WOODWARD COURT, MIRFIELD

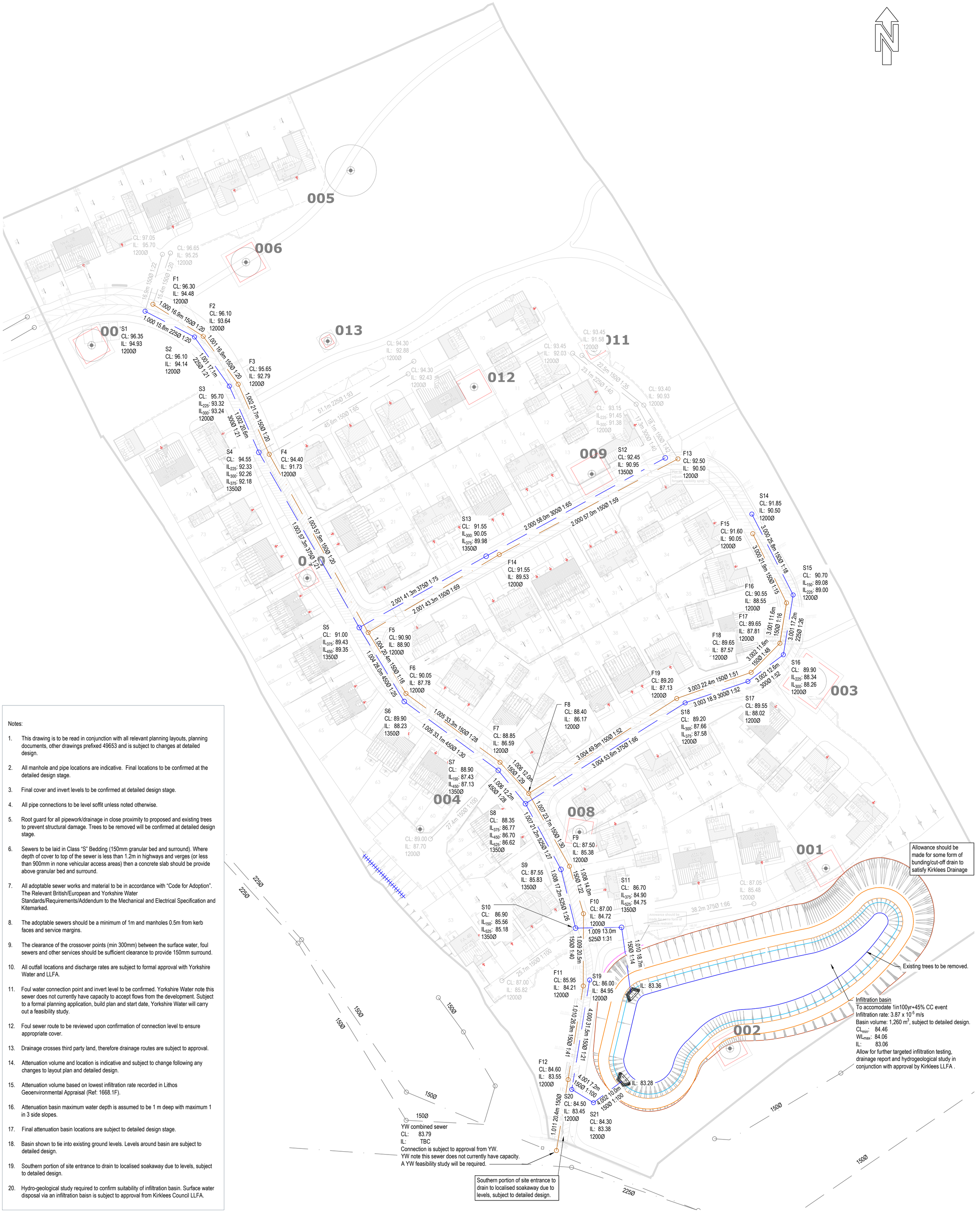
FLOOD ROUTING PLAN

Eastwood
CONSULTING ENGINEERS
St Andrew's House
23 Kingfield Road
Sheffield, S11 9AS
T: 0114 255 4554
E: mail@eastwoodce.com
eastwoodce.com

ECE PROJECT No	SCALE AT A1	STATUS	SUITABLE FOR
49653	1:500	S0	Initial

DRAWING NUMBER: **49653** - ECE - XX - XX - DR - C - **0008** REV P02

Project | Originator | Zone | Level | Type | Role | Number



Notes:

1. This drawing is to be read in conjunction with all relevant planning layouts, planning documents, other drawings prefixed 49653 and is subject to changes at detailed design.
2. All manhole and pipe locations are indicative. Final locations to be confirmed at the detailed design stage.
3. Final cover and invert levels to be confirmed at detailed design stage.
4. All pipe connections to be level soffit unless noted otherwise.
5. Root guard for all pipework/drainage in close proximity to proposed and existing trees to prevent structural damage. Trees to be removed will be confirmed at detailed design stage.
6. Sewers to be laid in Class "S" Bedding (150mm granular bed and surround). Where depth of cover to top of the sewer is less than 1.2m in highways and verges (or less than 900mm in none vehicular access areas) then a concrete slab should be provide above granular bed and surround.
7. All adoptable sewer works and material to be in accordance with "Code for Adoption". The Relevant British/European and Yorkshire Water Standards/Requirements/Addendum to the Mechanical and Electrical Specification and Kitemarked.
8. The adoptable sewers should be a minimum of 1m and manholes 0.5m from kerb faces and service margins.
9. The clearance of the crossover points (min 300mm) between the surface water, foul sewers and other services should be sufficient clearance to provide 150mm surround.
10. All outfall locations and discharge rates are subject to formal approval with Yorkshire Water and LLFA.
11. Foul water connection point and invert level to be confirmed. Yorkshire Water note this sewer does not currently have capacity to accept flows from the development. Subject to a formal planning application, build plan and start date, Yorkshire Water will carry out a feasibility study.
12. Foul sewer route to be reviewed upon confirmation of connection level to ensure appropriate cover.
13. Drainage crosses third party land, therefore drainage routes are subject to approval.
14. Attenuation volume and location is indicative and subject to change following any changes to layout plan and detailed design.
15. Attenuation volume based on lowest infiltration rate recorded in Lithos Geoenvironmental Appraisal (Ref: 1668.1F).
16. Attenuation basin maximum water depth is assumed to be 1 m deep with maximum 1 in 3 side slopes.
17. Final attenuation basin locations are subject to detailed design stage.
18. Basin shown to tie into existing ground levels. Levels around basin are subject to detailed design.
19. Southern portion of site entrance to drain to localised soakaway due to levels, subject to detailed design.
20. Hydro-geological study required to confirm suitability of infiltration basin. Surface water disposal via an infiltration baisn is subject to approval from Kirklees Council LLFA.

- Surface water drainage
- Linear drainage channel (ACO OSA)
- Infiltration basin
- Foul water drainage
- Existing combined water sewer (YW)
- Existing surface water sewer (YW)
- Offset (3m either side) for sewers outside highways
- Foul water drainage included for feasibility check only. Drainage in these areas likely to be in plot drainage.
- Surface water drainage included for feasibility check only. Drainage in these areas likely to be in plot drainage.
- Mine shaft location.

NOTES

APPROPRIATE TREATMENT TO MINESHAFTS/ADDITS ARE REQUIRED IN THE VICINITY OF THE INFILTRATION BASIN TO PREVENT DIRECT DISCHARGE

MANHOLES WITHIN ADOPTABLE HIGHWAYS WILL REQUIRE DESIGN CHECK CERTIFICATE ALONG WITH APPROPRIATE SITE INSPECTIONS/SIGN OFF.

DRAINAGE DESIGN WILL REQUIRE APPROVAL FROM KIRKLEES LLFA

ADDITIONAL SUD'S MEASURE COULD BE REQUIRED AS PART OF PLANNING APPROVAL

REV	DESCRIPTION	SIG	CHK	DATE
P01	First issue.	JSS	CH	23.10.2025
P02	Updated to suit latest site layout (Rev: F)	EL	JSS	13.11.2025
P03	Proposed SuDS features updated.	JSS	CH	26.11.2025

BELLWAY HOMES LTD (YORKSHIRE)

WOODWARD COURT, MIRFIELD

DRAINAGE APPRAISAL- OPTION 2

Eastwood CONSULTING ENGINEERS
St Andrew's House
23 Kingfield Road
Sheffield, S11 9AS
T: 0114 255 4554
E: mail@eastwoodce.com
eastwoodce.com

ECE PROJECT No	SCALE AT A1	STATUS	SUITABLE FOR
49653	1:500	S0	Initial

DRAWING NUMBER: 49653 - ECE - XX - XX - DR - C - 0016 REV P03
(Project - Originator - Zone - Level - Type - Role - Number)

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S1	0.173	5.00	96.350	1200	420850.581	421153.002	1.425	94.925
S2			96.100	1200	420864.614	421145.688	1.960	94.140
S3	0.062	5.00	95.700	1200	420874.491	421131.738	2.460	93.240
S4	0.222	5.00	94.550	1350	420882.873	421112.936	2.370	92.180
S5	0.083	5.00	91.000	1350	420911.390	421063.196	1.650	89.350
S6	0.082	5.00	90.100	1350	420924.173	421042.185	1.870	88.230
S7	0.078	5.00	88.950	1350	420950.863	421022.635	1.820	87.130
S8	0.065	5.00	88.350	1350	420958.576	421013.179	1.730	86.620
S9	0.040	5.00	87.550	1350	420968.661	420994.530	1.725	85.825
S10	0.216	5.00	86.900	1350	420972.806	420977.847	1.725	85.175
S11			86.700	1350	420985.868	420978.064	1.950	84.750
S12	0.214	5.00	92.450	1350	420998.275	421111.368	1.500	90.950
S13	0.062	5.00	91.550	1350	420947.416	421083.439	1.575	89.975
S14	0.078	5.00	91.850	1200	421022.853	421095.413	1.350	90.500
S15			90.700	1200	421034.579	421072.446	1.700	89.000
S16	0.045	5.00	90.400	1200	421031.799	421055.464	2.140	88.260
S17	0.089	5.00	89.700	1200	421021.745	421047.891	1.680	88.020
S18	0.039	5.00	88.850	1200	421003.913	421041.811	1.270	87.580
S19	0.025	5.00	86.000	1200	420976.793	420963.111	1.050	84.950
S20			84.500	1200	420971.742	420932.034	1.050	83.450
S21	0.009	5.00	84.300	1200	420977.887	420928.278	0.920	83.380
Atten	0.360	5.00	85.000	1350	421025.045	420958.495	1.720	83.280
Outfall			85.000	1350	421028.086	420944.092	1.000	84.000

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	15.820	0.600	94.925	94.140	0.785	20.2	225	5.09	48.9
1.001	S2	S3	17.093	0.600	94.140	93.320	0.820	20.8	225	5.19	48.5
1.002	S3	S4	20.586	0.600	93.240	92.260	0.980	21.0	300	5.29	48.2
1.003	S4	S5	57.335	0.600	92.180	89.425	2.755	20.8	375	5.53	47.4
2.000	S12	S13	58.023	0.600	90.950	90.050	0.900	64.5	300	5.49	47.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	2.928	116.4	30.6	1.200	1.735	0.173	0.0
1.001	2.878	114.4	30.3	1.735	2.155	0.173	0.0
1.002	3.445	243.5	40.9	2.160	1.990	0.235	0.0
1.003	3.986	440.3	78.2	1.995	1.200	0.457	0.0
2.000	1.961	138.6	36.7	1.200	1.200	0.214	0.0

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
2.001	S13	S5	41.324	0.600	89.975	89.425	0.550	75.1	375	5.82	46.3
1.004	S5	S6	28.003	0.600	89.350	88.230	1.120	25.0	450	5.94	46.0
1.005	S6	S7	33.084	0.600	88.230	87.130	1.100	30.1	450	6.09	45.5
1.006	S7	S8	12.203	0.600	87.130	86.700	0.430	28.4	450	6.14	45.3
3.000	S14	S15	25.787	0.600	90.500	89.080	1.420	18.2	150	5.18	48.6
3.001	S15	S16	17.208	0.600	89.000	88.340	0.660	26.1	225	5.29	48.2
3.002	S16	S17	12.587	0.600	88.260	88.020	0.240	52.4	225	5.41	47.8
3.003	S17	S18	18.840	0.600	88.020	87.660	0.360	52.3	300	5.55	47.3
3.004	S18	S8	53.621	0.600	87.580	86.770	0.810	66.2	375	5.95	45.9
1.007	S8	S9	21.201	0.600	86.620	85.825	0.795	26.7	525	6.22	45.0
1.008	S9	S10	17.190	0.600	85.825	85.175	0.650	26.4	525	6.29	44.8
1.009	S10	S11	13.064	0.600	85.175	84.750	0.425	30.7	525	6.34	44.6
1.010	S11	Atten	18.700	0.600	84.750	83.360	1.390	13.5	525	6.39	44.5
4.000	S19	S20	31.485	0.600	84.950	83.450	1.500	21.0	150	5.24	48.4
4.001	S20	S21	7.202	0.600	83.450	83.380	0.070	102.9	150	5.36	48.0
4.002	S21	Atten	10.000	0.600	83.380	83.280	0.100	100.0	150	5.52	47.4
1.011	Atten	Outfall	5.000	0.600	84.060	84.000	0.060	83.3	525	6.42	44.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
2.001	2.092	231.0	46.2	1.200	1.200	0.276	0.0
1.004	4.078	648.6	135.7	1.200	1.420	0.816	0.0
1.005	3.717	591.2	147.5	1.420	1.370	0.898	0.0
1.006	3.827	608.7	159.7	1.370	1.200	0.976	0.0
3.000	2.374	42.0	13.7	1.200	1.470	0.078	0.0
3.001	2.572	102.3	13.6	1.475	1.835	0.078	0.0
3.002	1.810	72.0	21.2	1.915	1.455	0.123	0.0
3.003	2.178	153.9	36.2	1.380	0.890	0.212	0.0
3.004	2.229	246.2	41.6	0.895	1.205	0.251	0.0
1.007	4.349	941.5	210.2	1.205	1.200	1.292	0.0
1.008	4.367	945.4	215.7	1.200	1.200	1.332	0.0
1.009	4.050	876.7	249.8	1.200	1.425	1.548	0.0
1.010	6.129	1326.7	248.9	1.425	1.115	1.548	0.0
4.000	2.208	39.0	4.4	0.900	0.900	0.025	0.0
4.001	0.990	17.5	4.3	0.900	0.770	0.025	0.0
4.002	1.005	17.8	5.8	0.770	1.570	0.034	0.0
1.011	2.455	531.4	311.4	0.415	0.475	1.942	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	15.820	20.2	225	Circular	96.350	94.925	1.200	96.100	94.140	1.735
1.001	17.093	20.8	225	Circular	96.100	94.140	1.735	95.700	93.320	2.155
1.002	20.586	21.0	300	Circular	95.700	93.240	2.160	94.550	92.260	1.990
1.003	57.335	20.8	375	Circular	94.550	92.180	1.995	91.000	89.425	1.200
2.000	58.023	64.5	300	Circular	92.450	90.950	1.200	91.550	90.050	1.200
2.001	41.324	75.1	375	Circular	91.550	89.975	1.200	91.000	89.425	1.200
1.004	28.003	25.0	450	Circular	91.000	89.350	1.200	90.100	88.230	1.420
1.005	33.084	30.1	450	Circular	90.100	88.230	1.420	88.950	87.130	1.370
1.006	12.203	28.4	450	Circular	88.950	87.130	1.370	88.350	86.700	1.200
3.000	25.787	18.2	150	Circular	91.850	90.500	1.200	90.700	89.080	1.470
3.001	17.208	26.1	225	Circular	90.700	89.000	1.475	90.400	88.340	1.835
3.002	12.587	52.4	225	Circular	90.400	88.260	1.915	89.700	88.020	1.455
3.003	18.840	52.3	300	Circular	89.700	88.020	1.380	88.850	87.660	0.890
3.004	53.621	66.2	375	Circular	88.850	87.580	0.895	88.350	86.770	1.205
1.007	21.201	26.7	525	Circular	88.350	86.620	1.205	87.550	85.825	1.200
1.008	17.190	26.4	525	Circular	87.550	85.825	1.200	86.900	85.175	1.200
1.009	13.064	30.7	525	Circular	86.900	85.175	1.200	86.700	84.750	1.425
1.010	18.700	13.5	525	Circular	86.700	84.750	1.425	85.000	83.360	1.115
4.000	31.485	21.0	150	Circular	86.000	84.950	0.900	84.500	83.450	0.900
4.001	7.202	102.9	150	Circular	84.500	83.450	0.900	84.300	83.380	0.770
4.002	10.000	100.0	150	Circular	84.300	83.380	0.770	85.000	83.280	1.570
1.011	5.000	83.3	525	Circular	85.000	84.060	0.415	85.000	84.000	0.475

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1350	Manhole	Adoptable
1.003	S4	1350	Manhole	Adoptable	S5	1350	Manhole	Adoptable
2.000	S12	1350	Manhole	Adoptable	S13	1350	Manhole	Adoptable
2.001	S13	1350	Manhole	Adoptable	S5	1350	Manhole	Adoptable
1.004	S5	1350	Manhole	Adoptable	S6	1350	Manhole	Adoptable
1.005	S6	1350	Manhole	Adoptable	S7	1350	Manhole	Adoptable
1.006	S7	1350	Manhole	Adoptable	S8	1350	Manhole	Adoptable
3.000	S14	1200	Manhole	Adoptable	S15	1200	Manhole	Adoptable
3.001	S15	1200	Manhole	Adoptable	S16	1200	Manhole	Adoptable
3.002	S16	1200	Manhole	Adoptable	S17	1200	Manhole	Adoptable
3.003	S17	1200	Manhole	Adoptable	S18	1200	Manhole	Adoptable
3.004	S18	1200	Manhole	Adoptable	S8	1350	Manhole	Adoptable
1.007	S8	1350	Manhole	Adoptable	S9	1350	Manhole	Adoptable
1.008	S9	1350	Manhole	Adoptable	S10	1350	Manhole	Adoptable
1.009	S10	1350	Manhole	Adoptable	S11	1350	Manhole	Adoptable
1.010	S11	1350	Manhole	Adoptable	Atten	1350	Manhole	Adoptable
4.000	S19	1200	Manhole	Adoptable	S20	1200	Manhole	Adoptable
4.001	S20	1200	Manhole	Adoptable	S21	1200	Manhole	Adoptable
4.002	S21	1200	Manhole	Adoptable	Atten	1350	Manhole	Adoptable
1.011	Atten	1350	Manhole	Adoptable	Outfall	1350	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	20.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	45	0	0

Node Atten Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.13932	Safety Factor	2.0	Invert Level (m)	83.060
Side Inf Coefficient (m/hr)	0.13932	Porosity	1.00	Time to half empty (mins)	376

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1002.0	1002.0	1.000	1610.0	1623.2	1.001	0.0	1623.2

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	94.987	0.062	18.4	0.2214	0.0000	OK
15 minute summer	S2	10	94.203	0.063	18.2	0.0711	0.0000	OK
15 minute summer	S3	10	93.306	0.066	24.6	0.1085	0.0000	OK
15 minute summer	S4	11	92.264	0.084	48.0	0.2770	0.0000	OK
15 minute summer	S5	11	89.462	0.112	84.4	0.2723	0.0000	OK
15 minute summer	S6	11	88.352	0.122	92.9	0.2810	0.0000	OK
15 minute summer	S7	11	87.269	0.139	101.2	0.3192	0.0000	OK
15 minute summer	S8	11	86.762	0.142	134.0	0.3097	0.0000	OK
15 minute summer	S9	11	85.968	0.143	138.1	0.2701	0.0000	OK
15 minute summer	S10	11	85.351	0.176	160.0	0.6938	0.0000	OK
15 minute summer	S11	11	84.883	0.133	159.9	0.1902	0.0000	OK
15 minute summer	S12	11	91.032	0.082	22.7	0.3502	0.0000	OK
15 minute summer	S13	11	90.065	0.090	28.4	0.2007	0.0000	OK
15 minute summer	S14	10	90.546	0.046	8.3	0.1048	0.0000	OK
15 minute summer	S15	10	89.044	0.044	8.2	0.0496	0.0000	OK
15 minute summer	S16	10	88.326	0.066	12.9	0.1022	0.0000	OK
15 minute summer	S17	10	88.100	0.080	22.3	0.1748	0.0000	OK
15 minute summer	S18	11	87.663	0.083	26.0	0.1452	0.0000	OK
15 minute summer	S19	10	84.977	0.027	2.7	0.0426	0.0000	OK
15 minute summer	S20	11	83.491	0.041	2.6	0.0461	0.0000	OK
15 minute summer	S21	11	83.427	0.047	3.5	0.0627	0.0000	OK
360 minute summer	Atten	232	83.209	-0.071	66.2	156.1966	0.0000	OK
15 minute summer	Outfall	1	84.000	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	18.2	2.029	0.157	0.1421	
15 minute summer	S2	1.001	S3	18.1	2.057	0.158	0.1501	
15 minute summer	S3	1.002	S4	24.5	2.179	0.100	0.2313	
15 minute summer	S4	1.003	S5	47.5	2.626	0.108	1.0372	
15 minute summer	S5	1.004	S6	84.6	2.598	0.130	0.9128	
15 minute summer	S6	1.005	S7	93.2	2.445	0.158	1.2627	
15 minute summer	S7	1.006	S8	101.3	2.647	0.166	0.4673	
15 minute summer	S8	1.007	S9	134.0	2.843	0.142	0.9997	
15 minute summer	S9	1.008	S10	138.1	2.497	0.146	0.9528	
15 minute summer	S10	1.009	S11	159.9	3.018	0.182	0.6951	
15 minute summer	S11	1.010	Atten	159.6	3.978	0.120	0.7509	
15 minute summer	S12	2.000	S13	22.1	1.443	0.160	0.8895	
15 minute summer	S13	2.001	S5	28.5	1.425	0.123	0.8272	
15 minute summer	S14	3.000	S15	8.2	1.819	0.195	0.1157	
15 minute summer	S15	3.001	S16	8.1	1.521	0.079	0.0916	
15 minute summer	S16	3.002	S17	12.8	1.154	0.178	0.1401	
15 minute summer	S17	3.003	S18	22.0	1.519	0.143	0.2735	
15 minute summer	S18	3.004	S8	26.1	1.462	0.106	0.9583	
15 minute summer	S19	4.000	S20	2.6	0.914	0.067	0.0930	
15 minute summer	S20	4.001	S21	2.6	0.607	0.149	0.0310	
15 minute summer	S21	4.002	Atten	3.5	0.766	0.199	0.0461	
360 minute summer	Atten	1.011	Outfall	0.0	0.000	0.000	0.0000	0.0
360 minute summer	Atten	Infiltration		20.6				

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	95.066	0.141	73.5	0.5022	0.0000	OK
15 minute summer	S2	10	94.284	0.144	73.1	0.1626	0.0000	OK
15 minute summer	S3	10	93.384	0.144	98.9	0.2357	0.0000	OK
15 minute summer	S4	10	92.359	0.179	192.8	0.5902	0.0000	OK
15 minute summer	S5	10	89.601	0.251	340.1	0.6111	0.0000	OK
15 minute summer	S6	11	88.508	0.278	373.2	0.6423	0.0000	OK
15 minute summer	S7	11	87.481	0.351	407.1	0.8034	0.0000	OK
15 minute summer	S8	11	86.955	0.335	540.1	0.7306	0.0000	OK
15 minute summer	S9	11	86.187	0.362	558.0	0.6868	0.0000	OK
15 minute summer	S10	11	85.630	0.455	647.1	1.7906	0.0000	OK
15 minute summer	S11	11	85.065	0.315	648.0	0.4508	0.0000	OK
15 minute summer	S12	10	91.131	0.181	91.0	0.7770	0.0000	OK
15 minute summer	S13	11	90.171	0.196	115.0	0.4359	0.0000	OK
15 minute summer	S14	10	90.606	0.106	33.2	0.2416	0.0000	OK
15 minute summer	S15	10	89.093	0.093	32.8	0.1048	0.0000	OK
15 minute summer	S16	10	88.422	0.162	51.8	0.2507	0.0000	OK
15 minute summer	S17	10	88.201	0.181	89.3	0.3962	0.0000	OK
15 minute summer	S18	10	87.756	0.176	105.0	0.3065	0.0000	OK
15 minute summer	S19	10	85.003	0.053	10.6	0.0855	0.0000	OK
180 minute winter	S20	176	83.570	0.120	2.4	0.1353	0.0000	OK
180 minute winter	S21	176	83.570	0.190	3.3	0.2516	0.0000	SURCHARGED
180 minute winter	Atten	176	83.570	0.290	185.2	591.1554	0.0000	OK
15 minute summer	Outfall	1	84.000	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	73.1	2.760	0.628	0.4191	
15 minute summer	S2	1.001	S3	72.6	2.881	0.634	0.4303	
15 minute summer	S3	1.002	S4	98.4	3.116	0.404	0.6501	
15 minute summer	S4	1.003	S5	192.1	3.753	0.436	2.9357	
15 minute summer	S5	1.004	S6	339.9	3.513	0.524	2.7088	
15 minute summer	S6	1.005	S7	375.3	3.171	0.635	3.8969	
15 minute summer	S7	1.006	S8	408.9	3.539	0.672	1.4008	
15 minute summer	S8	1.007	S9	541.8	3.568	0.576	3.2255	
15 minute summer	S9	1.008	S10	559.3	3.123	0.592	3.0756	
15 minute summer	S10	1.009	S11	648.0	3.819	0.739	2.1822	
15 minute summer	S11	1.010	Atten	648.1	5.435	0.489	2.2288	
15 minute summer	S12	2.000	S13	88.9	2.065	0.641	2.5062	
15 minute summer	S13	2.001	S5	115.4	2.055	0.499	2.3211	
15 minute summer	S14	3.000	S15	32.8	2.551	0.781	0.3313	
15 minute summer	S15	3.001	S16	32.6	2.208	0.319	0.2540	
15 minute summer	S16	3.002	S17	51.4	1.591	0.715	0.4074	
15 minute summer	S17	3.003	S18	88.4	2.137	0.574	0.7816	
15 minute summer	S18	3.004	S8	104.9	2.048	0.426	2.7827	
15 minute summer	S19	4.000	S20	10.5	1.244	0.269	0.2708	
180 minute winter	S20	4.001	S21	2.4	0.609	0.137	0.1176	
180 minute winter	S21	4.002	Atten	3.3	0.735	0.186	0.1760	
180 minute winter	Atten	1.011	Outfall	0.0	0.000	0.000	0.0000	0.0
180 minute winter	Atten	Infiltration		25.2				

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	95.845	0.920	135.9	3.2752	0.0000	SURCHARGED
15 minute summer	S2	12	94.700	0.560	121.6	0.6337	0.0000	SURCHARGED
15 minute summer	S3	11	93.439	0.199	166.7	0.3256	0.0000	OK
15 minute summer	S4	11	92.488	0.308	333.6	1.0172	0.0000	OK
15 minute summer	S5	12	91.000	1.650	561.8	4.0211	2.3115	FLOOD
15 minute summer	S6	12	90.085	1.855	562.2	4.2809	0.0000	FLOOD RISK
15 minute summer	S7	12	88.819	1.689	605.2	3.8671	0.0000	FLOOD RISK
15 minute summer	S8	12	88.033	1.413	794.7	3.0843	0.0000	SURCHARGED
15 minute summer	S9	12	87.112	1.287	822.3	2.4387	0.0000	SURCHARGED
15 minute summer	S10	11	86.255	1.080	970.8	4.2508	0.0000	SURCHARGED
15 minute summer	S11	11	85.191	0.441	965.4	0.6307	0.0000	OK
15 minute summer	S12	12	92.364	1.414	168.1	6.0577	0.0000	FLOOD RISK
15 minute summer	S13	12	91.380	1.405	187.0	3.1180	0.0000	FLOOD RISK
15 minute summer	S14	12	91.659	1.159	61.2	2.6511	0.0000	FLOOD RISK
15 minute summer	S15	12	89.349	0.349	50.7	0.3942	0.0000	SURCHARGED
15 minute summer	S16	12	89.157	0.897	82.0	1.3920	0.0000	SURCHARGED
15 minute summer	S17	12	88.790	0.770	148.1	1.6860	0.0000	SURCHARGED
15 minute summer	S18	12	88.425	0.845	174.9	1.4753	0.0000	SURCHARGED
15 minute summer	S19	10	85.025	0.075	19.7	0.1208	0.0000	OK
360 minute winter	S20	344	84.026	0.576	2.7	0.6514	0.0000	SURCHARGED
360 minute winter	S21	344	84.026	0.646	3.4	0.8571	0.0000	FLOOD RISK
360 minute winter	Atten	344	84.026	0.746	205.6	1255.4720	0.0000	OK
15 minute summer	Outfall	1	84.000	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	121.6	3.058	1.045	0.6292	
15 minute summer	S2	1.001	S3	120.7	3.036	1.055	0.6794	
15 minute summer	S3	1.002	S4	167.0	3.422	0.686	1.1019	
15 minute summer	S4	1.003	S5	322.4	3.888	0.732	5.9373	
15 minute summer	S5	1.004	S6	500.6	3.477	0.772	4.4369	
15 minute summer	S6	1.005	S7	549.7	3.470	0.930	5.2419	
15 minute summer	S7	1.006	S8	597.8	3.773	0.982	1.9335	
15 minute summer	S8	1.007	S9	797.6	3.693	0.847	4.5801	
15 minute summer	S9	1.008	S10	824.7	3.818	0.872	3.7136	
15 minute summer	S10	1.009	S11	965.4	4.508	1.101	2.6756	
15 minute summer	S11	1.010	Atten	965.8	5.734	0.728	3.1168	
15 minute summer	S12	2.000	S13	140.7	2.076	1.015	4.0859	
15 minute summer	S13	2.001	S5	180.7	2.008	0.782	4.5579	
15 minute summer	S14	3.000	S15	50.7	2.878	1.207	0.4540	
15 minute summer	S15	3.001	S16	54.1	2.049	0.529	0.6844	
15 minute summer	S16	3.002	S17	80.6	2.028	1.121	0.5006	
15 minute summer	S17	3.003	S18	144.3	2.268	0.937	1.3267	
15 minute summer	S18	3.004	S8	163.8	2.016	0.665	5.9142	
15 minute summer	S19	4.000	S20	19.6	1.393	0.501	0.4161	
360 minute winter	S20	4.001	S21	2.4	0.582	0.137	0.1268	
360 minute winter	S21	4.002	Atten	3.2	0.669	0.181	0.1760	
360 minute winter	Atten	1.011	Outfall	0.0	0.000	0.000	0.0000	0.0
360 minute winter	Atten	Infiltration		31.0				

Eastwood

CONSULTING ENGINEERS

St Andrew's House
23 Kingfield Road
Sheffield, S11 9AS
mail@eastwoodce.com
0114 255 4554
eastwoodce.com