FORTEM

Civil Engineering Consultants Ltd

Proposed Residential Development Roslyn Avenue, Netherton

Flood Risk Assessment

March 2024

KCS Development Ltd

Report

This report consists of a Flood Risk Assessment and Drainage Strategy, produced to support the proposed residential development of the site located at Roslyn Avenue, Netherton. It has been produced by FORTEM Civil Engineering Consultants Ltd for KCS Development Ltd.

Revision History

Rev Ref	Date	Amendments	By	Chk'd
1	22.11.2023	First Issue	ML	ADC
2	23.11.2023	Updated in accordance with client comments.	ML	RD
3	01.03.2024	Updated in accordance with revised layout	ML	ADC

Contract

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Executive Summary

Site Description

The proposed development site is located off Roslyn Avenue, Netherton near Huddersfield, is 3.51ha in size and currently consists of agricultural grassland. The site is steeply sloping and typically falls from northwest to southeast with gradients between 1in20 and 1in9. The northern part of the site has flatter topography and falls towards the northeast corner.

There are no surface water sewers within the vicinity of the site. Combined sewers are located in Roslyn Avenue, Henry Fredrick Avenue and Meltham Road.

There are watercourses located to the north and south of the site.

Proposed Development

It is proposed to construct 82 residential dwellings and associated infrastructure on the site.

Flood Risk

Environment Agency Flood Mapping confirms the site is located in Flood Zone 1 with flood risk from all other sources Low.

The following standard mitigation measures are recommended:

Finished floor levels are to be set minimum 150mm above external levels;

Exceedance and blockage events have been considered, ensuring the proposed development and surrounding areas are not at increased flood risk.

Drainage

It is proposed to discharge surface water flows to the 300mm diameter combined water sewer in Meltham Road at a restricted rate of 5l/s. The surface water drainage will be designed such that there is no external flooding for the 1in30 year event and all flows to be retained on site for up to the 1in100 year event + climate change.

It is proposed to discharge foul water flows to the 300mm diameter combined water sewer in Meltham Road.

The location of the combined sewer in Meltham Road requires a new offsite combined sewer routed through an existing residence.

Contents

1. Introduction

1.1. Report Background

1.1.1. This report has been produced to support the planning application by KCS Development Ltd. for the proposed residential development located off Roslyn Avenue, Netherton. It has been produced in accordance with the National Planning Policy Framework (NPPF) and guidance documents produced by Kirklees Council.

1.1.2. The study consists of data collection, consultation and review with regulatory bodies and third parties in relation to flood risk and drainage. FORTEM cannot guarantee the reliability of third party information and/or changes in consultee conclusions/responses.

1.2. Site Description

1.2.1. The site is located off Roslyn Avenue, Netherton - OS grid reference 412000, 413000, see Appendix A for Location Plan. Details of the site are tabled below:

Site Area		3.51ha
Topography		The site is steeply sloping falling from a high point located on the western boundary (201.70mAOD), to low points in the southeast (186.20mAOD) and northeast corners (197.20mAOD). The northern part of site falls northeast typically 1in20, with the central/southern part of the site falling southeast between 1in20 and 1:9, see Appendix A for topographical survey.
Land Use		The proposed development site is currently agricultural grassland.
Boundaries	**North:**	Dense woodland.
	South:	Existing dwellings (rear boundaries).
	East:	Existing dwellings (rear and side boundaries).
	West:	Agricultural grassland.
Watercourses		Dean Clough is located within Dean Wood approximately 100m northeast of the site. The watercourse is significantly lower lying to the development (circa 30m) and is centrally located in a valley. An unnamed watercourse is located approximately 300m south of the site and is significantly lower lying to the development (circa 60m) and is located in agricultural land and is surrounded by dense woodland.
Public Sewers		Yorkshire Water records confirm 225mm diameter combined water sewers located in Roslyn Avenue and Henry Fredrick Avenue which connect to a 300mm diameter combined water sewer in Meltham Road. Yorkshire Water record drawings confirm there are no surface water sewer networks within the vicinity of the site. See Appendix A for existing drainage records.
Other Drainage		There are no known existing drainage systems serving the proposed development land, however it is anticipated the site could be served by a series of existing land drains.
Ground		Based upon BGS records local to the site, it is anticipated the site ground make up will consist of Sandstone overlaying Mudstone, with Sandstone bedrock at depth.

1.3. Proposed Development

1.3.1. It is proposed to construct 82 No residential dwellings within the development boundary, see Appendix B for the Ellis Healey Architects Proposed Site Layout drawing 2246-PL-105B.

1.4. Consultation

1.4.1. Consultation with the relevant consultees has been undertaken, see summary below:

Consultee	Response Summary
Kirklees Council (KC) as LLFA	Detailed discussions were held with KC (LLFA) at the pre-application meeting held on 02.06.2023, following which KC produced a formal response. A formal response to the KC consultation has been sent, including: • Discounting of infiltration drainage based upon increase flood risk to the existing dwellings located to the south; • Confirmation of the proposed surface water discharge to the 300mm diameter combined water sewer in Meltham Road at a restricted rate of 5l/s. Through consultation KC have confirmed acceptance of the principles of the FORTEM Flood Risk Assessment, subject to confirmation that the offsite sewer easement agreement has been agreed.
Yorkshire Water	Through consultation, Yorkshire Water have confirmed the following: • Surface water to discharge to the 300mm diameter combined water sewer in Meltham Road; • Surface water flows should be restricted to 5l/s; • Foul water to discharge to the 300mm diameter combined water sewer in Meltham Road; • The proposed offsite combined sewer route (1174-004B – Proposed Drainage Strategy); • The proposed off-site sewer will cross third party land. Due to the constrained route the proposed new combined water sewer from the proposed development boundary is acceptable.

Consultation responses can be found in Appendix D.

2. Sources of Flood Risk

2.1. Summary

2.1.1. Below is a summary of the sources of flood risk and the potential risk associated to the proposed development:

Source	Risk Level	Notes
Fluvial/Tidal	Low	Environment Agency Flood Mapping confirms that the site is located within Flood Zone 1.
Surface Water/Pluvial	Low	Environment Agency maps confirm no risk of surface water flooding for the site.
Groundwater	Low	There are no known records of any historic groundwater flooding or risk. Based upon the recorded ground conditions and site topography, the risk to the development is low.
Sewers	Low	Based upon searches undertaken, no historic incidents have been recorded within the vicinity of the proposed development.
Other Man-Made Sources	Low	Environment Agency maps confirm no risk of flooding from a major failure of a reservoir and there are no other known artificial sources of flood risk in the area.

Copies of the Environment Agency flood maps are included in Appendix C.

2.2. Development Mitigation

2.2.1. Based upon the assessment above there are no site specific flood risk mitigation measures required for the proposed development. However, the following standard mitigation measures are recommended:

2.2.2. Finished floor levels to be set minimum 150mm above external levels to mitigate any risk from blockage and exceedance events;

2.2.3. Blockage and exceedance events have been considered as part of the concept design, confirming the proposed development and surrounding areas are not at increased flood risk, see Appendix B for drawing 1174-005B - Exceedance Flow Routing;

2.2.4. The proposed development surface water drainage is to be designed such that there is no external flooding for the 1in30 year event, and all flows retained on site for up to the 1in100 year event plus climate change (30%).

3. Development Drainage

3.1. Existing Site Drainage

3.1.1. Section 1.2 confirms 225mm diameter combined water sewers located in Roslyn Avenue and Henry Fredrick Avenue which connect to a 300mm diameter combined water sewer in Meltham Road. There are no surface water sewers within the vicinity of the site.

3.1.2. Dean clough is located 100m to the north of the site and there is an unnamed watercourse located 300m to the south of the site. Both have no direct linkage to the site and are heavily constrained by topography and ecology.

3.1.3. There is no evidence indicating the agricultural land has previously been served by a positive drainage system. Due to topography and the natural geology the surface water run-off from the land routes south and is likely to be intercepted by first the properties on the southern boundary before discharging to the combined water sewer system in Meltham Road.

3.1.4. The greenfield run-off for the site has been calculated using the IH124 method for 50ha, with a resulting Q_{Bar} of 164.2l/s, which is equivalent to 3.28l/s/ha, see Appendix A for calculations. Therefore, the existing greenfield runoff for the site is:

Nett Developable Area	Greenfield Runoff Rate	Existing Greenfield Runoff
2.86ha	x 3.28l/s/ha	= **9.38l/s**

3.2. Development Surface Water Drainage

3.2.1. The potential surface water outfall/discharge options have been considered and summarised below:

Outfall/Discharge Option (Ranked in order of Preference)	✓/×	Notes
1. Infiltration	×	The use of infiltration drainage has been discounted for the site due to the steep topography, natural geology and southern low lying boundary consisting of existing buildings. The high risk of migration and increase flood risk to the existing dwellings has resulted in the use of infiltration drainage being discounted.
2. Discharge to Watercourse	×	Discharge to the watercourses to the north and south has been discounted on the following grounds: • Ecological and tree protection (watercourses located in existing dense woodland); • Need to pump flows to negate topographical and superstructure constraints; • Located outside development boundary and land ownership (no right to discharge).
3. Discharge to Public Surface Water Sewer	×	No sewers within the vicinity of the site or surrounding area.
4. Discharge to Public Combined Water Sewer	✓	Discharge feasible to the existing 300mm diameter combined water sewer located in Meltham Road.

3.2.2. Based upon the findings of the review above, it is proposed to discharge the surface water from the proposed development to the existing 300mm diameter combined water sewer located in Meltham road.

3.2.3. In accordance with the principles agreed with Yorkshire Water, the discharge is to be restricted to 5l/s, resulting in 46% reduction in existing greenfield runoff (9.38l/s).

3.2.4. The proposed development surface water drainage is to be designed such that there is no external flooding for the 1in30 year event, and all flows are retained on site for up to the 1in100 year event plus climate change.

3.2.5. Based upon a discharge rate of 5l/s the total attenuation required for the development is 1,308m^3 (1in100 year event + 30% climate change). Due to the steep topography of the site the surface water is to be attenuated in an underground storage tank, see Appendix B for attenuation calculations and drawing 1174-004B - Proposed Drainage Strategy.

3.2.6. Exceedance and blockage events have been assessed for the proposed drainage design, see Appendix B for drawing 1174-005B - Exceedance Flow Routing. No risk areas have been identified within the proposed development and the potential risk to the existing dwellings on the southern boundary is mitigated by the existing channel formed on the boundary routing overland flows to the south-eastern boundary before routing flows to Henry Fredrick Avenue via the existing public footpath link.

3.2.7. As the surface water flows discharge to combined water sewer treatment will be provided as part of Yorkshire Water sewerage treatment.

3.3. Development Foul Water Drainage

3.3.1. It is proposed to discharge the foul water flows from the development to the existing 300mm combined water sewer in Meltham Road, see drawing 1174-004B - Proposed Drainage Strategy, Appendix B.

3.4. Development Combined Water Drainage

3.4.1. In order to provide a gravity foul and surface water discharge for the proposed development, it is necessary to provide outfalls to the south, which involves crossing third party land. There is landowner and Yorkshire water agreement to construct a new combined sewer to serve the proposed development routed through the garden and down the drive of 404 Meltham Road, see drawing 1174-004B - Proposed Drainage Strategy, Appendix B.

3.5. Maintenance

3.5.1. It is proposed for both the foul and surface water drainage networks to be adopted by Yorkshire Water or Independent Water Authority under a Section 104 agreement. The long term maintenance of the adoptable drainage system will therefore be the responsibility of the Water Authority.

3.5.2. Until adopted, responsibility for maintenance of the foul and surface water drainage systems will sit with the developer and site management company. Details of these responsibilities will be set out within the Section 106 Agreement.

4. Conclusion

4.1. Flood Risk

4.1.1. Environment Agency Flood Mapping confirms the site is located in Flood Zone 1, with all other forms of flood risk Low.

4.1.2. The following standard mitigation measures are recommended:

- Finished floor levels to be set 150mm above the surrounding ground levels;
- Exceedance and blockage events have been considered confirming the proposed development and surrounding areas are not at increased flood risk.

4.2. Drainage

4.2.1. Development surface water runoff is proposed to discharge to the 300mm diameter combined water sewer in Meltham Road.

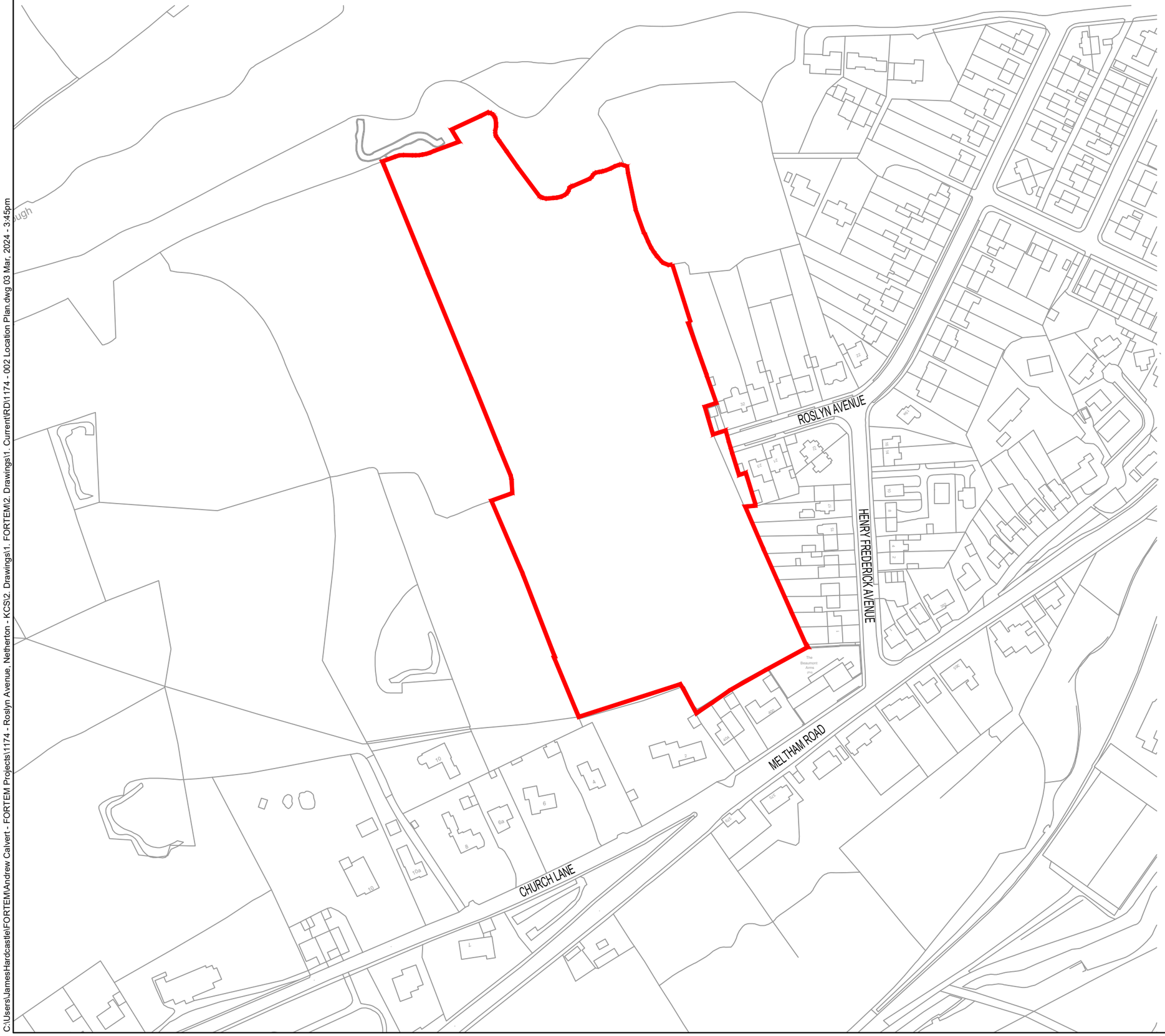
4.2.2. The surface water discharge rate is to be limited to 5l/s and the surface water drainage designed such that there is no external flooding for the 1in30 year event, with all flows retained on site for up to the 1in100 year event + climate change.

4.2.3. The foul water flows from the development will discharge to the 300mm combined water sewer in Meltham Road.

4.2.4. The location of the combined sewer in Meltham Road requires a new offsite combined sewer routed through an existing residence.

Appendix A **Existing Site**

Drawing 1174-002A - Site Location Plan
Drawings S1710 - Topographical Survey
Yorkshire Water Sewer Records
Drawing 1174-003A - Existing Drainage Networks
IH124 Calculation



N

NOTES:

1. THIS DRAWING IS BASED UPON ELLIS HEALEY ARCHITECTS PROPOSED SITE LAYOUT 2246-PL-105B (DATED FEB 2024) AND ORDNANCE SURVEY MAPS.

KEY:

DEVELOPMENT BOUNDARY

Rev	Date	Amendments	By
A	01.03.24	Updated in accordance with revised layout.	LS

Drawing Status.
INFORMATION

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Client
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Project
ROSLYN AVENUE, NETHERTON

Drawing Title.
SITE LOCATION PLAN

Drawn: ML
Checked: RD
Scale: 1:2000 @ A3
Date: NOV 2023

Drawing No.
1174 - 002

Rev.
A

C:\Users\JamesHardcastle\FORTEM\Andrew Calvert - FORTEM Projects\1174 - Roslyn Avenue, Netherton - KCS\2. Drawings\1. FORTEM\2. Drawings\1. Current\RD\1174 - 002 Location Plan.dwg 03 Mar, 2024 - 3:45pm

Sheet 1 of 1	Surveyed by NT
Datum	Drawn by NT
GRID– Related to Ordnance Survey using One Point Localisation on OS GNSS Transformation at OS Grid North.	Date of Survey August 2017
	Scale 1:500 @ A0
LEVEL– Related to Ordnance Survey by connection to the OS Active Network by GPS	Survey Job No. S1200 August 2017 S1710February 2023

SITE SURVEY

LAND OFF ROSLYN AVE NETHERTON HUDDERSFIELD

LEGEND

Manhole shown thus	(C)	Rail Line	+133.962
Inspection Cover	(IC)	Retaining Wall	▪▪▪▪▪▪▪▪
Gully	(G)	Hedge & Surface Feature Line	~~~~~~~~
Catchpit	(CP)	Wire and/or Post Fence	——x——x——
Telephone Pole	(TP)	Overhead Cable	——o——o——
Road Sign	(RS)	Pedestrian Guardrail	——o——o——
Traffic Signal	(TS)	Railway Fence	——o——o——
Bollard	(BOL)	Contours Index Interval	10.00m
Traffic Signal Box	(TSB)	Spot Level	54.00
Electricity Pole	(EP)	Bench Mark	BM
Electricity Box	(EB)	Trial Hole	TH
Gas Valve	(GV)	Survey Control	⊿SS1
Manhole Surface	(MH)		

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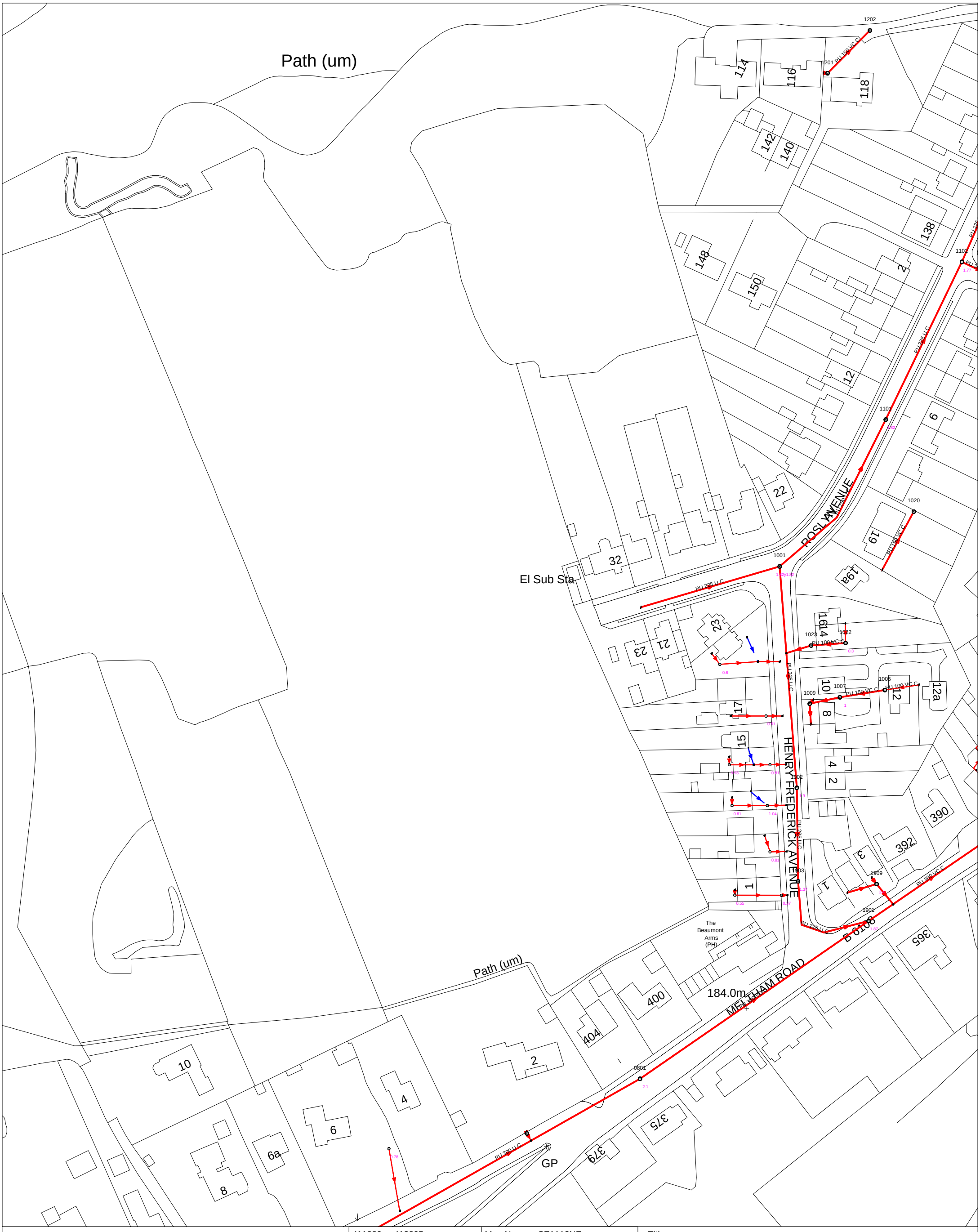
Station	Easting	Northing	Level
S1	412044.813	413041.718	163.517
S2	412117.808	413060.276	189.856
S4	411999.845	413024.452	196.667
S5	411857.857	412952.457	200.108
S6	412013.048	412970.099	193.085
S7	412053.178	412994.198	185.517
S8	412110.355	413008.771	187.000
S9	412115.536	412913.651	179.660
S10	411991.479	412827.423	187.920
S20	412023.822	412844.660	184.927
S21	412048.059	412867.051	183.029
S22	412072.246	412888.991	182.148
S23	412086.473	412881.535	181.488
S24	412115.245	412913.781	179.723
S25	412115.061	412935.473	181.175
S26	412097.288	412934.924	184.566
S27	412077.370	412933.637	186.344
S28	412041.582	413028.134	183.350



411889 : 412895	Map Name : SE1112NE	Title
Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : YorMap Advisor C ROBERTS Contact Tel : 87 2582		Notes
Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS		This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.
Date Req : 12/09/2023, 10:03:25		Date Gen : 12/09/2023, 10:03:42
Source : Sewer Network Enquiry		

UPN: Undefined Originator: C ROBERTS, YorMap, 87 2582

N

NOTES:

1. THIS DRAWING IS BASED UPON ELLIS HEALEY ARCHITECTS PROPOSED SITE LAYOUT 2246-PL-105B (DATED FEB 2024) , TURNBULL SURVEYING SITE SURVEY S1710 (DATED AUG 2017), YORKSHIRE WATER RECORDS AND ORDNANCE SURVEY MAPS.

KEY:

DEVELOPMENT BOUNDARY

EXISTING YORKSHIRE WATER COMBINED WATER SEWER

LEVELS INFORMATION:

CL:182.95^{T}
DEEP:2.10^{YW}
IL:180.85^{INT}

T	LEVEL TAKEN FROM TOPOGRAPHIC SURVEY
YW	DEPTH TAKEN FROM YORKSHIRE WATER RECORDS
ASS	INFORMATION ASSUMED FROM INFORMATION AVAILABLE
INT	LEVELS INTERPOLATED FROM INFORMATION AVAILABLE

ROSLYN AVENUE
EXISTING 225Ø
CL:193.28^{T}
IL:NO INFO
IL:191.48^{ASS}
CL:190.38^{T}
IL:NO INFO
IL:188.58^{ASS}
CL:189.88^{T}
DEEP:1.82^{YW}
IL:188.06^{INT}
HENRY FREDERICK AVENUE
EXISTING 225Ø
CL:185.61^{T}
DEEP:1.90^{YW}
IL:183.71^{INT}
CL:180.15^{T}
DEEP:1.37^{YW}
IL:178.78^{INT}
CL:178.13^{T}
DEEP:1.87^{YW}
IL:176.26^{INT}
The Beaumont Arms (PH)
MELTHAM ROAD
EXISTING 300Ø
CL:182.95^{T}
DEEP:2.10^{YW}
IL:180.85^{INT}
CHURCH LANE
EXISTING 300Ø
CL:190.027^{T}
DEEP:2.06^{YW}
IL:1887.967^{INT}

Rev	Date	Amendments	By
A	01.03.24	Updated in accordance with revised layout.	LS

Drawing Status.
INFORMATION

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Project
ROSLYN AVENUE, NETHERTON

Drawing Title.
EXISTING DRAINAGE NETWORKS

Drawn: ML
Checked: RD
Scale: 1:1000 @ A2
Date: NOV 2023

Drawing No.
1174 - 003

Rev.
A

IH 124 Mean Annual Flood

Input

Return Period (years)	1	Soil	0.300
Area (ha)	50.000	Urban	0.000
SAAR (mm)	1158	Region Number	Region 3

Results l/s

QBAR Rural	164.2
QBAR Urban	164.2
Q1 year	141.2
Q1 year	141.2
Q2 years	154.9
Q5 years	205.3
Q10 years	238.1
Q20 years	269.7
Q25 years	280.1
Q30 years	288.6
Q50 years	311.0
Q100 years	341.6
Q200 years	387.5
Q250 years	402.3
Q1000 years	499.2

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Appendix B **Proposed Development**

Drawing 2246-PL-105B - Proposed Site Layout

Drawing 1174-004B - Proposed Drainage Strategy

Drawing 1174-005B - Exceedance Flow Routing

Attenuation Calculations

SCHEDULE OF ACCOMMODATION

TYPE 1A - 1 BED APARTMENT- 560 SQ FT (52 sq m) (2 person) - 1no. Off street parking spaces	6
TYPE 2A- 2 BED SEMI-DETACHED- 775 SQ FT (72 sq m) (3 person) - Off street parking spaces - varies	28
TYPE 2B - 2 BED TERRACE - 850 SQ FT (79 sq m) (4 person) - Off street parking spaces - varies NOTE - Integral access at ground floor level	4
TYPE 2C - 2 bed bungalow 675 sq ft (62.7 sqm) (3 person) (1 storey) 1 no. off street parking space	1
TYPE 3A - 3 BED SEMI-DETACHED - 931 SQ FT (86.5 sq m) (4 person) - 2no. off street parking spaces	8
TYPE 3B - 3 BED DETACHED -1,029 sq ft (95.8 sqm) (5 person) - 2 no. off street parking spaces	20
TYPE 3C - 3 bed bungalow 842 sq ft (78.2 sqm) (4 person) (1 storey) 2 no. off street parking space	1
TYPE 4A - 4 BED DETACHED - 1,076 sq ft (100 sqm) (5 person) - 3 no. off street parking spaces	14
TOTAL	82

21 no. visitors parking spaces

NOTES

North

KEY

- VP Visitors parking
- Garden shed/cycle storage
- Bin storage
- Indicative bin presentation point
- Aspect
- Pedestrian Crossing point
- Visabilty splay

DEAN WOOD ANCIENT WOODLAND

approx line of existing foot path

KIRKLEES WILDLIFE HABITAT NETWORK

Link to existing foot path

Line of 15m buffer to KWHN buildngs only to include enhanced garden space

New link foot path to adjacent land

Line of ancient woodland with 20m buffer to include access to dwellings 5m

Existing landscaping retained

Bin collection point

Proposed 5m enhanced landscaping buffer

Drop kerb to access substation

Existing electrical cables to be removed and redirected as necessary

Apartment cycle store

Development link to existing foot path

Apartment bin store

Bin collection point

Recreation area

Orchard

Play area

Attenuation tank refer to engineers details

Existing PROW

ROSLYN AVENUE

HENRY FREDERICK AVENUE

Beaumont Arms

B 6108

MELTHAM ROAD

GP

Rev B	Updated to comments.	27.02.24	(DPE)
Rev A	Bins to plot 12 and 13 and apartment block updated.	23.01.24	(DPE)
Designation	Details of Revision	Date	Initials/Sign

ellis healey architecture

PLANNING

PROJECT: PROPOSED DEVELOPMENT LAND OFF ROSLYN AVENUE NETHERTON

TITLE: PROPOSED SITE LAYOUT

DRAWING NO: 2246 PL 105B

BY/CHECKED: DPE DATE: NOV 2023

SCALE @A3: 1:1250

Tower Works, Globe Road, Leeds, LS11 5QG
Tel: 0113 3453090 E-mail: info@ellishealey.com

N

NOTES:

1. THIS DRAWING IS BASED UPON ELLIS HEALEY PROPOSED SITE LAYOUT 2246-PL-105B (DATED FEB 2024), TURNBULL SURVEYING SITE SURVEY S1710 (DATED FEB 2023), YORKSHIRE WATER SEWER RECORDS AND ORDNANCE SURVEY MAPS.

2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE FORTEM FLOOD RISK ASSESSMENT 1174-R001-V3.

KEY:

- DEVELOPMENT BOUNDARY
- EXISTING COMBINED WATER SEWER (YORKSHIRE WATER)
- PROPOSED COMBINED WATER SEWER (S104)
- PROPOSED FOUL WATER SEWER (S104)
- PROPOSED SURFACE WATER SEWER (S104)
- PROPOSED SURFACE WATER ATTENUATION (S104) BELOW GROUND TANK
- PROPOSED SEWER EASEMENT (S104) - SEWER LOCATED OUTSIDE THE ADOPTABLE HIGHWAY

SURFACE WATER FLOW CONTROL MANHOLE RESTRICTED IN ACCORDANCE WITH FORTEM FRA

SURFACE WATER ATTENUATION TANK

PROPOSED COMBINED WATER OFF SITE SEWER

FOUL AND SURFACE WATER FLOWS TO DISCHARGE TO COMBINED SEWER IN MELTHAM ROAD

The Beaumont Arms (PH)

Rev	Date	Amendments	By
B	01.03.24	Updated in accordance with revised layout.	LS
A	23.11.23	Note 2 updated.	ML

Drawing Status.
PLANNING

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Project
ROSLYN AVENUE, NETHERTON

Drawing Title.
PROPOSED DRAINAGE STRATEGY

Drawn: ML
Checked: ADC
Scale: 1:500 @ A1
Date: NOV 2023

Drawing No. 1174 - 004
Rev. B

C:\Users\ricky\FORTEM\Andrew Calvert - FORTEM Projects\1174 - Roslyn Avenue, Netherton - KCS\2. Drawings\1. FORTEM\2. Drawings\1. Current\RD\1174 - 004 Proposed Drainage Strategy.dwg 03 Mar, 2024 - 4:29pm

BLOCKAGE FLOW ROUTE NOTE
IN THE EVENT OF A BLOCKAGE IN THE SURFACE WATER SYSTEM, WATER WILL OVERTOP THE DOUBLE GULLY OPPOSITE PLOT 47 WITH OVERLAND FLOWS TO THE ADJACENT WOODLAND, MIMICKING EXISTING RUN-OFF.

BLOCKAGE FLOW ROUTE NOTE
IN THE EVENT OF A BLOCKAGE IN THE SURFACE WATER SYSTEM, WATER WILL OVERTOP THE DOUBLE GULLY OPPOSITE PLOT 39 WITH OVERLAND FLOWS TO THE ADJACENT GRASSLAND, MIMICKING EXISTING RUN-OFF.

BLOCKAGE FLOW ROUTE NOTE
IN THE EVENT OF A BLOCKAGE WITHIN THE HIGHWAY LOOP, SURFACE WATER FLOWS WILL OVERFLOW ONTO THE HIGHWAY.

BLOCKAGE FLOW ROUTE NOTE
IN THE EVENT OF A BLOCKAGE IN THE SURFACE WATER SYSTEM, WATER WILL OVERTOP THE DOUBLE GULLY ADJACENT TO PLOT 29 WITH OVERLAND FLOWS ALONG THE PRIVATE DRIVE INTO THE PRIVATE DRAINAGE NETWORK, REJOINING THE NETWORK DOWNSTREAM OF THE BLOCKAGE.

BLOCKAGE FLOW ROUTE NOTE
IN THE EVENT OF A BLOCKAGE WITHIN THE HIGHWAY LOOP, SURFACE WATER FLOWS WILL OVERFLOW ONTO THE HIGHWAY.

BLOCKAGE FLOW ROUTE NOTE
IN THE EVENT OF A BLOCKAGE IN THE SURFACE WATER SYSTEM, WATER WILL OVERTOP THE GULLY AT THE SITE ENTRANCE AND ONTO ROSLYN AVENUE.

BLOCKAGE FLOW ROUTE NOTE
IN THE EVENT OF A BLOCKAGE UPSTREAM OF THE FLOW CONTROL CHAMBER, WATER WILL OVERTOP THE DOUBLE GULLY AT THE LOW POINT (ADJACENT TO THE P.O.S.), WITH OVERLAND FLOWS ALONG THE SOUTHERN BOUNDARY BEFORE ROUTING FLOWS TO HENRY FREDERICK AVENUE VIA THE EXISTING PUBLIC FOOTPATH LINK.

BLOCKAGE FLOW ROUTE NOTE
IN THE EVENT OF A BLOCKAGE OVERLAND FLOWS WILL BE ROUTED ALONG THE SOUTHERN BOUNDARY IN ACCORDANCE WITH THE EXISTING BOUNDARY CHANNEL (SEE DRAWING 1174-001C) BEFORE ROUTING FLOWS TO HENRY FREDERICK AVENUE VIA THE EXISTING PUBLIC FOOTPATH LINK.

NOTES:

1. THIS DRAWING IS BASED UPON ELLIS HEALEY PROPOSED SITE LAYOUT 2246-PL-105B (DATED FEB 2024), TURNBULL SURVEYING SITE SURVEY S1710 (DATED FEB 2023), YOURKSHIRE WATER SEWER RECORDS AND ORDNANCE SURVEY MAPS.
2. THIS DRAWING PROVIDES AN OVERVIEW OF THE DEVELOPMENT DRAINAGE NETWORK AND PROPOSED TOPOGRAPHY IN RELATION TO EXCEEDANCE EVENTS ARISING FROM EXTREME RAINFALL.
3. tHIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE FORTEM FLOOD RISK ASSESSMENT 1174-R001-V3.

KEY:

- DEVELOPMENT BOUNDARY
- EXISTING COMBINED WATER SEWER (YORKSHIRE WATER)
- PROPOSED COMBINED WATER SEWER (S104)
- PROPOSED FOUL WATER SEWER (S104)
- PROPOSED SURFACE WATER SEWER (S104)
- PROPOSED SURFACE WATER ATTENUATION (S104) BELOW GROUND TANK
- FFL 196.50 — PROPOSED FINISHED FLOOR LEVEL
- 199.60 — PROPOSED PRIMARY ROAD CONTOUR (200mm INTERVALS)
- PROPOSED SECONDARY ROAD CONTOUR (50mm INTERVALS)
- FLOW ROUTE MAPPING

EXCEEDANCE FLOW ROUTING NOTES:

THE PROPOSED SURFACE WATER DRAINAGE SYSTEM HAS BEEN DESIGNED TO ENSURE NO FLOODING UP TO AND INCLUDING 1 IN 100 YEAR + 30% CLIMATE CHANGE, WITH 10% ALLOWANCE FOR URBAN CREEP.

BEYOND THIS EXTREME EVENT, ANY EXCESS WATER WILL OVERTOP THE DOUBLE GULLY AT THE LOW POINT (ADJACENT TO THE P.O.S.), WITH OVERLAND FLOWS ALONG THE SOUTH-EASTERN BOUNDARY BEFORE ROUTING FLOWS TO HENRY FREDERICK AVENUE VIA THE EXISTING PUBLIC FOOTPATH LINK.

THIS WOULD POSE NO INCREASED RISK TO THE EXISTING / PROPOSED DWELLINGS.

Rev	Date	Amendments	By
B	01.03.24	Updated in accordance with revised layout.	LS
A	23.11.23	Note 3 updated.	ML

Drawing Status.
PLANNING

FORTEM

FORTEM Civil Engineering Consultants Ltd
T. 07377 556170 / 07748 982468
E. info@fortemconsultants.co.uk
W. www.fortemconsultants.co.uk

Client
KCS DEVELOPMENT LTD

Project
ROSLYN AVENUE, NETHERTON

Drawing Title.
EXCEEDANCE FLOW ROUTING

Drawn: ML
Checked: ADC
Scale: 1:500 @ A1
Date: NOV 2023

Drawing No. 1174 - 005
Rev. B

C:\Users\ricky\FORTEM\Andrew Calvert - FORTEM Projects\1174 - Roslyn Avenue, Netherton - KCS\2. Drawings\1. FORTEM\2. Drawings\1. Current\RD\1174 - 005 Exceedance Flow Routing.dwg 03 Mar, 2024 - 4.43pm

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	187.366	0.366	4.9	319.0	O K
30 min Summer	187.503	0.503	4.9	438.7	O K
60 min Summer	187.659	0.659	4.9	574.4	O K
120 min Summer	187.827	0.827	4.9	721.4	O K
180 min Summer	187.925	0.925	4.9	806.9	O K
240 min Summer	187.990	0.990	4.9	863.4	O K
360 min Summer	188.084	1.084	4.9	945.2	O K
480 min Summer	188.147	1.147	4.9	1000.1	O K
600 min Summer	188.192	1.192	4.9	1039.5	O K
720 min Summer	188.225	1.225	4.9	1068.6	O K
960 min Summer	188.269	1.269	4.9	1106.3	O K
1440 min Summer	188.302	1.302	4.9	1135.3	O K
2160 min Summer	188.292	1.292	4.9	1126.6	O K
2880 min Summer	188.269	1.269	4.9	1106.5	O K
4320 min Summer	188.213	1.213	4.9	1057.4	O K
5760 min Summer	188.158	1.158	4.9	1009.4	O K
7200 min Summer	188.102	1.102	4.9	961.1	O K
8640 min Summer	188.047	1.047	4.9	912.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	109.904	0.0	290.8	27
30 min Summer	75.763	0.0	378.6	41
60 min Summer	49.937	0.0	569.3	70
120 min Summer	31.725	0.0	710.4	130
180 min Summer	23.903	0.0	763.7	190
240 min Summer	19.395	0.0	766.4	250
360 min Summer	14.464	0.0	753.4	368
480 min Summer	11.723	0.0	740.0	488
600 min Summer	9.950	0.0	729.3	606
720 min Summer	8.696	0.0	720.8	726
960 min Summer	7.023	0.0	709.0	964
1440 min Summer	5.184	0.0	700.8	1442
2160 min Summer	3.816	0.0	1467.1	1932
2880 min Summer	3.065	0.0	1426.0	2288
4320 min Summer	2.246	0.0	1313.2	3076
5760 min Summer	1.805	0.0	2035.4	3920
7200 min Summer	1.523	0.0	2144.7	4760
8640 min Summer	1.326	0.0	2235.7	5616

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	187.991	0.991	4.9	864.5	O K
15 min Winter	187.410	0.410	4.9	357.8	O K
30 min Winter	187.564	0.564	4.9	492.2	O K
60 min Winter	187.740	0.740	4.9	645.2	O K
120 min Winter	187.931	0.931	4.9	811.7	O K
180 min Winter	188.041	1.041	4.9	907.9	O K
240 min Winter	188.115	1.115	4.9	972.0	O K
360 min Winter	188.222	1.222	4.9	1065.8	O K
480 min Winter	188.296	1.296	4.9	1130.0	O K
600 min Winter	188.350	1.350	4.9	1176.8	O K
720 min Winter	188.390	1.390	4.9	1212.0	O K
960 min Winter	188.445	1.445	4.9	1259.9	O K
1440 min Winter	188.495	1.495	5.0	1303.7	O K
2160 min Winter	188.499	1.499	5.0	1306.8	O K
2880 min Winter	188.465	1.465	4.9	1277.2	O K
4320 min Winter	188.393	1.393	4.9	1214.8	O K
5760 min Winter	188.313	1.313	4.9	1145.1	O K
7200 min Winter	188.229	1.229	4.9	1072.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.180	0.0	2304.9	6456
15 min Winter	109.904	0.0	322.8	26
30 min Winter	75.763	0.0	398.4	41
60 min Winter	49.937	0.0	634.9	70
120 min Winter	31.725	0.0	763.1	128
180 min Winter	23.903	0.0	768.4	188
240 min Winter	19.395	0.0	760.1	246
360 min Winter	14.464	0.0	744.9	362
480 min Winter	11.723	0.0	735.5	480
600 min Winter	9.950	0.0	730.3	596
720 min Winter	8.696	0.0	728.1	714
960 min Winter	7.023	0.0	731.6	944
1440 min Winter	5.184	0.0	741.3	1398
2160 min Winter	3.816	0.0	1497.1	2052
2880 min Winter	3.065	0.0	1457.0	2600
4320 min Winter	2.246	0.0	1380.4	3288
5760 min Winter	1.805	0.0	2278.7	4216
7200 min Winter	1.523	0.0	2399.5	5128

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
8640 min Winter	188.145	1.145	4.9	998.2	O K
10080 min Winter	188.059	1.059	4.9	923.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Winter	1.326	0.0	2493.2	6056
10080 min Winter	1.180	0.0	2503.2	6968

Appendix C **Flood Risk Mapping**

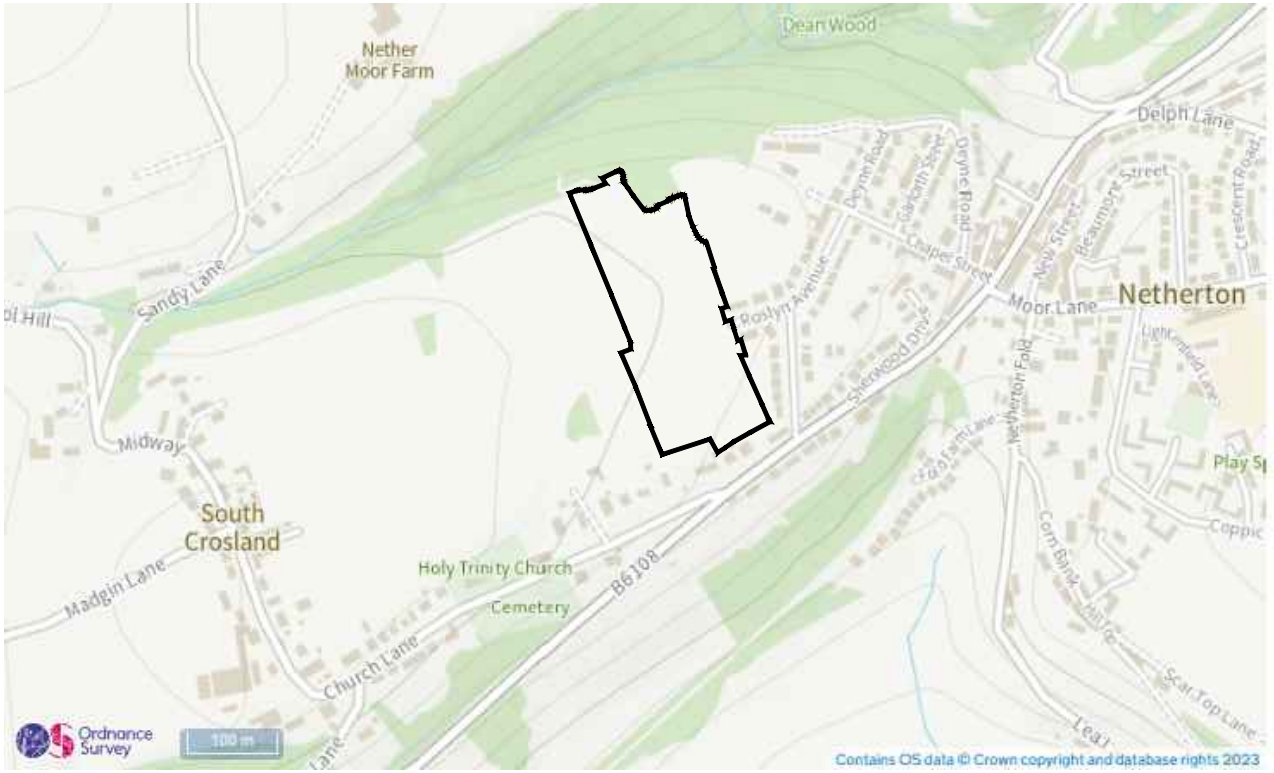
EA Map Risk of Flooding from Rivers or Sea

EA Map Risk of Flooding from Surface Water

EA Map Risk of Flooding from Reservoir

FORTEM

Development Boundary



Flood zone 3

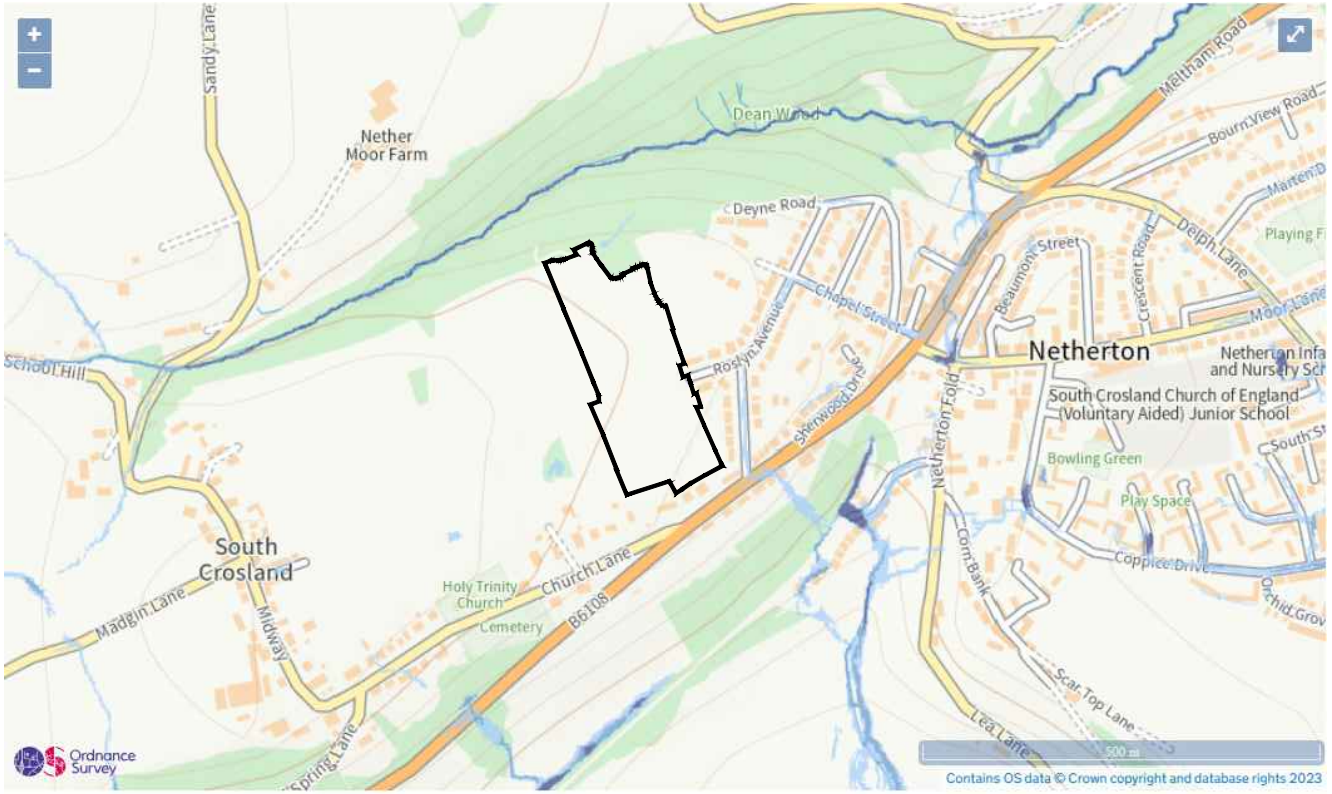
Flood zone 2

Flood zone 1

ROSLYN AVENUE, NETHERTON
EXTRACT FROM ENVIRONMENT AGENCY MAPPING (GOV.UK)
RISK OF FLOODING FROM RIVERS OR SEA
EXTRACT TAKEN 09.11.2023 : NTS

FORTEM

Development Boundary



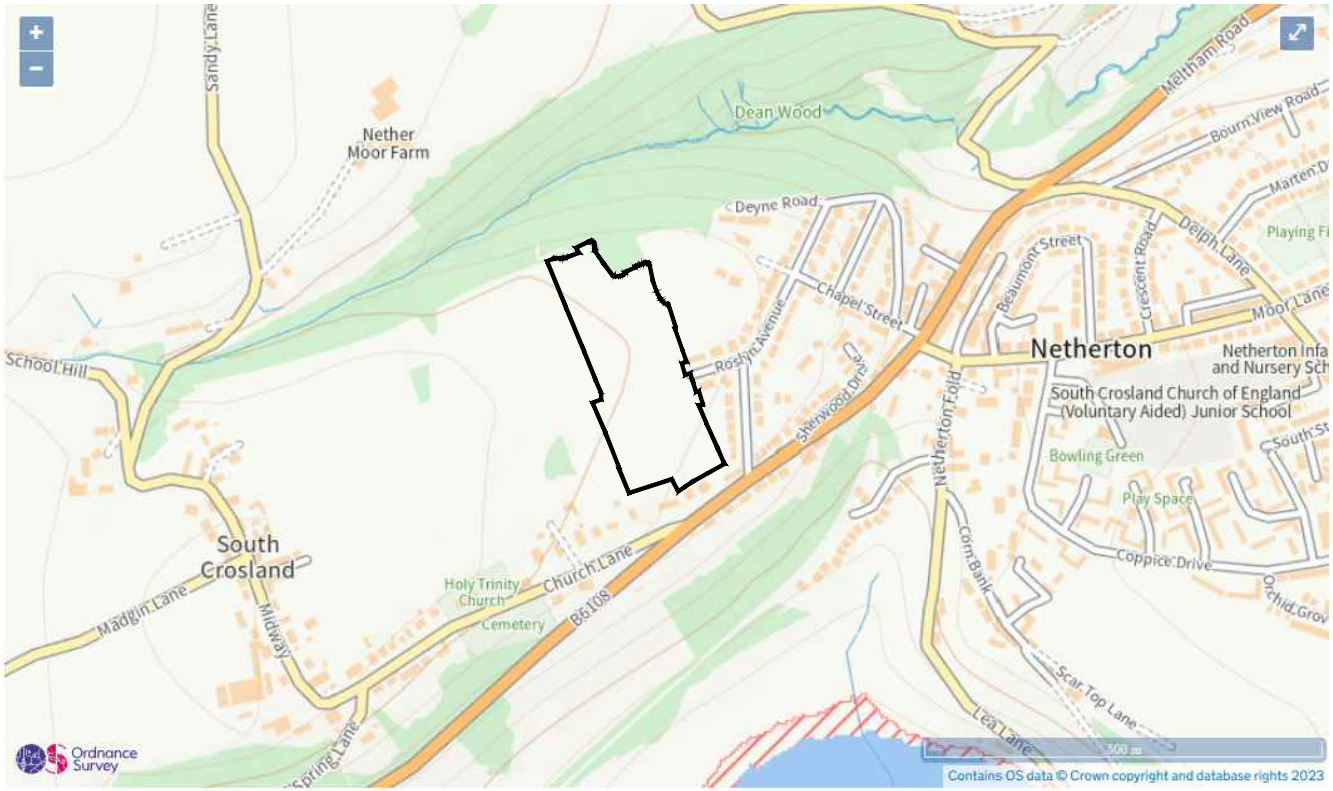
Extent of flooding from surface water

High Medium Low Very low

ROSLYN AVENUE, NETHERTON
EXTRACT FROM ENVIRONMENT AGENCY MAPPING (GOV.UK)
RISK OF FLOODING FROM SURFACE WATER
EXTRACT TAKEN 09.11.2023 : NTS

FORTEM

Development Boundary



Maximum extent of flooding from reservoirs:

when river levels are normal when there is also flooding from rivers

ROSLYN AVENUE, NETHERTON
EXTRACT FROM ENVIRONMENT AGENCY MAPPING (GOV.UK)
RISK OF FLOODING FROM RESERVOIR
EXTRACT TAKEN 09.11.2023 : NTS

FORTEM

Appendix D **Consultation**

Yorkshire Water Correspondence (Pre-App)

Yorkshire Water Correspondence (S104 Team)

Kirklees Council Correspondence (LLFA)

YorkshireWater

Mr M Lock
Fortem Civil Engineering Consultants Ltd
4100 Park Approach
Leeds
West Yorkshire
LS15 8GB
matthew.lock@fortemconsultants.co.uk

Yorkshire Water Services
Developer Services
Pre-Development Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482

Email:
technical.sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

Your Ref:
Our Ref: Z004469

12th September 2023

Dear Mr Lock,

Roslyn Avenue, Netherton, HD4 7EW - Pre-planning Enquiry V240729

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. 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:

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.

Meltham Road Option through 404

I would have no objection to the combined single sewer proposal through 404 Meltham Road but if the site is to be put forward for adoption you will need to get this agreed with the S104 Adoptions Team so I would advise you to submit a Pre-Design Discussion Request to them to talk it through.

https://www.yorkshirewater.com/media/dt3jcmzq/s104_predesigndiscussion_request_23-24.pdf

Development of the site should take place with separate systems for foul and surface water drainage on site, with a combined sewer off site.

Foul Water

Roslyn Avenue Option - Pumped Option

Foul water domestic waste can discharge to the 225 mm diameter public combined sewer recorded in Roslyn Avenue, at a point to the east of the site.

Meltham Road Option - Gravity Solution - Preferred

Foul water domestic waste can discharge to the 300 mm diameter public combined sewer recorded in Meltham Road, at a point to the east of the site.

Surface Water

Roslyn Avenue Option - Pumped Option

Curtilage surface water may discharge to the 225 mm diameter public combined sewer recorded in Roslyn Avenue, at a point to the east of the site.

The surface water discharge from the site to be restricted to not greater than 5 (five) litres/second. This permission is not an acceptance in respect to any planning conditions imposed under the Grant of Planning Permission.

Meltham Road Option - Gravity Solution - Preferred

Curtilage surface water may discharge to the 300 mm diameter public combined sewer recorded in Meltham Avenue, at a point to the south of the site.

The surface water discharge from the site to be restricted to not greater than 5 (five) litres/second. This permission is not an acceptance in respect to any planning conditions imposed under the Grant of Planning Permission.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply on line or obtain an application form from our website - https://www.yorkshirewater.com/developers/sewerage/sewerage-connections/

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 2022/23, 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.

YorkshireWater

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 is subject to formal planning approval agreement. 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

Chris Roberts
Development Services Technician

Matthew Lock

From: Wendy Mullaney <wendy.mullaney@yorkshirewater.co.uk>
Sent: 28 September 2023 14:04
To: Matthew Lock
Subject: RE: 1174 - Land Off Roslyn Avenue, Netherton - Outfall Options - V240729
Attachments: Roslyn Avenue, Netherton, HD4 7EW - Pre-planning Enquiry V240729.pdf; 1174-SK03 - FW+SW Discharge Option (404 Meltham Road).pdf

Hi Matthew,

Thank you for taking the time to have the meeting this morning.

In order to have the site drained via a gravity system rather than a pumped option, in principle we can accept the combined sewer as detailed in the attached drawing no. 1174-SK03. This would be subject to :-

- The combined sewer, no greater than 150mm laid in a straight line with two manholes at either end of the run, as detailed. We will not accept any manholes/access point on the home owner's plot.
- We will accept the easement with a pinch point of no less than 3m.
- We require evidence that there will be no loading on the pipe from the house or the retaining wall.
- The home owner/land owner must be party to the S104 agreement and a deed of grant easement.

Kind Regards
Wendy

YorkshireWater Developer Services

Wendy Mullaney
Sewer Adoption & Diversion Senior Engineer
Customer Experience

07790 616925
yorkshirewater.com/developers

From: Matthew Lock <matthew.lock@fortemconsultants.co.uk>
Sent: 26 September 2023 11:25
To: Wendy Mullaney <wendy.mullaney@yorkshirewater.co.uk>
Subject: FW: 1174 - Land Off Roslyn Avenue, Netherton - Outfall Options - V240729

Good morning Wendy, I hope you are well,

We have recently completed discussions on a pre-planning enquiry with yourselves, see attached response from Chris Roberts, regarding a scheme off Roslyn Avenue, Netherton. The proposed development is for 82No. dwellings with associated infrastructure.

We now have a SW discharge rate and SW/FW outfall regime agreed. As you can see from the correspondence and below, we initially requested a pumped outfall solution due to site constraints - we were then asked to revisit the outfall agreement by the developer based upon a potential gravity outfall solution, see attached FW+SW Discharge Option Sketch, 1174-SK03.

The PPE covers acceptance of both potential solutions, however Chris has suggested that we approach the S104 team to confirm adoptability due to the constrained nature of the gravity route. As part of the proposed gravity outfall, we have reviewed the route and have identified the following technical issues:

- Reduced easement (<3m) between retaining wall and dwelling,
- Extent of combined proposed (insufficient space for separate systems),
- Construction in close proximity to existing dwelling,
- Level loss across dwelling and sewer through retaining structures.

Could you please have a look over the attached proposals and confirm if the outfall route proposed would be acceptable to YW and considered suitable for adoption.

As it stands, there is no formal agreement with the homeowner, as the developer would like confirmation that the proposals are acceptable to YW before committing to a deal with the owner (and offering a gravity solution to KCC).

If there is any further information that you would like, or if you would like to run through any of the above/attached, please do not hesitate to give me a call.

Regards,
Matthew Lock
Principal Technician

FORTEM
T: 07956 432 450
W: www.fortemconsultants.co.uk

From: Technical Sewerage <technical.sewerage@yorkshirewater.co.uk>
Sent: Tuesday, September 12, 2023 10:11 AM
To: Matthew Lock <matthew.lock@fortemconsultants.co.uk>
Subject: RE: 1174 - Land Off Roslyn Avenue, Netherton - Outfall Options - V240729

Hi Matthew,

Please find my response attached.

Kind Regards

YorkshireWater

Chris Roberts
Pre-Development Technician
Developer Services
Tel: 0345 1 20 84 82

*******Please note we have 10 working days to respond to email enquiries*******

Matthew Lock

From: Martin Stephenson <Martin.Stephenson@kirklees.gov.uk>
Sent: 26 January 2024 11:19
To: Matthew Lock
Cc: Nick Hirst; Paul Farndale
Subject: RE: 1174 - Roslyn Avenue, Netherton - Planning Comments
Attachments: RE: Netherton Consultee Responses

Good Morning Matthew

I understand from the attached email from KCS Development Ltd that the 3rd party agreement is still being processed to finalise the detailed legal agreement.

Please can you confirm when the agreement is in place and the appropriate signatures have been obtained. Once this is in place, the LLFA will be able to remove the objection.

Note further that, should the agreement not be obtained, the LLFA will not accept a pumped solution for surface water disposal from the development due to the risk of pump/electricity supply failure during stormy weather.

Regards

Martin Stephenson
Principal Flood Risk Officer
Flood Risk and Drainage Management
Civic Centre 1
Huddersfield
High Steet
HD1 2NF

T: 01484 22 1000 (Ext. 75870)
E: martin.stephenson@kirklees.gov.uk