Queensberry
DESIGN LIMITED
RESIDENTIAL AND COMMERCIAL DESIGN CONSULTANTS

Strata and Thirteen Group

Land at Main Avenue, Cowlersley, Huddersfield

FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

September 2024

Queensberry Design (Yorkshire) Ltd: Brookfield Court, Selby Road, Leeds, LS25 1NB

ISSUE SHEET

Prepared	Date		Checked	Date
ND	11.09.2024		24.09.2024	RPB
P01	First Issue			30.09.24
P02	Layout and drainage strategy drawing updated to current site layout			09.10.24
P03	Latest site layout added			20.11.24
P04	Latest site layout added			11.12.24

This document has been prepared solely as a Flood Risk Assessment for Strata and Thirteen Group, Queensberry Design Ltd accepts no responsibility or liability for any use that is made of this document other than by the Client for which it was originally commissioned and prepared.

CONTENTS

APPENDICES

1. Introduction

1.1 Queensberry Design Ltd has been commissioned by Thirteen and Strata to undertake a Flood Risk Assessment (FRA) for a proposed residential development at Main Avenue, Cowlersley, Huddersfield.

1.2 This FRA has been produced to demonstrate how flood risk from all sources of flooding, and flood risk to others from the development will be managed, to satisfy the requirements, set out in *'National Planning Policy Framework, and Technical Guidance to the National Planning Policy Framework'*. A full assessment of the flood risk to the site and consideration of the surface water management as a result of the development is to be considered in this investigation.

1.3 Consultation has been undertaken with Yorkshire Water (YW), Environment Agency (EA) and Kirklees Lead Local Flood Authority (LLFA) including inspection of their Strategic Flood Risk Assessment (SFRA). Data has also been gathered from several other sources including aerial photographs, Ordnance Survey (OS), the British Geological Society (BGS), National Soil Resources Institute (NSRI), Sewerage Sector Guidance (SSG), SuDS Manual (C753) and anecdotal evidence from the internet.

2. Site Description

2.1 The application boundary is 2.12 ha with a developed area of 1.55 ha and is located 2km west of Huddersfield town centre, with the Cowlersley area.

2.2 The site is irregularly shaped and is predominantly greenfield, the site is accessed from Main Avenue and Windsor Road. Garage buildings and associated hard paved access are located at the northern end of the site, large parts of the site are heavily vegetated/overgrown.

2.3 Boundary features around the application site are residential dwellings to the east, west, and part of the northern boundary, the southern boundary is open undeveloped land, Woodside Green Primary School forms the majority of the northern boundary.

2.4 The location of the development is shown in Figure 1a, and Figure 1b.

Site Levels

2.5 A topographical survey was carried out during May 2024 and can be viewed in Appendix 1. Site levels generally fall from the north-west towards the south-east. The existing topography is steep with gradients up to 1 in 4.

2.6 Existing levels fall centrally forming a channel through the site, falling from west to east.

2.7 Appendix 2 provides a coloured plan showing how the existing topography falls.

Hydrogeology

2.8 Bedrock underlain the site is Millstone Grit (sandstone, mudstone and siltstone), a secondary A aquifer. The site is not located in a source protection zone.

Hydrology

2.9 The nearest main river is River Colne located 0.5km north of the site, the River Colne flows easterly through Huddersfield and is a tributary of the River Calder. Immediately north of River Colne is the Huddersfield Narrow Canal which follows a similar route as the River Colne to the River Calder.

2.10 The scheme is in the River Colne catchment and the site will not impact the main river network.

2.11 Information from Kirklees Council shows a culvert at the eastern edge of the site, the recorded culvert runs through the rear of the dwellings fronting Warneford Road. The culvert then discharged to a normal watercourse at the junction of Warneford Road and Manse Drive, an open channel then runs through the rear of dwellings fronting Avison Road.

2.12 Photographic information supplied by residents shows two large gully grates outside the site's eastern boundary, on the boundary of 66 Warneford Road, the area around these gully grates has collapsed allowing run-off to bypass the grates into the network below.

2.13 Drainage investigation has recorded a 225mm diameter pipe within the site boundary, this pipe has further connections which are all capped. This pipe connects to a chamber which is below the gully grates, some flow is recorded which is expected to be infiltrated surface water run-off and groundwater.

2.14 Based on the information available the culvert starts at the eastern edge of the development adjacent 66 Warneford Road.

2.15 The location of the culvert opening is directly on a flow route, discussed further in this assessment.

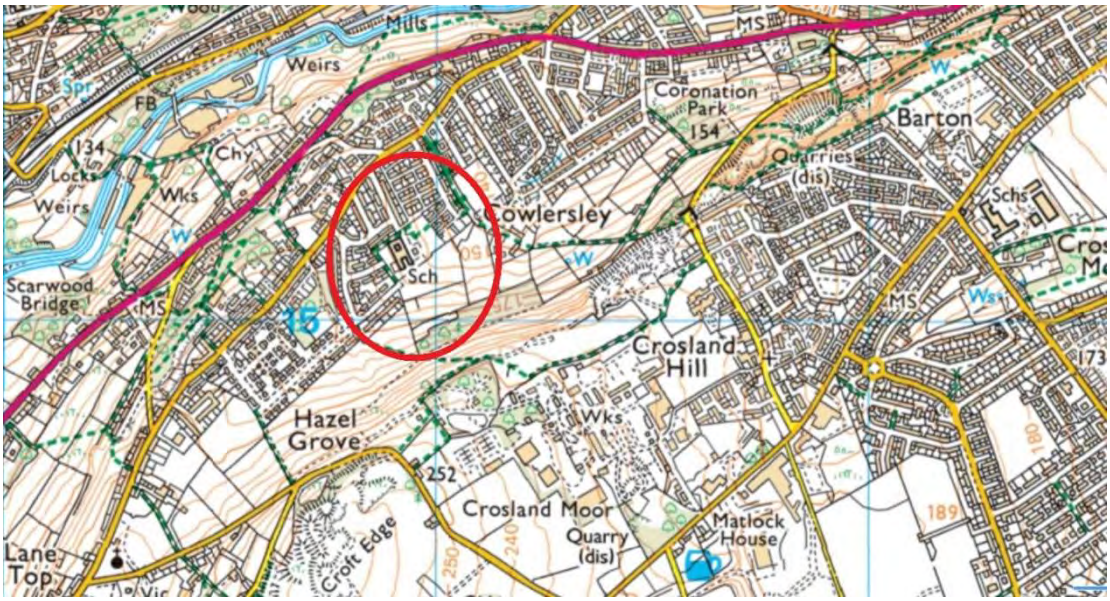
Existing Drainage Infrastructure

2.16 Existing public sewerage infrastructure within the site's vicinity is described below. The existing sewer records provided by Yorkshire Water can be found in Appendix 4.

2.17 Sewer records show an existing 450mm diameter combined sewer crossing the site from Main Avenue flowing in an eastern direction leaving the site at the eastern boundary to the rear of the existing dwellings on Warneford Road.

2.18 Two combined sewers are recorded entering the site from the northern boundary from Windsor Road and Jubilee Lane, these sewers connect into the 450mm diameter sewer.

2.19 Records also show an existing 225mm diameter sewer passing along the school boundary connecting into the 450mm diameter sewer.



2.20 *Figure 1a – Site Location, Ordnance Survey*

2.21 *Figure 1b - Detailed Site Location*

3. Strategic Flood Risk Documentation

Calder Catchment Strategic Flood Risk Assessment Volume 1 (2016)

3.1 The Level 1 Strategic Flood Risk Assessment (SFRA) has been produced for Kirklees Council in April 2016 by JBA Consulting. The report considers the risk of flooding within the river Calder catchment as well as overview of risk from, groundwater and surface water runoff.

Calder Catchment Strategic Flood Risk Assessment Volume 2 (2016)

3.2 The Level 2 Strategic Flood Risk Assessment (SFRA) produced in July 2016 by JBA Consulting involves a more detailed (local) investigation. Volume 2 covers National Planning Policy and flood risk policy while assessing actual flood risk, flood risk within key communities and conclusions and recommended for further work.

3.3 The volume 2 assessment mapping highlights surface water flood risk crossing the site as shown in appendix 6.

3.4 Information available within the SFRA mapping confirms the site is outside of a critical drainage area and has a less the 25% chance of groundwater emergence.

4. Flood Risk Assessment

4.1 When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment.

4.2 A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

4.3 The Planning Practice Guidance was published in March 2014. The new Guidance is intended to reflect and support (but not replace) the National Planning Policy Framework (the NPPF) published in February 2019. On 25th August 2022, the Ministry of Housing, Communities & Local Government, released an updated version of the National Planning Policy Framework (NPPF).

4.4 In respect of flood risk, the NPPF was amended to clarify that all plans should apply a sequential, risk-based approach to the location of development, taking into account 'all sources of flood risk' and the current and future impacts of climate change.

4.5 If it is not possible for development to be located in zones with a lower risk of flooding, an application for the development should be considered having regard to the vulnerability of the site and development proposed. A new 'Floor Risk Vulnerability Classification' has been added to the NPPF that categorises those types of development particularly vulnerable to flood risk.

Sources of Flooding

4.6 In accordance with NPPF all forms of flood risk need to be considered in relation to any development. Flood risk has been assessed from the following sources: tidal and fluvial, surface water and flooding from the land, groundwater, sewer flooding and artificial sources (i.e., canals, reservoirs etc.)

Tidal and Fluvial Flooding

4.7 The Environment Agency 'Flood Map for Planning' map in figure 4.1, indicates the site is located entirely within Flood Zone 1 and so is considered to have the lowest probability of flooding from rivers and the sea, of 1 in 1000 in any one year (0.1%).

4.8 *Figure 4.1 – Environment Agency Flooding from Rivers and Sea Flood Map*

Surface Water Flooding

4.9 Flooding from overland flow can become a risk to any development if flooding occurs at a higher level than the development site.

4.10 The Environment Agency national Risk of Surface Water Flooding (RoFSW) data set map shows the majority of the site is at a very low risk.

4.11 Very low risk refers to land having less than a 1 in 1000 annual exceedance probability of flooding. Low risk refers to land having between a 1 in 1000 and 1 in 100 annual exceedance probability of flooding (0.1 % - 1% AEP). Medium risk refers to land having 1 in 100 and 1 in 30 annual probabilities (1% - 3.33% AEP). High risk refers to land having a greater than 1 in 30 annual exceedance probability of flooding (>3.33% AEP).

4.12 The RoFSW mapping shows a surface water flow route entering the development boundary where the Main Avenue carriageway ends, this flow route originates further west of the development, with Main Avenue collecting the run-off and channelling it into the development.

4.13 Once flows enter the development run-off is channelised by the existing site levels towards the existing properties on Warneford Road, ref appendix 2 for existing site falls diagram.

4.14 The risk probability and extent of flood risk then increase on the eastern boundary, it is anticipated this increase is due to the culverted watercourse discussed in section 2 not having the capacity to collect the run-off.

4.15 Mapping also shows a flow route entering the development's northern boundary from Windsor Road, as the flow from Main Avenue, Windsor Road is channeling exceedance run-off into the development, this run-off poses a lesser risk as it turns and follows lower-lying levels to the open space north-east of the site.

4.16 Although unrecorded the development will be subject to a significant amount of run-off from the land beyond the southern boundary, this run-off will also contribute to the surface water flooding entering the site from Main Avenue.

4.17 The development will provide a minor reduction in the cumulative run-off flowing towards the culverted watercourse, flooding at Warneford Road and adjacent open space, by collecting and attenuating run-off.

4.18 The design of the development must ensure the surface water flow routes entering the site are managed in a way that the site levels collect and divert the run-off to its existing location. Flow routing must pass through an adopted carriageway or managed shared drives to ensure run-off is managed for the development lifetime.

4.19 All new dwellings shall have 300mm freeboard from the flow route to ensure exceedance does not raise above a finished floor level – level design and exceedance routing can be viewed in appendix 9.

4.20 The proposed new dwellings backing onto the southern boundary will be intersecting surface water run-off from the land south of the site, and mitigation is required.

4.21 Due to the significant level changes across the site, a retaining wall will be required to form the southern boundary. To collect and divert the overland flow the retaining wall is proposed to include a parapet. The parapet will stop the run-off from entering the gardens of the proposed dwellings and potentially flooding the dwellings.

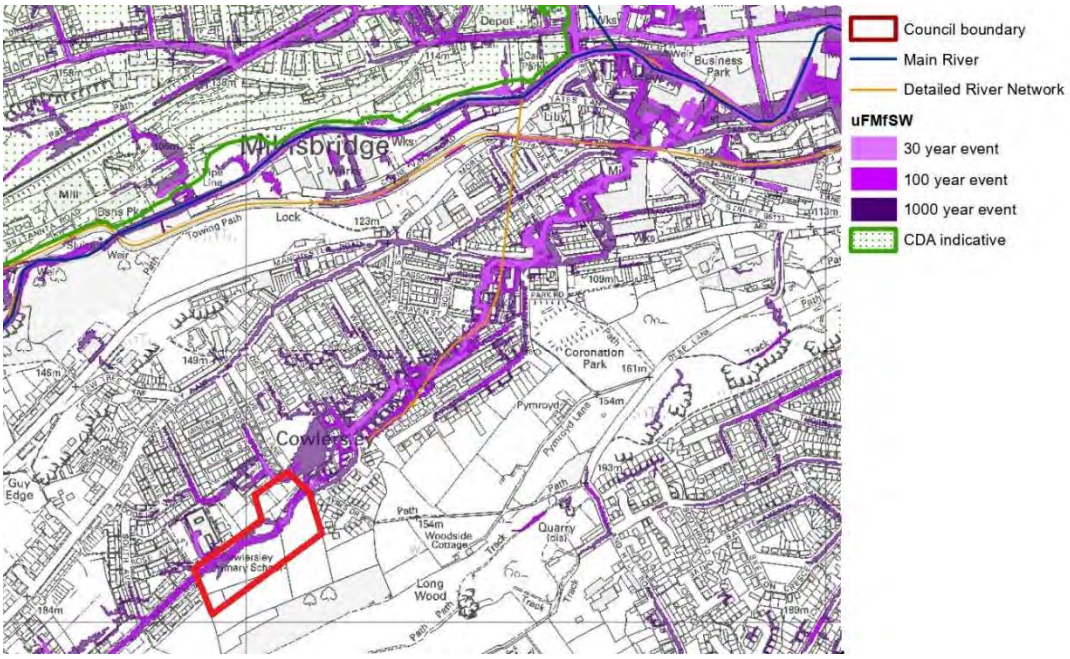
4.22 Levels and the retaining wall design must direct the existing run-off to the shared drive serving plots 49 - 52 to allow the run-off to escape down the drive to its current flow route as the surface water mapping.

4.23 Details within Appendix 9 provide the mitigation principle.

4.24 Based on the available information flood risk from this source is considered HIGH.

4.25 *Figure 4.2 – Environmental Agency Surface Water Flood Risk Map*

4.26 *Figure 4.3 – Environment Agency Surface Water – flood depth*



4.27 *Figure 4.4 – Strategic Flood Risk Assessment Surface Water Flood Risk Map*

Groundwater

4.28 Groundwater flooding is caused by water originating from beneath the ground surface from permeable strata through a natural process, usually after periods of higher-than-average rainfall.

4.29 The SRRA identifies the site as having a 25% risk of groundwater emergence.

4.30 Groundwater has been recorded during the site investigation, with the groundwater being shallower in low-lying areas.

4.31 Based on the information from the site investigation groundwater poses a low risk to the finished development.

4.32 Based on the available information significant flood risk from this source is considered LOW.

Sewer Flooding

4.33 No known sewer flood events are known, given the scheme is to divert existing drainage to modern standards and the new surface water network will be designed following this document and current best practice possible future sewer flooding is limited.

4.34 Based on the available information flood risk from this source is considered LOW.

Land Drainage

4.35 If any land drainage discovered during excavations on site, it is recommended that the drain is repaired or diverted. Should this not be possible due to layout constraints, then it is recommended that the land drain is further investigated by the development engineer, to determine if the drain is still required post development.

4.36 Based on the available information flood risk from this source is considered LOW.

Artificial Sources

4.37 Environment Agency data and mapping indicates the site is not at risk of reservoir flooding.

4.38 Based on the available information flood risk from this source is considered LOW.

5. Summary of Existing Flood Risk

5.1 Table 5.1 below summarises the sources of possible flooding which have been investigated.

Table 5.1 – Summary of Flood Risk		
Flood Risk Source	**Current Risk Level**	**Mitigation Requirement**
Tidal & Fluvial Flooding	LOW	Not required
Groundwater	LOW	Not required
Sewer Flooding	LOW	Not required
Overland Flow	HIGH	Dwellings to be set 300mm higher than existing flow routes Existing flow routes are to be maintained along the southern boundary Recorded flow routes to the diverted through the site via the road network
Land Drainage	LOW	Not required
Artificial Sources	LOW	Not required

6. Existing Drainage Regime

6.1 The site is a mixture of permeable and impermeable surfaces, however, given the small amount of impermeable surfaces the site is being assessed as a greenfield site.

6.2 Micro drainage rural run-off calculator (ICP SuDS for small catchments) has been used to calculate the existing greenfield run-off rates from the developed site, the results can be viewed in Table 6.1 and Appendix 7

Table 6.1 – Greenfield Run-off	
Return Period	**Discharge**
1 Year	7.2 l/sec
QBAR	8.3 l/sec
30 Year	14.6 l/sec
100 Year	17.7 l/sec

7. Proposed Development

7.1 Strata and Thirteen Group proposes to develop the site for residential use comprising 57 dwellings with associated landscaping, access and infrastructure works.

7.2 A copy of the proposed site layout can be viewed in Appendix 3.

Planning Context

7.3 The EA flood maps for the region show that the development sits within Flood Zone 1, which has a low probability of flooding 1 in 1000 in any one year (0.1%). This is illustrated in Table 7.1.

7.4 The proposed development will comprise residential dwellings. Therefore, in accordance with NPPF Table 7.2, the development is classified as 'more vulnerable'.

7.5 Thus, given that site is situated in Flood Zone 1 and the vulnerability classification in accordance with the NPPF compatibility matrix in Table 7.3, the scheme is classified as appropriate for development.

Table 7.1 Flood Risk Probability

Flood Zone	Probability	Explanation
Flood Zone 1	Low Probability	This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).
Flood Zone 2	Medium Probability	This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.
Flood Zone 3a	High Probability	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Flood Zone 3b	Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood

Table 7.2Flood Risk Vulnerability	
Category	**Explanation**
Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons. • Wind turbines and Solar farms.
Highly Vulnerable	• Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent.
More Vulnerable	• Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels. • Non–residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	• Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non–residential institutions not included in 'more vulnerable'; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment plants. • Sewage treatment plants (if adequate pollution control measures are in place). • Car Parks
Water-compatible development	• Flood control infrastructure • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel workings. • Docks, marinas and wharves. • Navigation facilities. • MOD defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Table 7.3 Flood Risk Vulnerability Classification					
Flood Zone	**Essential Infrastructure**	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
Zone 1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
Zone 2	Appropriate	Exception Test required	Appropriate	Appropriate	Appropriate
Zone 3a	Exception Test required	Not Permitted	Exception Test required	Appropriate	Appropriate
Zone 3b	Exception Test required	Not Permitted	Not Permitted	Not Permitted	Appropriate

8. Management of Surface Water

Possible Drainage Solutions

8.1 An assessment of possible drainage options has been undertaken in accordance with Building Regulations H3 Section 3 and NPPF. The disposal of surface water has been considered in the following order of priority.

-An adequate soakaway or some other infiltration system; or, where not reasonably practicable,

-A watercourse, or where not reasonably practicable,

-A sewer

Infiltration

8.2 In-situ testing carried out during the site investigation has determined that the use of infiltration will not be possible.

Discharge to a Watercourse

8.3 As this assessment, a culverted watercourse is located to the rear of the existing dwellings fronting Warneford Road, the watercourse is recorded on Local Authority records.

8.4 The culvert is fed by over land flow as shown on the surface water flood mapping. Investigation has shown that a 225 diameter pipe enters the development which feeds into the culverted watercourse, survey has shown this pipe to be 400mm deep, and is capped in all directions.

8.5 Given existing greenfield run-off from the development contributes to the culverts catchment, discharge to this watercourse is the preferred method of surface water disposal.

8.6 Discharge to this watercourse would follow the existing greenfield QBAR discharge rate of 8.3 litres/sec.

8.7 An assessment of surface water storage requirements, development layout, and outfall level has concluded a gravity connection to the 225 diameter pipe will not be possible, without pumping of flow.

8.8 A gravity connection to the culverted watercourse downstream may be possible (subject to further survey) however this will require agreement from several third-party landowners.

Discharge to Public Sewers

8.9 Due to the issue with achieving a surface water outfall to the culverted watercourse, discharge to the existing public sewers will be necessary.

8.10 Yorkshire Water has been contacted through the pre-development enquiry process and has confirmed an allowable discharge of 3.5 litres/sec into the existing 450 diameter combined sewer.

8.11 This sewer is within the development boundary and is at a suitable depth for a gravity connection.

9. Preferred Drainage Solution

Storm Drainage

9.1 The preferred drainage solution will involve the discharge of site surface water flows to the combined sewerage within the site boundary. The proposed drainage strategy and calculations can be viewed in Appendix 9.

Storm Drainage

9.2 The allowable discharge rate from Yorkshire Water is 3.5 litres/second which is a 58% reduction of the existing QBAR discharge rate.

9.3 Surface water modelling has been undertaken following the West Yorkshire Combined Authority Sustainable Drainage Guidance Table 8. By ensuring modelling assesses 30% climate with no inclusion of urban creep.

9.4 Attenuation will be provided by the means of a pre-cast attenuation tank located within the green space on the developments eastern boundary and flows will be restricted using a vortex flow control device in accordance with Yorkshire Water adoption requirements the minimum orifice diameter shall be 75mm.

9.5 The attenuation is to be placed allowing suitable standoff from the adoptable highway and neighbouring boundary.

9.6 Given the outfall is an existing sewer owned by Yorkshire Water no detailed considerations are required, the connection to the sewer must be made at soffit level or higher to mitigate possible surcharge from the existing sewer.

9.7 All new adoptable standard surface water drainage is to be designed in accordance with ‘SSG’ and to ensure that no flooding occurs during the critical 1 in 30-year storm event.

Foul Drainage

9.8 Foul drainage will connect into diverted sewers under Section 185 of the Water Industry Act or new foul drains under Section 104 of the Water Industry Act.

9.9 Flows will ultimately connect into the existing 450mm dia combined sewer at the east of the development.

9.10 All new adoptable foul sewerage is to be designed in accordance with ‘SSG’.

10. Conclusion

Flood Risk

10.1 The flood risk assessment and drainage strategy has been prepared in accordance with the NPPF, Flood Risk and Coastal Change Planning Practice Guidance. The management of the surface water flows has also been considered in accordance with Building Regulations H3 Section 3.

10.2 The proposed development is classified as 'more vulnerable' and is located within Flood Zone 1 according to the SFRA and Flood Maps for Planning, therefore the development is suitable within this flood zone in accordance with NPPF.

10.3 The development is at risk of surface water flooding, employment of the mitigation measures stated in this report will ensure that the development will be safe and suitable in this location.

10.4 Flood risk from all sources have been considered and with mitigation where necessary, it has been established that these sources do not pose a residual risk to the development.

Storm Drainage

10.5 Surface water runoff will discharge to the existing combined sewerage to a rate of 3.5 litres/sec for all storm return periods.

10.6 Exceedance flows above the restricted rate of 3.5 litres/sec will be attenuated on-site via underground attenuation.

10.7 All new adoptable standard surface water drainage is to be designed in accordance with 'SSG' and to ensure that no flooding occurs during the critical 1 in 30-year storm event. A 30% increase in rainfall due to climate change has been considered.

Foul Drainage

10.8 It is proposed to discharge foul flows into either diverted or new sewers.

10.9 All new adoptable foul sewerage is to be designed in accordance with 'SSG'.

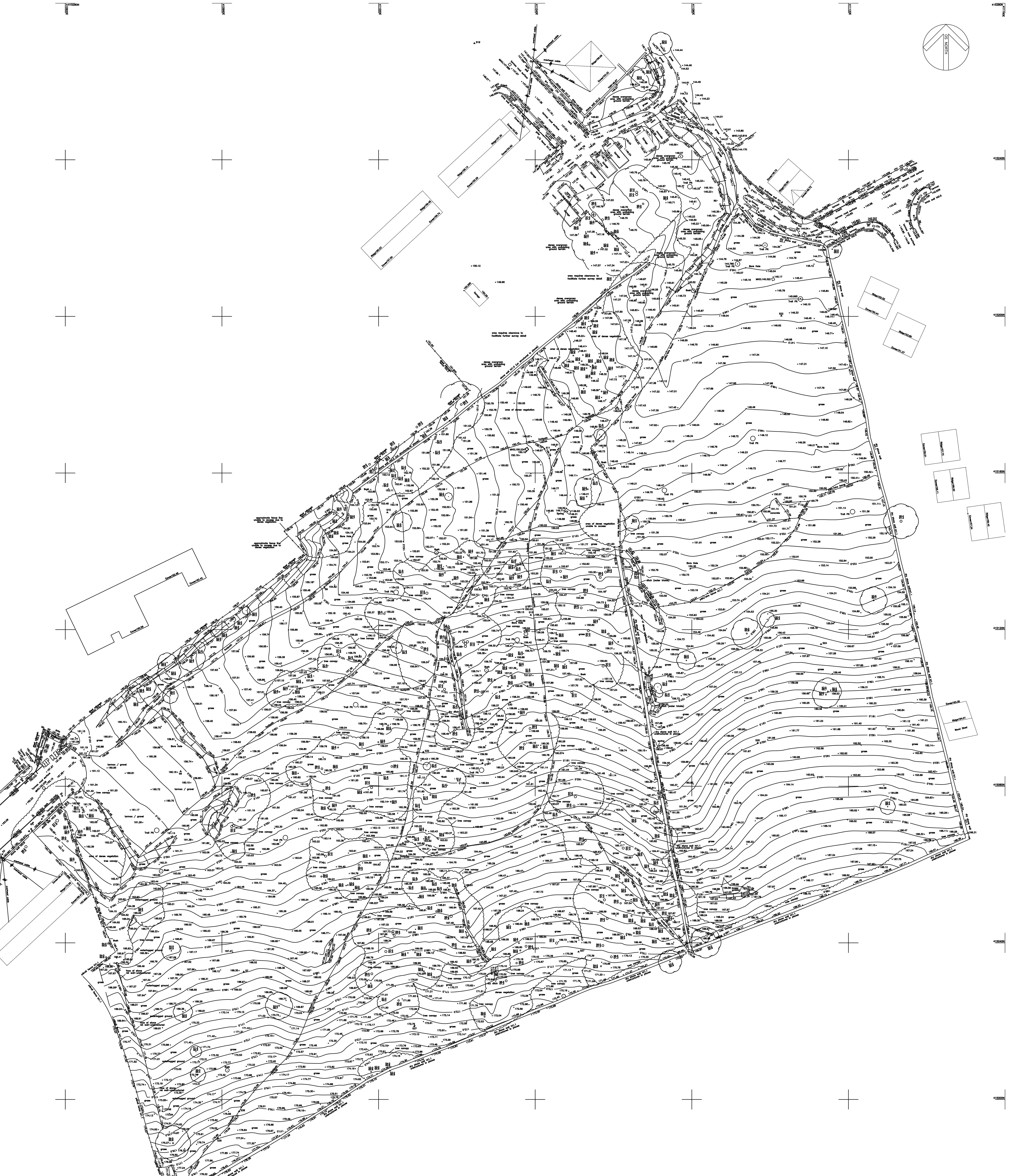
Appendix 1 - Topographical Survey

The Hollies, 43 Church Street, Royston, Barnsley, S71 4QU. T:01226 709630
E:info@land-surveying.co.uk W:land-surveying.co.uk

Sheet 1 of 1	Surveyed by PMS
Datum	Drawn by PMS
GRID– Related to Ordnance Survey using One Point Localisation on Station S4. Orientation at OS Grid North.	Date of Survey May 2024
	Scale 1/200
LEVEL– Related to Ordnance Survey by connection to the OS Active Network by G.P.S	Survey Job No.

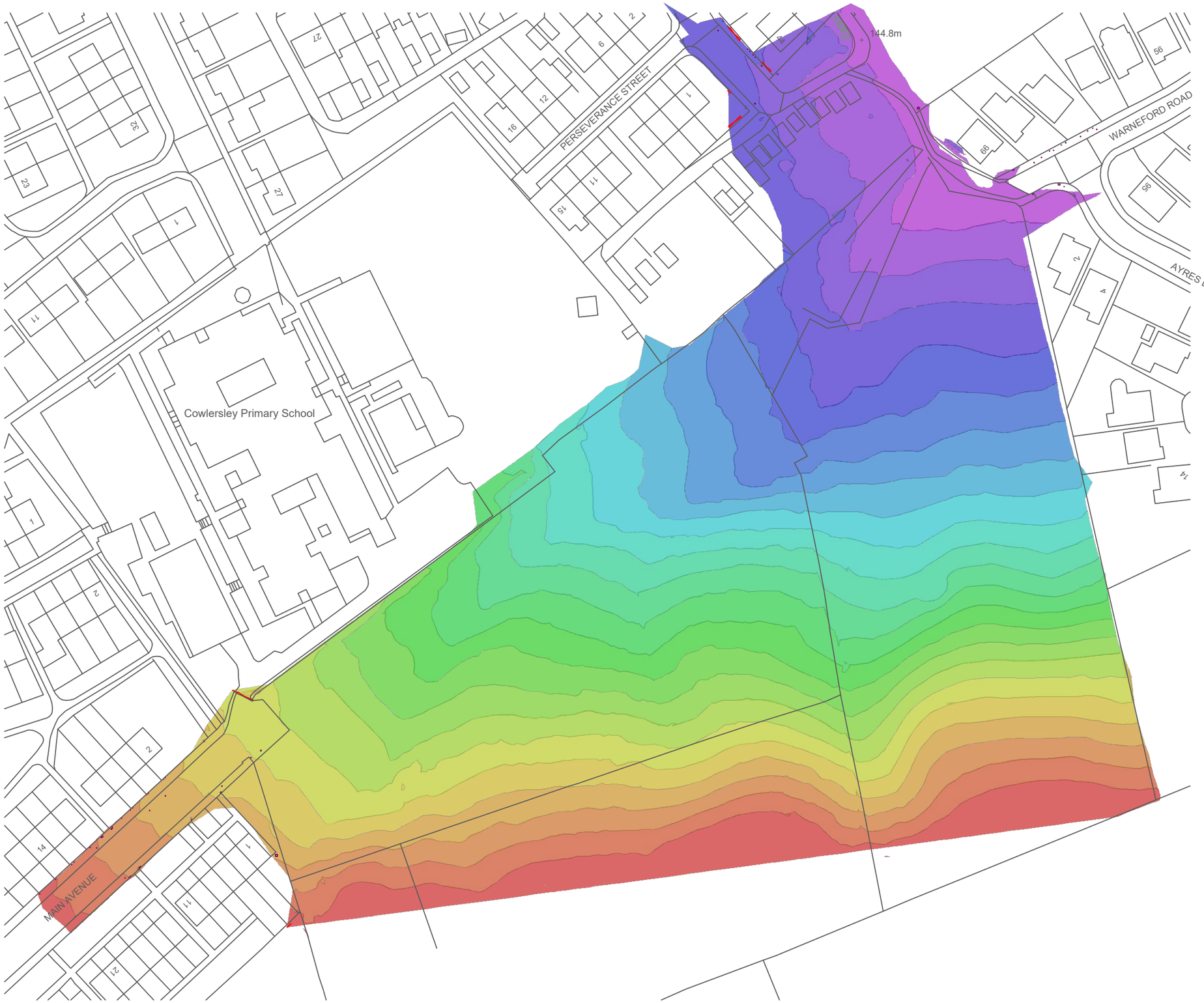
LEGEND

Manhole shown thus	MH	Floor Level	FL 10.907
Inspection Cover	IC	Height floor to ceiling	C 2.22
Lamp post	LP	Height floor to struct soffit	SS 2.67
Gully	G	Height floor to false ceiling	FC 2.22
Lampost	LP	Height floor to sill	S0.67
Telegraph Pole	TP	Height sill to window head	W1.23
Electricity Pole	EP	Height of Door	D1.98
Road Traffic Signs	RS	Height floor to underside	US 3.61
Traffic Lights	TL	Ceiling Slopes Up	CSU
British Telecom	BT	Height floor to Arch	Ar2.99
Cable Television	CATV	Height floor to Arch Spring	Sp2.67
Fire Hydrant	FH	Vent	VP
Safety Valve	SV	Fall Pipe	FP
Stop tap Water	W	Sky Light	SL
Stopcock Gas	Gas	Water Closet	WC
Unknown Stoptap	ST	Sink	S
		Boxed Column	
		Survey Station	



Station	Easting	Northing	Level
S1	410836.485	415015.185	169.245
S2	410922.623	415087.179	161.236
S3	410903.922	415062.640	163.538
S4	410914.012	415071.608	162.654
S5	410909.115	415081.391	162.364
S6	410949.459	415083.817	160.137
S7	410965.586	415032.619	168.474
S8	411011.470	415105.944	157.055
S9	410986.147	415130.700	154.961
S10	411002.243	415149.924	153.385
S11	411042.333	415166.166	149.760
S12	411060.924	415176.795	148.150
S13	411038.881	415123.745	155.320
S14	411074.588	415207.022	145.850
S15	411097.078	415226.627	144.136
S16	411118.506	415220.553	144.129
S17	411079.186	415250.355	144.994
S18	411046.593	415243.400	147.155
S19	411024.465	415269.745	148.114
S20	411137.669	415229.193	143.324
S21	411135.916	415224.551	143.792
S22	411102.860	415200.147	146.490
S24	411112.997	415116.278	156.934
S25	411096.835	415091.076	162.080
S26	411070.970	415046.199	167.986
S27	411051.076	415037.732	170.298
S30	411033.561	415101.448	158.595
S31	411026.545	415085.909	160.056
S32	411011.428	415088.745	160.044
S33	411006.227	415065.508	163.877
S34	411000.195	415051.162	166.157
S35	410958.991	414990.119	177.034
S36	410964.391	414996.946	175.787
S37	411009.110	415018.694	172.785

Appendix 2 – Site Fall Diagram



Height Bands

- 166m - 167m
- 165m - 166m
- 164m - 165m
- 163m - 164m
- 162m - 163m
- 161m - 162m
- 160m - 161m
- 159m - 160m
- 158m - 159m
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- 153m - 154m
- 152m - 153m
- 151m - 152m
- 150m - 151m
- 149m - 150m
- 148m - 149m
- 147m - 148m
- 146m - 147m
- 145m - 146m
- 144m - 145m
- 143m - 144m

Rev.	Date	Revision Details	Drawn	Checked

QUEENSBERRY DESIGN
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Client

STRATA AND THIRTEEN GROUP

Project

MAIN AVENUE
COWLERSLEY
HUDDERSFIELD

Title

SITE FALL DIAGRAM

Drawn	Checked	Date
ND		

Drawing Number

Drawing Status	Scale	Rev.
	1:1000 - A3	

Appendix 3 – Development Layout

DO NOT SCALE

All dimensions to be checked on site and Architect to be notified of any discrepancies prior to commencement

DESIGNERS RISK ASSESMENT

Construction (Design and Management) Regulations 2015

RESIDUAL RISKS

REF	DATE	DESCRIPTION
P1	03.10.24	Planning Issue GP
P2	11.10.24	Apartment footprints revised. GP
P3	22.10.24	Substation location revised. GP
P4	23.10.24	Private drive arrangement altered plots 16-18. GP Plot 1 changed to HT11 from HT9.
P5	26.11.24	Altered following client feedback. Coodinated with levels proposals. GP
P6	27.11.24	Road alignment altered from Windsor Road. GP

Kirklees - Main Avenue

(GIA)

Thirteen Group/Strata

	ha	acres
GROSS SITE AREA	2.12	5.24
NET SITE AREA	1.55	3.83

HOUSE TYPE	BEDROOM	APPROVED DOCUMENT M COMPLIANCE	CONFIG	STOREYS	NO	MIX %	SQ FT	SQ M	TOTAL SQ FT	TOTAL SQ M
HT6	2B3P	CAT M4(2)	HOUSE	2	7	12	784.69	72.9	5493	510.30
HT7	2B4P	CAT M4(2)	HOUSE	2	8	14	877.26	81.5	7018	652.00
HT8	3B4P	CAT M4(1)	HOUSE	2	8	14	928.92	86.3	7431	690.40
HT9	3B5P	CAT M4(1)	HOUSE	2	3	5	1020.42	94.80	3061	284.40
HT10	3B5P	CAT M4(2)	HOUSE	2	1	2	1020.42	94.80	1020	94.80
HT11	3B5P	CAT M4(2)	HOUSE	2	7	12	1020.42	94.80	7143	663.60
HT12	3B5P	CAT M4(2)	HOUSE	2	8	14	1032.26	95.90	8258	767.20
HT14	4B6P	CAT M4(2)	HOUSE	2	1	2	1184.03	110.00	1184	110.00
HT24	4B6P	CAT M4(1)	HOUSE	2.5	6	11	1357.33	126.10	8144	756.60
APT (G)	2B3P	CAT M4(2)	APARTMENT	1	4	7	659.83	61.30	2639	245.20
APT (1)	2B3P	CAT M4(2)	APARTMENT	1	4	7	731.95	68.00	2928	272.00
			OVERALL TOTALS		57	100			54320	5047

OVERALL DENSITY	
UNITS / ha	36.77
UNITS / ACRE	14.88
SQ M / ha	3256
SQ FT / ACRE	14183

OVERALL MIX		TOTAL	%
2 BED		23	40
3 BED		27	47
4 BED		7	12
		57	100

OVERALL MIX APPROVED DOCUMENT M		TOTAL	%
CAT M4(1)		17	30
CAT M4(2)		40	70
CAT M4(3)		0	0
		57	100

TOTAL NO	57

NOTE: Nett area excludes all public open space and associated structural landscaping / buffer planting / half road

N

0 5 10 20 50 metres

Scale 1:500 @ A1

REV	DATE	INITIAL	DESCRIPTION

PROJECT / CLIENT: Kirklees Cluster Sites Main Avenue, Cowersley	PROJECT NO.: N81-3084
DRAWING TITLE: Proposed Site Layout	DRAWING STATUS: Planning
	DRAWING NO.: 102
PROJECT LEADER: GP / DRAWN BY: GP / CHECKED BY: IDP	DRAWING REVISION: P6
SCALE: 1 to 500 @ A1 / DATE: 22.10.2024	

Architecture Masterplanning Urban Design

IDPartnership Northern, St. Jude's, Barker Street, Shieldfield, Newcastle Upon Tyne, NE2 1AS T: 0191 2614442
E. info@idpartnership.com I W: idpartnership.com

Appendix 4 – Yorkshire Water

YorkshireWater

Mr N Dunwoodie
Queensbury Design Ltd
5 The Staithes
NE11 9SN
nick.dunwoodie@queensberrydesign.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

Your Ref:
Our Ref: A000354

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

5th February 2024

Dear Mr Dunwoodie,

Main Aveune, Cowlersley, Huddesfield, HD4 5US - Pre-planning Enquiry V360332

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:

Existing Infrastructure

There is a 450 mm diameter public combined water sewer recorded crossing the site. No buildings, or other obstructions, are to be erected within 3.5 (three point five) metres is required at each side of the sewer centre-line, no trees planted within 5 (five) metres of this public sewer.

There is a 225 mm diameter public combined water sewer recorded crossing the site. No buildings, or other obstructions, are to be erected within 3 (three) metres is required at each side of the sewer centre-line, no trees planted within 5 (five) metres of this public sewer.

It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0345 120 84 82.

YorkshireWater

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.

Foul water domestic waste can discharge to the 450 mm diameter public combined sewer recorded in the northern part of site.

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.

As a last resort and subject to providing satisfactory evidence as to why the other methods of surface water disposal have been discounted, curtilage surface water may discharge to the 450 mm diameter public combined sewer recorded in the northern part of site.

The surface water discharge from the site to be restricted to not greater than 3.5 (three pooint 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/

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Code for Adoption 2023/24, 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.

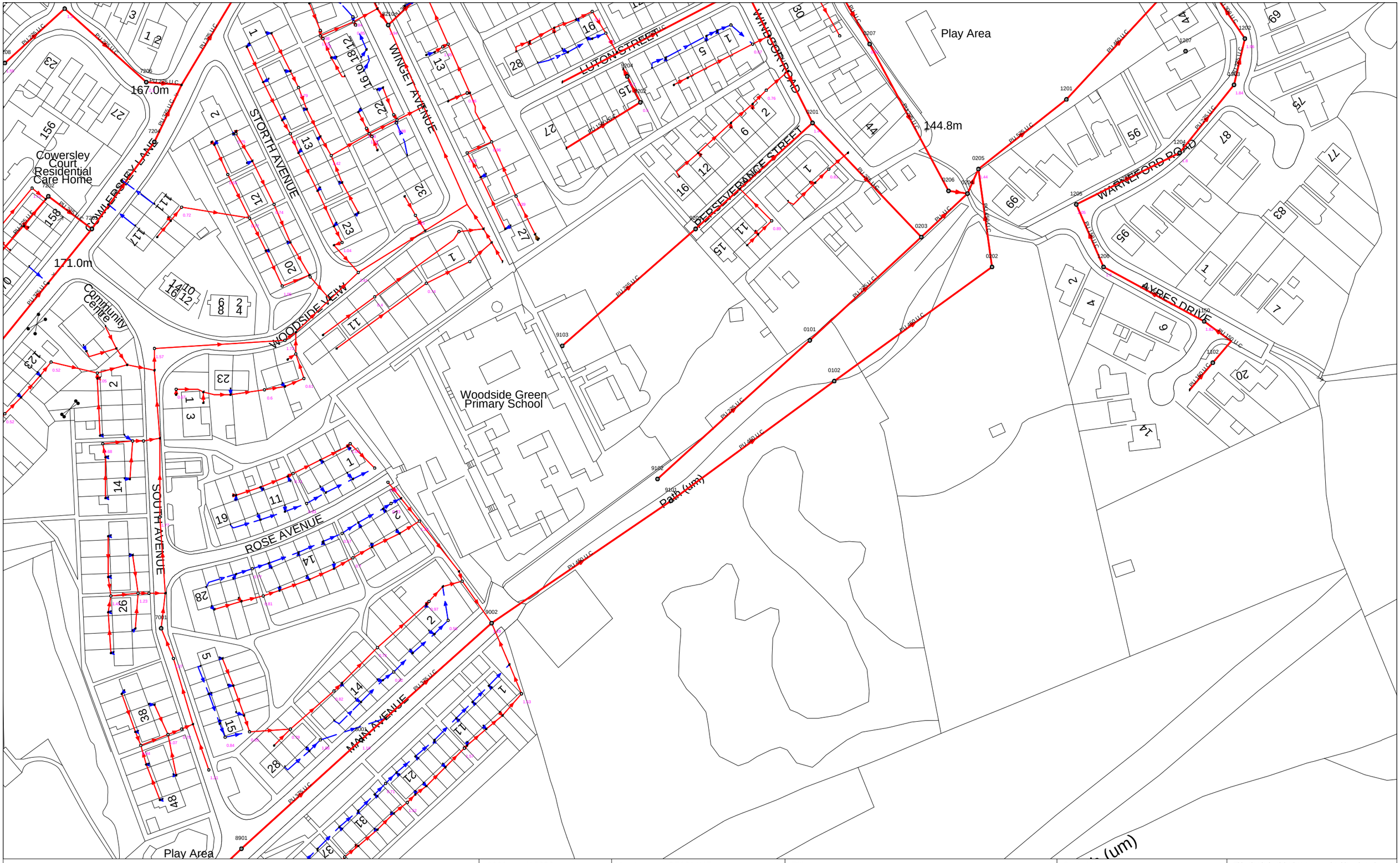
All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith.

YorkshireWater

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



	410894 : 415090	Map Name : SE1014NE	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

Date Req : 05/02/2024, 15:08:41

Date Gen : 05/02/2024, 15:15:28

Source : Sewer Network Enquiry

UPN: Undefined

Originator: C ROBERTS, YorMap, 87 2582

Appendix 5 – Environment Agency

Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**411031/415144**	**11 Sep 2024 9:10**

Your selected location is in flood zone 1, an area with a low probability of flooding.

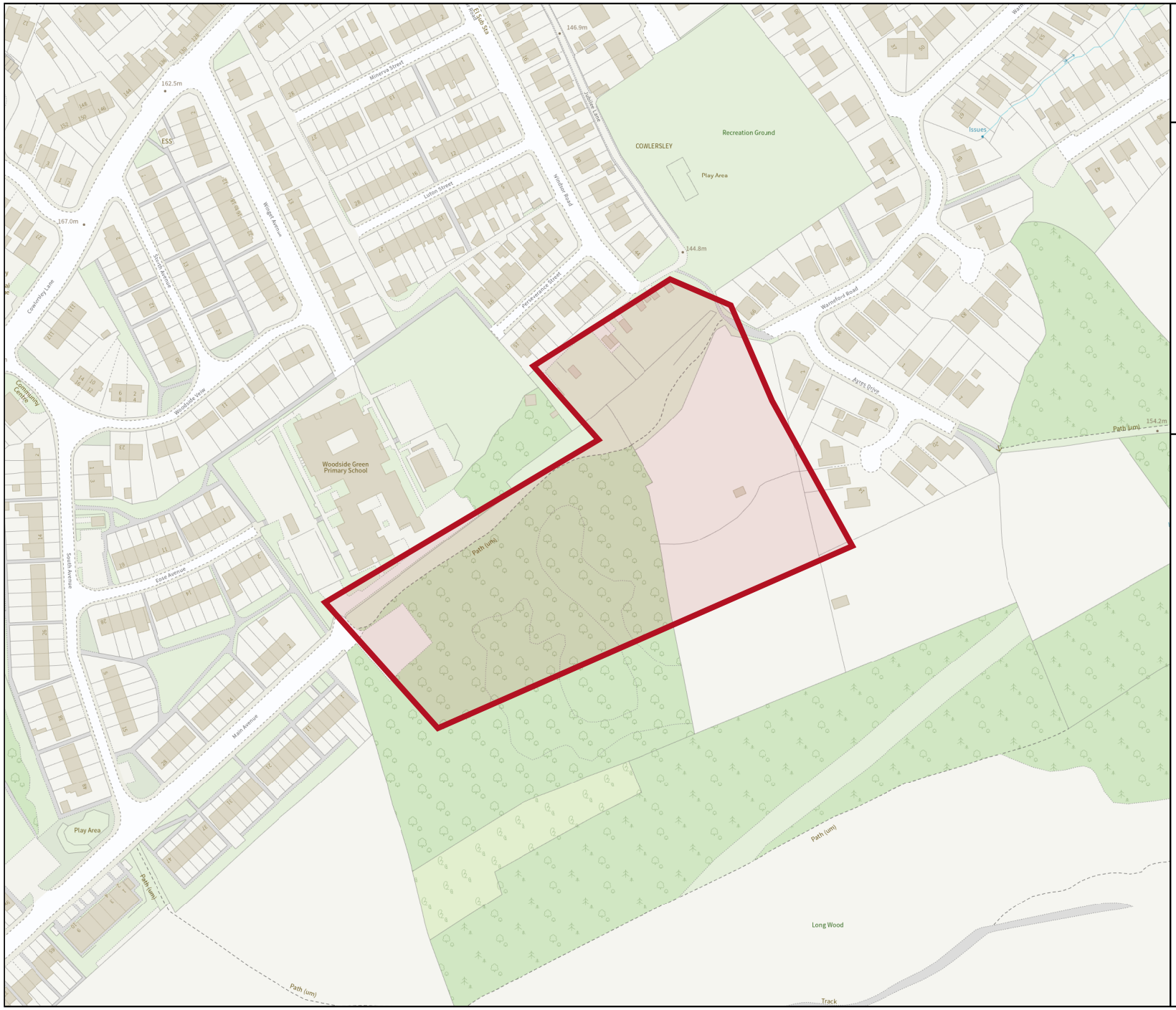
You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.



Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
411031/415144

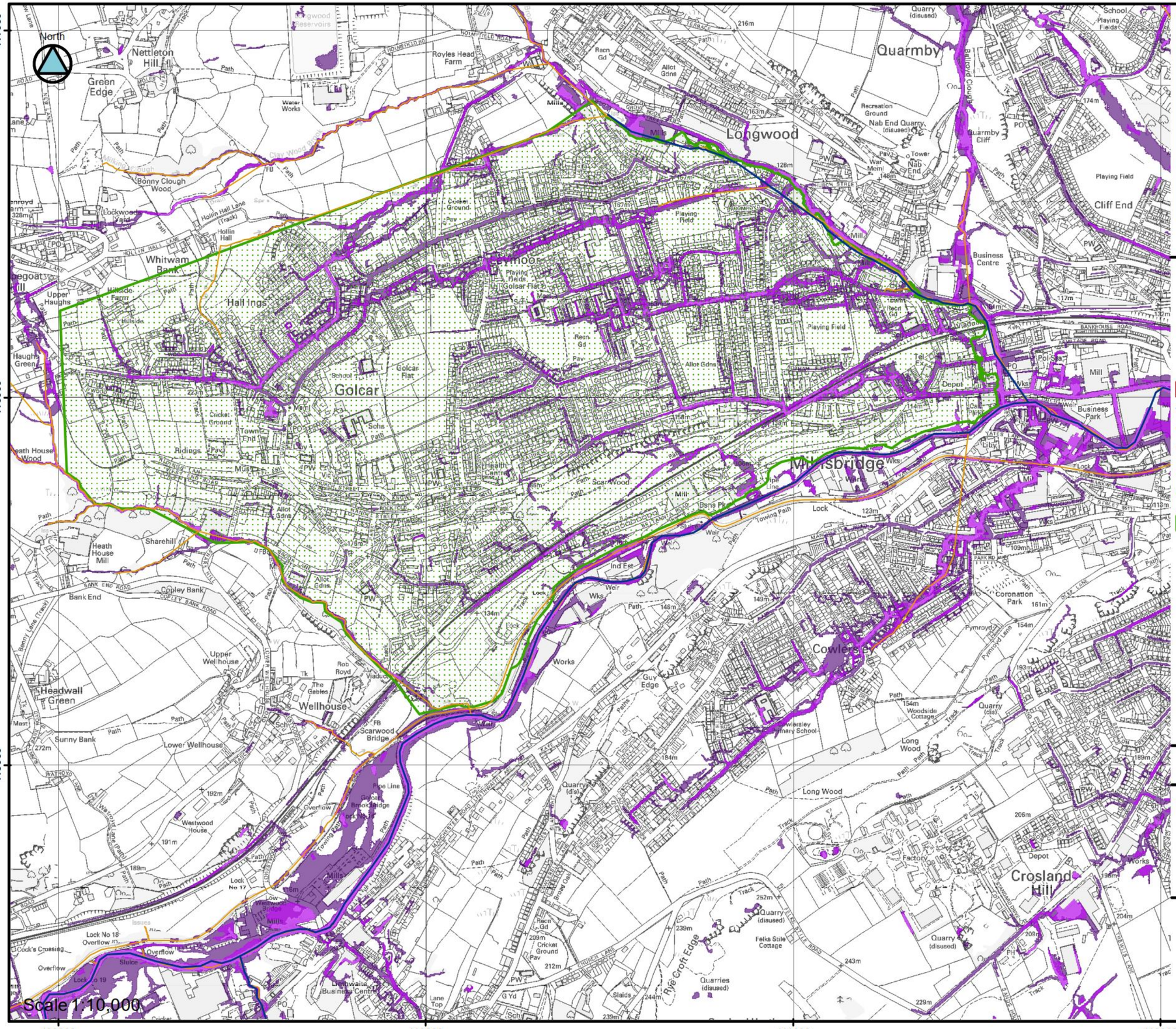
Scale
1:2500

Created
11 Sep 2024 9:10

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60m

Appendix 6 – Lead Local Flood Authority



JBA consulting

Kirklees COUNCIL

STRATEGIC FLOOD RISK ASSESSMENT

For

KIRKLEES COUNCIL

MAP_D

Appendix 7 – Greenfield Run-off Calculation

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	Soil	0.450
Area (ha)	1.550	Urban	0.000
SAAR (mm)	831	Region Number	Region 3

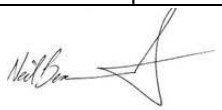
Results l/s

QBAR Rural	8.3
QBAR Urban	8.3
Q1 year	7.2
Q1 year	7.2
Q30 years	14.6
Q100 years	17.3

Appendix 8 – Drainage Investigation

CCTV Drainage Inspection Report.

WRc MSCC Fifth Edition

Control			
	Prepared By	Reviewed By	Authorised By
	Curtis Hobson-Clarke Centara Ltd Principle CCTV Surveyor	Tom Peart Centara Ltd Survey Manager	Neil Beaumont Centara Ltd Director of Operations
Signed			
Client	**Strata Homes**		
Location	**Cowersley, Kirklees**		
Requirements	**To carry out a CCTV Drainage Condition survey showing connectivity**		

Distribution List	
Issued to Strata	03/07/24
Revision Control	
00 – Issued – 03/07/24 - CHC	

Table of Contents.

Executive Summary.

Further to our recent commission to carry out an investigative survey and provide a condition report of the underground drainage system at: **138 Main Ave, Cowersley, Kirklees.**

This report should be viewed in conjunction with the individual MP4 Files included in the report.

Each Folder contains the MP4 files for the individual pipes associated with the Coded Manhole. E.g., MH01, MH101 etc.

Issues Encountered on Site:

We were unable to complete a full survey for the reasons listed below:

MH105 Pipe B was unable to be surveyed as it would require man access to place the camera unit in the pipe

MH105A Was unable to be raised (UTR)

General Considerations

The drainage system consists of mostly (PVC) Polyvinylchloride, (CO) Concrete. The drains surveyed are in good condition.

Recommendations

Centara are not able to make recommendations for remedial works or indeed whether this is feasible. However, in its current state the drainage is flowing, reparative measures will most likely be needed in the short term.

Survey Drawing

Each manhole is referenced in the report using a unique code e.g., MH01 etc. This report should be read in conjunction with the AutoCAD drawing provided as an appendix to this report.

CCTV Drainage Survey Code List.

B	BROKEN PIPE AT..... (OR FROM… TO…) O'CLOCK
BR	BRANCH MAJOR
CC	CRACK CIRCUMFERENTIAL FROM … TO … O'CLOCK
CL	CRACK LONGITUDINAL AT … O'CLOCK
CM	CRACK'S MULITIPLE FROM … TO … O'CLOCK
CN	CONNECTIONS AT … O'CLOCK, DIAMETER … MM
CNI	CONNECTION AT … O'CLOCK, DIAMETER …MM, INTRUSION … MM
CU	CAMERA UNDER WATER
CX	CONNECTION DEFECTIVE AT … O'CLOCK, DIAMETER … MM
CXI	CONNECTION DEFECTIVE AT … O'CLOCK, DIAMETER … MM, INTRUSION
D	DEFORMED SEWER … %
DB	DISPLACED BRICKS AT … (OR FROM … TO …) O'CLOCK
DC	DIMENSION OF SEWER CHANGES, NEW DIMENSION … MM
DE	DEBRIS …% CROSS-SECTIONAL AREA LOSS
DEG	DEBRIS GREASE …% CROSS-SECTIONAL AREA LOSS
DES	DEBRIS SILT …% CROSS-SECTIONAL AREA LOSS
DI	DROPPED INVERT, GAP …MM
EH	ENCRUSTATION HEAVY FROM … TO … O'CLOCK …% CROSS-SECTIONAL AREA LOSS
EHJ	ENCRUSTATION HEAVY FROM … TO … O'CLOCK …% CROSS-SECTIONAL AREA LOSS AT JOINT
EN	ENCRUSTATION LIGHT FROM … TO … O'CLOCK
ELJ	ENCRUSTATION LIGHT FROM … TO … O'CLOCK AT JOINT
EM	ENCRUSTATION MEDIUM FROM … TO … O'CLOCK …% CROSS-SECTIONAL AREA LOSS
EMJ	ENCRUSTATION MEDIUM FROM … TO … O'CLOCK …% CROSS-SECTIONAL AREA LOSS
ESH	SCALE HEAVY FROM … TO … O'CLOCK …%
ESL	SCALE LIGHT …% CROSS-SECTIONAL AREA LOSS FROM … TO … O'CLOCK
ESM	SCALE MEDIUM …% CROSS-SECTIONAL AREA LOSS FROM … TO … O'CLOCK
FC	FRACTURE CIRCUMFERENTIAL FROM … TO … O'CLOCK
FH	FINISH SURVEY
FL	FRACTURE LONGITUDINAL AT … O'CLOCK
FM	FRACTURES MULTIPLE FROM … TO … O'CLOCK
GO	GENERAL OBSERVATION AT THIS POINT
GP	GENERAL PHOTOGRAPH NUMBER … TAKEN AT THIS POINT
H	HOLE IN SEWER AT … (OR FROM … TO …) O'CLOCK
ID	INFILTRATION DRIPPER AT … (OR FROM … TO …) O'CLOCK
IDJ	INFILTRATION DRIPPER AT … (OR FROM … TO …) O'CLOCK AT JOINT
IG	INFILTRATION GUSHER AT … (OR FROM … TO …) O'CLOCK
IGJ	INFILTRATION GUSHER AT … (OR FROM … TO …) O'CLOCK AT JOINT
IR	INFILTRATION RUNNER AT … (OR FROM … TO …) O'CLOCK

IRJ	INFILTRATION RUNNER AT … (OR FROM … TO …) O'CLOCK AT JOINT
IS	INFILTRATION SEEPER AT … (OR FROM … TO …) O'CLOCK
ISJ	INFILTRATION SEEPER AT … (OR FROM … TO …) O'CLOCK AT JOINT
JDL	JOINT DISPLACED LARGE
JDM	JOINT DISPLACED MEDIUM
JN	JUNCTION AT … O'CLOCK, DIAMETER …MM
JX	JUNCTION DEFECTIVE AT … O'CLOCK, DIAMETER …MM
LC	LINING OF SEWER CHANGES/START/FINISHES AT THIS POINT
LD	LINE OF SEWER DEVIATES DOWN
LL	LINE OF SEWER DEVIATES LEFT
LN	LINING DEFECT AT … (OR FROM … TO …) O'CLOCK
LR	LINE OF SEWER DEVIATES RIGHT
LU	LINE OF SEWER DEVIATES UP
MB	MISSING BRICKS AT … (OR FROM … TO …) O'CLOCK
MC	MATERIAL OF SEWER CHANGES AT THIS POINT
MH	MANHOLE/NODE
MM	MORTAR MISSING MEDIUM AT … (OR FROM … TO …) O'CLOCK
MS	MORTAR MISSING SURFACE AT … (OR FROM … TO …) O'CLOCK
MT	MORTAR MISSING TOTAL AT … (OR FROM … TO …) O'CLOCK
OB	OBSTRUCTION …% HEIGHT/DIAMETER LOSS
OJL	OPEN JOINT LARGE
OJM	OPEN JOINT MEDIUM
PC	LENGTH OF PIPE FORMING SEWER CHANGES AT THIS POINT, NEW LENGTH …MM
RF	ROOTS FINE
RFJ	ROOTS MASS …% CROSS-SECTIONAL AREA LOSS
RMJ	ROOTS MASS …% CROSS-SECTIONAL AREA LOSS AT JOINT
RT	ROOTS TAP
RTJ	ROOTS TAP AT JOINT
SA	SURVEY ABANDONED
SC	SHAPE OF SEWER CHANGES AT THIS POINT
SSL	SURFACE DAMAGE, SPALLING LARGE AT … (OR FROM … TO …) O'CLOCK
SSM	SURFACE DAMAGE, SPALLING MEDIUM AT … (OR FROM … TO …) O'CLOCK
SSS	SURFACE DAMAGE, SPALLING SLIGHT AT … (OR FROM … TO …) O'CLOCK
ST	START OF SURVEY
SWL	SURFACE DAMAGE, WEAR LARGE AT … (OR FROM … TO …) O'CLOCK
SWM	SURFACE DAMAGE, WEAR MEDIUM AT … (OR FROM … TO …) O'CLOCK
SWS	SURFACE DAMAGE, WEAR SLIGHT AT … (OR FROM … TO …) O'CLOCK
V	VERMIN (RATS AND MICE)
WL	WATER LEVEL …% HEIGHT/DIAMETER
X	SEWER COLLAPSED …% CROSS-SECTIONAL AREA LOSS

MANHOLE NODE: Combined Water	MH 101	PHOTOGRAPHIC PLAN

EXTERNAL PHOTOGRAPH:

INTERNAL PHOTOGRAPH:

MANHOLE NODE: Combined Water	MH 102	PHOTOGRAPHIC PLAN

EXTERNAL PHOTOGRAPH:

INTERNAL PHOTOGRAPH:

MANHOLE NODE: Combined Water	MH 103	PHOTOGRAPHIC PLAN

EXTERNAL PHOTOGRAPH:

INTERNAL PHOTOGRAPH:

MANHOLE NODE: Combined Water	MH 104	PHOTOGRAPHIC PLAN

EXTERNAL PHOTOGRAPH:

INTERNAL PHOTOGRAPH:

MANHOLE NODE: Combined Water	MH 105	PHOTOGRAPHIC PLAN

EXTERNAL PHOTOGRAPH:

INTERNAL PHOTOGRAPH: