FLOOD RISK ASSESSMENT
& DRAINAGE STRATEGY

Proposed Residential Development
Southern Road, Cowlersley, Huddersfield

Reference	RWO/FRADS/Y21220
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4 Park Place
Leeds
LS1 2RU

Tel: +44 (0)113 5323500
info@rwo.group
www.rwo.group

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CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Farrar Bamforth Associates Ltd
51 Trinity Street
Huddersfield
HD1 4DN

This report has been prepared for the sole use and reliance of the above-named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of RWO. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

VERSION	PURPOSE/DESCRIPTION	DATE
1	First Issue	22.06.2022

1.0 EXECUTIVE SUMMARY

This assessment has looked at the drainage and flood risk issues to support a planning application for a proposed residential development at Southern Road, Cowlersley.

The site lies within Flood Zone 1 and is therefore at low risk of flooding from river or sea. NPPF Technical Guidance states all uses of land are appropriate in Flood Zone 1.

As the site is in Flood Zone 1 and the site area is less than 1.0 Hectare no further consideration of flood risk is required.

It is proposed to discharge surface water to the existing watercourse passing though the site which will ultimately be culverted and diverted as part of the proposals. The connection shall be made into the culverted watercourse within the curtilage of the site.

It is proposed to discharge surface water to the existing watercourse at a rate of 3.5 litres/second.

Foul water shall discharge to the 225 diameter combined public sewer system within Southern Road.

2.0 INTRODUCTION

RWO Associates (RWO) has been instructed by Farrar Bamforth Associates Ltd to prepare a Flood Risk Assessment and Drainage Strategy to support a planning application for a proposed residential development at land off Southern Road, Cowlersley.

The proposed development comprises of a single dwelling served via a proposed single private drive access off of Southern Road.

3.0 THE SITE

The site is located at the south western end of the Southern Road in Cowlersley, approximately 3.5km to the south west of Huddersfield. The approximate centre of the site is located at NGR SE 11292 15386.

The site is located in a residential area surrounded by existing private dwellings. Vehicular access can be made directly onto Southern Road. The site currently comprises undeveloped grassland/overgrown vegetation.

An existing culverted stream/minor watercourse issues within the site flowing through the development in a northerly direction before entering an existing headwall where the watercourse is then culverted again as it exits the development site. It is proposed that this minor watercourse shall be diverted as part of the development works.

The site shall be designer such that shoulf outfall become blocked, water flow ovrland and exit the site onto Southern Road colleting in the existing highway draiage system.

The site is mainly rectangular in shape with the south western boundary roughly two thirds the length of the north eastern boundary. The site covers an area of approximately 0.048 Ha. A site location plan is included in Appendix A and an aerial photograph is presented in Figure 1 below.



Figure 1 – Site location (site boundary indicated in red)

The site slopes in a northerly direction from the highest point in the southern corner, towards the north. The total fall across the site is approximately 2.6m. A copy of the site topographic survey is provided in Appendix B.

4.0 EXISTING DRAINAGE

Records obtained from Yorkshire Water are provided in Appendix D which indicate the following public sewer in close proximity to the site:

- A 225mm combined water public sewer is recorded in Southern Road at the junction with Western Road to the north east of the site.

The nearest watercourse is an un-named watercourse passing through the development site.

In close proximity to each other approximately 0.35km to the north of the development site, are the watrecourses known as the Colne from Wessenden Brook and the Huddersfield Narrow Canal east section.

5.0 PROPOSED DEVELOPMENT

The proposed development comprises a new single residential dwelling along with detached garage and single vehicular point of access with associated utilities.

A proposed site layout plan is included in Appendix C.

6.0 FLOOD RISK

The site under consideration is located within Flood Zone 1 on the latest version of the Indicative Floodplain Maps produced by the Environment Agency (EA) a copy of the flood map is provided in Appendix E.

Flood Zone 1 is defined in Planning Practice Guidance as a low-risk area, which comprises land assessed as having less than 1 in 1,000 annual probability of river or sea flooding (0.1%).

Planning Practice Guidance states that all uses of land are appropriate in Flood Zone 1.

The proposed site usage falls within the 'more vulnerable' category as identified in the Planning Practice Guidance Table 2: Flood Risk Vulnerability Classification. As such the exception test, will not need considering based on the Planning Practice Guidance Table 3: Flood risk vulnerability and flood zone 'compatibility'.

As the site is in Flood Zone 1 and the site area is less than 1.0 Hectare no further consideration of flood risk is required.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Table 1 – 'Planning Practice Guidance Table 1: Flood Risk Vulnerability Classification'

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) has to cross the area at risk. • Essential utility infrastructure has to be located in a flood risk area for operational reasons, including electricity-generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind Turbines.
Highly Vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunication installations are required to be operational during flooding. • Emergency disposal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure").
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 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 workings and processing (except for sand and gravel working). • Water treatment works do not need to remain operational during times of flood. • Sewerage treatment works (if adequate measures to control pollution and manage sewerage during flooding events are in place).
Water-compatible development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of defence installations. • Shipbuilding, repairing, dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastal stations. • Amenity open space, nature conversation 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 specific warning and evacuation plan.*

Table 2 – 'NPPF Table 2: Flood Risk Vulnerability Classification'

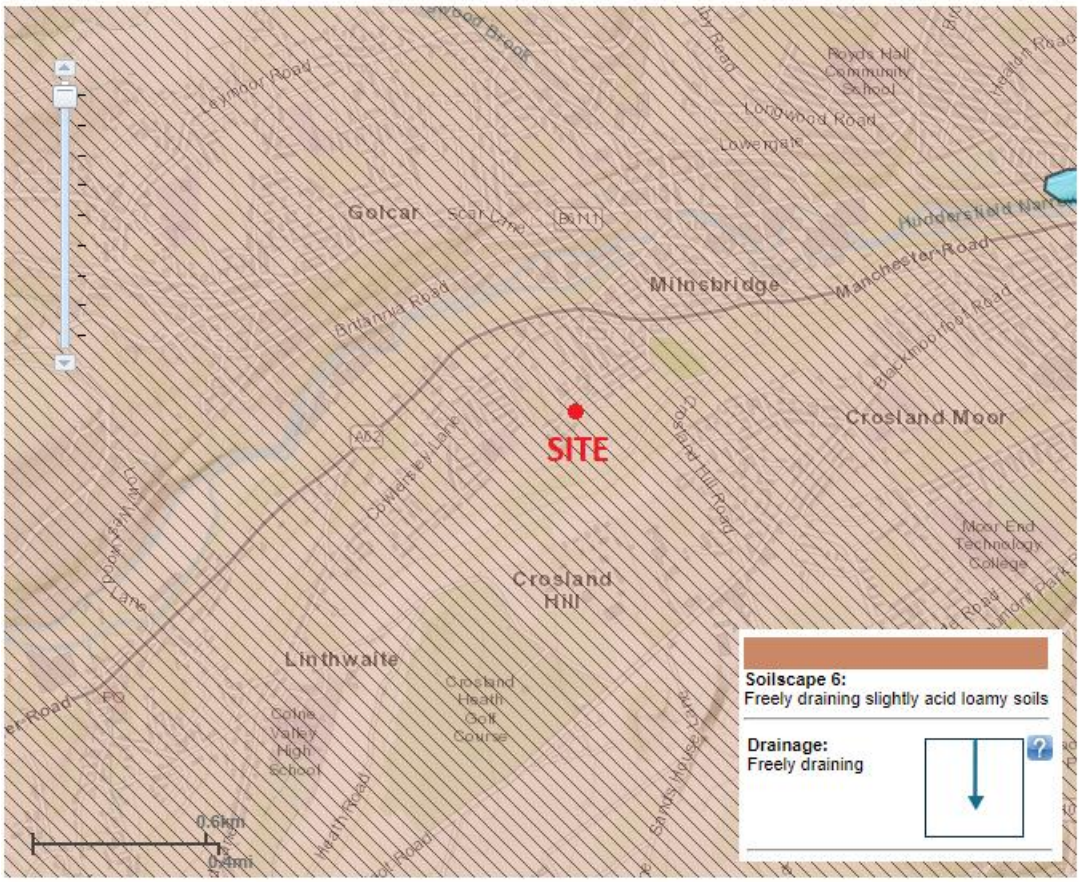
7.0 SURFACE AND FOUL WATER DRAINAGE

The proposed site drainage will comprise a separate foul and surface water drainage system.

The following summarises the requirements for the disposal of surface and foul water from the site.

Sustainable Urban Drainage Systems (SUDS)

A review of the Soilscapes geology maps has been undertaken. A copy of the soil mapping is provided in Figure 2 which indicates the soil strata and details of the natural drainage. Soils are anticipated as being Soilscape type 6 comprising of freely draining slightly acid loamy soils.



It is recommended that further investigations are undertaken on site in accordance with BRE Digest 365 to ascertain if infiltration methods are acceptable on the site.

It should be noted that soakways should be located 5m away from buildings.

Should further investigations conclude that infiltration methods are not deemed feasible Sustainable Urban Drainage System (SUDS) may be used in conjunction with conventional drainage systems to improve water quality as well as manage surface water discharge.

The following audit has been carried out relating to the suitability of SUD's systems:

Drainage Method	Description/Suitability	Proposal/Feasibility
1. Infiltration.	Methods may be suitable subject to soakaway tests.	Applicable.
2. Ponds and wetlands.	Not suitable due to steep incline of site	Not applicable.
3. Infiltration Basins.	No land available.	Not applicable.
4. Detention Basins.	No land available	Not applicable.
5. Swale.	May be utilised to convey water.	Applicable.
6. French/Filter drain.	May be utilised to convey water.	Applicable.
7. Pervious/Permeable Pavement.	Methods may be suitable subject to soakaway tests.	Applicable.
8. Geocellular Systems/Tank systems.	May be used as surface water attenuation.	Applicable.
9. Oversized pipes.	May be used as surface water attenuation.	Applicable.
10. Box culverts.	May be used as surface water attenuation.	Applicable.
11. Purpose designed tanks.	May be used as surface water attenuation.	Applicable.

Surface Water Drainage

The disposal of surface water shall be in accordance with the Requirement H3 of Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should first be given to discharge to a soakaway/infiltration system, watercourse, and public sewer in that priority order.

As noted in the SUDS sections, the discharge of surface water drainage via infiltration methods should be explored in the first instance as a feasible solution.

The second consideration for the disposal of surface water should be discharged to a watercourse.

It is proposed that surface water may discharge to the existing ditch/ minor watercourse passing through the development site which is culverted prior to exiting the site in a northerly direction.

As the site is currently undeveloped and considered greenfield, any proposed surface water flows would need to be discharged at a greenfield runoff rate. A calculation has been undertaken using the H R Wallingford tool which indicates a greenfield runoff rate (Qbar) for the site of 0.14 litres/second. A copy of the greenfield runoff calculation is provided in Appendix F.

It is proposed to discharge surface water to the existing watercourse at a rate of 3.5 litre/second being the minimum practical discharge rate for a flow control device with an orifice of 75mm.

In the event a discharge to the watercourse is deemed unsuitable, the third option would be to discharge surface water to the combined public surface water sewer in Southern Road to the northeast of the site at a greenfield rate (or minimum discharge rate agreed with Yorkshire Water).

A schematic drainage layout plan and detailed Microdrainage calculations are provided in Appendix G. The calculations have been prepared to meet Kirklees Council current design criteria with an increased climate change allowance of 45% in line with the Environment Agency's updated climate change allowance guidance May 2022 as set out below;

- Design storm – 1:100 Year
- Climate change allowance – 45%
- Urban creep allowance –0%
- Volumetric run-off coefficient (CV) – 0.84

Should infiltration not be viable and a positive drainage system be implemented, surface water discharge from the site will be restricted and on-site surface water attenuation provided. The following provides an initial calculation of the approximate volumes of attenuation using the 'Quick Storage Estimate' element of Windes Microdrainage:

Attenuation Volumes

Storage Design Parameters

- M5-60 = 19.000
- Ratio R = 0.302
- CV = 0.84

The Site

- Restricted discharge rate = 3.50 litres/second.
- Proposed Impermeable area = 0.017 ha
- 1:30 Year Return Period) = between 0.0m^3 and 1.5m^3
- 1:100 Year Return Period (+45% cc) = between 1.3m^3 and 4.5m^3

The proposed on-site drainage system shall be designed in accordance with the following as defined in NPPF Technical Guidance:

- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall events (including an allowance of 45% for the effects of future climate).

Foul Water Drainage

Foul water shall discharge to the 225 diameter combined public sewer system within Southern Road.

Details will need to be agreed with Yorkshire Water via a Section 106 connection agreement.

8.0 CONCLUSIONS

This assessment has looked at the drainage and flood risk issues to support a planning application for a proposed residential development at Southern Road, Cowlersley.

The site lies within Flood Zone 1 and is therefore at low risk of flooding from river or sea. NPPF Technical Guidance states all uses of land are appropriate in Flood Zone 1.

As the site is in Flood Zone 1 and the site area is less than 1.0 Hectare no further consideration of flood risk is required.

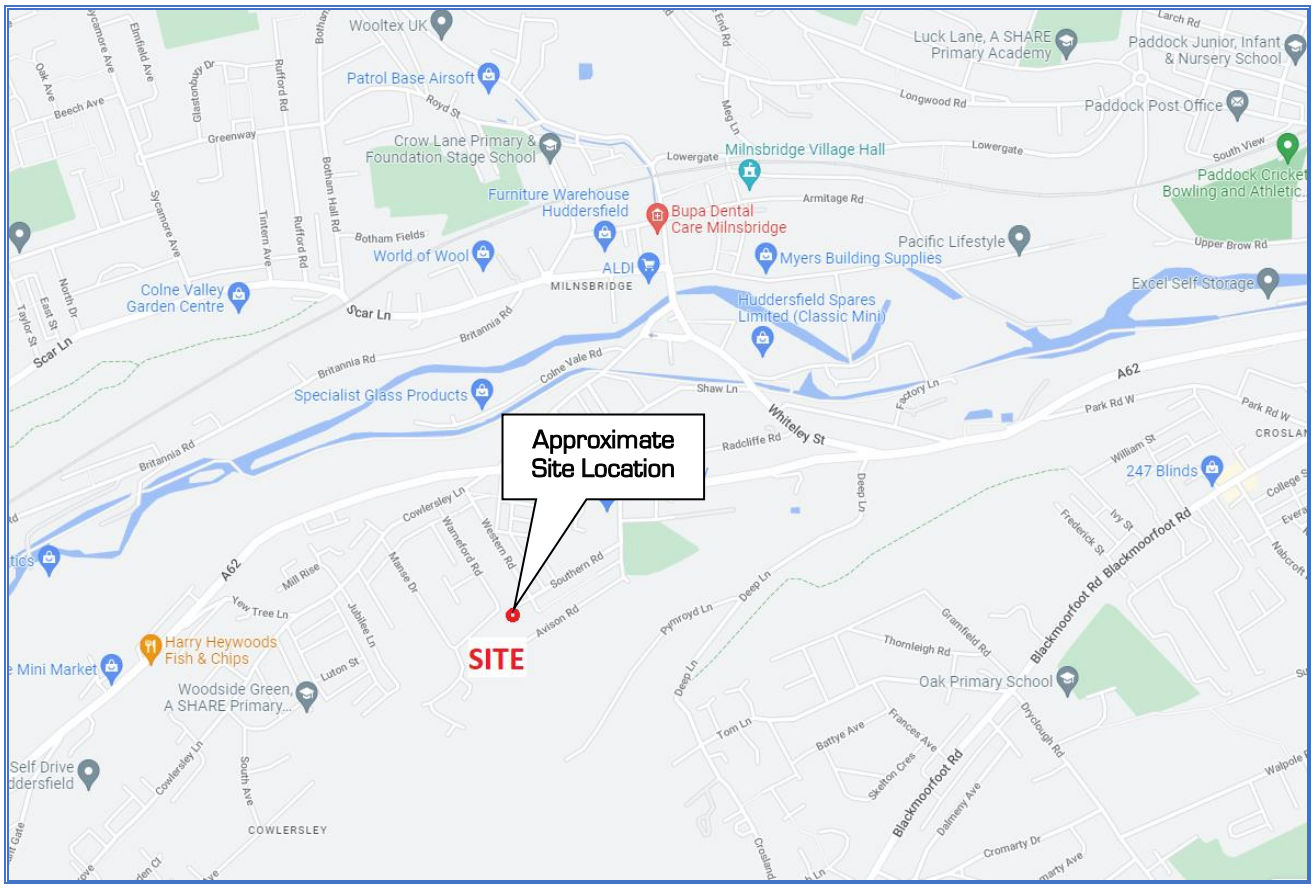
It is proposed that infiltration testing should be investigated on site through the means of intrusive investigation in accordance with BRE Digest 365.

Should it be concluded that infiltration is not viable it is proposed that surface water may discharge to the existing ditch/ minor watercourse passing through the development site which is culverted prior to exiting the site in a northerly direction. This ditch is to be diverted as part of the development works.

Foul water shall discharge to the 225 diameter combined public sewer system within Southern Road.

Rik Binnersley
For and behalf of RWO

Appendix A Site Location Plan



Location Map	
Site	Land off Southern Road, Cowlersley, Huddersfield
Client	Farrar Bamforth Associates Ltd
Job Number	Y21220
Scale	NTS

Appendix B Topographic Survey

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Appendix C Site Layout Plan

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Appendix D Yorkshire Water Sewer Records Plan

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Appendix E Gov.UK Flood Map

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Appendix F Greenfield Run-off Rate Calculation

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Appendix G Schematic Drainage Layout & Microdrain Calculations

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