FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

Proposed Residential Development Woodwalk - Barnsley

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CONFIDENTIALITY STATEMENT

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

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DOCUMENT HISTORY

VERSION	PURPOSE/DESCRIPTION	DATE
1	First Issue - Draft	17.04.20
2	Final Issue	10.07.21

1.0 EXECUTIVE SUMMARY

This assessment has looked at the implications of a proposed residential development in relation to drainage and 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 D.

Flood Zone 1 is defined in the 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.

Other sources of flooding have been assessed and the risk of flooding from these sources is considered to be low and/or manageable with mitigation.

It is proposed to discharge surface water to the 375mm public surface water sewer at manhole ref 2512 in Wombwell Road at a rate of 6.1 litres/second, this being the equivalent greenfield discharge rate for the site. As surface water discharge from the sites will be restricted, on-site surface water attenuation will be provided.

Foul water disposal shall be in accordance with the Yorkshire Water pre-development enquiry response, to the 225mm diameter public combined sewer recorded in Woodwalk, at a point to the southwest of the site.

2.0 INTRODUCTION

RWO Associates (RWO) has been instructed by Yelcon Limited to prepare a Flood Risk Assessment and Drainage Strategy to support a planning application for a proposed residential development at Woodwalk, Barnsley.

3.0 THE SITE

The proposed development site is in Wombwell located in the Metropolitan Borough of Barnsley in South Yorkshire, approximately 5Km to the southeast of Barnsley town centre. The site centred ordnance survey reference is SE 37356 01725. A site location plan is provided in Appendix A and an aerial photograph is presented in Figure 1 below.



Figure 1 – Site location (Red line indicates the approximate extents)

The site area is approximately 3.6 Ha, the majority of which is currently used as agricultural land. A small wooded area exists to the east of the site.

Public highways bound the site to the north, east and south with further agricultural land and residential properties to the west.

A topographic survey of the site is provided in Appendix B which indicates the site is elevated in the centre falling to the east and west with a slight incline to the south. The levels to the centre of the site are in the region of 138.50-139.00m AOD, levels to the west vary between 134.30-135.30m AOD and to the east 132.00-133.00m AOD. The boundaries to the north and east sit at an elevated position above the adjacent public highways.

4.0 EXISTING DRAINAGE

A public sewer record plan obtained from Yorkshire Water is provided in Appendix E which identifies the following public sewers in the vicinity of the site;

- A 375mm public surface water sewer and several combined sewers are recorded Wombwell Road to the southwest of the site
- Foul, combined and surface water sewers are recorded in the residential areas to the southwest of the site.

The sewer record plan indicates a short section of open watercourse to the southwest of the site, denoted as a light blue line.

An enquiry has been raised with Barnsley MBC who advised they have no records of a watercourse in close proximity of the site.

The topographic survey included in Appendix B indicates a manhole cover to the western tip of the site, it is unclear if this located on the public combined sewer or is another drain. It is suggested this is investigated on-site to confirm.

5.0 PROPOSED DEVELOPMENT

It is proposed to develop the sites for residential purposes which will consist of 84 dwellings, along with associated roads, drainage, and site infrastructure.

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 D.

Flood Zone 1 is defined in the 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.

As the site is located within Flood Zone 1 and has an area greater than 1Ha other sources of flooding should be considered.

The proposed site usage falls within the 'more vulnerable' category as identified in the Planning Practice Guidance Table 2: Flood Risk Vulnerably 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'.

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

Table 1 - Planning Practice Guidance Table 3: 'Flood risk Vulnerability Classification'

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, 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 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 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 workings and processing (except for sand and gravel working). • Water treatment works which 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 - Planning Practice Guidance Table 2: 'Flood Risk Vulnerability Classification'

Surface Water (Pluvial) Flooding

The Environment Agency Surface Water (Pluvial) Flood Map provided below indicates the site has a small area of surface water flooding, this is associated with a localised low-lying areas on the site. With the inclusion of positive drainage across the site and new levels, the localised ponding will be removed.

The risk of flooding from this source is therefore considered manageable and low.

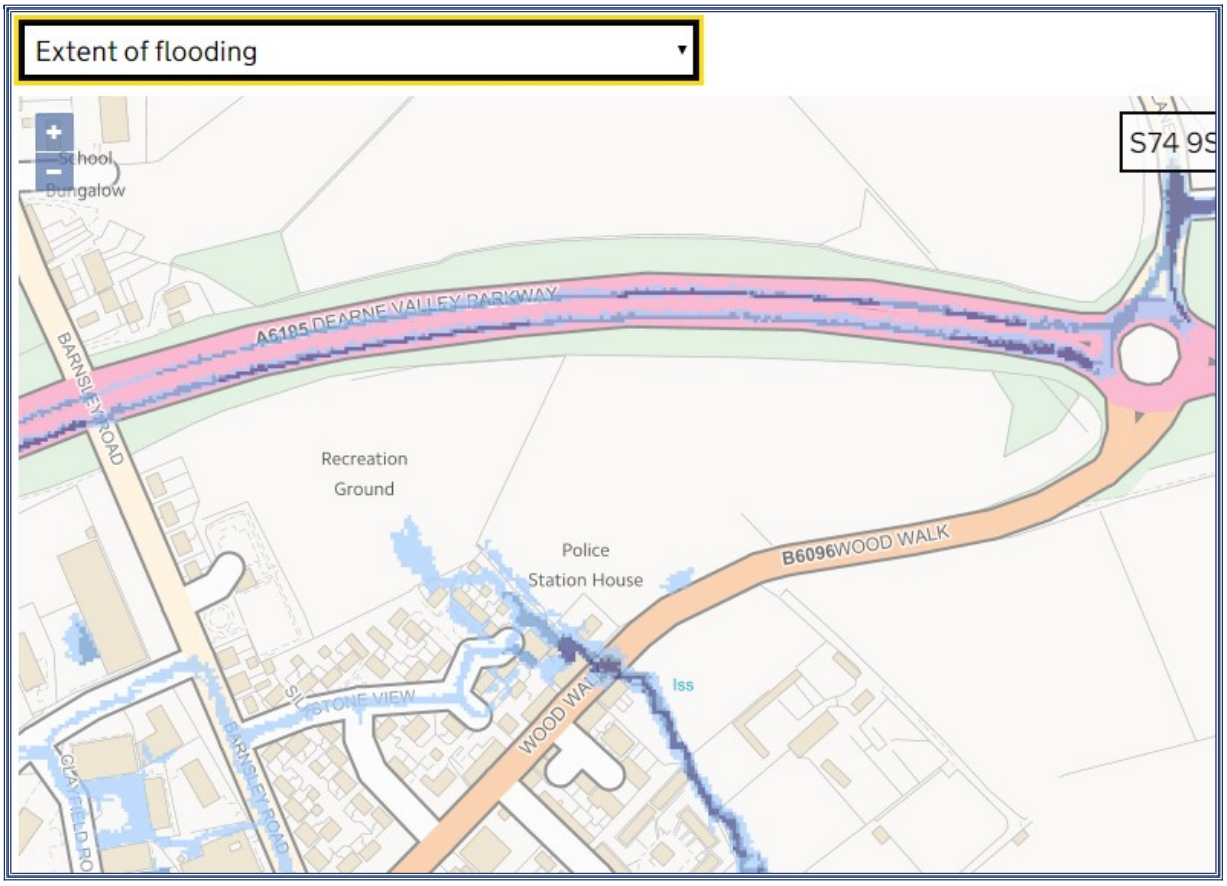


Figure 2 – Surface Water (Pluvial) Flood Map

Groundwater Flooding

The Groundsure Floodview report included in Appendix F advises the site has a 'negligible' risk of flooding from groundwater.

Given the elevated nature of the above the northern and eastern boundaries, it is considered groundwater flooding of the site is unlikely.

Flooding from Sewers

The sewers near the site are public sewers owned by Yorkshire Water and will be subject to regular maintenance and inspection, therefore blockage of these sewers is unlikely.

The risk of flooding from sewers is low.

The measures to mitigate the risks of flooding from new drainage are as detailed in Section 7.0.

Flooding from Reservoirs, Canals and Other Artificial Sources

The flood maps provided on the Gov.UK website indicate the site is not at risk of flooding from reservoirs, a copy of the flood map is provided in Appendix E.

There are no other known artificial sources of flooding in the vicinity of the site.

Historic Flooding

The Groundsure Floodview report included in Appendix F advises there are no records of historic flooding on the site.

7.0 SURFACE AND FOUL WATER DRAINAGE

The proposed site drainage will comprise a separate surface and foul water drainage system. The following summarises the requirements for the discharge of surface and foul water from the site.

Sustainable Urban Drainage Systems (SUDS)

A review of the Soilscapes geology maps has been undertaken which identifies the site to be underlain by differing strata. To the south the underlying ground comprises 'slowly permeable seasonally wet slight acid loamy and clayey soils', and to the north comprising 'freely draining slightly acid loamy soils'. A copy of the soil mapping is provided in Figure 4 below.

The actual underlying ground strata will be confirmed by an intrusive ground investigation.

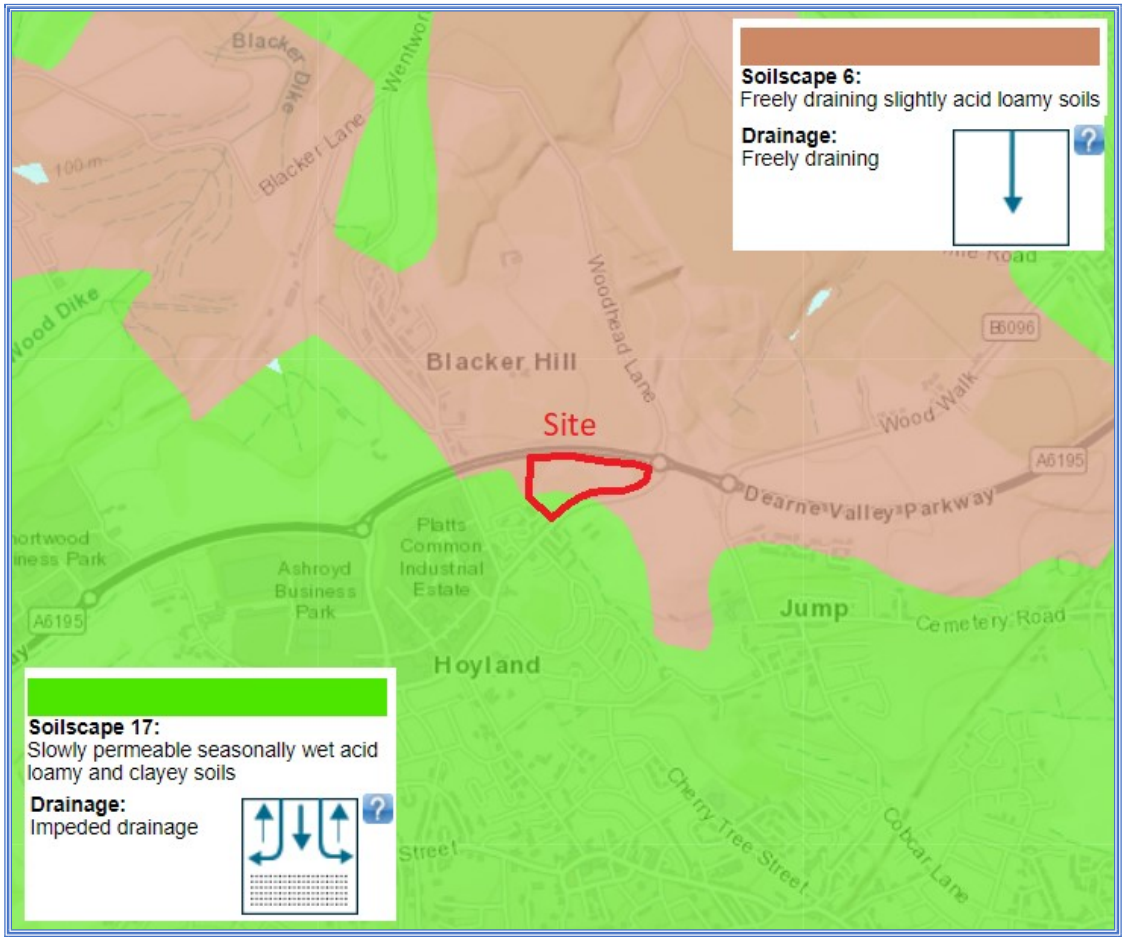


Figure 4 – Soil Types (Soilscapes)

The Coal Authority coal mining records plans indicate the site has been subject to coal mining activities in the past and the underlying ground strata consists of significant depth of backfilled opencast mine workings. A preliminary intrusive site investigation was undertaken in March 2020 comprising a number of trial hole excavations to depths of 4.0m which identified the site to be underlain with made ground.

Given the underlying ground strata, the use of infiltration methods for the discharge of surface water is deemed unsuitable due to potential settlement issues associated with the made ground becoming inundated with surface water.

Whilst the disposal of surface water by infiltration methods is not 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.	Not suitable due to ground strata	Not applicable
2. Ponds and wetlands.	Suitable subject to land being made available	Applicable.
3. Infiltration Basins.	Not suitable due to ground strata	Not applicable
4. Detention Basins.	Suitable subject to land being made available	Applicable.
5. Swale.	May be utilised to convey water/improve water quality.	Applicable.
6. French/Filter drain.	May be utilised to convey water/improve water quality.	Applicable.
7. Pervious/Permeable Pavement.	Not suitable due to ground strata	Not 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 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 is not feasible.

The second consideration for the disposal of surface water should be a discharge to a watercourse, the only known watercourse in close proximity of the site is located to the south of the site, however, a connection to this location is not deemed feasible as access would be required across third party plan.

As infiltration and drainage to a watercourse are not feasible a discharge to sewer is proposed. It is proposed to discharge surface water to the 375mm public surface water sewer at manhole ref 2512 in Wombwell Road at greenfield discharge rates.

Following correspondence with Barnsley MBC, they have confirmed agreement that the applicable greenfield discharge rate for the site is 1.7 litres/second/hectare which equates to a rate of 6.12 litres/second for the site (3.6Ha x 1.7 l/s/ha).