



Nicholas O'Dwyer

Land at Darton Wastewater Treatment Works

Flood Risk Assessment

882193-R1(01)-FRA



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RSK GENERAL NOTES

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK LDE Ltd.

Nicholas O'Dwyer.
 Land at Darton Waste Water Treatment Works
 Flood Risk Assessment
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1 INTRODUCTION

1.1 Context

RSK Land and Development Engineering Ltd (RSK) was commissioned to carry out a Flood Risk Assessment (FRA) for Nicholas O'Dwyer. (the 'client'). This report is provided to assist the assessment of the site to be taken forward to planning for a minor extension to the existing Darton Wastewater Treatment Works (the 'site').

The assessment has been prepared in accordance with the National Planning Policy Framework (NPPF)¹ and its accompanying Planning Practice Guidance², the Interim Code of Practice for Sustainable Drainage³, BS 8533-2011 Assessing and Managing Flood Risk in Development Code of Practice⁴, BS 8582:2013 Code of practice for surface water management for development sites⁵ and the Non-statutory technical standards for sustainable drainage systems⁶, with site-specific advice from the Environment Agency (EA), the Lead Local Flood Authority (LLFA), the Local Planning Authority (LPA), the architect and the client.

The NPPF sets out the criteria for development and flood risk by stating that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.

The key definitions within the PPG are:

- "Flood risk" is a combination of the probability and the potential consequences of flooding from all sources – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources; and
- "Areas at risk of flooding" means areas at risk from all sources of flooding. For fluvial (river) and sea flooding, this is principally land within Flood Zones 2 and 3. It can also include an area within Flood Zone 1 which the EA has notified the local planning authority as having critical drainage problems.

For this site, the key aspects that require the assessment are:

- The EA's indicative flood zone map shows that the majority of the site is located within areas of Flood Zone 2 and Flood Zone 3.

¹ Communities and Local Government, 'National Planning Policy Framework', February 2019.

² Communities and Local Government, 'Planning Practice Guidance - Flood Risk and Coastal Change, ID 7', March 2014. <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

³ DEFRA, 'Interim Code of Practice for Sustainable Drainage Systems' National SUDS Working Group, July 2004.

⁴ BSI, 'BS 8533-2011 Assessing and managing flood risk in development Code of practice', October 2011.

⁵ BSI, 'BS 8582:2013 Code of practice for surface water management for development sites', November 2013.

⁶ DEFRA, 'Sustainable Drainage Systems - Non-statutory technical standards for sustainable drainage systems', March 2015.

1.2 Scope of work

A key element of project development is to prepare a FRA to establish the flood risk associated with the proposed development and to propose suitable mitigation, if required, to reduce the risk to a more acceptable level.

The scope of work relating to a FRA is based on the guidance provided in Section 14 of the NPPF and its accompanying Planning Practice Guidance.

A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. The scope of this assessment therefore comprises the following elements:

- To review architect plans, planning information and other studies to determine existing site conditions;
- To obtain information on the hydrology and hydrological regime in and around the site;
- To obtain the views of the EA/LLFA including scope, location and impacts;
- To determine the extent of new flooding provision and the influence on the site;
- To assess the impact on the site from climate change effects and anticipated increases in rainfall over a 60 year period for utilities uses;

Reliance has been placed on factual and anecdotal data obtained from the sources identified. RSK cannot be held responsible for the scope of work, or any omissions, misrepresentation, errors or inaccuracies with the supplied information. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

The comments given in this report and opinions expressed are subject to RSK Group Service Constraints provided in **Appendix A**.

2 SITE DESCRIPTION

2.1 Existing site

2.1.1 Location

Site Address: Darton Wastewater Treatment Works,
Darton,
Barnsley,
S75 1LY (approx)

Site National Grid Reference: 432428 E, 408872 N

The site is located to the north of Barnsley and is comprised of the existing Darton Wastewater Treatment Works (WwTW). The area outlined for the expansion is approximately 0.22ha in size and is located in the south western corner of the existing WwTW

Table 2.1, below, provides a description of the immediate surroundings of the area of expansion. **Figure 2.1** shows a Site Location Map.

Table 2.1: Site setting

Direction	Characteristic
North	To the immediate north are existing sections of the WwTW with the River Dearne located to the north of the WwTW.
East	To the immediate east are existing sections of the WwTW
South	The south of the site is bounded by open agricultural and scrub lands with the north western most extent of the Barnsley area beyond.
West	The west of the site is bounded by open agricultural and scrub lands with the urban extent of Barugh Green beyond.



Figure 2.1: Site location map (blue outline – boundary of Darton WwTW, red outline – area of expansion).

2.1.2 Land use and topography

A topographic survey has been carried out and is included as **Appendix B**. The survey shows the area outlined is relatively level, with a ground levels ranging from 52.64mAOD to 53.04mAOD.

2.1.3 Hydrology

2.1.3.1 Main River

The closest Environment Agency designated 'Main River' is the River Dearne, located to the north of the site (110m at its closest point) and the overall WwTW, flows in an easterly direction from the region to the west of the M1 / A637 and eventually discharging into the River Don in Doncaster. Areas to the north, east and south of the WwTW are designated as flood storage areas on the Environment Agency's Flood Map for Planning (Figure 4.1).

2.1.3.2 Ordinary watercourse

There are a number of small unnamed watercourses within the wider area which flow into the River Dearne along its course, though none are shown to be located within 50m of the application site.

2.1.4 Geology

2.1.4.1 Desk Study

Based on published geological records for the area (British Geological Survey online mapping), the site exhibits the following geology:

- Superficial Geology: Alluvium - Clay, Silt, Sand And Gravel. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by rivers (U).
- Bedrock Geology: Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone. Sedimentary Bedrock formed approximately 310 to 318 million years ago in the Carboniferous Period. Local environment previously dominated by swamps, estuaries and deltas
- Bedrock Geology: Pennine Middle Coal Measures Formation - Sandstone. Sedimentary Bedrock formed approximately 310 to 318 million years ago in the Carboniferous Period. Local environment previously dominated by swamps, estuaries and deltas

There are a number of BGS boreholes located within the wider vicinity of the site. The closest borehole (SE30NW557) located approximately 425m to the south west of the site shows alternating strata of blue and black shales with occasional clay lenses and notes a rest water level within the well of 70ft (21m) below top of well. Similar horizons are seen in borehole SE30NW64 (located approximately 500m to the east of the site) which shows alternating strata of mudstone, coal, siltstone and sandstone.

A series of Boreholes are recorded as SE30NW50 located 520m to the south of the site which notes depths of made ground in the area to depths ca. 9 – 10m overlying clays. These records also note that water was encountered in the boreholes in the region of 9 – 10m below ground level.

2.1.5 Hydrogeology

Hydrogeological information was obtained from the online 'Magic Map' service. The site is underlain with bedrock geology and superficial geology both designated as a Secondary A aquifer. These are described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers. There are no superficial deposits.

Mapping indicates that the site is not within Groundwater Source Protection Zone.

2.1.6 Existing Infrastructure

Existing utilities records have been provided for the site with the plans included in **Appendix C**.

A 300mm diameter drainage pipe enters the site area via the southern boundary running in a northerly direction towards an open pit (MH6 on Utility Survey drawing – noted as cover missing). A 225mm and a 375mm drainage pipe discharge into the chamber from the north. A drainage pipe of unknown size enters the chamber from the west, with the outfall from the chamber via a 450mm diameter drainage pipe running to the east. A further 225mm upsizing to a 300mm diameter sewer is mapped entering the expansion area from the wider Darton WwTW works to the east. The sewer is shown running for a short distance before becoming unable to trace.

2.2 Development proposals

The proposed development is for a commercial / utilities end use. The current proposals show the inclusion of a new Ferric Dosing Kiosk, Ferric Bulk Storage in Prefabricated Kiosk, a bunded delivery road, delivery blink tank, and a space for Site Cabins and Car Park. The proposals also include for a new access road with turning radii. The latest plan is included in **Appendix D**.

3 LEGISLATION, POLICY AND GUIDANCE

3.1 National policy

Table 3.1: National legislation and policy context

Legislation	Key provisions
National Planning Policy Framework (2019)	The aims of planning policy on development and flood risk are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.
Planning Practice Guidance (2014)	The NPPF is supported by an online Planning Practice Guidance, which provide additional guidance on flood risk.
Flood and Water Management Act 2010 ⁷	The Flood and Water Management Act (FWMA) aims to implement the findings of the 2007 Pitt Review and co-ordinate control of drainage and flood issues. There are a number of increased responsibilities within the Act that affect adoption of SuDS features and the role of the EA to expand on the mapping data they provide. The implementation of SuDS features has many beneficial impacts on the treatment of surface water during remediation works.
Water Resources Act 1991 ⁸	Section 24 – The EA is empowered under this Act to maintain and improve the quality of ‘controlled’ waters Section 85 – It is an offence to cause or knowingly permit pollution of controlled waters Section 88 – Discharge consents are required for discharges to controlled waters
Water Framework Directive (2000) ⁹	The Water Framework Directive (WFD) requires all inland and coastal waters to reach ‘good’ chemical and biological status by 2015. Flood risk management is unlikely to have a significant impact on chemical water quality except where maintenance works disturb sediment (such as de-silting) or where pollutants are mobilised from contaminated land by floodwaters. The main impact of the WFD on flood risk management, both now and in the future, relates to the ecological quality of water bodies. Channel works, such as straightening and deepening, or flood risk management schemes that modify geomorphological processes can change river morphology. The WFD aims to protect conservation sites identified by the EC Habitats Directive and Birds Directive that have water-related features, by designating them as ‘protected sites’.

⁷ Flood and Water Management Act, 2010

⁸ Water Resources Act, 1991

⁹ EU Water Framework Directive, 2000

3.2 Local policy

Table 3.2: Local policy legislation and policy context

Legislation	Key provisions
Barnsley Adopted Local Plan January 2019	Policy CC3 Flood Risk The extent and impact of flooding will be reduced by: • Not permitting new development where it would be at an unacceptable risk of flooding from any sources of flooding, or would give rise to flooding elsewhere; • Ensuring that in the Functional Floodplain (Flood Zone 3b), only water compatible development or essential infrastructure (subject to the flood risk exception test) will be allowed. In either case it must be demonstrated that there would not be a harmful effect on the ability of this land to store floodwater; • Requiring developers with proposals in Flood Zones 2 and 3 to provide evidence of the sequential test and exception test where appropriate; • Requiring site-specific Flood Risk Assessments (FRAs) for proposals over 1 hectare in Flood Zone 1 and all proposals in Flood Zones 2 and 3; • Expecting proposals over 1000 m² floor space or 0.4 hectares in Flood Zone 1 to demonstrate how the proposal will make a positive contribution to reducing or managing flood risk; and • Expecting all development proposals on brownfield sites to reduce surface water run-off by at least 30% and development on greenfield sites to maintain or reduce existing run-off rates requiring development proposals to use Sustainable Drainage Systems (SuDS) in accordance with policy CC4; and • Using flood resilient design in areas of high flood risk

3.3 Area guidance

Table 3.3: Area Guidance

Study	Overview of key provisions and policies
Barnsley Strategic Flood Risk Assessment (Level 1) Sept 2010	The principle aim of the SFRA was to map all forms of flood risk in order to provide an evidence base to locate new development. It also aims to provide appropriate policies for the management of flood risk, and identify the level of detail required for site-specific FRAs. The SFRA contains information and maps detailing flood sources and risks. The site is not referred to specifically within the SFRA however associate mapping appended to the SFRA does show the outlines of

Study	Overview of key provisions and policies
	historic flood events which have occurred in the immediate vicinity of the site.

3.4 Site-specific consultation

As part of this assessment, the following authorities have been contacted to obtain relevant data/guidance and establish key site constraints:

Table 3.4: Key site-specific consultations

Consultee	Date issued	Enquiry	Appendix
Environment Agency (EA)	December 2020	A pre-application enquiry submitted to obtain further flood information and policy guidance. The response is currently pending	Appendix E

Key findings are referred to in the relevant part of Section 4 and full details are contained in the relevant appendices.

4 SOURCES OF FLOOD RISK

4.1 Criteria

In accordance with the NPPF¹ and advice from the EA, a prediction of the flood sources and levels is required along with the effects of climate change from the present for the design life of the development (in this case assumed to be 60 years).

Changes to climate change guidance in February 2016 indicate that increased allowances in peak river flow and rainfall intensity should now be incorporated within any assessment. The appropriate allowance for peak river flow is based on the site's location in the country, the lifetime of development, the relevant flood zone and the vulnerability of the proposed end use.

The flood risk elements that need to be considered for any site are defined in BS 8533 as the "Forms of Flooding" and are listed as:

- Flooding from rivers (fluvial flood risk);
- Flooding from the sea (tidal flood risk);
- Flooding from the land;
- Flooding from groundwater;
- Flooding from sewers (sewer and drain exceedance, pumping station failure etc); and
- Flooding from reservoirs, canals and other artificial structures.

The following section reviews each of these in respect of the subject site.

4.2 Flooding from rivers (fluvial flood risk)

4.2.1 Main river

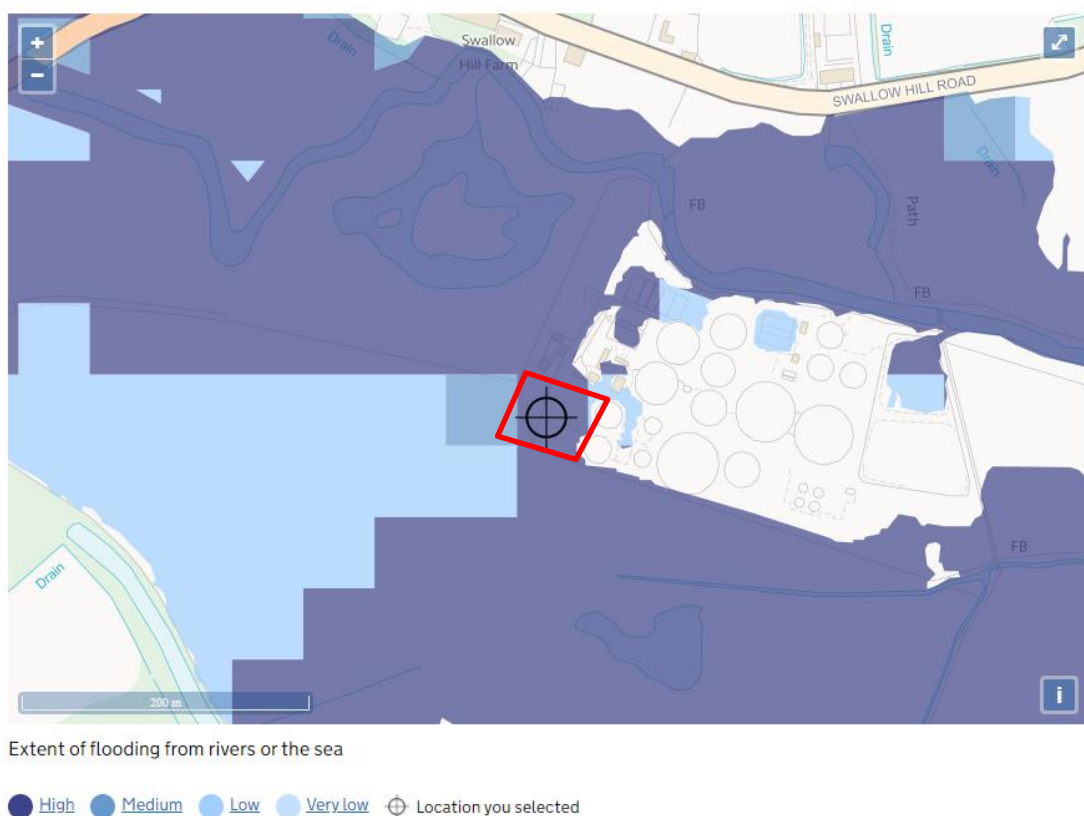
The EA Flood Zone mapping study for England and Wales is available on their website at: <https://flood-map-for-planning.service.gov.uk>.

The latest Environment Agency published flood zone map (**Figure 4.1**) shows overall Darton WwTW to be primarily located in Flood Zone 1, though the area outlined for the expansion is located within Flood Zone 2 and 3 representing a **Medium** to **High** risk of flooding to the site.

In December 2013, the EA released an additional form of mapping 'Risk of Flooding from Rivers and Sea', which is available at:

<https://flood-warning-information.service.gov.uk/long-term-flood-risk>

The latest 'Risk of Flooding from Rivers and Sea' flood map (**Figure 4.2**), which shows the Environment Agency's assessment of the likelihood of flooding from rivers and the sea at any location and is based on the presence and effect of all flood defences, predicted flood levels, and ground levels, indicates that the area outlined for expansion is considered to be at a '**High**' risk of flooding.



4.2.2 Modelled Fluvial Flood Risk

The Environment Agency have been contacted with a request for modelled flood levels at this location.

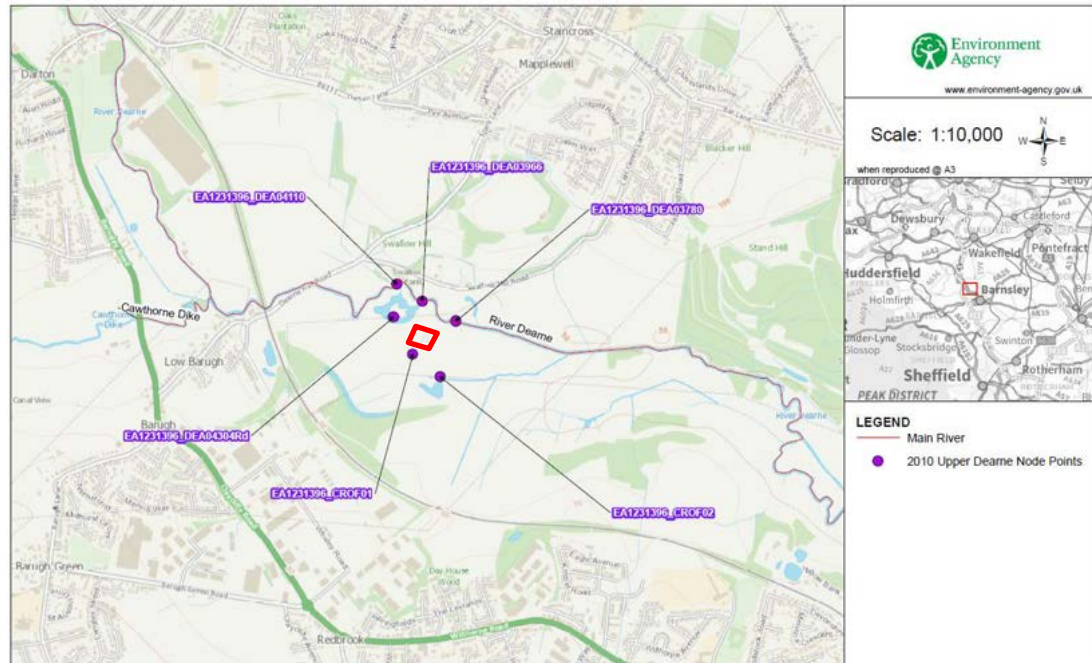


Figure 4.3: Model data node locations

Figure 4.3 outlines the node locations provided by the Environment Agency for the River Deane and its tributaries, with the modelled flood levels in the immediate vicinity of the site provided in Table 4.1. The full Environment Agency dataset is included in **Appendix E**.

Table 4.1: Environment Agency modelled water levels for the River Deane (levels in mAOD, flows in m³/s)

Node Location	AEP									
	4% (1 in 25)		2% (1 in 50)		1.33% (1 in 75)		1% (1 in 100)		0.1% (1 in 1000)	
	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
Crofo1	51.23	0.1	51.23	0.1	51.23	0.1	51.23	0.1	52.78	0.1
DEA04304Rd	52.15	0	52.81	0	52.91	0.01	52.98	0.16	53.38	11.79
DEA03966	52.56	59.12	52.73	70.54	52.81	75.72	52.88	82.83	53.20	120.11
DEA03780	52.38	50.84	52.57	54.75	52.66	57.23	52.74	59.68	53.01	83.24

It should be noted that the climate change allowance provided by the EA for a 20% uplift in river flows and therefore consideration should be given to the latest allowances.

4.2.3 Climate change

Fluvial flooding is likely to increase as a result of climate change. A greater intensity and frequency of precipitation is likely to raise river levels and increase the likelihood of a river overtopping its banks. In accordance with a request from the Environment Agency, updated climate change allowances have been considered in the location of the development area.

In accordance with the climate change allowance guidance the central and higher central allowance in the peak river flows in the Humber River Basin District should be considered. The central allowance for the 2080s is a 20% flow increase (data provided in EA response) and for the higher central allowance for the 2080s is a 30% flow increase.

Consideration of these climate change levels has been applied to Node DEA03966 (slightly upstream of the site) and Node DEA03780 (slightly downstream of the site).

4.2.3.1 Node DEA03966

Table 4.2 shows the relevant flow and water levels provided by the Environment Agency for Node DEA03966.

Table 4.2: Environment Agency Model Data

	Node DEA03966	
Return Period	Flow (m ³ /s)	Water Level (mAOD)
5	42.34	52.12
10	47.60	52.29
25	59.12	52.56
50	69.33	52.73
75	75.72	52.81
100	82.83	52.88
1000	120.11	53.20

To calculate the water level for the 1% AEP plus 30% climate change increases, a stage / discharge approach has been used. **Figure 4.3** shows the stage / discharge curve used to determine the calculation for the water level for Node DEA03966 to assess the 30% climate change increase in peak river flows.

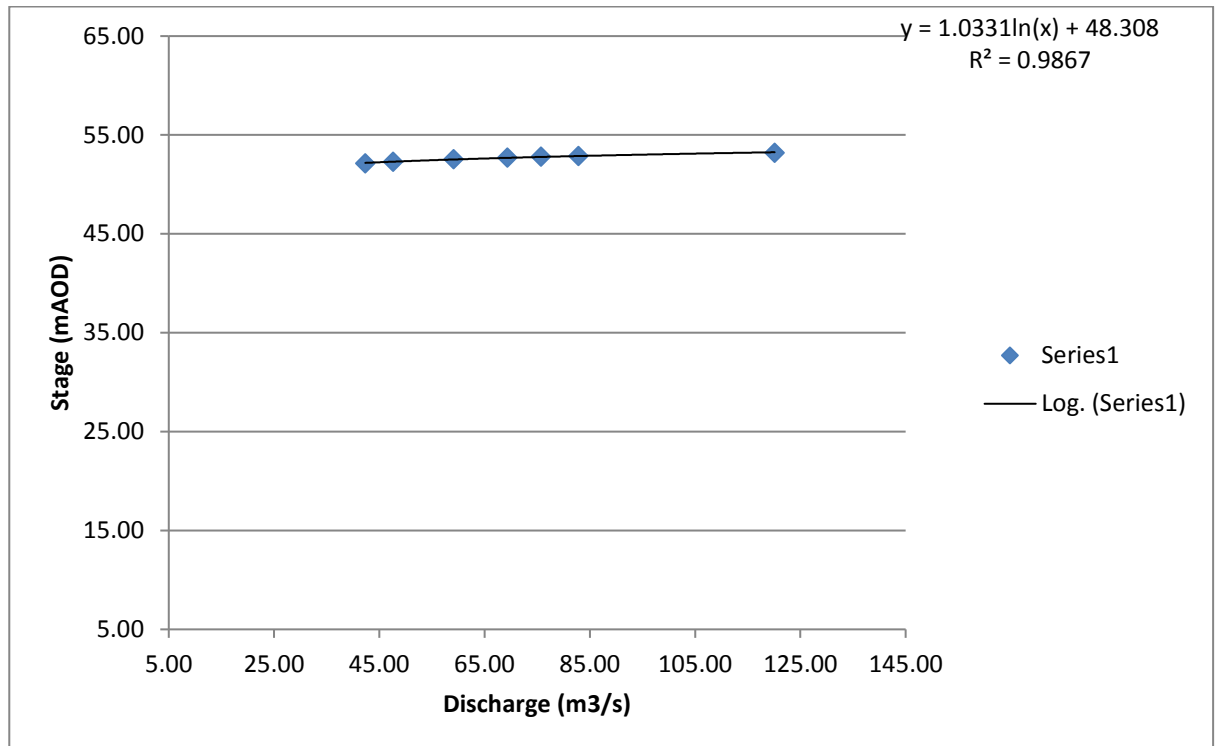


Figure 4.4: Climate Change allowances stage discharge curve (Node DEA03966).

The resulting water level for Node DEA03966 as calculated above in accordance with the climate change allowances guidance is 53.14mAOD for the 1 in 100 year plus 30% climate change as shown in **Table 4.3**.

Table 4.3: Calculated climate change water level (20% and 30% peak flow increase)

Node DEA03966		
Return Period	Flow (m³/s)	Water Level (mAOD)
100	82.83	52.88
100 + 20% CC*	92.88	52.99
100 + 30% CC	107.679	53.14

*20% data provided as part of EA product 4 dataset

4.2.3.2 Node DEA03780

Table 4.5 shows the relevant flow and water levels provided by the Environment Agency for Node DEA03780.

Table 4.5: Environment Agency Model Data

	Node DEA03780	
Return Period	Flow (m³/s)	Water Level (mAOD)
5	41.93	51.87
10	45.42	52.07
25	50.84	52.38
50	54.78	52.57
75	57.23	52.66
100	59.68	52.74
1000	83.24	53.01

To calculate the water level for the 1% AEP plus 30% climate change increases, a stage / discharge approach has been used. **Figure 4.3** shows the stage / discharge curve used to determine the calculation for the water level for Node DEA03780 to assess the 30% climate change increase in peak river flows.

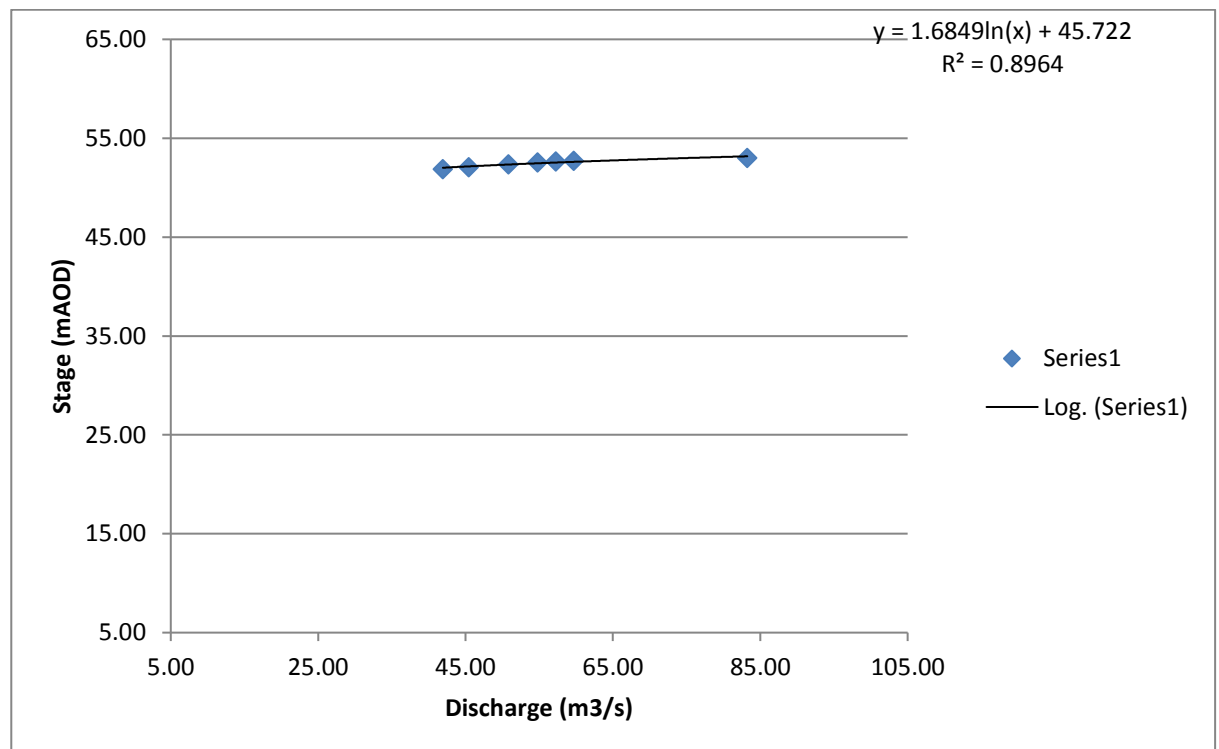


Figure 4.5: Climate Change allowances stage discharge curve (Node DEA03780).

The resulting water level for Node DEA03780 as calculated above in accordance with the climate change allowances guidance is 53.05mAOD for the 1 in 100 year plus 30% climate change as shown in **Table 4.6**.

Table 4.6: Calculated climate change water level (20% and 30% peak flow increase)

Node DEA03780		
Return Period	Flow (m ³ /s)	Water Level (mAOD)
100	59.68	52.74
100 + 20% CC*	64.88	52.84
100 + 30% CC	77.584	53.05

*20% data provided as part of EA product 4 dataset

In accordance to the Environment Agency definitions, the flood risk to the site is classed as **High**.

4.2.4 Historic Mapping

Historical mapping included with the SFRA shows the historical flood extents of event in Autumn 2000 and June 2007 impacting the immediate area surrounding the site. The provided Environment Agency mapping contained within Appendix E shows the extent of the 2000 and 2007 extents around the site. The Environment Agency mapping suggests that the site would have been impacted by the Autumn 2000 event, with a spot flood level shown close to the site of 53.25mAOD (though the return period for this event is unknown) . Whilst the mapping provided by the Environment Agency suggests that the area outlined for development was impacted by the flooding event in 2000, it is not clear to what extent the site or the operations of the WwTW were impacted at the time.

4.3 Flooding from the sea (tidal flood risk)

The site is not considered to be at risk from tidal flooding due to its inland location and elevated position indicating a '**very low**' risk of flooding.

4.3.1 Climate change

Climate change is not considered to result in an increased risk of tidal flooding to the site.

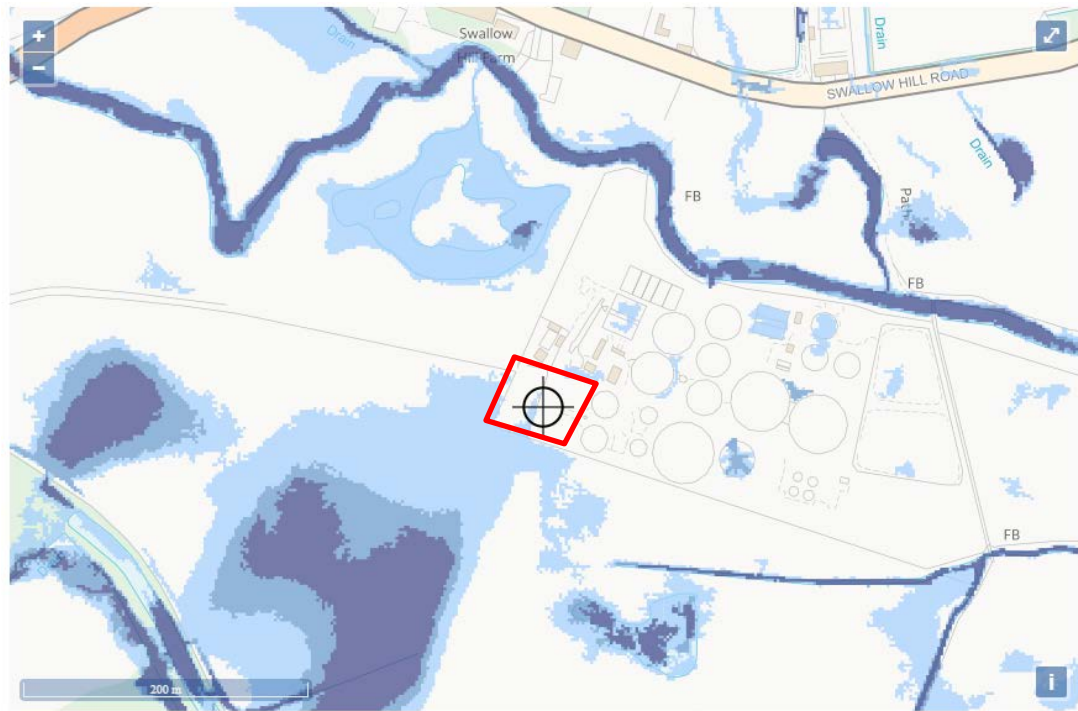
4.4 Flooding from the land (overland pluvial flood risk)

If intense rain is unable to soak into the ground or be carried through manmade drainage systems, for a variety of reasons, it can run off over the surface causing localised floods before reaching a river or other watercourse.

Generally, where there is impermeable surfacing or where the ground infiltration capacity is exceeded, surface water runoff will occur. Excess surface water flows from the site are believed to drain naturally to the local water features, either by overland flow or through infiltration.

The Environment Agency's surface water flood map (**Figure 4.6**) shows that the risk posed to the site from pluvial flooding is predominantly very low across the site with a minor area at low risk encroaching from the southern boundary.

The development of the site will ensure that this existing potential flood risk is taken into account and will seek to reduce runoff rates from the site during the more extreme rainfall events.



Extent of flooding from surface water

● High ● Medium ● Low ○ Very low ⊕ Location you selected

Figure 4.6: Environment Agency 'Flood risk from surface water' map (accessed December 2020)

4.4.1 Climate change

Surface water flooding is likely to increase as a result of climate change in a similar ratio to fluvial flooding. Increased intensity and frequency of precipitation is likely to lead to reduced infiltration and increased overland flow, however due to the topography of the site and the very low risk of pluvial flooding, this is unlikely to have an impact on the development area.

4.5 Flooding from groundwater

Groundwater flooding tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional

groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

There is no available information on groundwater in the immediate vicinity of the site, however with reference to the local borehole records, groundwater was noted in the region of 9 – 10m below ground level. There is potential that due to the location of the development in the vicinity of the River Dearne that groundwater levels in this area may be hydraulically linked to the watercourse.

Further to this the SFRA notes that the Coal Authority were consulted with respect to the possibility of flooding caused by the re-emergence of minewaters from the former South Yorkshire mining region following the cessation of minewater pumping. It was determined that the Coal Authority in partnership with the EA and other local mining interests were developing a strategic plan to manage minewater levels to minimise the risk of re-emerging minewaters causing both flooding and water quality issues in the Sherwood Sandstone aquifer

From the above and due to the sporadic nature of groundwater flooding, the design of the development and the possibility of groundwater emergence at the site, it is unlikely that groundwater flooding would be a significant source of risk to the proposed development. However further investigation should be undertaken to further inform the risk posed by groundwater emergence especially during periods of fluvial flooding which may temporarily impact upon the levels of the groundwater table and seasonally wet periods. The resultant groundwater flood risk is considered to be **low** based upon available information.

4.5.1 Climate change

Climate change could increase the risk of groundwater flooding as a result of increased precipitation filtering into the groundwater body. If winter rainfall becomes more frequent and heavier, groundwater levels may increase. Higher winter recharge may however be balanced by lower recharge during the predicted hotter and drier summers. This is less likely to cause a significant change to flood risk than from other sources, since groundwater flow is not as confined. It is probable that any locally perched aquifers may be more affected, but these are likely to be isolated. The change in flood risk is likely to be low.

4.6 Flooding from sewers

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its conveyance capacity, the system becomes blocked or it cannot discharge due to a high-water level in the receiving watercourse. A sewer flood is often caused by surface water drains discharging into the combined sewer systems; sewer capacity is exceeded in large rainfall events causing the backing up of floodwaters within properties or discharging through manholes.

Most adopted surface water drainage networks are designed to the criteria set out in Sewers for Adoption . One of the design parameters is that sewer systems be designed such that no flooding of any part of the site occurs in a 1 in 30-year rainfall event. By definition a 1 in 100-year event would exceed the capacity of the sewer network as well as any proposed drainage.

Based on the site use as a WwTW there is a network of sewers within the site boundary as noted in Section 2.1.6.

These sewers could be considered to be a source of flood risk to the site and as such would be considered a **medium** risk. Given the operational nature of the site, any sewer exceedance would be factored into the design and operation of the site.

To ensure that sewer and surface water flooding is not exacerbated; surface water must be considered within the design of the site. This ensures that any additional surface water and overland flows are managed correctly, to minimise flood risk to the site and the surrounding area. The proposed surface water network on the site should be designed to ensure exceedance of the network has been considered.

4.6.1 Climate change

The impact of climate change is likely to be negative regarding flooding from sewers. Increased rainfall and more frequent flooding put existing sewer and drainage systems under additional pressure resulting in the potential for more frequent surcharging and potential flooding. This would increase the frequency of local sewer flooding but would not be significant in terms of the proposed development.

4.7 Other sources of flooding

4.7.1 Reservoirs

Flood events can occur from a sudden release of large volumes of water from reservoirs, canals and artificial structures.

The Environment Agency reservoir flood map (reproduced as **Figure 4.7**) shows the largest area that might be flooded if a reservoir were to fail and release the water it holds, with the site lying outside this extent. Since this is a prediction of a worst-case scenario, it is unlikely that any actual flood would be this large.

Reservoir flooding is also extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to ensure reservoirs are maintained.

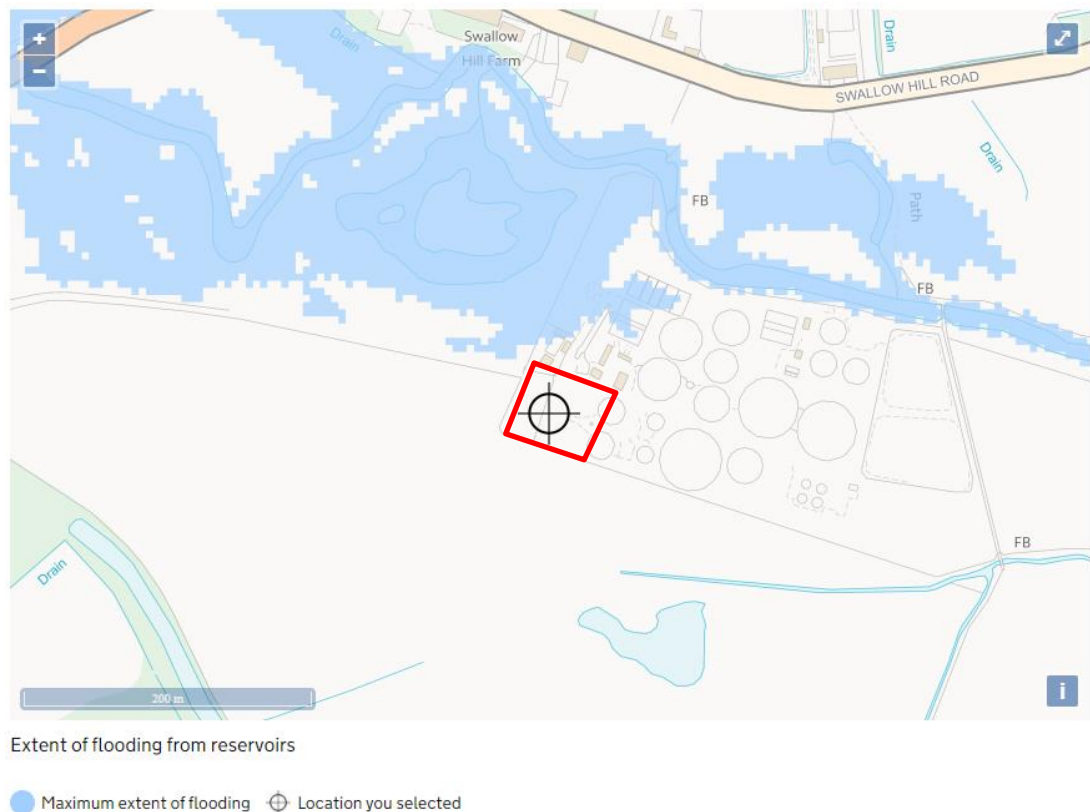


Figure 4.7: Environment Agency ‘Flood risk from reservoirs’ map (accessed December 2020)

Given the unlikelihood of reservoir resultant flood risk is considered to be **low**.

Reservoirs can be managed over time, controlling inflow/outflow of water and therefore there is the capacity to control the effects of climate change. Increased rainfall has the potential to increase base flow, but this should be minimal. It is unlikely that there will be a substantial change to the risk of flooding for this site.

4.7.2 Canals

A short section of disused canal is shown to lie to the south of the site, but with no onwards connections, this is not understood to pose a risk to the site. As a result, the risk to the site from this source is considered **very low**.

4.7.3 Blockages of artificial drainage systems

There is a possibility that flooding may result due to culverts and/or sewers being blocked by debris or structural failure. This can cause water to backup and result in localised flooding, as well as placing areas with lower ground levels at risk.

Aside from the operational facilities on site, there are no known artificial drainage systems located on the site as such, the risk of flooding from artificial drainage systems is considered to be **very low**.

Climate change is unlikely to affect the flooding risk to the site from such blockages.

5 FLOOD MITIGATION MEASURES

5.1 Overview

The expansion area lies primarily within Flood Zone 2, with an ingress of Flood Zone 3 as shown by the Environment Agency's Flood Map for Planning.

5.2 Finished floor levels

As the proposed development is classified as a less vulnerable development and the developable area will be affected by fluvial flooding it is recommended that a measure of freeboard be incorporated into the finished floor levels of the design.

It is recommended that finished floor levels are set a minimum of 300mm above the 100 year plus climate change flood level (53.14mAOD for the 1 in 100 year plus calculated 30% flow increase at DEA03966), as such the minimum FFLs should be set no lower than 53.44mAOD. It is advised that an additional freeboard is considered above the minimum FFLs with respect to any essential switch gear / operational electrical / shut off equipment in line with best practice to ensure the site remains operational in times of flooding or can be shut down and reinitialised once the flood waters recede.

5.3 Safe access/egress

As noted, the expansion area lies primarily within Flood Zone 2, with an ingress of Flood Zone 3, though sections of the wider site are shown to be located within Flood Zone 1. These areas would provide safe refuge if required during times of flood and any operation shut down / evacuation plan will accord with any existing procedures in place and the WwTW.

5.4 Easements

The site area does not lie within the immediate vicinity of any watercourse and as such no easements will be required for the development.

6 PLANNING CONTEXT

6.1 Application of planning policy

Section 14 of the NPPF includes measures specifically dealing with development planning and flood risk using a sequential characterisation of risk based on planning zones and the EA Flood Map. The main study requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.

6.2 Land use vulnerability

Planning Practice Guidance (PPG) includes a list of appropriate land uses in each flood zone dependent on vulnerability to flooding. In applying the Sequential Test, reference is made to Table 6.1 below, reproduced from Table 3 of PPG.

Table 6.1: Flood risk vulnerability and flood zone ‘compatibility’

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
	Zone 2	Appropriate	Appropriate	Exception Test Required	Appropriate	Appropriate
	Zone 3a	Exception Test Required	Appropriate	Should not be permitted	Exception Test Required	Appropriate
	Zone 3b functional floodplain	Exception Test Required	Appropriate	Should not be permitted	Should not be permitted	Should not be permitted

With reference to Table 2 of the PPG, the proposed development, based on its wastewater treatment use, is classed as ‘Less Vulnerable’. This classification of development is appropriate for areas within all Flood Zones, with the exception of Flood Zone 3b. As the developable areas of the site are located within Flood Zones 1 - 3, the sequential test is deemed to have been passed and the development considered appropriate.

6.3 Sequential Test

The Sequential Test is required to assess flood risk and the PPG recommends that the test be applied at all stages of the planning process to direct new development to areas



with the lowest probability of flooding where possible. In line with Table 2 of the PPG, the site therefore passes the sequential test and thus the exception test will not be required.

7 CONCLUSIONS AND RECOMMENDATIONS

This FRA complies with the NPPF and Planning Practice Guidance and demonstrates that flood risk from all sources has been considered in the proposed development. It is also consistent with the Local Planning Authority requirements with regard to flood risk.

The development lies primarily in an area designated by the Environment Agency as Flood Zone 2, with a linear expanse of Flood Zone 3 also present within the development area. The development area lies within the boundary of the existing Darton WwTW,

NPPF sets out a Sequential Test, which states that preference should be given to development located within Flood Zone 1. This flood risk assessment demonstrates that the requirements of the Sequential Test have been met, with the developable area of the site located within Flood Zone 2 and 3 and 'Less Vulnerable' classification of the development and the location of the development required to be located in close proximity to a watercourse (as part of the wider Darton WwTW).

This flood risk assessment has considered multiple sources of flooding and concluded the following:

Table 7.1: Flood risk summary

Source	Level of risk	Summary
Fluvial	Medium -High	Developable area is shown to be primarily within Flood Zone 2, with some minor encroachment into Flood Zone 3.
Tidal	Very Low	The site is inland and elevated.
Surface water	Very Low	The existing risk is considered very low
Groundwater	Low	Recorded Groundwater levels do not indicate a risk from Groundwater flooding; however these levels may fluctuate seasonally, this risk is unknown.
Sewers	Low	Sewer records show sewers do cross the site however due to the nature of the site as an operation WwTW. Sewer risk is considered medium to high but likely to be considered within the operation scheme of the WwTW.
Reservoirs	Low	The site is not shown to lie within the mapped reservoir flood risk area.
Artificial sources	Very Low	There are no confirmed sources of artificial flood risk with the WwTW being operated and managed.

Overall, taking into account the above points, the development of the site should not be precluded on flood risk grounds.



APPENDIX A

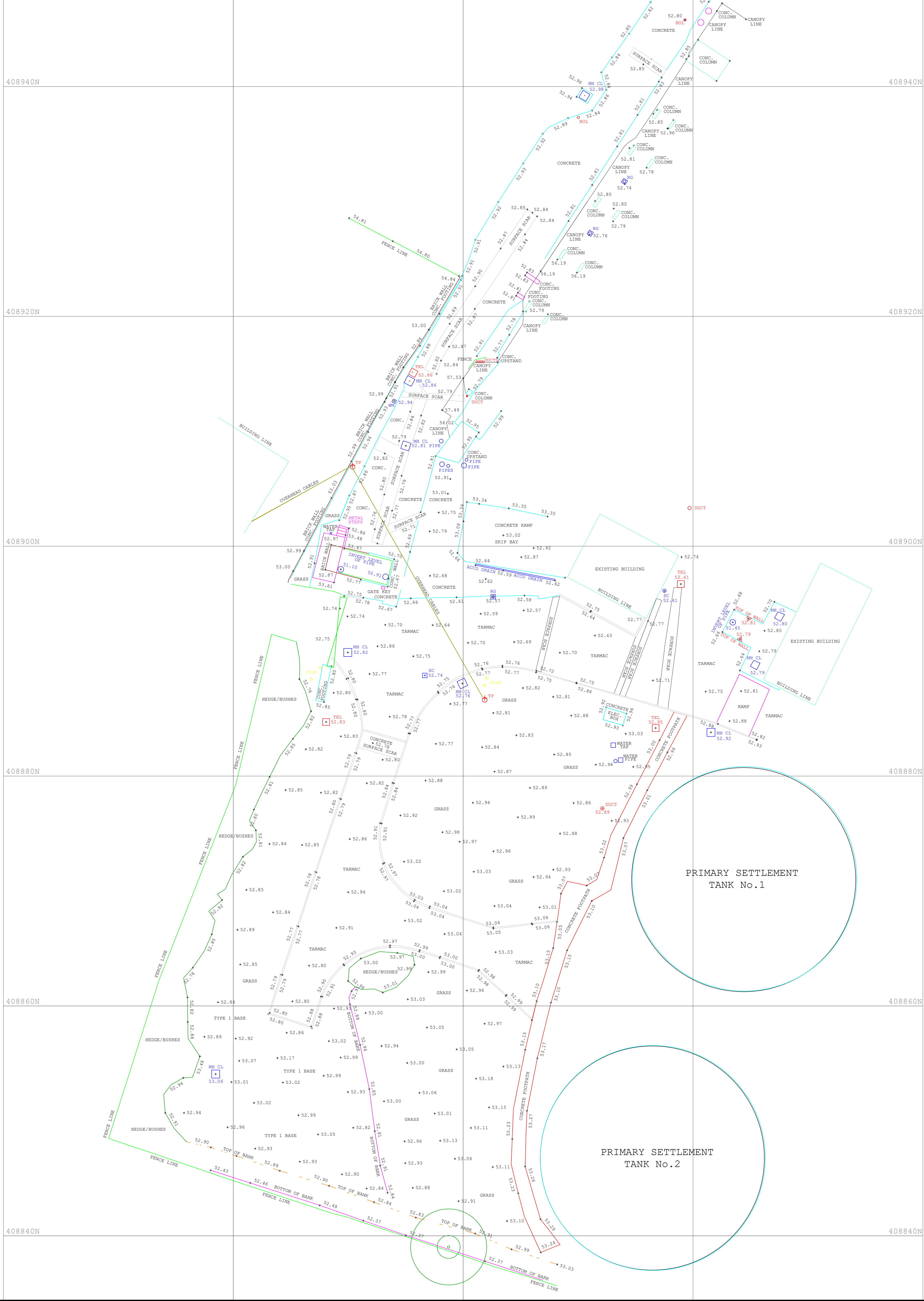
RSK GROUP SERVICE CONSTRAINTS

1. This report and the drainage design carried out in connection with the report (together the "Services") were compiled and carried out by RSK LDE Ltd (RSK) for Nicholas O'Dwyer (the "client") in accordance with the terms of a contract between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable civil engineer at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services, which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.
7. The Services are based upon RSK's observations of existing physical conditions at the site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.
8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the appropriate location. Such features should not be used for setting out and should be considered indicative only.



APPENDIX B

TOPOGRAPHIC SURVEY



Notes

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N

Approximate Direction of North

Layout Key

(1)

Grid : OS National Grid.
Datum : OS Level Datum.

KEY		
AIR VALVE	AV	KERB OUTLET
BENCH MARK	BM	LAMP POST
BIN	BN	MANHOLE (CIRCULAR)
BOLLARD	BOL	MANHOLE (RECTANGULAR)
BORE HOLE	BU	MANHOLE (TRIANGULAR)
BRITISH TELECOM COVER	BT	MARKER POST
BUS STOP	BUS	GULLY
CABLE TV COVER	CATV	RODDING EYE
CABLE TV SUPPLY	CA	SIGN POST
COLUMN	COL	TELECOM COVER
EARTHING POINT	EP	TELEGRAPH POLE
ELECTRICITY COVER	ELEC	THRESHOLD LEVEL
ELECTRICITY POLE	EP	TRAFFIC LIGHT
FIRE HYDRANT	FH	TRIAL PIT
GAS VALVE	GAS	WASH OUT
GATE		WATER METER
INSPECTION COVER (CIRCULAR)	IC	WATER STOP COCK
INSPECTION COVER (RECTANGULAR)	IC	WATER STOP VALVE
COVER LEVEL	CL	CHAMBER BASE LEVEL
INVERT LEVEL	IL	WATER SURFACE LEVEL
UNABLE TO RAISE	UTR	UNABLE TO MEASURE
GIRTH OF TREE TRUNK	G	DIAMETER OF TREE TRUNK
HEIGHT TO TOP OF TREE CANOPH		MULTI BOLE TREE

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Rev	Date	Drawn	Description	Check



MORRIS
INFRASTRUCTURE GROUP UK
— SURVEYING & ENGINEERING DIVISION —

MORRIS INFRASTRUCTURE GROUP UK
60 NOBLE ROAD, Tel : 0113 414 9144
OUTWOOD, WAKEFIELD Web : www.morrisig.co.uk
WEST YORKSHIRE E: jordan.morris@morrisig.co.uk
WF1 2ES

Client
BarhaleDoosan Ltd.
Livingstone House, Leeds

Site
Darton STW
South Yorkshire

Title
Topographical Survey
3D

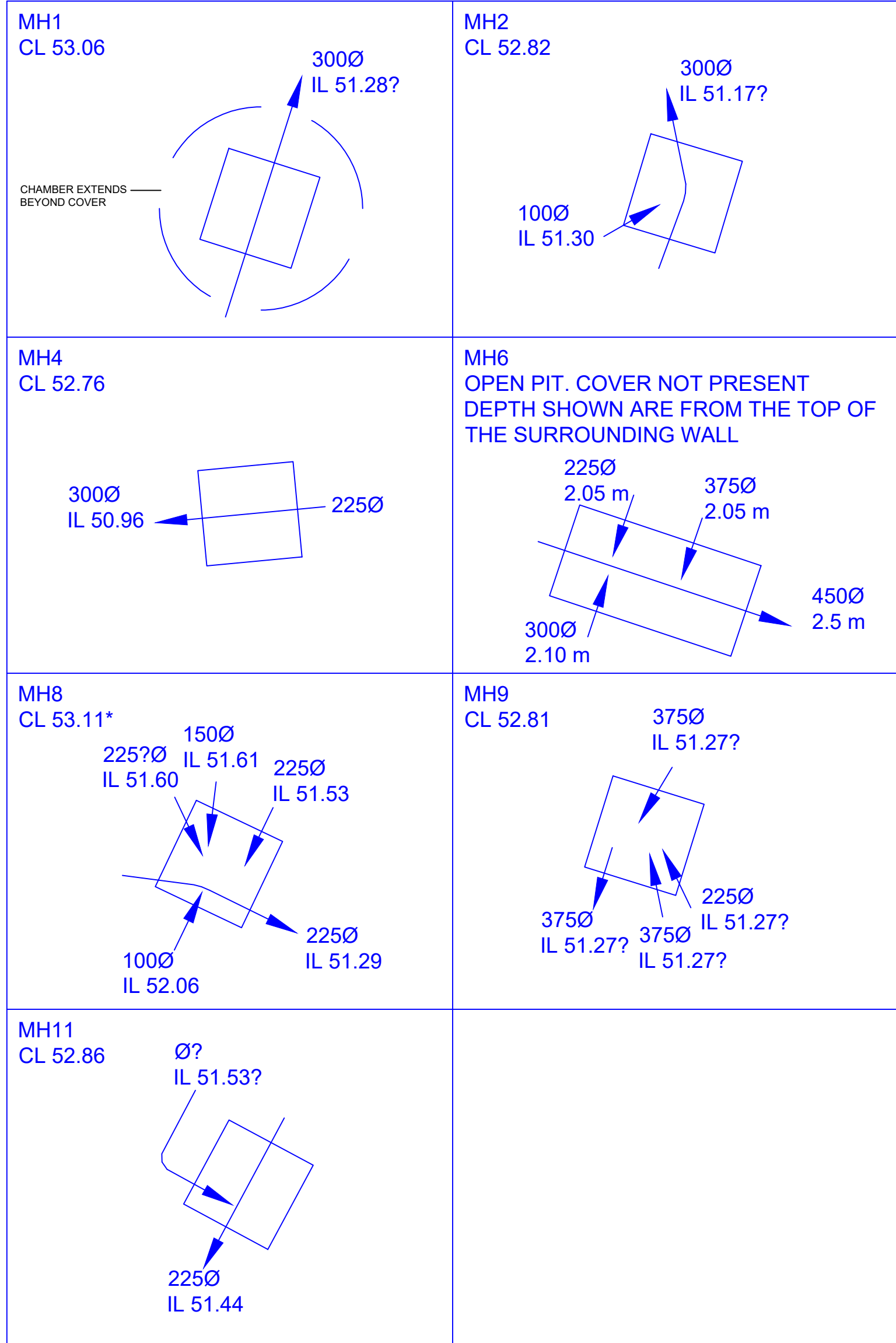
Surveyed	JM,KC,HS	Drawn	KC
Chk.	JM	Date	05/11/20
Scale	[A1 Sheet] 1/200	DWG Ref. (Layout No) MIG_139_3DT	Status FINAL
Job No	MIG_139		Rev Ø



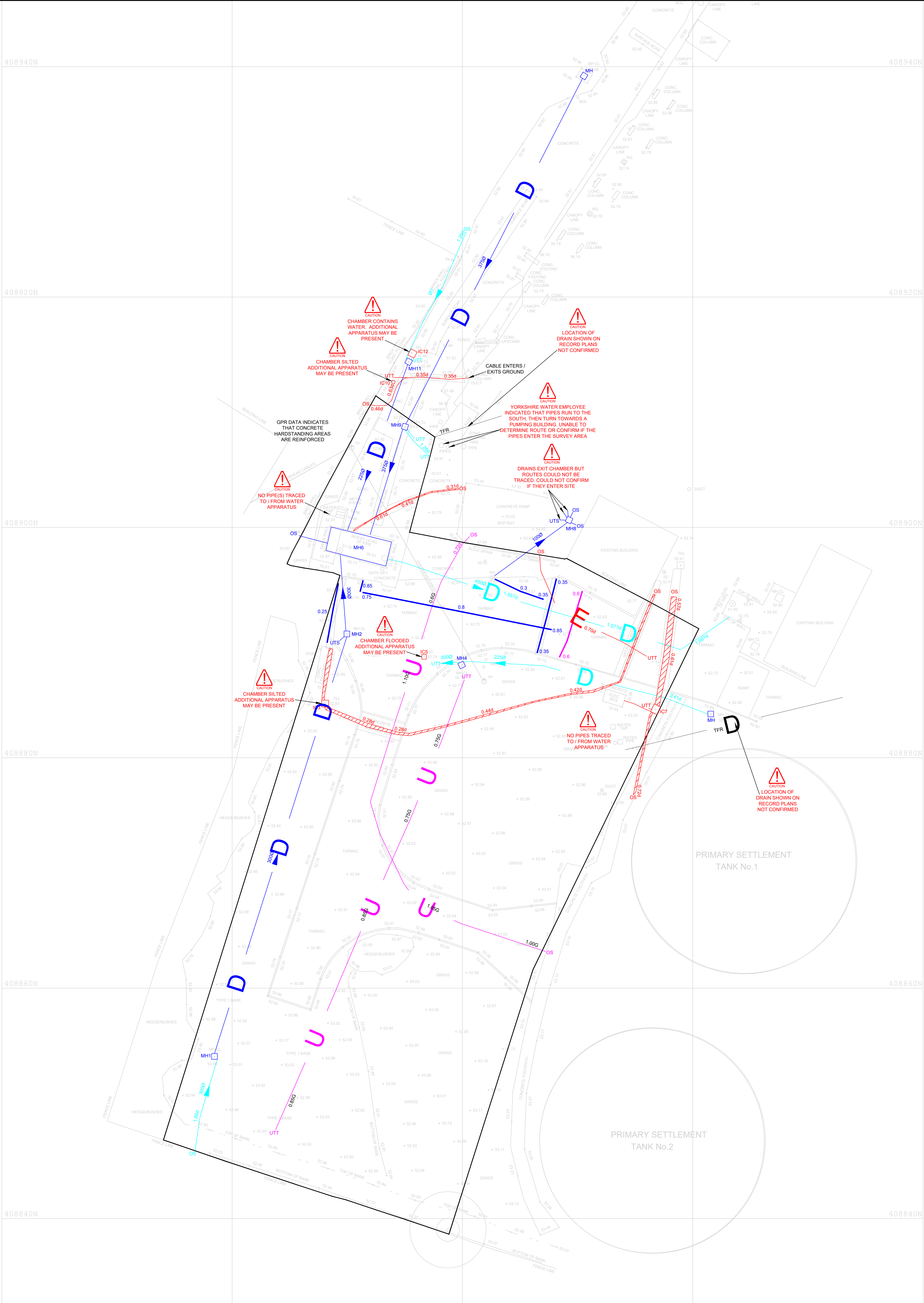
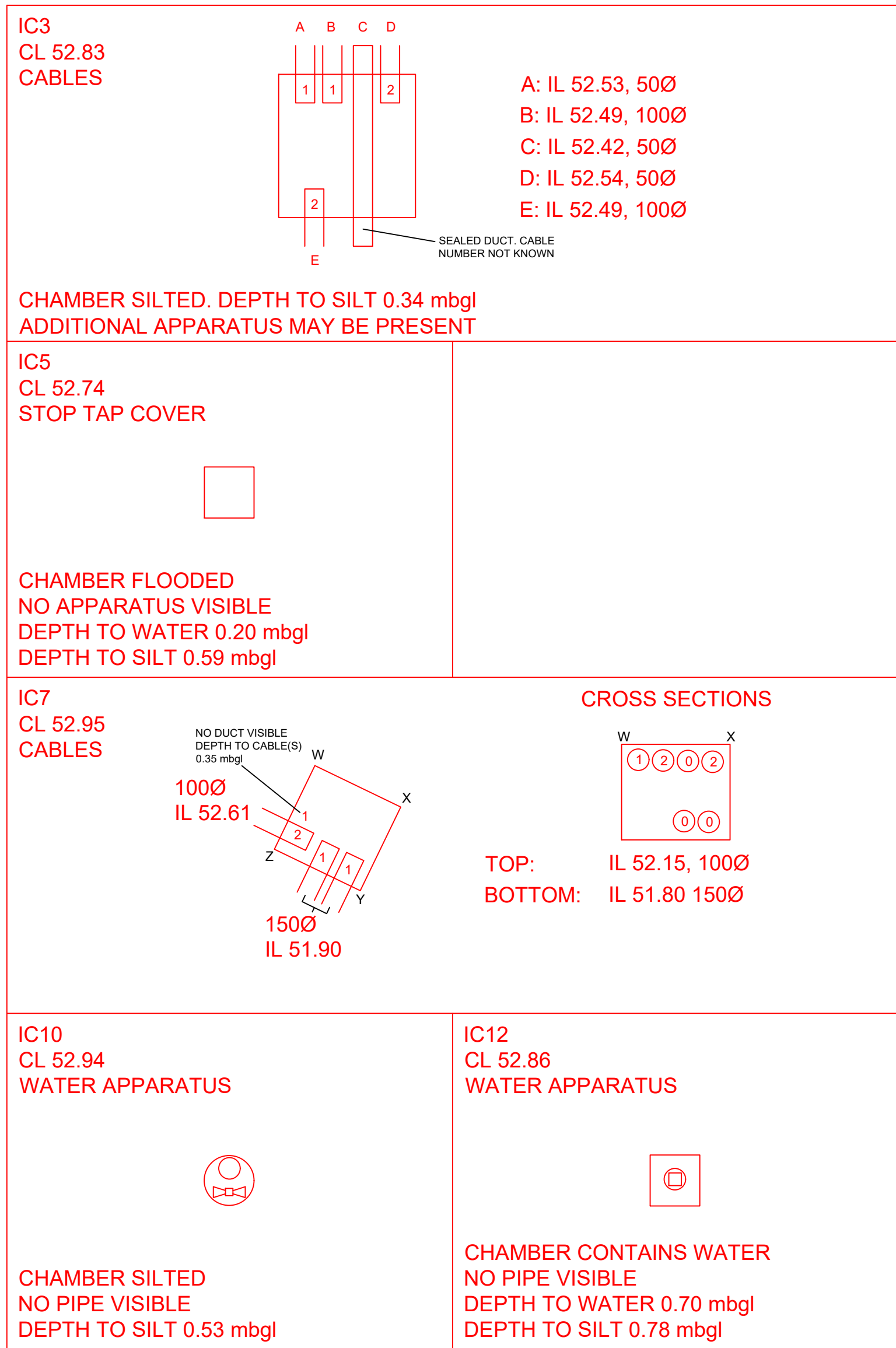
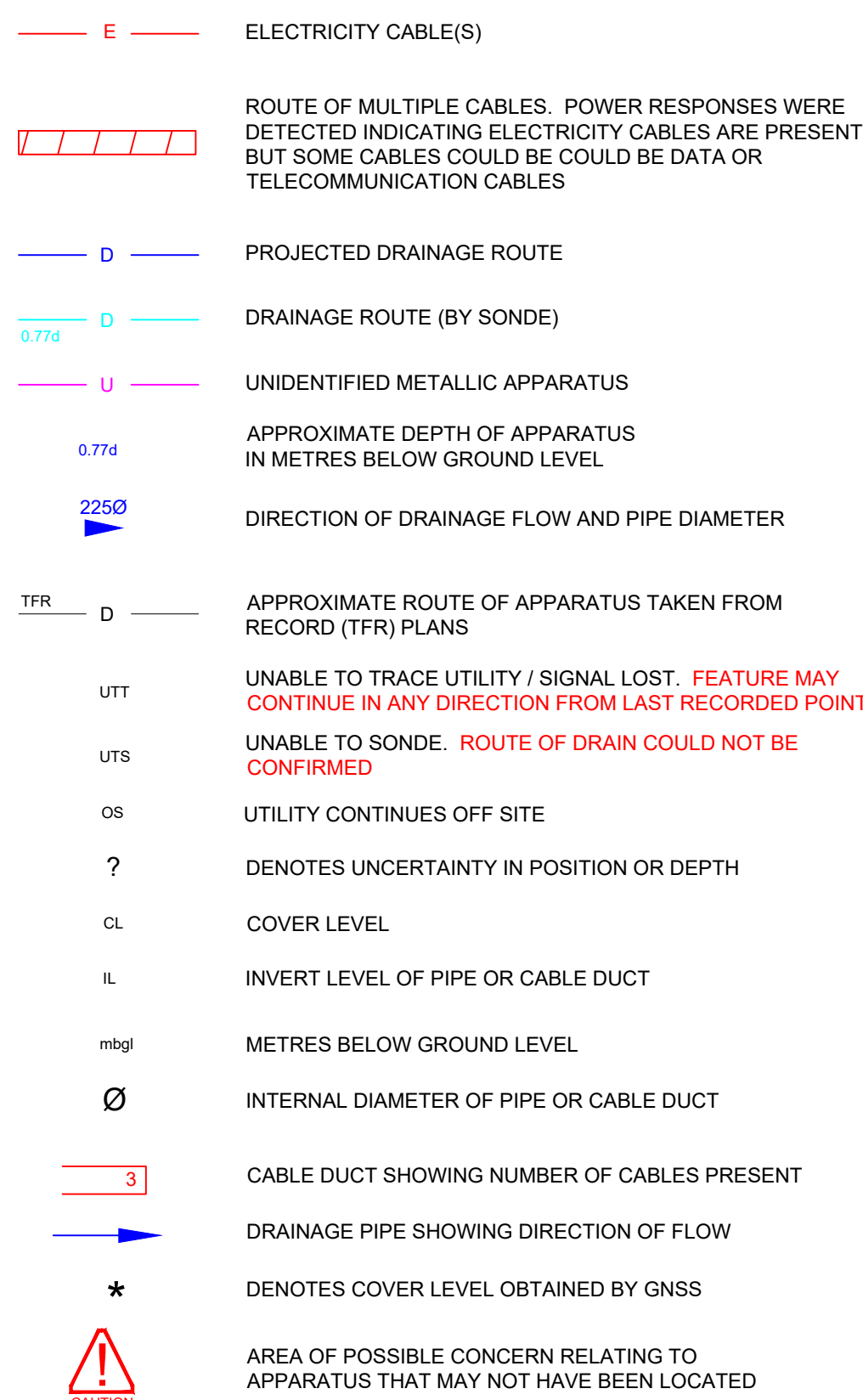
APPENDIX C

UTILITIES PLANS

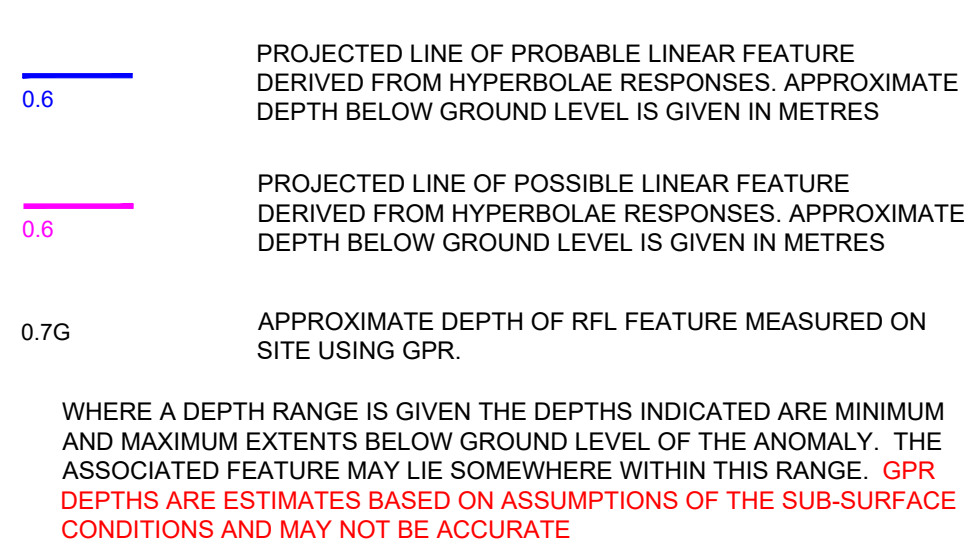
DRAINAGE CHAMBERS



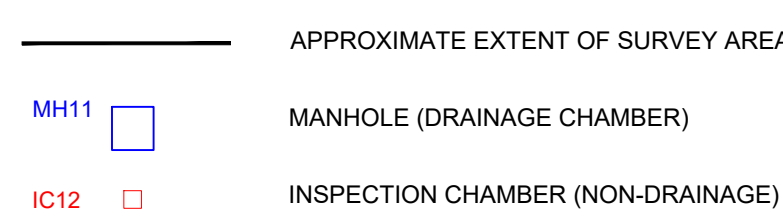
INSPECTION CHAMBERS

KEY
RADIO FREQUENCY LOCATOR (RFL)

GROUND PENETRATING RADAR (GPR)



GENERAL



NOTES

- THIS DRAWING MUST BE USED IN CONJUNCTION WITH SERVICE RECORD DRAWINGS AND THE ACCOMPANYING REPORT (UTL_2022_1228_RPT.PDF) WHICH PROVIDES DETAILS OF THE TECHNIQUES EMPLOYED, THEIR INHERENT LIMITATIONS AND ANY SITE SPECIFIC ISSUES.
- ORIGINAL SERVICE RECORD DRAWINGS WERE NOT AVAILABLE AT THE TIME OF SURVEY AND THEREFORE INFORMATION FROM THESE HAS NOT BEEN INCORPORATED INTO THE DRAWING. A COMPOSITE DRAWING SHOWING AN EXISTING SEWER AND ELECTRICITY ROUTE WERE PROVIDED.
- THE RESULTS OF ANY NON-INTRUSIVE SURVEY ARE NOT INFALLIBLE. EVERY REASONABLE EFFORT HAS BEEN MADE TO IDENTIFY ALL TYPES OF APPARATUS BUT THE SITE SPECIFIC CONDITIONS, TYPE AND MATERIAL OF THE APPARATUS MAY MEAN THAT IT IS NOT POSSIBLE TO LOCATE ALL SUB-SURFACE UTILITIES AND FEATURES THAT ARE PRESENT ON SITE.
- THE SURVEY WAS TIED-IN USING GNSS WITH THE UKOSN02 PROJECTION. IT HAS BEEN OVERLAIN ONTO THE BASE DRAWING USING ORDNANCE SURVEY NATIONAL GRID COORDINATES.
- THE ACCURACY OF TRACED FEATURES IS RELATIVE TO THE DEPTH OF THE FEATURE. IN GOOD CONDITIONS THE ACCURACIES ARE ±5% IN PLAN AND ±10% IN DEPTH. ALL DEPTHS AND POSITIONS SHOULD BE CONSIDERED AS APPROXIMATE AND SHOULD BE VERIFIED WHERE POSSIBLE BY EXCAVATION.
- DEPTHS ARE GIVEN IN METRES BELOW GROUND LEVEL AND WERE MEASURED AT THE POINT WHERE THE DEPTH IS SHOWN.
- DEPTHS OF PIPES AND CABLES TRACED BY RFL ARE USUALLY TO THE CENTRE OF A FEATURE. DEPTHS OF DRAINS THAT HAVE BEEN SONDED ARE THE DEPTH IN METRES BELOW GROUND LEVEL TO THE SONDE AND ARE NOT NECESSARILY THE DEPTH TO THE BOTTOM OF THE PIPE. DEPTHS OF GPR ANOMALIES ARE EITHER TO THE TOP OF A FEATURE OR THE FEATURE LIES WITHIN THE RANGE OF DEPTHS GIVEN.
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ALWAYS EXERCISE CAUTION WHEN EXCAVATING

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MORRIS INFRASTRUCTURE GROUP UK 60 NOBLE ROAD, Tel : 0113 414 9144 OUTWOOD, WAKEFIELD Web : www.morrisig.co.uk WEST YORKSHIRE E: jordan.morris@morrisig.co.uk WF1 2ES					
Client BarhaleDoosan Ltd. Livingstone House, Leeds					
Site Darton STW South Yorkshire					
Title Utility Survey 3D					
Surveyed	JM,KC,HS	Drawn	KC, JM, MW		
Chk.	JM	Date	05/11/20		
Scale	[A1 Sheet] 1/200	DWG Ref (Layout No)	MIG_139_3DT	Status	FINAL
Job No	MIG_139				Rev Ø



APPENDIX D

DEVELOPMENT PROPOSALS



APPENDIX E

ENVIRONMENT AGENCY DATA

Kristian Jackson

From: France, Debbie <Debbie.France@environment-agency.gov.uk>
Sent: 15 February 2021 13:05
To: Kristian Jackson
Subject: Your Enquiry: RFI/2021/195199
Attachments: Planning advice for developers.pdf; Supporting Information 195199.pdf; PSO Response.zip; Water Discharges Map.pdf; Water discharges.xlsx; Culverts south of River Dearne.pdf; Culverts North of River Dearne.pdf

Our Ref: RFI/2021/195199

Dear Kristian

**RE: Provision of Product 4 plus other data for Land at Darton WWTW, Off Darton Hall Road, Darton Yorkshire
Grid reference – 432472 (E), 408911 (N)
Request for information under the Freedom of Information Act 2000 (FOIA) / Environmental Information
Regulations 2004 (EIR)**

Thank you for your enquiry which was received on 25 November 2020. Apologies for the delay in responding.

The requested data is attached (PSO Response.zip) . Please also find attached a 'Supporting Information' document which should be read in conjunction with this data.

Re Water discharges:

As no specified radius for a search was provided we have focussed on the immediate area. Please find attached a map showing the discharges to water (Water Discharges Map) and excel sheet showing specific details to each (Water Discharges)

Culverted watercourse of private sewers:

Please find attached two maps showing north and south of the River Dearne.

Note: these maps may be not be mapped accurately, there may be sections of culverted watercourse missing from here and the maps do not include private sewers (something which we do not have information on). Therefore the maps should be used as a guide only and may need further investigation.

Recommendations for how the surface water is managed:

As mentioned in the attached Supporting Information document, we are not able to provide specific advice on this as this falls within the LLFA remit. Part of the planning process should be to discuss site specific drainage requirements. Some additional guidance links if needed can be found below:

Guidance on when a permit is and is not required - <https://www.gov.uk/guidance/discharges-to-surface-water-and-groundwater-environmental-permits#when-you-do-not-need-a-permit>

Specific guidance on discharges to groundwater –
<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

The developer may need to consider any flood risk from the run-off water and ways to control the flow rates and volume. SuDS should be provided in new developments where appropriate. <https://www.susdrain.org/>

If you require further guidance after reading the above guidance links you will need to apply for pre-application advice <https://www.gov.uk/government/publications/environmental-permit-pre-application-advice-form>

This information is provided subject to the Open Government Licence ([here](#)). Please read for details of permitted use.

Planning Advice

If you are using our data to inform a development proposal, we encourage you to contact our Sustainable Places team for pre-planning application advice. Their advice can help you solve key environmental issues early, reduce the chance of an objection, and help you design a more sustainable development for proposed planning applications. If you would like to take advantage of this service, our advisers will be able to provide further information and estimated costs for any detailed advice. Please contact our Sustainable Places Team by e-mail at sp-yorkshire@environment-agency.gov.uk for further information.

For general enquiries relating to your development or our role within the planning system, please refer to the attached 'Planning advice for developers' document.

I hope that we have correctly interpreted your request. We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

If you require any further help, please do not hesitate to contact me.

Yours sincerely

Debbie France

Customers and Engagement Team

Environment Agency | Lateral, 8 City Walk, Leeds, LS11 9AT

debbie.france@environment-agency.gov.uk

External: 0203 0254731 | Internal :54731

Enquiries Team Tel: 020 847 48174

Email: neyorkshire@environment-agency.gov.uk

Working days: Monday to Friday

CORONAVIRUS PROTECT YOURSELF & OTHERS	For the latest guidance: - INTRANET.EA.GOV - NHS.UK/coronavirus - GOV.UK/coronavirus	 Environment Agency
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email and its attachments for viruses. But you should still check any attachment before opening it. We may have to make this message and any reply to it public if asked to under the Freedom of Information Act, Data Protection Act or for litigation. Email messages and attachments sent to or from any Environment Agency address may also be accessed by someone other than the sender or recipient, for business purposes. [WARNING: This email originated outside of RSK. DO NOT CLICK links, attachments or respond unless you recognise the sender and are certain that the content is safe]



Planning advice for developers – FAQs

INTRODUCTION

Local planning authorities (LPAs) across Yorkshire are required to consult us on [certain planning applications](#) which affect flood risk, groundwater, waste, or water quality.

If your development falls into one of these categories, we'll be invited to comment on your planning application. Your LPA, when considering your application, will take our comments into account.

We've produced this guidance to summarise the environmental issues we're responsible for. The guidance forms part of our free advice service; if you require site-specific or face-to-face advice, we'll need to recover our costs through our [charged advice service](#). Engaging with us early can help you identify the big issues, reduce the chances of subsequent delays and help you design a more sustainable and attractive development.

DEVELOPMENT AND FLOOD RISK

Is my development proposal at risk of flooding?

The [flood map for planning](#) shows where flooding from rivers and the sea may occur. Whilst this map isn't suitable for a detailed flood risk assessment, it'll show which [flood zone](#) your development is located within and therefore will indicate whether further assessment is needed. You should also refer to your LPA's [strategic flood risk assessment](#) which will provide additional local information on flood risk, including the location of functional floodplain and areas which are susceptible to other sources of flooding such as from surface water or reservoirs.

Will my application need to pass the sequential and exception tests?

Local planning authorities apply the [sequential test](#) to steer development towards areas at the lowest risk of flooding. If your proposal is located within flood zones 2 or 3, you should contact your LPA to discuss the sequential test **before** submitting your application. The LPA may require you to submit information with your application in support of the sequential test.

If the LPA confirm that the sequential test has ruled out steering the development to lower risk sites, the development may also need to pass the [exception test](#) by demonstrating that its sustainability benefits outweigh flood risk and that it can be made safe for its lifetime, through the production of a site-specific flood risk assessment. [Planning practice guidance](#) advises when an exception test will be required, which will depend on the [vulnerability of the development](#) and the flood zone it lies within.

Do I need to submit a flood risk assessment with my planning application?

You'll need to submit a flood risk assessment if your application lies within flood zones 2 or 3 or is over 1 hectare within flood zone 1. You'll also need to submit an assessment if your proposal could be affected by sources of flooding other than from rivers or the sea. For certain lower risk applications, we've provided '[flood risk standing advice](#)' which enables local planning authorities to assess flood risk assessments without the need to consult us.

What information should I include in my flood risk assessment?

We recommend that you refer to the checklist for a [site-specific flood risk assessment](#) for detailed advice on what to include in your flood risk assessment. Alongside referring to your LPA's strategic flood risk assessment, you should contact your LPA to find out whether there are any development guidelines which are specific to your locality.

Can I undertake my own flood risk assessment?

Your FRA must be appropriate to the scale, nature and location of the development whilst being credible and fit-for-purpose. Whilst it's possible to undertake your own assessment, most applicants employ suitably experienced professionals. We're not able to recommend specific consultants, but a simple web search should help you source a competent individual or company.

Do I need to consider how climate change will affect my proposal's flood risk?

Yes, you should demonstrate how flood risk will be managed now and over the development's lifetime, taking climate change into account. Please refer to the following [guidance](#) when undertaking your flood risk assessment. In some cases we'll hold the climate change flood data you need. In others you'll need to undertake your own analysis to understand the impacts.

Where can I get modelled or historic flood levels from?

Email our Customers and Engagement team (neyorkshire@environment-agency.gov.uk) to find out whether we have any modelled or historic flood levels available for your development site. A list of the packages of information we're able to provide can be found under the 'get information to complete an assessment' section of the [planning practice guidance](#). They'll aim to provide this information within 20 days. We no longer charge for providing this information.

The risk portrayed by your flood map doesn't seem to reflect the site's actual risk. How do I 'challenge' your flood map?

If you have evidence suggesting that our flood map is inaccurate, please contact our Customers and Engagement team (neyorkshire@environment-agency.gov.uk) who will provide you with any existing data we hold. To formally contest our flood zones, you'll need to submit supporting evidence, such as digital copies of a topographic survey or modelling for quality assurance purposes. Digital files of the proposed new flood zones in ArcMap or MapInfo format should also be supplied. Any new outline data you submit must conform to our flood zones policy, copies of which are available on request.

Whilst we'll usually be happy to review any topographical survey or model prior to the application being submitted, we would have to recover our costs for this work. In some cases where work to review and update our existing models is already underway, we may decline to consider a challenge.

As we have to be certain that the data which informs our flood map is fit-for-purpose, any revisions will need to meet stringent quality checks.

SURFACE WATER AND DRAINAGE

Who's responsible for managing surface water?

[Lead local flood authorities](#) are responsible for providing advice on the management of surface water resulting from new [major](#) development. [Internal drainage boards](#), where established, have permissive powers to manage water levels within their drainage districts, so also play a key role in managing surface water.

Will I need to provide surface water storage and limit the discharge rate?

You should contact your lead local flood authority to discuss surface water discharge rates and storage requirements. Typically, they'll ask that your development does not increase run-off and limits the discharge to the existing greenfield run-off rate (usually 1.4l/s/ha if not calculated).

Do I need to install sustainable drainage systems?

[Sustainable Drainage Systems \(SuDS\)](#) should always be carefully considered in discussion with your lead local flood authority. A SuDS scheme can reduce flood risk, improve water quality, create better habitats for wildlife, and produce pleasant, more amenable places for people.

Infiltration drainage must not, however, pose a risk to groundwater quality. All infiltration SuDS must:

- Meet the groundwater protection criteria set out on [GOV.UK](https://www.gov.uk)
- Not be constructed in ground affected by contamination

Who should I contact about connecting my development to the mains sewer?

Talk to your water company about connecting to their sewerage system. Here are some contact details for water companies operating in the Yorkshire Environment Agency area:

Yorkshire Water	planningconsultation@yorkshirewater.co.uk
Northumbrian Water	developmentenquiries@nwl.co.uk
Severn Trent Water	new.connections@severntrent.co.uk

My development is a long way from the mains sewer. Can I install a 'non-mains' drainage system, such as a package treatment plant?

New development should connect to the public mains sewer wherever possible. Individual treatment plants can deteriorate local water quality and are more challenging to monitor and regulate. If you can't connect to the mains sewer, your planning submission should outline how you will deal with foul drainage discharge. You should include evidence as to why it is not possible to connect to the mains system, including details of any prohibitive costs. Please

note that some 'non-mains' foul water drainage systems will require an environmental permit, irrespective of any planning approval.

OTHER ENVIRONMENTAL CONSIDERATIONS

What other environmental issues will you consider with my planning application?

Your planning application will need to demonstrate that any environmental risks can be managed, through design and construction, for the development's lifetime. Alongside flood risk, the key environmental risks we'll consider are:

- **[Land Contamination](#)**
We're mainly interested in those sites where there is a risk of pollution to controlled waters. You should investigate any contamination to see whether the environmental risk or cost of clean-up (remediation) would hinder your proposal. If contamination is known or suspected, a desktop study, investigation, remediation and other works may be required to enable safe development. Our [model procedures for the management of land contamination](#) provide further information.
- **[Pollution prevention](#)**
Your application should demonstrate how you'll minimise the risk of pollution from all aspects of your development, including construction and

operation phases. Groundwater can be vulnerable to pollution, as well as rivers and streams. Some areas (source protection zones and aquifers) are especially sensitive to pollutants as they typically supply public drinking water. To find out whether your development is located in an area sensitive to groundwater pollution, visit our interactive [maps](#). Advice on groundwater protection can be found on [GOV.UK](#)

- **Fisheries, biodiversity, geomorphology and protected species**

If your proposal is likely to affect the ecology of a main river, you'll need to carry out a risk assessment. This assessment should show that your development can proceed without demonstrable harm, and should propose mitigation, compensation or enhancements where required. A survey should be carried out if any protected species are thought to be nearby. If this survey confirms the presence of protected species or their habitat, measures should be taken to manage the development's risks. Natural England are the statutory consultee for other biodiversity-related matters. Further information on their remit can be found on [GOV.UK](#)

- **Water framework directive**

If your proposal affects ground or surface waterbodies, you'll need to consider the [Water Framework Directive](#) (WFD) and the actions set out in the [Humber River Basin Management Plan](#). You'll also need to submit a [WFD Assessment](#) demonstrating how the development will prevent deterioration and improve the waterbody's ecological status.

- **River buffer zone**

Your development should ensure that an 8m strip of land (planted with locally appropriate, native species) is left undisturbed next to the bank of any main river. This 'river corridor' will improve habitat connectivity and will ensure we're able to access the bank for any future flood defence construction and maintenance.

- **Culverting**

We're opposed to culverting. Culverts degrade watercourses' ecology and prevent the movement of wildlife and fish. As culverts can easily become blocked, they increase flood risk. They're also difficult to inspect and maintain. We may object to any planning applications involving culverting on a main river and may refuse to grant an environmental permit. Existing culverts should be removed and the river channel and bankside habitat reinstated to restore the ecological continuity of the river channel and its corridor.

Will I need any other Environment Agency permits for my development?

You might need an environmental permit if your development manages or produces waste or emissions that pollute the air, water or land or is work that affects a [main river](#) or a sea defence. The lead local flood authority is responsible for any consents relating to ordinary watercourses.

The [Environmental Permitting Regulations \(England and Wales\) 2015](#) cover water discharges, groundwater activities, flood risk activities, radioactive substances, waste, mining waste and installations. They also include provision for a number of directives including batteries. Further information, including contact details for further permitting related enquiries, can be found [here](#).

As planning and permitting decisions are often closely linked, we have issued detailed [guidance for developments requiring planning permission and environmental permits](#). This guidance explains how, when responding to planning consultations that require environmental permits, we will advise of three possible positions:

- No major permitting concerns
- More detailed consideration is required and parallel tracking is recommended
- Don't proceed – unlikely to grant a permit.

PRE-APPLICATION ADVICE

Can you provide site-specific advice, review a submission document, or attend a site meeting before I submit my planning application?

We encourage you to seek pre-application advice as it can help you solve key environmental issues early, reduce the chance of an objection and help you design a more sustainable development. If you'd like to take advantage of this service, please email our Sustainable Places team so that we can provide further details and estimated costs.

Please note that any pre-application guidance we provide doesn't represent our final view in relation to any future planning application. We recommend that you seek your own expert advice prior to submitting your application.

Who should I contact for further information?

Yorkshire planning enquiries: sp-yorkshire@environment-agency.gov.uk

General enquiries: 03708 506 506

Environment Agency, Lateral, 8 City Walk, Leeds LS11 9AT
<https://www.gov.uk/government/organisations/environment-agency>

The Flood Map for Planning

The Flood Map for Planning (Rivers and Sea) can be viewed and downloaded as a PDF file on GOV.UK by following this link: <https://flood-map-for-planning.service.gov.uk> or downloaded in GIS format under an open data licence from the following address: <https://data.gov.uk/publisher/environment-agency>

Please type Flood Map for Planning in the search box.

What is the Flood Map for Planning?

The Flood Map for Planning provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.

The Flood Map for Planning shows the following:

1. Flood Zone 3 (dark blue area on the enclosed map): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences
 - For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year;
 - For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) chance of happening each year.
2. Flood Zone 2 (light blue area): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences. Flood Zone 2:
 - indicates the extent of a flood with a 0.1% (1 in 1000) chance of happening each year.
 - and/or indicates the greatest recorded historic flood, whichever is greater.
3. Flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, together with some natural or constructed entities which retain, store or channel water and which may protect against smaller floods.
4. Areas benefiting from flood defences - areas that benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening each year. If the defences were not there, these areas would flood.

Flood History

See the attached map showing the flood history for this site. The extent of flooding, and/or flood level information is only shown for those watercourses surveyed after the flood. Other flooding may have occurred which is not shown. This is the best information currently available.

Please refer to the following table detailing the causes of those past floods.

Name	Start Date	End Date	Flood Source	Flood Cause	Source of data
2019 November Flood Incident	07/11/2019	08/11/2019	main river	channel capacity exceeded (no raised defences)	Visual
2019 November Flood Incident	07/11/2019	08/11/2019	drainage	local drainage/surface water	Visual
June 2007 Flood Event (Ridings Area)	25/06/2007	26/06/2007	unknown	unknown	Aerial Photography
June 2007 Flood Event (Ridings Area)	25/06/2007	26/06/2007	unknown	unknown	Unknown
June 2007 Surface Water Flooding Yorkshire	15/06/2007	25/06/2007	other	unknown	Aerial Photography
123 Autumn 2000	01/10/2000	30/11/2000	main river	unknown	Other
123 March 1947	19/03/1947	22/03/1947	main river	channel capacity exceeded (no raised defences)	Unknown

Please note that this record doesn't include all of the flooding that may have occurred during and since February 2020. Given the process of recording, verifying and updating our record from major floods is extensive and may take a considerable amount of time.

Assets

Asset Location Map

Please find attached asset map(s) showing location of all (Agency and non Agency maintained) flood defences and channels.

Description of Works

See attached table with description of the defences and structures shown on the above drawing, including condition ratings, upstream and downstream crest levels, where available.

Risk of Flooding – Environment Agency Defences

The risk of flooding in this area is now reduced by the presence of flood defences that we maintain, but there still is a residual risk of flooding if these were to breach or be overtopped by a flood greater than that for which they were designed.

Risk of Flooding – Privately Maintained Defences

You will see that the Environment Agency does not maintain any of those defences. However we undertake regular risk based visual inspections. We do not hold design levels and have no height information on these defences or structures.

Asset Condition Ratings

The performance of a flood defence asset is recorded as the condition of the asset. Our asset inspectors subjectively assess the conditions of assets (during visual inspection site visits) with reference to a national standard template. Each asset is given a rating between one and five with one being very good condition and five being very poor. A condition rating of 3, or 'fair' is the minimal acceptable standard for a critical asset, such as a defence wall that protects properties. We are striving to improve all assets below 'fair' to an acceptable standard.

Asset inspections are done on average every six months, although some critical assets are assessed on a more regular basis. It is possible that adjacent assets are inspected on different dates, which may result in two assets of a similar state of repair having different condition ratings.

Condition ratings of assets may also be affected by the time of year the surveys are conducted, as vegetation may obscure the asset in the summer months, or accessibility may be an issue during winter months. These factors would not usually affect the recorded condition rating of an asset unless the asset is on a borderline between two ratings.

Asset Standard of Protection

Please note that the provided Design Standard of Protection is an estimate and should not be relied on. Please note that where available the defended flood extents provide more reliable information relating to the protection offered by the defence (i.e. at which return period the water levels are likely to overtop the defence). If available and required the defended flood extents can be provided on request.

Modelling

2010 Upper Dearne Study

See enclosed extracts from the Upper Dearne Flood Mapping Study produced by Halcrow Group Limited in May 2010.

Extracts consist of

- A spreadsheet showing the results for max stage and 0.1% (1 in 1000), 0.5% (1 in 200), 1% (1 in 100), 1% CC (1 in 100 +climate change), 1.3% (1 in 75), 2% (1 in 50), 4% (1 in 25), 10% (1 in 10) and 20% (1 in 5) annual chance events.
- An associated map showing the location of the model node points.

No Depth or Breach grids were produced as part of this modelling.

Climate Change

Updated guidance on how climate change could affect flood risk to new development - '[Flood risk assessments: climate change allowances](#)' was published on gov.uk on 19 February 2016. You should confirm the flood risk vulnerability classification and lifetime of your proposed development in line with NPPF and apply the appropriate climate change allowances.

Bespoke Flood Risk Assessment (FRA) advice:

If the pre-application advice is required with regards the preparation of a site-specific Flood Risk Assessment, this can be requested via the Yorkshire Sustainable Places team (email: sp-yorkshire@environment-agency.gov.uk). Charges may apply for any advice that is provided, this currently stands at £100 per hour per person. The [.gov.uk](#) pages provide a good starting point on what to include within a site-specific Flood Risk Assessment and can be accessed via <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>. A site-specific Flood Risk Assessment will need to consider flood risks from all sources, including those associated with defence failure (e.g. breach) and accounting for the predicted impacts as a result of climate change.

Other

Surface Water Map

Lead Local Flood Authorities (LLFA) are responsible for managing local flood risk from surface water flooding and groundwater flooding. You should check with the LLFA as they may have more up to date information regarding this type of flooding.

The Risk of Flooding from Surface Water Flood Map can be viewed and downloaded as a PDF file on GOV.UK by following this link: <https://flood-warning-information.service.gov.uk/long-term-flood-risk>

Please note:

It is not possible to say for certain what the flood risk is but we use the best information available to provide an indication so that people can make informed choices about living with or managing the risks. The information we supply does not provide an indicator of flood risk at an individual property / site level.

The flood risk information provided on the attached map does not cover other sources of flooding such as from rivers and sea.

Surface Water Drainage

The Lead Local Flood Authority is the statutory consultee for planning matters relating to surface water drainage, therefore it is recommended they should be consulted separately regarding this.

Surface water discharge from new development should ideally 'mimic' the pre-development situation using a sustainable drainage system so that the flow and volume of water in watercourses is not increased.

A permit may be required, under the Environmental Permitting Regulations 2016 from the Environment Agency for any proposed works or structures in, under, over or within eight metres of a 'main river' (e.g. a new outfall). A permit is separate to and in addition to any planning permission granted. Further details and guidance are available on the GOV.UK website:

<https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

Risk of Flooding from Reservoirs Map

Outlines and simplified depth and velocity maps can be viewed on our website:

<https://flood-warning-information.service.gov.uk/long-term-flood-risk/#x=438988&y=406600&scale=2>

Please, zoom into the location of interest, and then click on the inundated location for details. As a result a list of reservoirs will be provided with supporting information and a links to other data, such as estimated depths and speed of flooding, at the bottom of the result page.

A map showing the outlines can also be provided on request.

Flood Warning

The site is not covered by a Flood Warning.

LIDAR Data

Please note that our LiDAR data is now available free of charge (Open Data) from <http://environment.data.gov.uk/ds/survey/index.jsp#/survey> (once zoomed to the relevant location the available LiDAR products will be listed below the map).

Two LIDAR products are available:

1. Tiled LIDAR data - The full tiled dataset consists of historic LIDAR data which has been gathered since 1998. For some areas we have carried out repeat surveys and data is available in a range of resolutions.
2. Composite LIDAR data - The composite dataset is derived from a combination of our full tiled dataset which has been merged and re-sampled to give the best possible spatial coverage.

Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. This technique results in the production of an accurate, cost-effective terrain model suitable for assessing flood risk and other environmental applications.

The Environment Agency owns two LIDAR systems, which are installed in a survey aircraft along with its other operational remote sensing instruments.

The aircraft is positioned and navigated using Global Positioning System (GPS) corrected to known ground reference points. The aircraft typically flies at a height of about 800 metres above ground level and a scanning mirror allows a swath width of about 600 metres to be surveyed during a flight.

The Rights & Responsibilities of a Riverside Owner

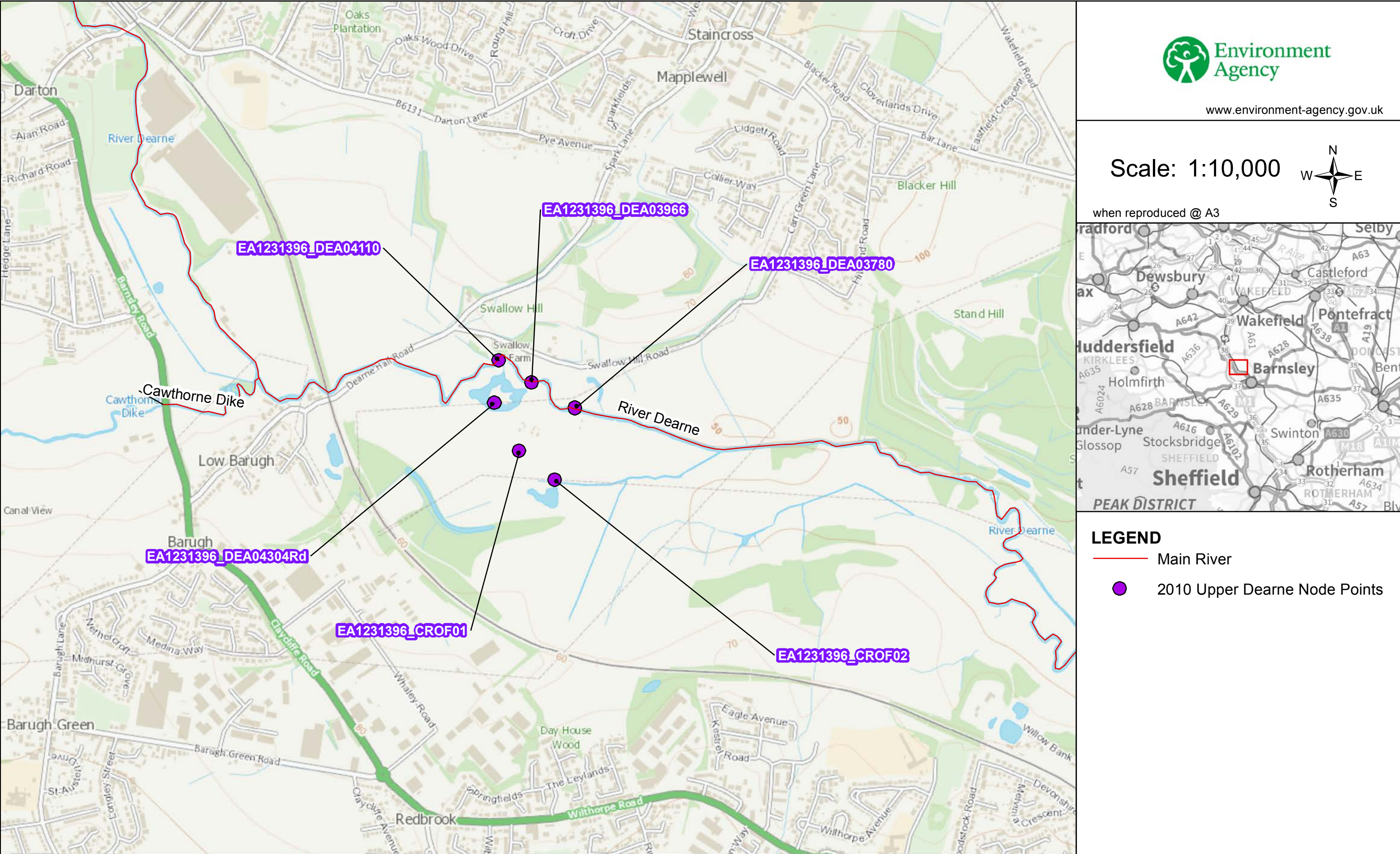
The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership.

For more information on Rights and Responsibilities of a riverside owner, you can visit our website at:

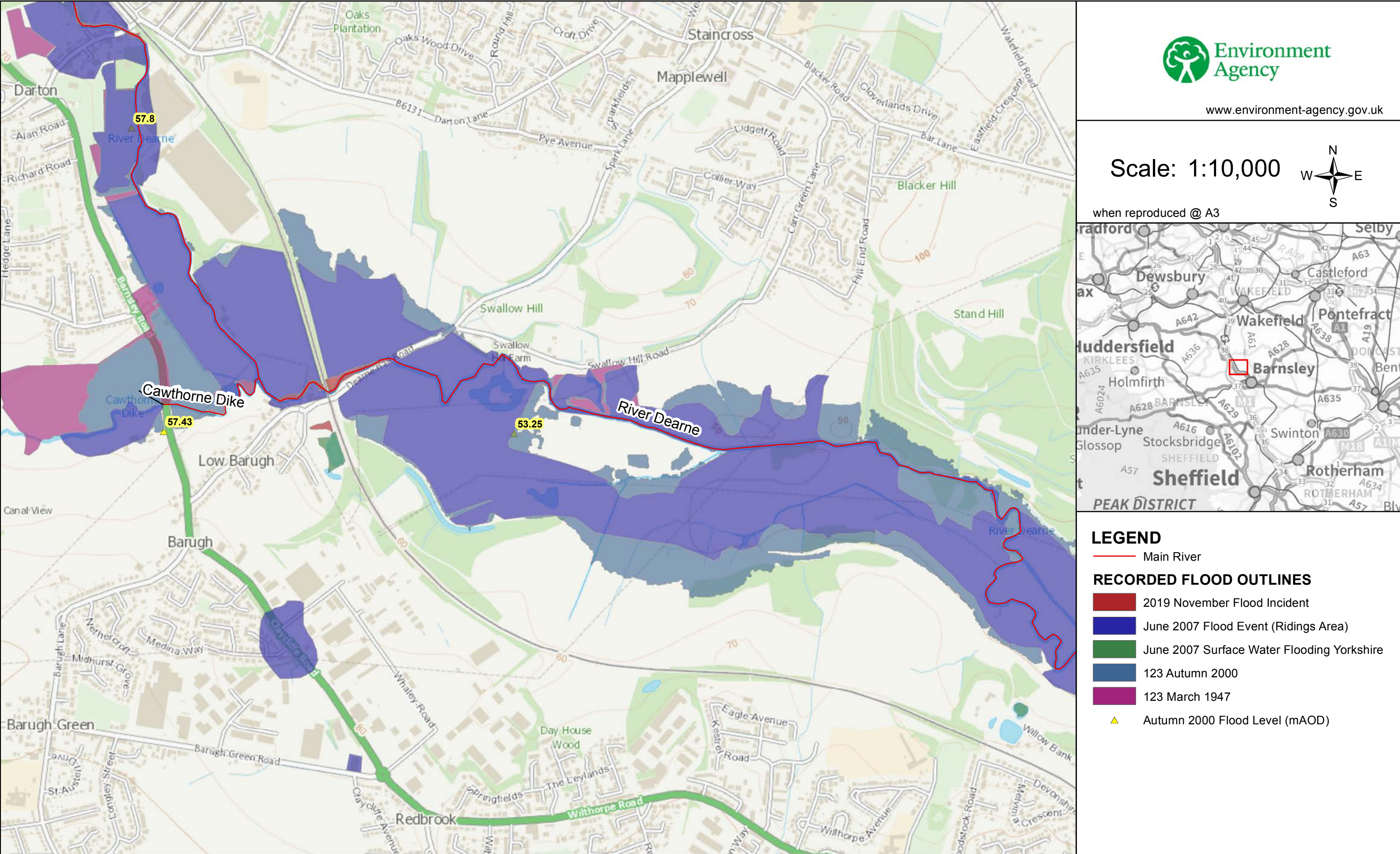
<https://www.gov.uk/guidance/owning-a-watercourse>

Ordnance Survey Data

Under the terms of our licence agreement with the Ordnance Survey, we are unable to supply the OS data. Under this agreement we can only supply OS data to consultants/contractors carrying out work on our behalf.

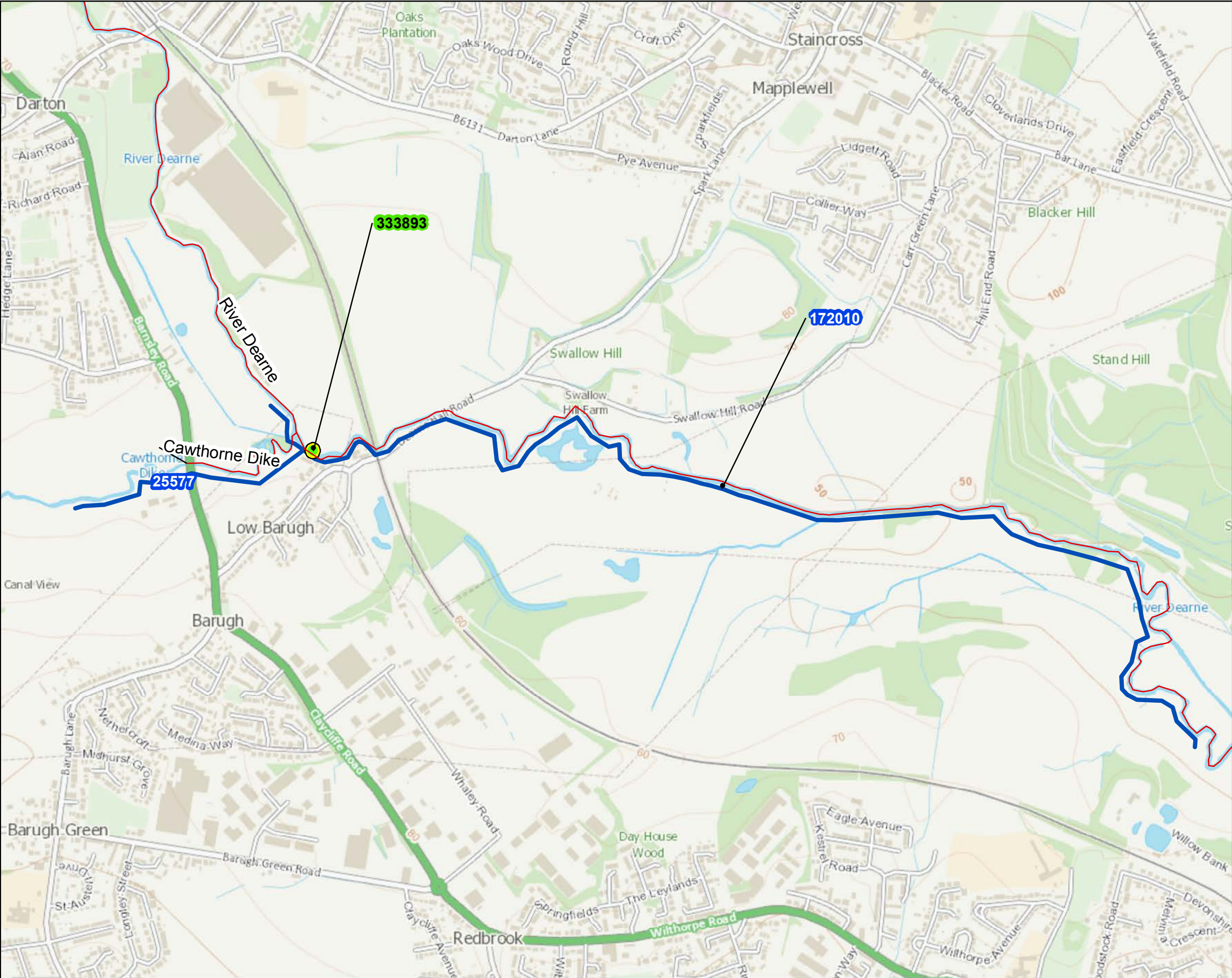


2010 Upper Dearne Model Results - RFI/2021/195199 (Level - mAOD, Flow - m³s)																
Node point	Annual Exceedance Probability (AEP)															
	20% AEP (1 in 5)		10% AEP (1 in 10)		4% AEP (1 in 25)		2% AEP (1 in 50)		1.33% AEP (1 in 75)		1% AEP (1 in 100)		1% AEP (1 in 100)+ 20 % CC		0.1% AEP (1 in 1000)	
	5	5	10	10	25	25	50	50	75	75	100	100	100cc	100cc	1000	1000
	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
EA1231396_CROF01	51.23	0.1	51.23	0.1	51.23	0.1	51.23	0.1	51.23	0.1	51.23	0.1	52.36	0.1	52.78	0.1
EA1231396_DEA04304Rd	50.63	0	51.03	0	52.15	0	52.81	0	52.91	0.01	52.98	0.16	53.08	1.03	53.38	11.79
EA1231396_DEA03780	51.87	41.93	52.07	45.42	52.38	50.84	52.57	54.78	52.66	57.23	52.74	59.68	52.84	64.88	53.01	83.24
EA1231396_CROF02	50.44	0.1	50.44	0.1	50.44	0.1	50.44	0.1	50.44	0.1	50.46	0.1	51.62	4.58	51.92	18.29
EA1231396_DEA04110	52.27	42.24	52.44	47.58	52.71	59.66	52.88	70.54	52.97	77.38	53.05	85.16	53.15	97.27	53.4	121.57
EA1231396_DEA03966	52.12	42.34	52.29	47.6	52.56	59.12	52.73	69.33	52.81	75.72	52.88	82.83	52.99	92.88	53.2	120.11



RFI/2021/195199 Assets Map Centred on Land at Darton WWTW, Off Darton Hall Road, Darton

Date created: 12/02/2021



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Scale: 1:10,000



when reproduced @ A3



LEGEND

- Main River
- Structures (3rd party maintained)
- Defences (3rd party maintained)
- SUB_TYPE
 - high_ground

Defences (3rd Party Maintained) - RFI/2021/195199										
ASSET ID	DESCRIPTION	ASSET MAINTAINER	ASSETS TYPE	LENGTH (m)	ACTUAL Downstream Crest Level (mAOD)	ACTUAL Upstream Crest Level (mAOD)	PROTECTION	TARGET CONDITION	OVERALL CONDITION	DESIGN STANDARD OF PROTECTION (SOP)
25577	high_ground	private	flood_risk_management	654.16			fluvial	3	3	
172010	high_ground	private	flood_risk_management	3208.53			fluvial	3	2	

Structures (3rd Party Maintained) - RFI/2021/195199							
ASSET ID	ASSETS TYPE	DESCRIPTION	DESIGN STANDARD OF PROTECTION (SOP)	ASSET MAINTAINER	PROTECTION	TARGET CONDITION	OVERALL CONDITION
333893	weir			private	fluvial	9	3

