



## DELTA ENTERPRISE PARK, GOOLE

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## FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

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## FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

Dewar Planning Associates

Flood Risk Assessment & Drainage Strategy

CONFIDENTIAL

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# 1 INTRODUCTION

1.1.1 This Flood Risk Assessment (FRA) and Drainage Strategy (DS) has been provided at the request of Dewar Planning Associates, hereafter referred to as “the client”, to assess the flood risks associated with the proposed development of Delta Enterprise Park, Goole, hereafter referred to as “the site”.

1.1.2 The purpose of this FRA is to:

- ▶ Identify the possible hazards posed from all major sources of flooding (fluvial, surface water, groundwater, infrastructural and coastal sources);
- ▶ Provide a qualitative assessment of the probability of each potential flood hazard representing a constraint on the proposed development, based on the proposed land use type for the development and likelihood of flood occurrence;
- ▶ Investigate and define any potential drainage impacts associated with the site;
- ▶ Determine and define necessary surface water management controls to ensure no exacerbation of flood risk on the site or to external receptors due to any increase in surface water runoff; and
- ▶ Recommend appropriate and necessary mitigation measures and additional assessments that may be required to progress the sustainable development of the site.

1.1.3 The FRA comprises the following:

- ▶ A desktop review of publicly available information, including information from the Environment Agency (EA) and East Riding of Yorkshire Council (ERYC) who are the Lead Local Flood Authority (LLFA) for the proposed development area; and
- ▶ An assessment and outline design of hydraulic controls and drainage requirements and drainage elements required to support the development of the site.

1.1.4 This report further details the methodologies employed within this study and provides recommendations as to any further work or investigations required to support the development of the site through the planning application process.

## 1.2 REGULATORY POLICY AND LEGISLATION

1.2.1 This assessment has been carried out in line with the current Government legislation, the National Planning Policy Framework (NPPF) 2023.

1.2.2 It has been assessed with reference to the following documents and legislative guidelines:

- ▶ CIRIA 753 The SUDS Manual V6 (2016);
- ▶ DEFRA “Flood Risk Assessment Guidance for New Developments” (2006);
- ▶ DEFRA “Surface Water Management Plan Technical Guidance” (2010);
- ▶ BS 8533 2011 Assessing & Managing Flood Risk in Development Code of Practice (2011);
- ▶ BS 8582:2013 Code of practice for surface water management for development Sites (2013);
- ▶ National Planning Practice Guidance (2012 – updated 2016);
- ▶ C624 Development and Flood Risk – Guidance for the Construction Industry’ (2004);
- ▶ Design and Construction Guidance for Sewage Sector (DCGSS) (2020);
- ▶ Planning Policy Guidance – Flood Risk and Climate Change (2014 and as amended).



1.2.3 In addition to the above, this report has also been informed by the following documents:

- ▶ East Riding Local Plan 2012 – 2029 Strategy Document
- ▶ East Riding of Yorkshire Council Strategic Flood Risk Assessment: Level 1 (2019)
- ▶ East Riding of Yorkshire Council Strategic Flood Risk Assessment: Level 2: Goole (2020)

## 1.3 SCOPE OF FLOOD RISK ASSESSMENT

1.3.1 The objective of this analysis and report is to provide an FRA in accordance with local and national guidance.

1.3.2 The detail and complexity of the FRA will reflect the level of risk to the site and consider the appropriateness of the proposed development type. This will also include assessment of potential risk to property and livelihoods, consideration of climate change, and the definition of appropriate flood risk mitigations required to satisfy the planning process.

1.3.3 Based on the assessment of requirements for a site-specific FRA as defined within NPPF 2023 technical guidance, the site is indicated as being located within Flood Zone 3, therefore it is necessary to provide a site-specific FRA. Flood Zone 3 refers to an area assessed as having a 1 in 100 or greater annual probability (>1%) of river flooding, or a 1 in 200 or greater annual probability (>0.5%) of sea flooding in any one year.

1.3.4 Similarly, as the site is indicatively located in an area that may be subject to other assessable sources of flooding, such as pluvial (surface water) flooding, it is necessary to undertake a further site-specific assessment to verify the proposals for development.

1.3.5 Policy ENV6 of the East Riding Local Plan states that all future development must ensure that:

- ▶ B. The risk of flooding to development will be managed by applying a Sequential Test to ensure that development is steered towards areas of lowest risk, as far as possible. The Sequential Test will, in the first instance, be undertaken on the basis of the East Riding of Yorkshire *Strategic Flood Risk Assessment (SFRA)* and the Environment Agency's *Flood Map*, within appropriate search areas. Where development cannot be steered away from Flood Zone 3, the sub-delineation of Zone 4a, detailed within the relevant *SFRA*, will be used to apply the Sequential Test, with preference given to reasonably available sites that are in the lower risk/hazard zones. Where necessary, development must also satisfy the Exception Test.
- ▶ C. If, following application of the Sequential Test, it has not been possible to successfully steer development to Flood Zone 1 or a sequentially preferable site, a Sequential Approach will be taken to site layout and design, aiming to steer the most vulnerable uses towards the lowest risk parts of the site and upper floors.
- ▶ D. Flood risk will be proactively managed by:
  - 1. Ensuring that new developments:
    - i. limit surface water run-off to existing run-off rates on greenfield sites, and on previously developed land reduce existing run-off rates by a minimum of 30%, or to greenfield run-off rate;
    - ii. do not increase flood risk within or beyond the site;
    - iii. incorporate Sustainable Drainage Systems (SuDS) into major development proposals and proposals at risk of flooding, unless demonstrated to be inappropriate;

- iv. do not culvert or otherwise build over watercourses, unless supported by the Risk Management Authority;
  - v. have a safe access/egress route from/to Flood Zone 1 or establish that it will be safe to seek refuge at a place of safety within a development;
  - vi. Incorporate high levels of flood resistant and resilient design if located in a flood risk area;
  - vii. are adequately set-back from all watercourses including culverted stretches; and
  - viii. adhere to other relevant *SFRA* recommendations.
- 2. Supporting proposals for sustainable flood risk management, including the creation of new and/or improved flood defences, water storage areas and other schemes, provided they would not cause unacceptable adverse environmental, social, or economic impacts.
  - 3. Supporting the removal of existing culverting and returning these sections to open watercourse.
  - 4. Designating areas of Flood Zone 3b (Functional Floodplain) and safeguarding land for current and future flood risk management, on the *Policies Map*.

1.3.6 Potential flood risk at the site has been assessed against the site layout plan, which has been provided as Appendix A to this report. Significant changes to the site's developable area may necessitate a further review of this document to ensure that risk of flooding is not exacerbated and has been satisfactorily addressed within the development proposal.

## 1.4 SCOPE OF DRAINAGE STRATEGY

1.4.1 Surface water runoff must be effectively managed to ensure that there is no exacerbation of potential surface water flooding issues on the site, or at any external receptors, due to any potential increases in surface water runoff rates and volumes.

1.4.2 The drainage hierarchy will be applied in determining the most suitable type and point of discharge of surface waters runoff from impermeable areas on the site. This will ensure that surface water is sustainably managed on the site, and that there is no exacerbation of flood risk elsewhere as a result of undertaking the development. This will be undertaken in accordance with industry best practice principles and guidance, such as the C753 SUDS Manual (2016), Design and Construction Guidance for Sewage Sector (DCGSS) (2020) and applicable sections of the Planning Policy Guidance (PPG).

1.4.3 Any increase in surface water runoff rate associated with the development of the site must also be managed in accordance with the guidelines set by LPA, the LLFA for the area.

1.4.4 The Drainage Strategy will identify potential opportunities and locations for attenuation infrastructure, as well as potential connection points and provide calculations of permissible discharge rates for runoff generated on site.

1.4.5 The Drainage Strategy therefore aims to provide surety that any drainage provided as part of the project development can safely and appropriately convey all flows from the site to appropriate discharge locations. This is to ensure sustainable and safe operation within the site, as well as ensuring sustainable operation of any receiving infrastructure. These assessments have been undertaken in accordance with prescribed best practice and building codes, including prioritising the incorporation of SuDS, where appropriate and practicable for the management of surface water.

- 1.4.6 Following the completion of a final site masterplan the drainage scheme proposed within this report should be reassessed to ensure surface water runoff and foul water drainage can be appropriately managed in accordance with best practise and local and national standard requirements.

## 2 METHODOLOGY

### 2.1 INTRODUCTION

- 2.1.1 This report aims to demonstrate that the proposed development is sustainable and will not be impacted by or exacerbate flood risk elsewhere through the development of the site. This assessment will account for the effects of climate change, as well as identifying further opportunities to reduce the probability and consequences of flooding within the site locality.
- 2.1.2 This report aims to identify constraints and opportunities for the site based on the development proposals provided by the client (Appendix A) and provide recommendations for the sustainable provision of drainage and mitigation of any potential flood risk for the site.
- 2.1.3 The assessment methodology is as follows:
- ▶ Desktop review of the geology, hydrology, and other pertinent environmental characteristics of the site, and how these affect flood risk of the proposed development and site drainage.
  - ▶ Obtain and review existing baseline flood risk and drainage guidance information from relevant environmental authorities (EA, LLFA, etc.) as to site specific flood risk from all applicable sources.
  - ▶ Produce design calculations for the Drainage Strategy to determine the requirements for developing the site's surface water drainage and providing adequate storage in line with local planning policy and guidance. This will include the presentation of drawings with a layout for any additional drainage and attenuation infrastructure located on the site.
  - ▶ Review the findings from the above and advise on the suitability of developing the site for the proposed development in consideration of the applicable flood risk and drainage and comment on limitations and opportunities for the site, with recommendations of further mitigation where applicable and appropriate.

## 3 PROJECT BACKGROUND

### 3.1 DEVELOPMENT DESCRIPTION AND LOCATION

- 3.1.1 Andrew Moseley Associates (AMA) was appointed by Dewar Planning Associates to provide a Flood Risk Assessment and Drainage Strategy in support of a storage container development, located at Delta Enterprise Park, Goole, Rawcliffe Road, Airmyn, East Riding of Yorkshire, DN14 8JU at NGR: SE 71243 24107.
- 3.1.2 The proposed development is located in the area of Airmyn approximately 2 miles to the west of Goole. Proposals for the site are for commercial use, consisting of 92 self-storage shipping containers (B8) with associated hardstanding and infrastructure. A site layout plan can be found in Appendix A.
- 3.1.3 The Local Planning Authority for this development is East Riding of Yorkshire Council, who are also the Lead Local Flood Authority for the area.
- 3.1.4 This report has been prepared in accordance with the National Planning Policy Framework (NPPF) and the accompanying technical guidance to assess all forms of flooding including the management of surface water on-site.
- 3.1.5 The site is referenced in Table 3-1 and Figure 1 below.

Table 3-1. Site Context

Site Name	Delta Enterprise Park
Location	East Riding
NGR (approx.)	SE 71243 24107
Application Site Area (ha)	0.4
General Locality	The site is location on undeveloped greenfield land and borders an agricultural development to the north, an unnamed road to the east, undeveloped land to the south, and a commercial yard to the west.  Pedestrian and vehicular access to the site is provided via the unnamed road to the east of the site, which connects to the A614 to the south of the site.
Development Type	Commercial
EA Flood Zone	Flood Zone 3
EA Office	Yorkshire
Local Planning Authority	East Riding of Yorkshire Council

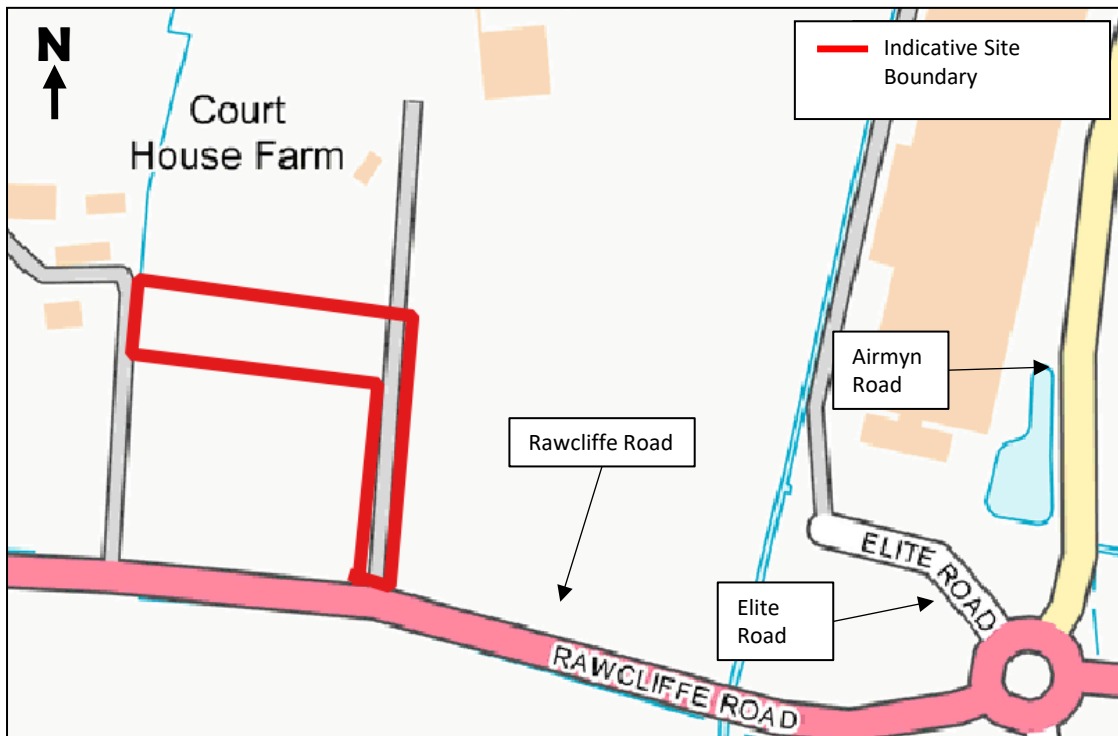


Figure 1. Site Location

## 3.2 CURRENT SITE CONDITIONS

### Ground Cover and Topography

- 3.2.1 A topographic survey provided by Dewar Planning Associates and undertaken by MT Surveys (Ref: 1485-105\_2D (A0)) shows ground levels at the site are shown to be in the region of 1.82 to 2.90m Above Ordnance Datum (m AOD). The topographic survey can be found in Appendix B.
- 3.2.2 Further review of topographical data shows site levels to be lowest towards the south centre of the site while the access has the greatest elevations. A general fall in gradient from south to north is observed across the site. As indicated by aerial imagery, the site consists of grass land consisting of light vegetation.

## 3.3 GEOLOGY

- 3.3.1 British Geological Survey (BGS) Open Geoscience website<sup>1</sup> indicates that the entire site is underlain by Sherwood Sandstone Group – Sandstone, with overlying superficial deposits of Brighton Sand Formation – Sand.
- 3.3.2 The BGS website information indicates that there are no borehole records within close proximity of the site.

<sup>1</sup> Available at: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> accessed on 10/01/2024

## 3.4 HYDROGEOLOGY

- 3.4.1 According to the Department for Environment, Food and Rural Affairs (DEFRA) MAGIC map<sup>2</sup>, the site is indicated is located within 700m of a Groundwater Source Protection Zone 3, as defined by the Environment Agency for the protection of a potable groundwater supply. Although not located directly within the source protection zone, the close proximity may preclude the use of soil infiltration as the primary means of discharging surface water run-off from the site, due to potential contamination from the development areas and site mineral stockpiles.
- 3.4.2 The site is located as being in an area of medium to high ground water vulnerability and located above a Principal bedrock aquifer and a Secondary A superficial drift aquifer.
- 3.4.3 Information obtained from the Cranfield University's Soilscape website<sup>3</sup> indicates that the site is located in an area classified as being Soilscape 10, which is defined as having freely draining slightly acid sandy soils.

## 3.5 HYDROLOGY

- 3.5.1 The sit is situated in between the Township Drain. At its closest point the site borders an arm of the Township Drain. The watercourse is located in the Goole & Airmyn IDB and therefore falls under their jurisdiction.
- 3.5.2 The EA's Catchment Data Explorer website<sup>4</sup> indicates that the site resides within the Aire Lower Operational Catchment.

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<sup>2</sup> Available at: <https://magic.defra.gov.uk/MagicMap.aspx?startTopic>, accessed on 10/01/2024

<sup>3</sup> Available at: <http://www.landis.org.uk/soilscales/>, accessed on 10/01/2024

<sup>4</sup> Available at: <https://environment.data.gov.uk/catchment-planning/>, accessed on 10/01/2024

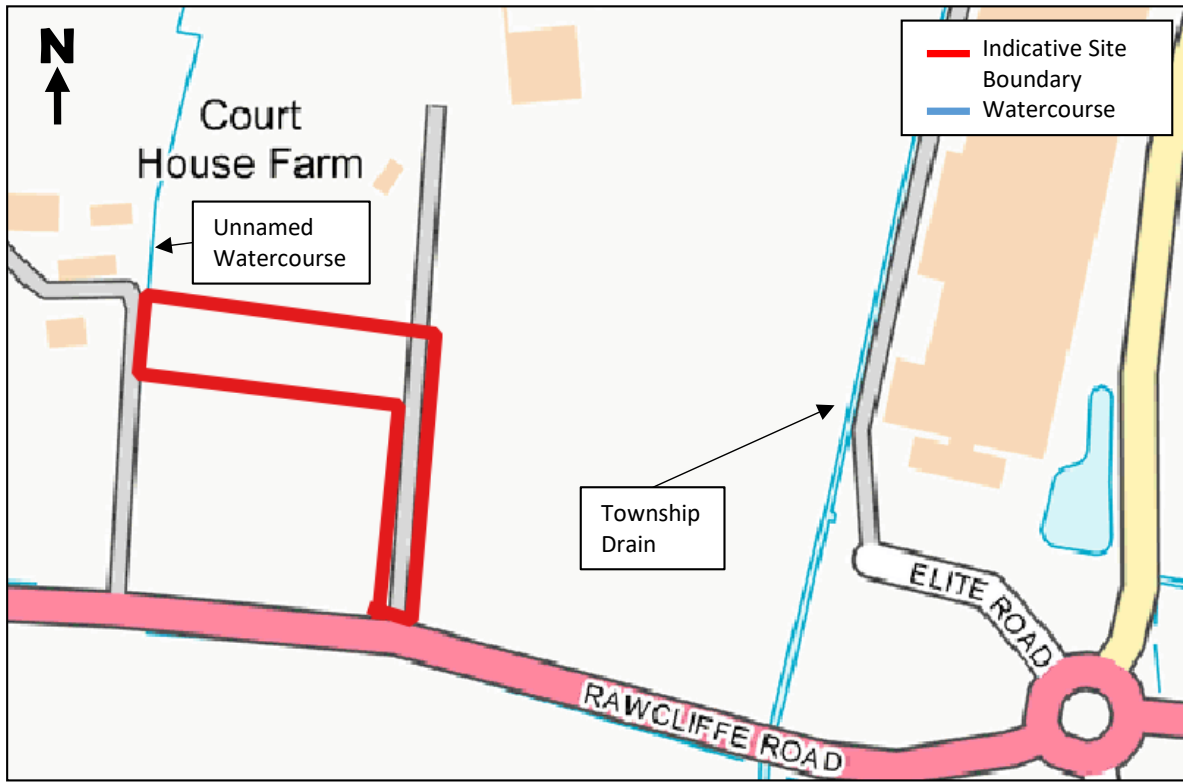


Figure 2. Watercourse Location



## 4 POTENTIAL FLOOD RISK

### 4.1 SOURCES OF FLOODING

4.1.1 This report is to consider flood risk from all potential sources. Section 5 then discusses in further detail the probability of flooding, any potential impacts and necessary mitigation, where required.

4.1.2 The NPPF (2023) also requires site developers to consider the impact of additional runoff generated by the proposed development on the receiving downstream catchment, and to assess the risk of runoff from the surrounding. This is further discussed in Section 6.

### 4.2 ENVIRONMENT AGENCY FLOOD ZONES

4.2.1 The EA Flood Map for Planning shows the site is located within Flood Zone 3, i.e. land assessed as having a 1 in 100 greater annual probability (>1%) of river flooding, or a 1 in 200 or greater annual probability (>0.5%) of sea flooding in any one year. This potential fluvial/coastal flood risk to the site has been illustrated in Figure 3.

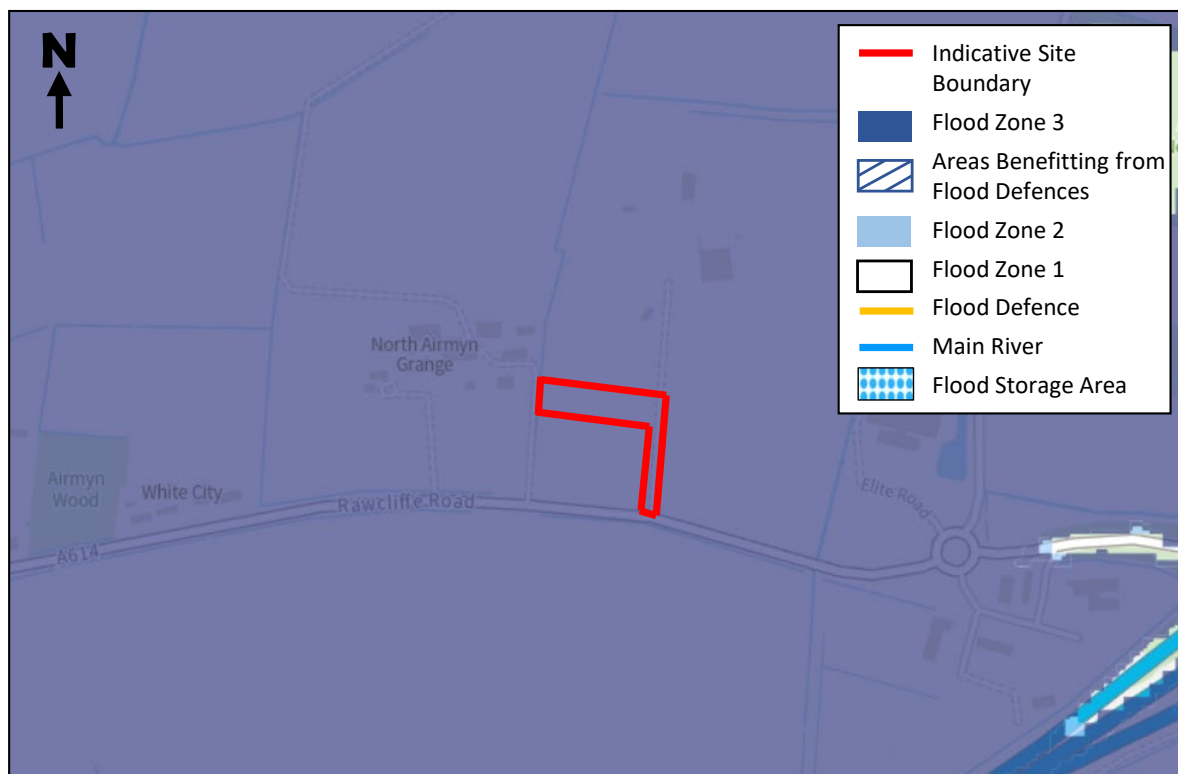


Figure 3. Environment Agency Long Term Flood Map for Planning

### 4.3 FLUVIAL AND COASTAL FLOODING

4.3.1 The EA Long Term Flood Risk Map for fluvial and coastal flooding shown in Figure 4 indicates that the site is at high risk of fluvial flooding. As the site is situated some miles from the nearest coastline

the site is also considered to not be at risk from coastal flooding. However, as the site is in close proximity to the River Ouse and the Humber Estuary the site is at risk of tidal flooding. The risk of flooding posed to the proposed development is classed as high.



Figure 4. Environment Agency Long Term Flood Map – Rivers and Sea

4.3.2 As the site is situated in Flood Zone 3, additional fluvial flood data was requested from the EA. This data has been provided in Appendix C. The data provided was taken from the 2016 Upper Humber study.

#### Defences

4.3.3 Information from the EA flood map for planning indicates that there are a series of flood defences located along the River Ouse and Aire. This is further reinforced within the review of the additional EA data (Appendix C), which indicates that along the full reach of the River Ouse and Aire to the north and east of the site there are a series of fluvial and tidal flood defences.

4.3.4 As discussed in Section 3.5 there are a significant number of major watercourses which influence the flooding seen at the site. The largest is the River Ouse which flows from the north of the site to the east, and drains an area of 4,500km<sup>2</sup>, while the River Aire also flows to the north of the site and connects with the River Ouse to the northeast of the site. Furthermore, there is the Dutch Drain which is a continuation of the River Don.

4.3.5 In addition to these major watercourses, there is a series of drains running in closer proximity to the site, including the Township Drain. All of these watercourses provide a flood risk to the site, which must be assessed to provide suitable mitigation measures to secure the safety of the site over a 100yr period.

4.3.6 The Township drains which run on both the east and west sides of the site are both undefended. Within the ERYC Level 1 SFRA, it is further confirmed that the site is situated in an area which benefits from flood defences. The assets and flood defence map can be found in Appendix D. The map provides further information on the type of defences in place near to the site; these include telemetry, storage assets, pumping station and soakaways.

4.3.7 As the EA and the ERYC have confirmed there are flood defences in close proximity to the site, and for the purpose of this report the site will be assessed against modelled defended flood events.

#### Fluvial

4.3.8 Additional fluvial flood data taken from the 2016 Upper Humber Study provided by the EA (Appendix C) shows that the site is not at risk of fluvial flooding for a defended 1in10, 1in30, 1in75, 1in100 or 1in200yr fluvial flood event. Furthermore, there is no flooding during a 1in100yr +CC (50%) defended fluvial flood event at the site, which is the baseline event for a fluvial flood event. The only event which indicates flooding at the site during a fluvial flood event is a 1in1000yr fluvial defended flood event.

4.3.9 However, the 2020 fluvial flood data indicates that for a 1in100yr +CC (50%) fluvial flood event that the site does flood, this can be seen in Appendix E. The map shows that the flood depth at the site will be between 1.00m and 2.00m.

#### Tidal

4.3.10 As the site is situated in close proximity to the Humber Estuary, which interlinks with both the River Ouse and Aire, the site is at risk of tidal flooding.

4.3.11 The ERYC Level 2 SFRA provided further details on the level of flooding at the site. Firstly, the site is shown to not flood during a 1in200year defended tidal flood event as shown in Appendix F.

4.3.12 However once again like fluvial flooding, the site is shown to flood during a 1in200year +CC (50%) as presented in Appendix G. It is shown that during a 1in200year +CC (50%) defended tidal flood event the site could flood between 0.00m and 0.50m.

#### Breach Scenario

4.3.13 As the site is situated in an area which is benefiting from flood defences, it is important to determine the possibility of a breach at points surrounding the site. The ERYC Level 2 SFRA stipulates that the site must be assessed against the flood depths modelled during a breach event.

4.3.14 Both the EA and the ERYC undertook breach analysis which showed that the site would be at significant risk of flooding. The ERYC Level 2 SFRA breach analysis map presented in Appendix H shows that the site would experience flood depths of between 3.0m and 4.0m.

4.3.15 As the site is located further inland, the site is modelled to be inundated within 0.5 – 1hr, providing sometime for evacuation. However, to fully protect against this and keep the users of the development safe, the site mitigation measures in Section 6 should be followed.

4.3.16 As discussed in the ERYC Level 2 SFRA the site is required to be assessed against the greatest modelled breach flood depth. Therefore, for the purpose of this FRA the mitigation measures put in place will be based upon a maximum breach flood depth of 4.0m.

## Conclusion

- 4.3.17 As shown above the site is at risk from flooding for all 3 types of events, when taking the effects of climate change into account. This FRA has based the analysis on the most up to date data which is taken from the ERYC Level 2 SFRA. For both fluvial and tidal flood events, the maximum flood depth is 0.5m, however for a breach scenario the site is shown to be at a much greater risk with flood depths of between 3.0m and 4.0m, with an associated hazard of 'Danger for All' due to the fact that potential rates of inundation are in the order of 1 hour in this modelled breach scenario.

## 4.4 PLUVIAL (SURFACE WATER) FLOODING

- 4.4.1 The EA Long Term Flood Risk Map (Figure 5) shows the majority of the site is located in an area at very low risk of surface water flooding, with the remainder being located in an area at low to medium risk of surface water flooding.
- 4.4.2 The areas at low to medium risk of surface water flooding are located to the south and centre of the main part of the site. These areas are shown to experience flood depths of between 0.3m – 0.6m with flow velocities of less than 0.25m/s.
- 4.4.3 As the proposed development of the site may potentially reduce the overall site permeability and potentially increase surface water runoff rates and volumes, the surface water discharge controls must ensure that any proposal for drainage, or discharge, does not adversely impact upon downstream drainage infrastructure or offsite receptors.
- 4.4.4 The site is therefore considered to have very low potential risk of flooding from pluvial sources.

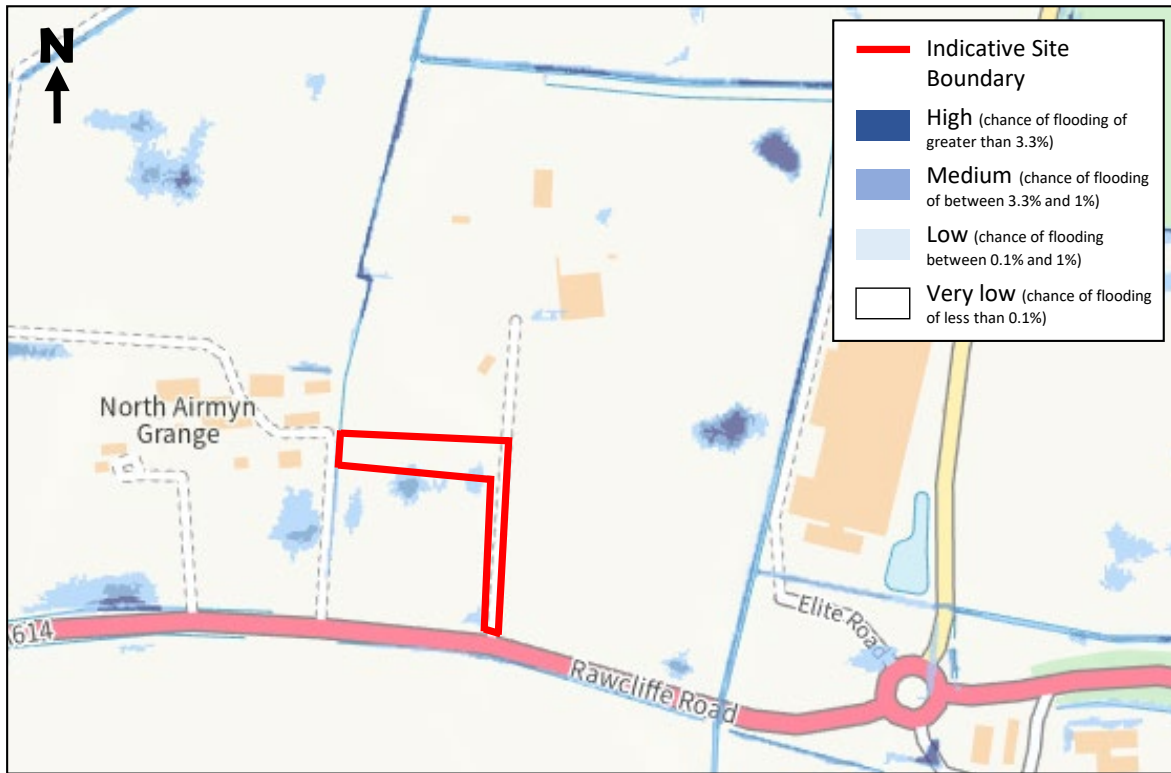


Figure 5. Environment Agency Long Term Flood Risk Map – Pluvial (Surface Water) Flooding

## 4.5 GROUNDWATER FLOODING

- 4.5.1 Ground conditions at the site consist of freely draining slightly acid sandy soils, therefore the propensity for ground water emergence at the site is considered to be medium, and the potential risk of groundwater emergence affecting the site development is considered to be medium.
- 4.5.2 According to the ERYC groundwater flood map the site is located in an area with 75% susceptibility to groundwater flooding, as shown in Appendix I.
- 4.5.3 During long periods of heavy rainfall, the water table within an area can rise above the natural ground level, resulting in groundwater flooding. The site is located above a principal bedrock aquifer. This signifies permeable layers which would allow infiltration of water up through the soil.
- 4.5.4 Given the impermeable nature of the proposed site's hardstanding areas subsequent to development, potential elevation of groundwater or groundwater emergence within the superficial geology causing flooding within the site post-development will be largely eliminated. Likewise, noting the slight fall in gradient from east to west, any emerging ground water would be directed away from the proposed development area and discharge into the Mother Drain.
- 4.5.5 Site specific investigations should be able to prove the presence of ground water and propose remedial mitigation where required. Flood risk to the proposed development due to groundwater emergence is therefore considered to be low.

4.5.6 Flood risk to the proposed development due to groundwater emergence is considered to be low provided that all reasonable and practicable mitigation measures for any subsurface construction associated with the development are adhered to.

## 4.6 FLOODING FROM ARTIFICIAL SOURCES

4.6.1 The EA Long Term Flood Risk Map of flood risk from reservoir and canal failure indicates that the site and its surroundings, are not affected by potential flood waters from artificial sources such as dam or canal failure. The figures provided within the EA mapping principally indicate the worst-case flooding extents. Therefore, the potential risk of flooding from reservoir and/or canal failure is considered to be negligible.

4.6.2 In addition to the above reservoirs and canals are regularly maintained by relevant local authorities and failure is extremely unlikely. The site is therefore considered to have very low potential risk of flooding from artificial sources.

## 4.7 FLOODING FROM SEWERS

4.7.1 The site currently consists of greenfield land and is not identified as having any drainage infrastructure within its boundary. Furthermore, the local council SFRA indicates there has been no history of sewer flooding within the site boundary.

4.7.2 As the site is surrounded by drainage ditches on all sides, any sewer flooding originating off site would be intercepted before it could be conveyed onto and across the site. Furthermore, these drainage ditches would convey any sewer flooding away from the site before building to any significant depth. The site is therefore considered to have very low potential risk of flooding from sewer flooding.

## 4.8 HISTORIC FLOODING

4.8.1 The EA historic flood map shows the site to not have experienced historic flooding. A review of the ERYC Level 2 SFRA further indicates that the site has not experienced any historic flooding events. This map can be seen in Appendix J.

## 4.9 FLOOD WARNING AND ALERT AREAS

4.9.1 The site is located in an EA Flood Warning and Flood Alert area (Figure 6). Flood warning areas are defined as areas where flooding can be expected to occur from rivers or the sea and in some areas or from groundwater during a predicted scenario. Flood Alert areas are defined as areas where it is possible for flooding to occur from rivers, sea, and in some locations groundwater during a predicted scenario.

4.9.2 Properties and businesses within this area can sign up to receive free flood alerts via email and text to inform them upon the risk of flooding prior to flood events (Available: <https://www.gov.uk/sign-up-for-flood-warnings>). It is recommended that Client does so as part of the future site flood risk management for this area.

4.9.3 In the scenario where a Flood Warning or Flood Alert is issued, the closest accessible land not located within a Flood Warning and Flood Alert area is approximately 1km from the site. Emergency access and egress can be provided to this point via Rawcliffe Road and travelling to the east and the onwards on Airmyn Road to the north.

4.9.4 A Flood Emergency and Evacuation Plan has been provided by AMA for the proposed development in Appendix K.

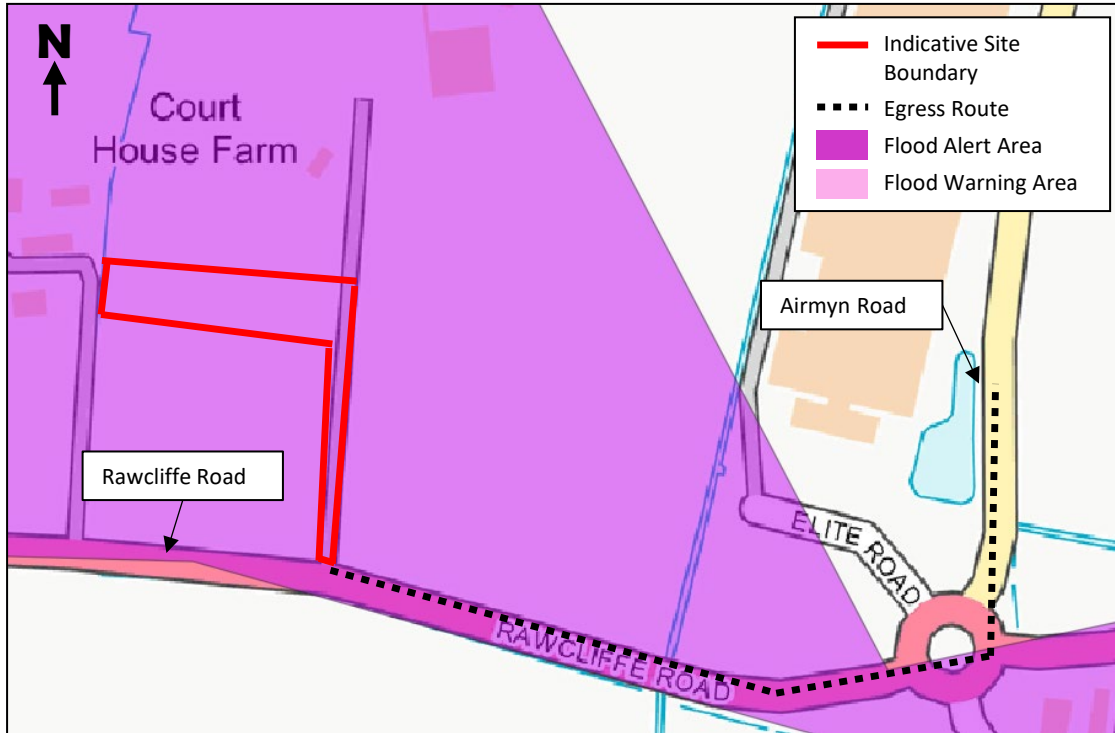


Figure 6. Environment Agency Flood Warning and Alert Areas

## 5 FLOOD RISK ASSESSMENT

### 5.1 FLOOD RISK PLANNING POLICY

#### National Planning Policy Framework

- 5.1.1 The NPPF sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance is also available online.
- 5.1.2 The Planning Practice Guidance sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 5.1.3 The Planning Practice Guidance also states that alternative sources of flooding, other than fluvial (river flooding), should also be considered when preparing a Flood Risk Assessment.
- 5.1.4 This Flood Risk Assessment is written in accordance with the NPPF and the Planning Practice Guidance.
- 5.1.5 The EA Flood Map for Planning locates the site within Flood Zone 3, i.e. land assessed as having a 1 in 100 greater annual probability (>1%) of river flooding, or a 1 in 200 or greater annual probability (>0.5%) of sea flooding in any one year.
- 5.1.6 The flood map extents indicated on this map show the potential for flooding from fluvial and coastal sources, and although they are indicative, they are a key tool in defining the appropriateness of a development type or the requirement for further assessment.
- 5.1.7 Under the NPPF (2023), Flood Zone 3 is defined as having a high probability flood risk. The proposed development consists of 92 self-storage shipping containers (B8), which are defined within Table 2 of the NPPF technical guidance as being 'Less Vulnerable'. Therefore, according to the criteria in Table 2 of the NPPF Technical Guidance (Flood Risk Vulnerability and Flood Zone 'Compatibility'), the proposed development may be deemed as 'Appropriate'.

### 5.2 SEQUENTIAL AND EXCEPTION TEST

- 5.2.1 Both the NPPG and the SFRA require the 'Sequential Test' to be applied to ensure that proposed developments are carried out in area that are at the least risk of flooding, before considering development in areas that are at risk of flooding. The proposed site falls within Flood Zone 3 and is considered to come under the 'Less Vulnerable' category as a commercial development.
- 5.2.2 Based on Table 3 in the National Planning Practice Guidance for Flood Risk and Coastal Change, the proposed use of the site is acceptable due to it being located in Flood Zone 3.



Table 5-1. Development Appropriateness Based on Vulnerability and Flood Zone

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	✓	Exception test required	✓	✓
Flood Zone 3a	Exception test required	✓	x	Exception test required	✓
Flood Zone 3b	Exception test required	✓	x	x	x

### 5.3 CONCLUSION

5.3.1 In light of this assessment against the sites applicable flood zone (Flood Zone 3), further assessment against the Sequential or Exception test may be required. This should be confirmed with (LPA) prior to development of the site.

Table 5-2 summarises the pre mitigation flood risk associated with the site as well as the impacts of the flood risk on the wider catchment prior to mitigation. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within Section 3.0.

Table 5-2 Pre-Mitigation Flood Risk Summary

Sources	Probability of Flood Risk	Impacts	Description
Tidal	Low	Low	The site is tidally influenced with the site at risk from a 1in200yr+CC with flood depth between 0.5m-1.0m.
Fluvial	Low	Low	The site is located in Flood Zone 3. The site is only at risk from a 1in100yr+CC event with flood depths modeled at 1.0m – 2.0m
Surface Water (Pluvial)	Very Low	Very Low	The site is not shown to be located in an area susceptible to surface water flooding.

Groundwater	Medium	Very Low	The site is shown to be at risk of ground water flooding; however, given the hard standing nature of the Site following development, ground water emergence at the site will be limited.
Artificial Sources	Very Low	Very Low	Review of information from multiple sources (EA, LLFA) reveals no evidence of flooding from reservoirs or canals.
Sewers	Very Low	Very Low	The risk of flooding from the surcharging of sewers is considered to be low.

5.3.2 Based on the assessable information presented, the site is considered to meet the requirements of the NPPF, given the assessed potential flood risk posed from all applicable sources, the means of adopting suitable mitigation measures to prevent increase in the potential for flood risk and based on the vulnerability of the development type. Further consideration of necessary surface water runoff mitigation measures will be provided, so as to address the potential for increase of surface water arising from the proposed development of the site.

## 6 FLOOD RISK MITIGATION

### 6.1 FLOOD RISK MITIGATION

- 6.1.1 Section 2.0 has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be considered within the proposed development detail design to address and reduce the risk of flooding to within acceptable levels.

### 6.2 EFFECT OF DEVELOPMENT ON WIDER CATCHMENT

#### Development Drainage

- 6.2.1 The current site is considered to be greenfield. The amount of impermeable area will be altered. Therefore, the existing drainage systems will not be suitable to discharge the surface water from the site alongside the additional run off from the proposed development. A sufficient drainage strategy will be therefore provided by AMA.

### 6.3 SITE ARRANGEMENTS

- 6.3.1 The site is indicated as being at high risk of fluvial flooding. As discussed within Section 4.3 of this report, in a worst-case scenario, the site could expect a flood depth of up to 4.0m for breach event.
- 6.3.2 As the development is for a new storage container, it is proposed that in the event of a flood, the water entry strategy should be adopted.
- 6.3.3 The water entry strategy involves allowing water to flow through the site and allowing everything to flood, and as such no flood water storage is lost with the proposed development.

## 7 FOUL WATER DRAINAGE

### 7.1 INTRODUCTION

- 7.1.1 As shown in Appendix A the site consists of a storage area for containers. There is no part of the site which requires foul drainage. Therefore, there will be no new foul drainage system to serve the proposed commercial development.

## 8 SURFACE WATER DRAINAGE STRATEGY

### 8.1 INTRODUCTION

- 8.1.1 The National Planning Policy Framework (NPPF) and accompanying Technical Guidance indicate that surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management.
- 8.1.2 Consideration should therefore firstly be given to using sustainable drainage (SuDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2015) sets out a hierarchy for the disposal of surface water which encourages a SuDS approach.

### 8.2 OVERVIEW AND CONCEPT

- 8.2.1 As detailed in Section 3.1, development proposals for the site consist of 92 self-storage shipping containers (B8). The site plan shows the developable area of the site to be restricted to the red line boundary, as shown in Appendix A, with an approximate total developable area of 0.7ha.
- 8.2.2 AMA attained a Yorkshire Water predevelopment enquiry which can be found in Appendix L.

### 8.3 PRE-DEVELOPMENT SURFACE WATER RUN-OFF

#### Greenfield

- 8.3.1 The site is approximately 0.4ha in area and currently comprises of greenfield land.
- 8.3.2 For the purposes of determining the existing rate of surface water run-off the site is considered to greenfield therefore the run-off will be estimated using the IH124 method.
- 8.3.3 The table below summarises the existing greenfield run-off rates generated by the development for a range of storm return periods. A calculation summary sheet from the UK SuDS website can be found in Appendix M.

Table 8-1. Existing Run-Off Rates

Area (Ha)	Q <sub>BAR</sub> (L/S)	Q <sub>1</sub> (L/S)	Q <sub>30</sub> (L/S)	Q <sub>100</sub> (L/S)	Q <sub>200</sub> (L/S)
0.40	1.60	1.38	2.80	3.33	3.79

## 8.4 GROUNDWATER PROTECTION

- 8.4.1 The proposed development site is not identified as being within a groundwater source protection, however the site is within a few 100 meters of a Zone III SPZ, therefore special measures may be required to prevent risk to drinking water supplies.

## 8.5 METHODS OF SURFACE WATER MANAGEMENT

- 8.5.1 There are three methods that have been reviewed for the management and discharge of surface water which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed:

- ▶ Discharge via Infiltration
- ▶ Discharge to a Watercourse
- ▶ Discharge to Surface Water Sewer or Highway Drain
- ▶ Discharge to Public Sewer

## 8.6 INFILTRATION

- 8.6.1 Any impermeable areas that can drain to a soakaway or an alternative method of infiltration would significantly improve the sustainability of any surface water systems.
- 8.6.2 The British Geological Society (BGS) Geology of Britain Viewer indicates that the entire site is underlain by Sherwood Sandstone Group – Sandstone, with overlying superficial deposits of Brighton Sand Formation – Sand.
- 8.6.3 Information obtained from the Cranfield University's Soilscape website indicates that the site is in an area classified as being Soilscape 10, which is defined as freely draining slightly acid sandy soils.
- 8.6.4 However even with ground conditions that may support infiltration, the site is shown to be situated above a principal bedrock aquifer as well as having a high risk of groundwater flooding it may not be appropriate to use soakaways as a method of discharging surface water. Furthermore, the site is located near SPZ and discharging surface water from a container yard may not to be appropriate.

## 8.7 WATERCOURSE

- 8.7.1 As discussed in Section 3.5 the site is situated in between the Township Drain. At its closest point the site borders an arm of the Township Drain. The watercourse is located in the Goole & Airmyn IDB and therefore falls under their jurisdiction. AMA have contacted the IDB in regards to the suitability of an outfall into the watercourse however, at the time of writing this report, await a response.
- 8.7.2 As the site is in close proximity to the watercourse, it would be possible to discharge surface water from the site into the watercourse.

## 8.8 PUBLIC SEWERS

- 8.8.1 As a last resort and following the hierarchy of surface water, disposal discharge to the public sewer system may need to be considered.

8.8.2 In the Yorkshire Water predevelopment enquiry (Appendix L) they state that there are no available sewers in which to discharge surface water into and therefore the SuDS hierarchy should be followed.

8.8.3 Therefore, it would not be possible to discharge surface water from the site into a public sewer.

## 8.9 PROPOSED DISCHARGE RATES

8.9.1 Surface water from the site will be discharged into the Township drain to the west of the site.

8.9.2 As the site will be drained by discharging surface water into the watercourse, surface water will be restricted to greenfield run off rate, which is set at 1.6 l/s as shown in Appendix M.

## 8.10 ATTENUATION REQUIREMENTS

8.10.1 As discussed earlier the site will be drained into a watercourse at a restricted discharge rate of 1.6 l/s. Therefore, attenuation will have to be provided.

8.10.2 Causeway Flow drainage design software has been used to estimate the maximum storage volume required on-site for the 100-year storm event plus 40% allowance for climate change. The results of these calculations can be found in Appendix N.

8.10.3 The results below are based on using an attenuation tank and hydrobrake to restrict flows.

8.10.4 A drainage layout drawing can be found in Appendix O.

### Total Impermeable Area

8.10.5 This volume is based on using an attenuation tank with a discharge rate of 1.6 l/s. The details on the attenuation can be found in Table 8-2 below.

Table 8-2. Attenuation Volume

Attenuation Volume			
Gross area (ha)	Max Discharge (l/s)	Imp. Area (ha)	Q100+40% Volume (m <sup>3</sup> )
0.7	1.6	0.7	343

## 9 SUSTAINABLE DRAINAGE SYSTEMS

9.1.1 Where possible, Sustainable drainage (SuDS) systems/techniques should be used to drain the site of surface water runoff. These could be in the form of permeable paving, rainwater harvesting, ponds, and other above ground green systems. Swales could also be incorporated into the layout to convey surface runoff rather than below ground pipes (which tend to have a higher velocity).

### 9.2 SUSTAINABLE DRAINAGE (OVERVIEW)

9.2.1 Drainage systems can contribute to sustainable development and improve urban design, by balancing the different issues that influence the development of communities. Approaches to manage surface water that take account of water quantity (flooding), water quality (pollution) and amenity issues are collectively referred to as Sustainable Drainage Systems (SuDS).

9.2.2 SuDS mimic nature and typically manage rainfall close to where it falls. SuDS can be designed to slow water down (attenuate) before it enters streams, rivers, and other watercourses, they provide areas to store water in natural contours and can be used to allow water to soak (infiltrate) into the ground or evaporated from surface water and lost or transpired from vegetation (known as evapotranspiration).

9.2.3 SUDS are technically regarded a sequence of management practices, control structures and strategies designed to drain surface water efficiently and sustainably, while minimising pollution and managing the impact on water quality of local water bodies.

9.2.4 SuDS are more sustainable than traditional drainage methods because they:

- ▶ Manage runoff volumes and flow rates from hard surfaces, reducing the impact of urbanisation on flooding,
- ▶ Protect or enhance water quality (reducing pollution from runoff),
- ▶ Protect natural flow regimes in watercourses,
- ▶ Are sympathetic to the environment and the needs of the local community,
- ▶ Provide an attractive habitat for wildlife in urban watercourses,
- ▶ Provide opportunities for evapotranspiration from vegetation and surface water,
- ▶ Encourage natural groundwater/aquifer recharge (where appropriate),
- ▶ Create better places to live, work and play.

### 9.3 SUDS PRINCIPALS

9.3.1 Sustainable drainage is a departure from the traditional approach to draining sites. There are some key principles that influence the planning and design process enabling SuDS to mimic natural drainage by:

- ▶ Storing runoff and releasing it slowly (attenuation)
- ▶ Allowing water to soak into the ground (infiltration)
- ▶ Slowly transporting (conveying) water on the surface
- ▶ Filtering out pollutants
- ▶ Allowing sediments to settle out by controlling the flow of the water



9.3.2 The above was replicated from [www.susdrain.org](http://www.susdrain.org)

## 9.4 SUDS TECHNIQUES

9.4.1 The following table is a list of SuDS features that may/may not be feasible for the proposed site.

Table 9-1. SuDS Feasibility Table

SUDS Technique	Can they be feasibly incorporated into the site?	Comments
Green Roofs	x	The sloping roofs of the proposed development would not permit a green-roof design
Basins and Ponds	x	The proposed development could not be designed to incorporate these elements due to site constraints such as the topography.
Filter Strips, Swales and Bio-Retention	x	The proposed development could not be designed to incorporate these elements due to site constraints.
Infiltration techniques	x	Desktop review of the available data indicate that infiltration would not be feasible at the site.
Permeable surfaces and tree pits	x	The proposed development could not be designed to incorporate these elements due to site constraints.
Rainwater Harvesting	x	The proposed development could not be designed to incorporate these elements due to site constraints.
Tanked Systems	✓	Attenuation storage could be provided if a restricted discharge is required by the LLFA.

# 10 SUDS MAINTENANCE PLAN

## 10.1 SURFACE WATER DRAINAGE MAINTENANCE AND MANAGEMENT SCHEDULE

Attenuation Tank

Table 10-1. Attenuation Tank

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action.	Monthly for the first 3 months of operation, then annually.
	Recover debris from catchment surface area where it may cause risk to performance.	Monthly
	Remove sediment and debris from pre-tank system.	Annually
Remedial Actions	Repair inlets/outlets/vents/overflows.	As necessary
Monitoring	Inspect all inlets/outlets and upstream drainage system to ensure they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment and build up and remove if necessary.	Every 5 years

Hydrobrake Manhole

Table 10-2. Hydrobrake Manhole

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove sediment and debris from flow control chambers and upstream manholes.	Monthly for first 12 months, then 6 monthly.
Remedial Actions	Replace or clean hydrobrake if performance deteriorates or failure occurs.	As necessary
Monitoring	Check flow control to ensure emptying is occurring.	Quarterly and post high intensity storm event

## 11 SUMMARY & CONCLUSION

- 11.1.1 The proposals for the site are for commercial use, consisting of 92 self-storage shipping containers (B8).
- 11.1.2 The site is in an area identified as having a high probability of flooding on the EA Flood Map and is located in Flood Zone 3.
- 11.1.3 The site is at risk of flooding from fluvial, tidal and a breach scenario when taking into account the effects of climate change. The flood depths for fluvial and tidal events range from 0.5m – 2.0m with breach events causing depths of up to 4.0m.
- 11.1.4 In the scenario where a Flood Warning or Flood Alert is issued, the closest accessible land not located within a Flood Warning and Flood Alert area is approximately 1km from the site. Emergency access and egress can be provided to this point via Rawcliffe Road and travelling to the east and the onwards on Airmyn Road to the north.
- 11.1.5 As with any drainage system, blockages within the surface water sewer systems constructed to serve the development has the potential to cause flooding or disruption. Any drainage systems which are not to be offered for adoption to either the Water Company or the Local Authority will have a suitable maintenance regime scheduled and an appropriate management company appointed to carry out the works.
- 11.1.6 The primary option for surface water disposal is to outfall to a watercourse to the west of the site. There is a suitable watercourse in the vicinity of the site which could be utilised to dispose of surface water from the site. It is proposed that surface water will discharge through an outfall with a discharge rate of 1.6 l/s.
- 11.1.7 Attenuation is required as the means of surface water disposal is through an outfall to a watercourse. Furthermore, there will be a restricted discharge limit of 1.6 l/s based on the greenfield run-off rate.

## 12 LIMITATIONS

### 12.1 LIMITATIONS

- 12.1.1 This report has been prepared for exclusive use by Dewar Planning Associates for the purpose of assisting them in evaluating the potential constraints imposed by flood risk and drainage in making a Planning Application.
- 12.1.2 AMA accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of AMA. Any advice, opinions or recommendations within this document should be read and relied upon only in the context of the document as a whole.
- 12.1.3 AMA has endeavoured to assess all information provided to them during this appraisal. The report summarises from several external sources and cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon.
- 12.1.4 This report has been undertaken with the assumption that the site will be developed in accordance with the above proposals without significant change. The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.
- 12.1.5 A topographic survey has been completed for the site and was supplied to AMA by the client. AMA accepts no liability for the accuracy of this survey, and it is recommended that it is verified on-site prior to the commencement of any construction work.
- 12.1.6 Existing drainage information is based on third party survey data and record information which is considered to be incomplete. It is therefore recommended that a FULL drainage investigation survey is commissioned to establish the precise alignment, level, and condition of ALL existing drainage within the development site to inform the masterplan and future detailed design proposals.

## APPENDICES

APPENDIX A – PROPOSED SITE LAYOUT

APPENDIX B – TOPOGRAPHIC SURVEY

APPENDIX C – ADDITIONAL EA FLOOD DATA

APPENDIX D – SFRA FLOOD DEFENCE MAP

APPENDIX E – SFRA FLUVIAL FLOOD MAP

APPENDIX F – SFRA TIDAL FLOOD MAP

APPENDIX G – SFRA TIDAL FLOOD MAP ACCOUNTING FOR CC

APPENDIX H – SFRA BREACH MAP

APPENDIX I – GROUNDWATER FLOOD MAP

APPENDIX J – HISTORIC FLOOD MAP

APPENDIX K – AMA FLOOD EMERGENCY AND EVACUATION FLOOD PLAN

APPENDIX L – YORKSHIRE WATER PRE DEVELOPMENT ENQUIRY

APPENDIX M – UK SUDS GREENFIELD RUNOFF RATES

APPENDIX N – CAUSEWAY FLOW CALCULATIONS

APPENDIX O – DRAINAGE LAYOUT DRAWING

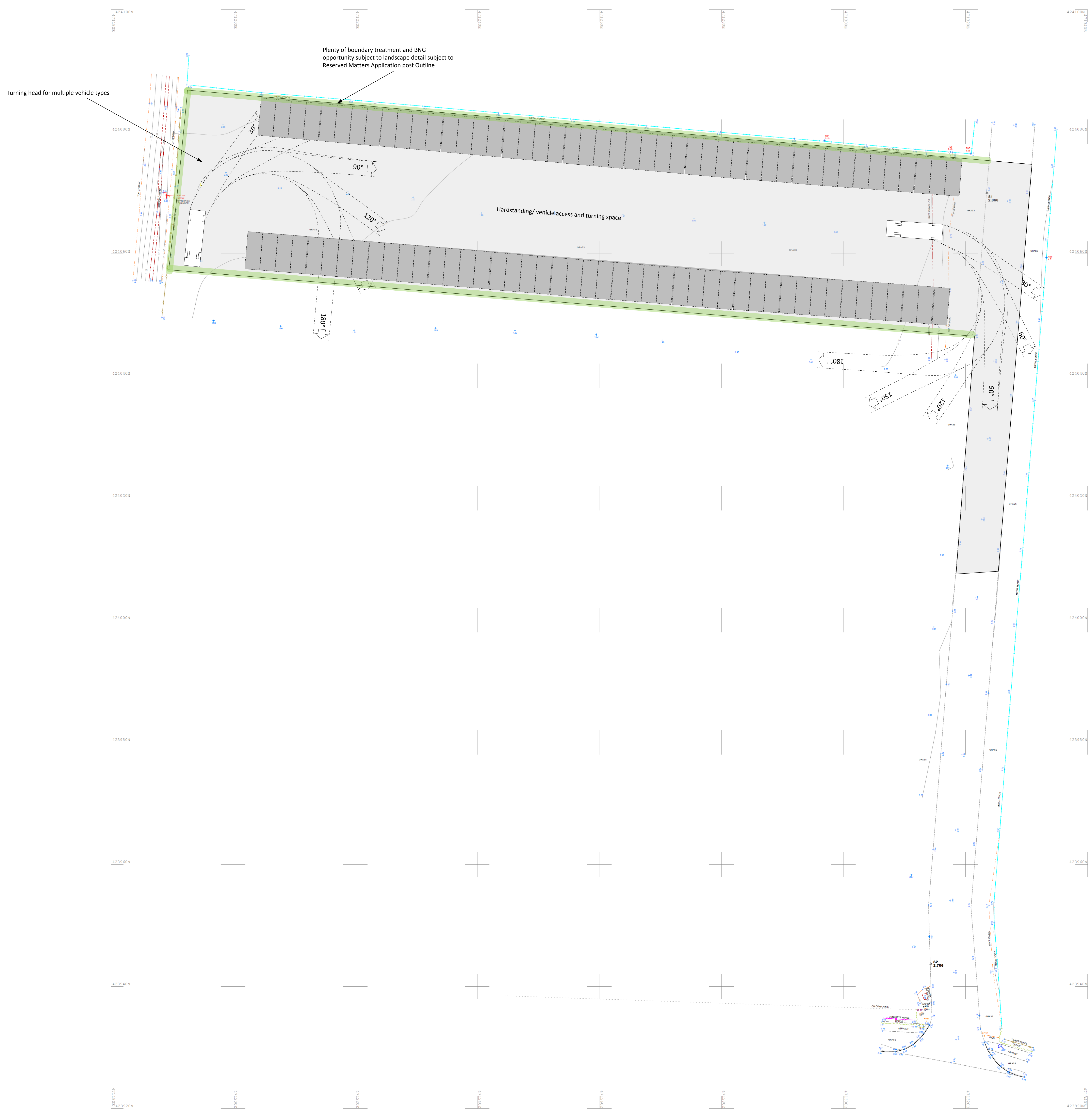
# Appendix A

## PROPOSED SITE LAYOUT

**OFFICE:**  
DPA Planning Ltd  
4100 Park Approach  
Leeds  
LS15 8GB  
Tel: 0113 3970 310  
Mob: 07799 095 613  
S.dewar@dpaPlanning.co.uk

**SITE ADDRESS:**  
Part of Plot 3  
Delta Enterprise Park  
Coole  
DN14 8JZ

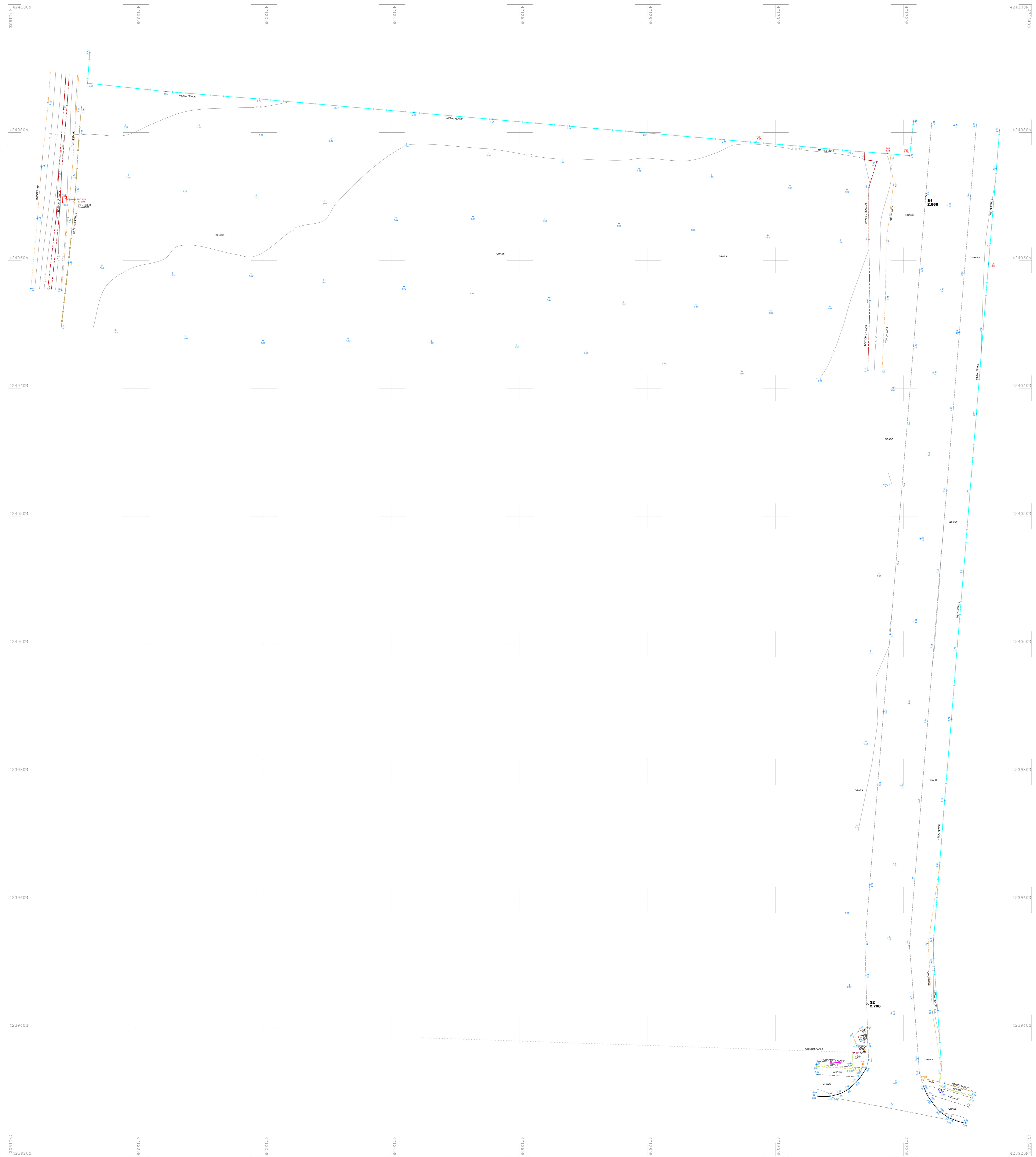
**Notes:**  
Site to accommodate up to 92 self-storage containers.  
Each container measures 6.00m long by 2.43m wide with a flat roof height of 2.62m.





# Appendix B

## TOPOGRAPHIC SURVEY



**Notes**  
 This drawing and the information contained therein is issued in confidence and is the copyright of MT Surveys Ltd. Disclosure of this information to Third Parties and unauthorised copying or replication of this data without approval is forbidden.

**Direction of North**

**GRID**  
 OS NATIONAL GRID.  
 Using the OS GPS Network and applying OSTN15 transformation and then removing the scale factor for true distances.

**DATUM**  
 OS LEVEL DATUM  
 Using the OS GPS Network and applying OSGM15 National Geoid Model to obtain local area corrections.

**STATION LISTING**

Station	Easting	Northing	Level
81	423323.510	424049.991	2.866
82	423324.218	423983.727	2.706

**TOPOGRAPHICAL SURVEY KEY**

DRAINAGE & WATER SERVICES		STREET FURNITURE & GEOTECH	
DS	Drain/Grully	PO	Post Box
KO	Kerb Outlet	BS	Bus Stop
CM	Circular Manhole	BO	Bollard
SM	Square Manhole	SI	Sign
TM	Triangular Manhole	TL	Traffic Light
RE	Rodding Eye	CA	Camera
FI	Fire Hydrant	LP	Lamp Post
ST	Stop Tap	LP	Lamp Post
SV	Stop Valve	CO	Column
TP	Tap	VE	Vent
WD	Wash Out	BM	Bench Mark
WM	Water Meter	MP	Marker Post
WV	Water Valve	TP	Trail Pin
AV	Air Valve	BN	Borehole

SERVICES		ABBREVIATIONS	
GV	Gas Valve	CL	Cover Level
IC	Inspection Cover	IL	Invert Level
CTC	Cable TV Cover	UR	Under To Rise
CS	Cable TV Supply	TH	Threshold Level
EC	Electric Cover	TF	Top Of Fence
EP	Electric Pole	TOH	Top Of Hedge
ER	Earth Rod	TOW	Top Of Wall
TC	Telecoms Cover	UN	Underside
TP	Telegraph Pole	WCL	Window C/L Level
GR	Gas Riser Pipe	WHL	Window Head Level
RP	Ratemer Pipe	DDL	Door Head Level
SV	Sol Vent Pipe		

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 Parkview Court  
 Shipley  
 BD18 3DZ

**CLIENT**  
 Dewar Planning Associates

**SITE**  
 Land at Court House Farm  
 Goole

**DRAWING TITLE**  
 2D Topographical Survey

<b>DRAWING REF (LAYOUT TAB)</b> 1485-105_2D (A0)	<b>SCALE</b> 1/250
<b>PROJECT REF</b> 1485-105	<b>REV</b> Ø
<b>SURVEYED</b> JW	<b>DRAWN</b> JW
<b>CHECKED</b> MT	<b>DATE</b> 12 / 01 / 2024

REV	DATE	DRAWN	DESCRIPTION	CHECKED

# Appendix C

## ADDITIONAL EA FLOOD DATA

Reference: RFI/2022/266038

Thank you for your email. We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Please find a sharefile link below that will enable you to download the Products 5 and 6 from the 2016 Upper Humber Study.

<https://ea.sharefile.com/d-sa662bdbbcf2c463790a6323c9c18a3c5>

Please note this link will expire in 30 days.

The following information is not available under the Open Government Licence but we may be able to licence it to you under the [Environment Agency Conditional Licence](#) :

Please refer to the tables below for the permitted use of the supplied information.

Name	Product 5
Description	2016 Upper Humber Study
Licence	<a href="#">Environment Agency Conditional Licence</a>
Conditions	<ol style="list-style-type: none"><li>1. You may use the Information for your internal or personal purposes and may only sublicense others to use it if you do so under a written licence which includes the terms of these conditions and the agreement and in particular may not allow any period of use longer than the period licensed to you.</li><li>2. Notwithstanding the fact that the standard wording of the Environment Agency Conditional Licence indicates that it is perpetual, this Licence has a limited duration of 5 years at the end of which it will terminate automatically without notice.</li><li>3. We have restricted use of the Information as a result of legal restrictions placed upon us to protect the rights or confidentiality of others. In this instance it is because of third party data. If you contact us in writing (this includes email) we will, as far as confidentiality rules allow, provide you with details including, if available, how you might seek permission from a third party to extend your use rights.</li><li>4.1 The Information may contain some data that we believe is within the definition of "personal data" under the Data Protection Act 1998 but we consider that we will not be in breach of the Act if we disclose it to you with conditions set out in this condition and the conditions above. This personal data comprises names of individuals or commentary relating to property that may be owned by an individual or commentary relating to the activities of an individual.</li><li>4.2 Under the Act a person who holds and uses or passes to others personal data is responsible for any compliance with the Act and so we have no option but to warn you that this means you have responsibility to check that you are compliant with the Act in respect of this personal data.</li></ol>

	<p>5. The location of public water supply abstraction sources must not be published to a resolution more detailed than 1 km<sup>2</sup>. Information about the operation of flood assets should not be published.</p> <p>6.1 Where we have supplied model data which may include model inputs or outputs you agree to supply to the Environment Agency copies of any assessments/studies and related outputs, modifications or derivatives created pursuant to the supply to you of the Information, all of which are hereinafter referred to as “the Data”.</p> <p>6.2 You agree, in the public interest to grant to the Environment Agency a perpetual royalty free non-exclusive licence to use the Data or any part thereof for its internal purposes or to use it in any way as part of Environment Agency derivative products which it supplies free of charge to others such as incorporation into the Environment Agency's Open Data mapping products.</p>
Attribution	<p>Contains Environment Agency information © Environment Agency and/or database rights.</p> <p>May contain Ordnance Survey data © Crown copyright 2020 Ordnance Survey 100024198.</p>

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Description	Model Output Data for 2016 Upper Humber Study
Licence	<a href="#">Environment Agency Conditional Licence</a>
Conditions	<ol style="list-style-type: none"> <li>1. You may use the Information for your internal or personal purposes and may only sublicense others to use it if you do so under a written licence which includes the terms of these conditions and the agreement and in particular may not allow any period of use longer than the period licensed to you.</li> <li>2. Notwithstanding the fact that the standard wording of the Environment Agency Conditional Licence indicates that it is perpetual, this Licence has a limited duration of 5 years at the end of which it will terminate automatically without notice.</li> <li>3. We have restricted use of the Information as a result of legal restrictions placed upon us to protect the rights or confidentialities of others. In this instance it is because of third party data. If you contact us in writing (this includes email) we will, as far as confidentiality rules allow, provide you with details including, if available, how you might seek permission from a third party to extend your use rights.</li> <li>4.1 The Information may contain some data that we believe is within the definition of “personal data” under the Data Protection Act 1998 but we consider that we will not be in breach of the Act if we disclose it to you with conditions set out in this condition and the conditions above. This personal data comprises names of individuals or commentary</li> </ol>

	<p>relating to property that may be owned by an individual or commentary relating to the activities of an individual.</p> <p>4.2 Under the Act a person who holds and uses or passes to others personal data is responsible for any compliance with the Act and so we have no option but to warn you that this means you have responsibility to check that you are compliant with the Act in respect of this personal data.</p> <p>5. The location of public water supply abstraction sources must not be published to a resolution more detailed than 1km<sup>2</sup>. Information about the operation of flood assets should not be published.</p> <p>6.1 Where we have supplied model data which may include model inputs or outputs you agree to supply to the Environment Agency copies of any assessments/studies and related outputs, modifications or derivatives created pursuant to the supply to you of the Information, all of which are hereinafter referred to as “the Data”.</p> <p>6.2 You agree, in the public interest to grant to the Environment Agency a perpetual royalty free non-exclusive licence to use the Data or any part thereof for its internal purposes or to use it in any way as part of Environment Agency derivative products which it supplies free of charge to others such as incorporation into the Environment Agency's Open Data mapping products.</p>
<b>Information Warnings</b>	Please be aware that model data is not raw, factual or measured but comprises of estimations or modelled results based on the data available to us.
Attribution	Contains third party information. Contains Environment Agency information © Environment Agency and/or database rights.

Name	Product 7
Description	Calibrated and Verified Model Input Data for 2016 Upper Humber Study
Licence	<a href="#">Environment Agency Conditional Licence</a>
Conditions	<ol style="list-style-type: none"> <li>1. You may use the Information for your internal or personal purposes and may only sublicense others to use it if you do so under a written licence which includes the terms of these conditions and the agreement and in particular may not allow any period of use longer than the period licensed to you.</li> <li>2. Notwithstanding the fact that the standard wording of the Environment Agency Conditional Licence indicates that it is perpetual, this Licence has a limited duration of 5 years at the end of which it will terminate automatically without notice.</li> </ol>

	<p>3. We have restricted use of the Information as a result of legal restrictions placed upon us to protect the rights or confidentiality of others. In this instance it is because of third party data. If you contact us in writing (this includes email) we will, as far as confidentiality rules allow, provide you with details including, if available, how you might seek permission from a third party to extend your use rights.</p> <p>4.1 The Information may contain some data that we believe is within the definition of “personal data” under the Data Protection Act 1998 but we consider that we will not be in breach of the Act if we disclose it to you with conditions set out in this condition and the conditions above. This personal data comprises names of individuals or commentary relating to property that may be owned by an individual or commentary relating to the activities of an individual.</p> <p>4.2 Under the Act a person who holds and uses or passes to others personal data is responsible for any compliance with the Act and so we have no option but to warn you that this means you have responsibility to check that you are compliant with the Act in respect of this personal data.</p> <p>5 The location of public water supply abstraction sources must not be published to a resolution more detailed than 1km<sup>2</sup>. Information about the operation of flood assets should not be published.</p> <p>6.1 Where we have supplied model data which may include model inputs or outputs you agree to supply to the Environment Agency copies of any assessments/studies and related outputs, modifications or derivatives created pursuant to the supply to you of the Information, all of which are hereinafter referred to as “the Data”.</p> <p>6.2 You agree, in the public interest to grant to the Environment Agency a perpetual royalty free non-exclusive licence to use the Data or any part thereof for its internal purposes or to use it in any way as part of Environment Agency derivative products which it supplies free of charge to others such as incorporation into the Environment Agency's Open Data mapping products.</p>
Information Warnings	
Attribution	Contains Environment Agency information © Environment Agency and/or database rights.

However, you MUST first check the supporting information and the above link to determine if the conditions on use are suitable for your purposes. If they aren't, this information is not provided with a licence for use, and the data is provided for read right only.

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.

Kind regards,  
Yorkshire PSO



## Planning advice for developers – FAQs

### INTRODUCTION

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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

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#### 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](mailto: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](mailto: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**

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### **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	<a href="mailto:planningconsultation@yorkshirewater.co.uk">planningconsultation@yorkshirewater.co.uk</a>
Northumbrian Water	<a href="mailto:developmentenquiries@nwl.co.uk">developmentenquiries@nwl.co.uk</a>
Severn Trent Water	<a href="mailto:new.connections@severntrent.co.uk">new.connections@severntrent.co.uk</a>

#### 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

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#### 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

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#### 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?

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Yorkshire planning enquiries: [sp-yorkshire@environment-agency.gov.uk](mailto: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>

**RFI/2022/266038**

## **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**

### **Flood History**

To the best of our knowledge there is no known flood history for this site. However, in close proximity to this location we do have some flood history available (see enclosed map). 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.

<b>Name</b>	<b>Start Date</b>	<b>End Date</b>	<b>Flood Source</b>	<b>Flood Cause</b>	<b>Flood Map Status</b>	<b>Historical Flood Map Status</b>	<b>Source of data</b>
2020 February Flood Incident - Storm Dennis	15/02/2020	19/03/2020	main river	channel capacity exceeded (no raised defences)	considered and accepted	considered and accepted	Aerial Photography
June 2007 Flood Event (Ridings Area)	25/06/2007	26/06/2007	unknown	unknown	considered and accepted	considered and accepted	Aerial Photography
June 2007 Flood Event (Ridings Area)	25/06/2007	26/06/2007	unknown	unknown	considered and accepted	considered and accepted	Aerial Photography
123 Autumn 2000	31/10/2000	15/12/2000	main river	unknown	considered and accepted	considered and accepted	Aerial Photography
123 February 1995 - Airmyn	01/02/1995	28/02/1995	main river	channel capacity exceeded (no raised defences)	considered and accepted	considered and accepted	Aerial Photography

Water causing flooding can come from different places, for example from rivers or the sea; surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system); overflowing or backing up of sewers or drainage systems which have been overwhelmed or from groundwater rising up from underground aquifers.

**Please note that this record doesn't include all of the flooding that may have occurred including and since 2<sup>nd</sup> March 2022. 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.

### **Description of Works**

See attached table with description of the defences 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.

### **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.

Please note that information about high ground, structures (such as weirs, control gates or screens) and channels (culverts) are no longer given out in Product 4, unless specifically requested. If you'd like to see this data, please let us know.

### **Modelling**

#### **2016 Upper Humber Study**

We have provided you with a copy of the Model Data Files for the 2016 Upper Humber Study. Also provided is a copy of the Modelling Reports (Product 5). They can be downloaded from the ShareFile link below:

<https://ea.sharefile.com/d-sa662bdbbcf2c463790a6323c9c18a3c5>

There is a Conditional Data Licence associated with the provision of the Model. This sets out the Terms and Conditions for the uses of the Data.

Please note that as you requested both Product 4 and 6, in order to avoid duplication of information, data provided in digital form such as in-channel water levels, flows and location of the cross sections are not provided as maps and tables in pdf format.

## **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](mailto: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. Please contact the Sustainable Places team if you require advice on how to include these within a Flood Risk Assessment.

## **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>

### **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 of showing the outlines can also be provided on request.

## **Flood Warning**

The site is covered by a Flood Warning. To register to receive this service, you can call Floodline 24 hours a day on 0845 988 1188.

## **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.

# Appendix D

## SFRA FLOOD DEFENCE MAP



# Appendix E

**SFRA FLOOD MAP FLUVIAL FLOOD MAP**