

# Flood Risk Assessment

**Address** Humber Bridge Garden Centre.  
Far Ings Road  
Barton upon Humber.  
North Lincolnshire.

**Client** Humber Bridge Garden Centre

**Date** 26<sup>th</sup> September 2024.  
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Document Control

<b>Revision</b>	<b>Remarks</b>	<b>Date</b>
A	Preliminary	26 <sup>th</sup> September 2024
B	Floor level amended	26 <sup>th</sup> September 2024

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## 1. Introduction

East Riding Consultants Ltd have been commissioned to prepare a detailed flood risk assessment (FRA) for proposed Workshop unit at Humber Bridge Garden centre.

A FRA is required because the site is situated in Flood Risk Zone 3a, this means that local and national planning policy requires an assessment which identifies and examines flood risk at the site level that also sets out measures to reduce the risk of flooding to the property and its occupants over the life of its use.

This is a supplementary document to a planning application and the conditions of a planning consent are likely to make reference to this document which means the applicant must comply with specific requirements set out in this FRA and give proper consideration to its recommendations in order to discharge the conditions of the consent.

## 2. Methodology and Site Information

### 2.1 Scope of Works

This FRA will:

- Assess the risk of flooding to the development
- Set out specific requirements which the applicant must adhere to
- Set out recommendations that the applicant must properly consider

This FRA will not:

- Set out any detailed design
- Give detailed hydraulic calculations

## 3. Sources of Data

The following publications and data sources were used in the production of this report:

- *National Flood Risk Map for Planning – Rivers and Sea*
- *National Map for Risk of Flooding from Surface Water*
- *North Lincolnshire Council Strategic Flood Risk Assessment (SFRA)*
- *National Planning Policy Framework (NPPF)*
- *NPPF Technical Guidance*
- *Flood Risk Assessments Guide for New Development (FD2320/TR2)*
- *Humber defence overtopping hazard and depth maps 2014: EA 2015*
- *Water level profile 2014: EA 2015*
- *Humber breach defence scenarios 2011: EA 2011*
- *Flood Risk Assessments: Climate Change Allowances: EA 2016*

### 3.1 Environment Agency Licence Information

Contains Environment Agency information © Environment Agency and database right.

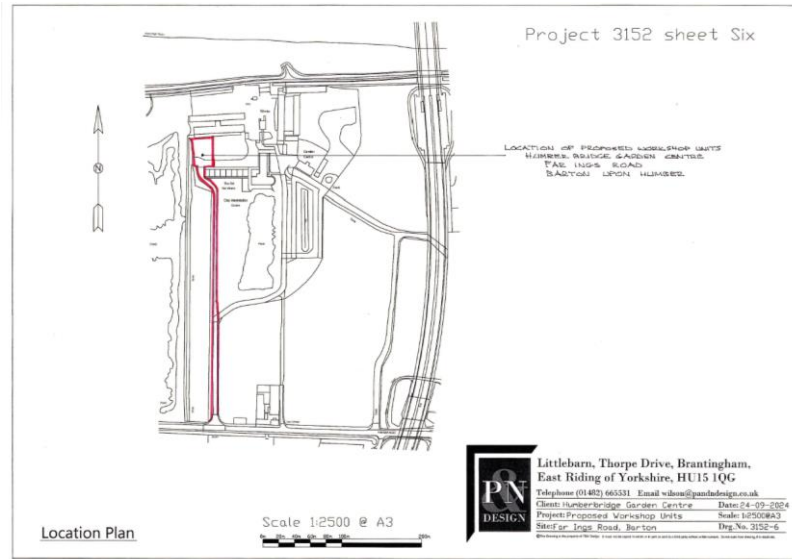
### 3.2 Study Area

The study area considered will be Far Ings Drain Catchment Area and the tidal Humber Estuary.

### 3.3 Location

The proposed development is located on the south bank of the Humber at Far Ings Road, Barton upon Humber. Adjacent to the tidal Humber Estuary.

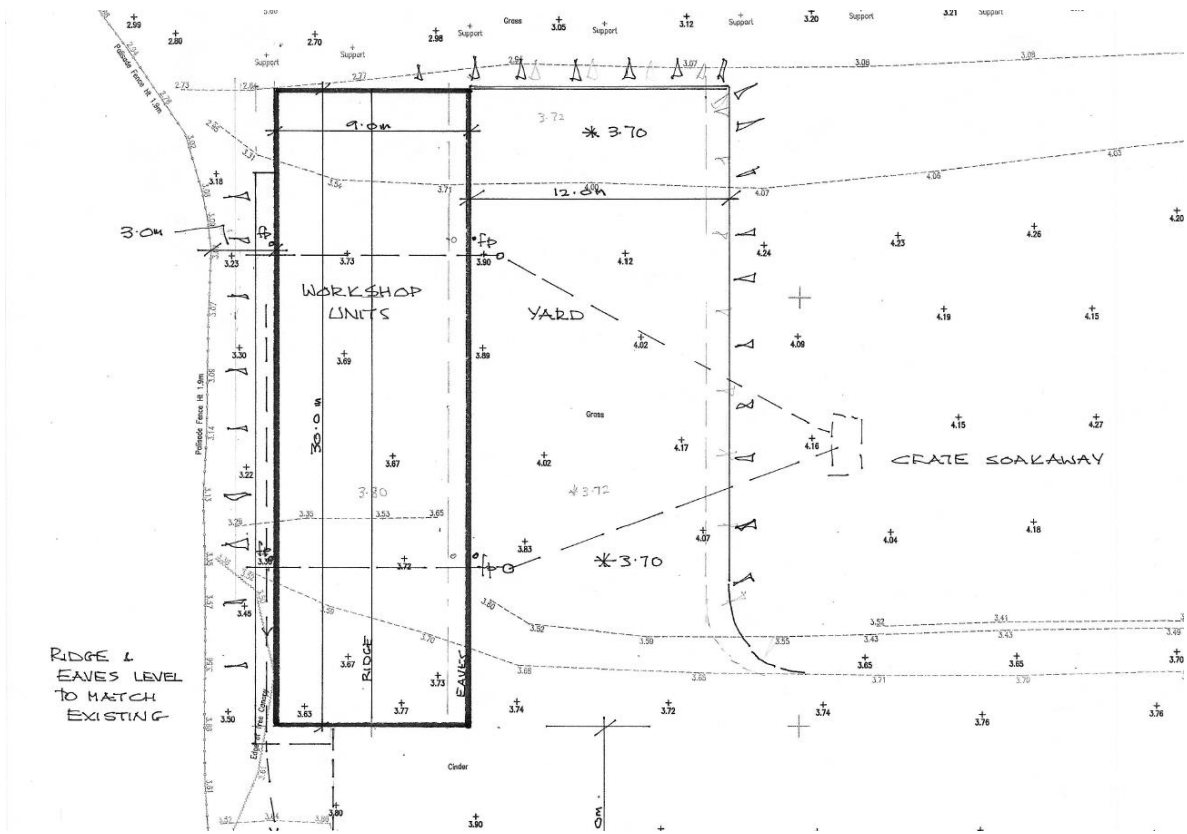
The National Grid Reference for the site is 50240 423300.



### 3.4 Description of Proposed Development

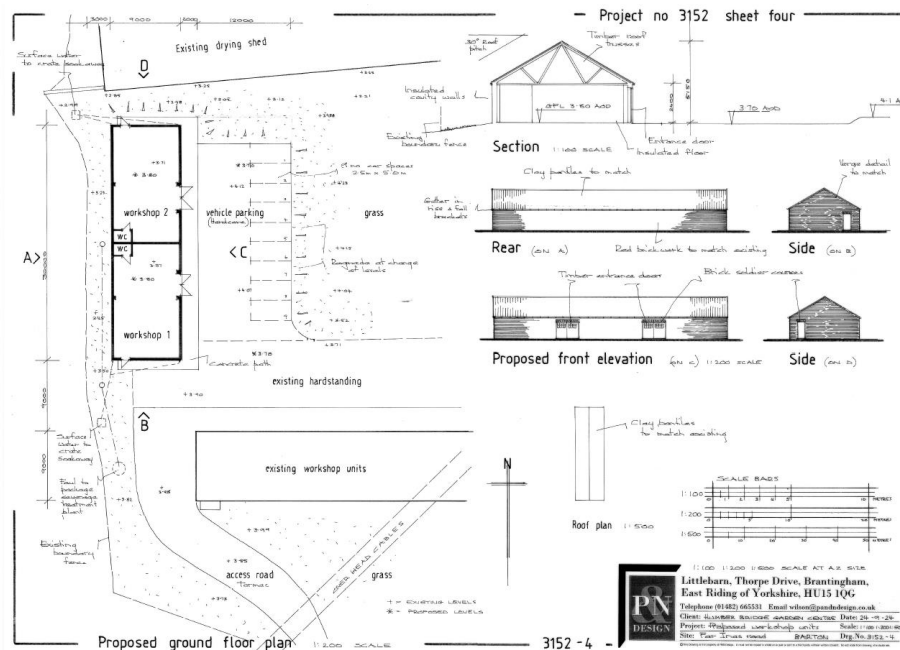
The proposal is for the construction of a new workshop building adjacent to the existing workshop.

### 3.5 Topography



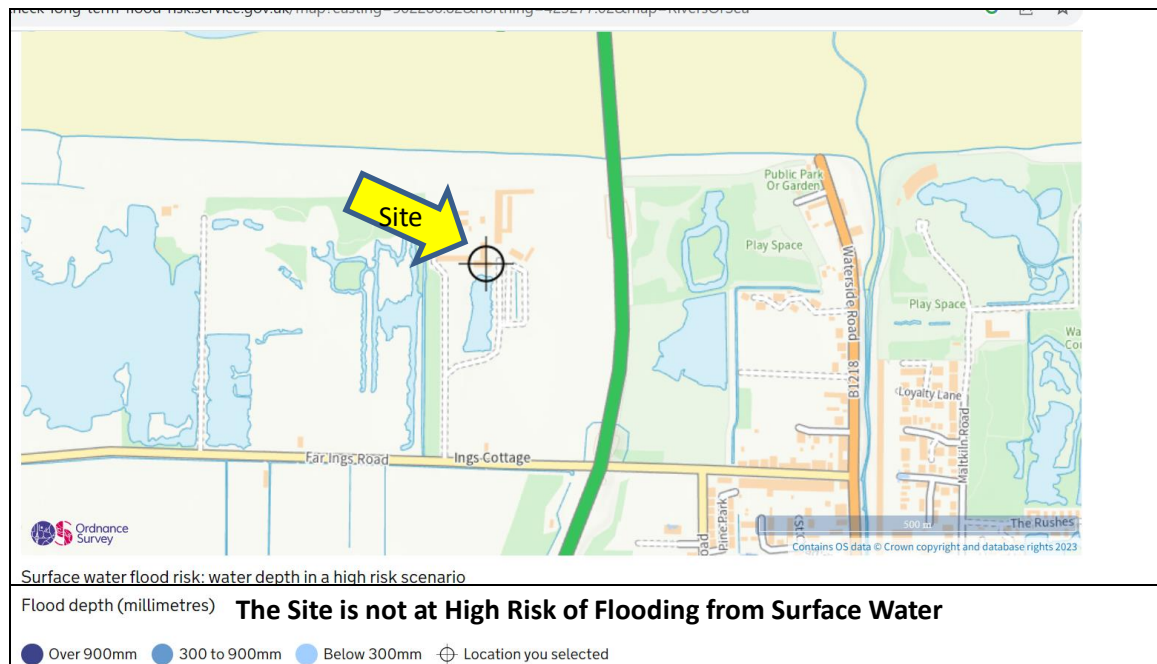
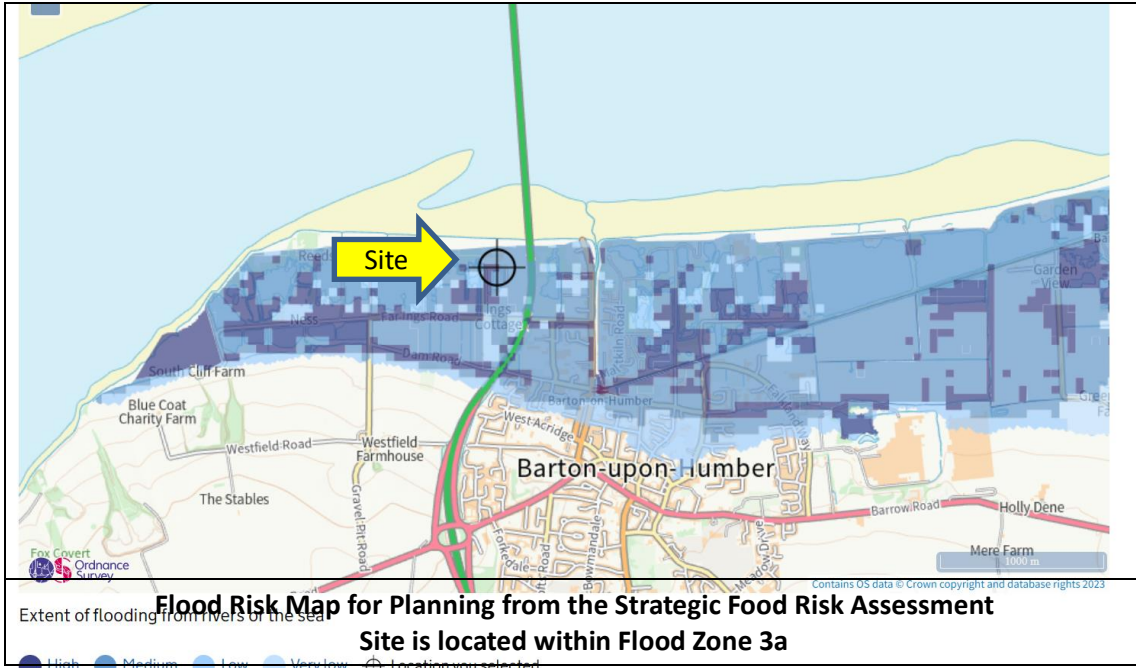
Adjacent Ground level is 3.700m AOD adjacent to the proposed building. The Existing adjacent workshop has a floor level of 4.05m AOD. The overall site has levels of 3.09m AOD to 2.790m AOD. The lowest level being in the southeast corner adjacent to a small pond.

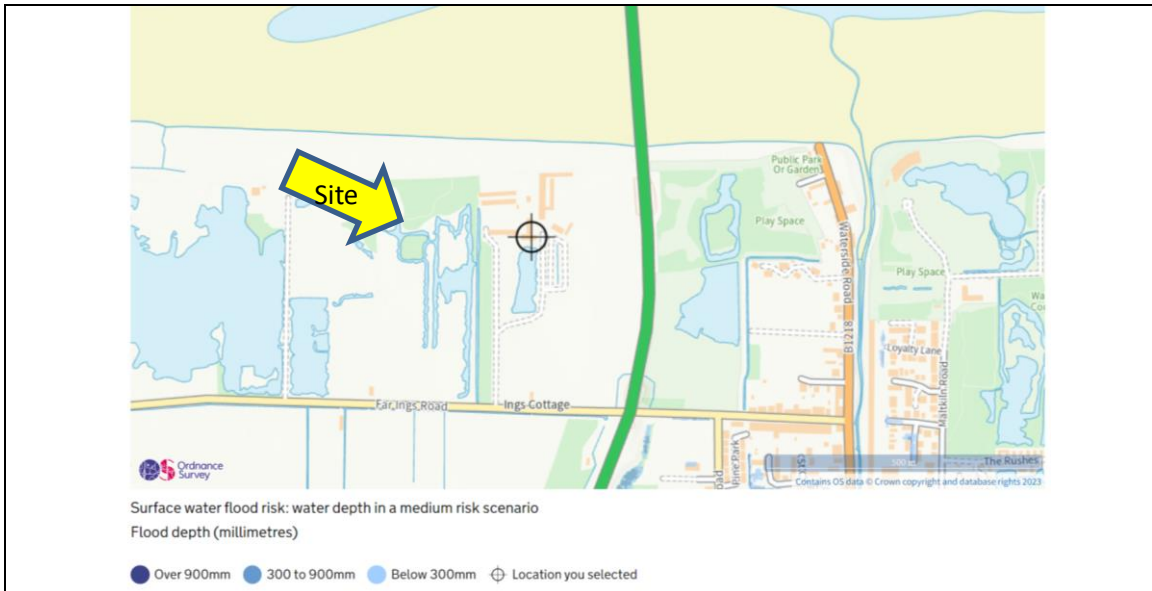
### Proposed building



## 4. Flood Risk

### 4.1 Flood Risk Maps





**The Site is not at Medium Risk of Flooding from Surface Water**



**The Site is not at Low Risk of Flooding from Surface Water**

North Lincolnshire Council Core Strategy sets out local policy regarding flood risk at Policy CS19 which establishes the basis upon which development in high risk flood zones would be considered permissible.

#### CS19: FLOOD RISK

The council will support development proposals that avoid areas of current or future flood risk, and which do not increase the risk of flooding elsewhere. This will involve a risk based sequential approach to determine the suitability of land for development that uses the principle of locating development, where possible, on land that has a lower flood risk, and relates land use to its vulnerability to flood. Development in areas of high flood risk will only be permitted where it meets the following prerequisites:

1. It can be demonstrated that the development provides wider sustainability benefits to the community and the area that outweigh flood risk.
2. The development should be on previously used land. If not, there must be no reasonable alternative developable sites on previously developed land.
3. A flood risk assessment has demonstrated that the development will be safe, without increasing flood risk elsewhere by integrating water management methods into development.

Development within the Lincolnshire Lakes area will comply with the flood management principals set out in the Western Scunthorpe Urban Extension Exception Test Strategy. Any further flood management proposals will have to be agreed by both the council and the Environment Agency during the process of the Lincolnshire Lakes Area Action Plan. Development proposals in flood risk areas which come forward in the remainder of North Lincolnshire shall be guided by the Strategic Flood Risk Assessment for North Lincolnshire and North East Lincolnshire. This will ensure that proposals include site specific flood risk assessments which take into account strategic flood management objectives and properly apply the Sequential and, where necessary, Exception Tests.

In addition development will be required, wherever practicable, to incorporate Sustainable Urban Drainage Systems (SUDS) to manage surface water drainage. The Council will also seek to reduce the increase in flood risk due to climate change through measures to reduce carbon dioxide emissions.

With regard to the three point tests in policy CS19, it can be demonstrated that the proposed workshop provides local sustainability benefits and is to be located on land that formed the previous tile works. This FRA demonstrates that the proposed development will be safe and not increase the flood risk elsewhere.

The justification for the development is that it will enhance the use of the site and encourage employment.

#### 4.2 Flood Risk Map Commentary

The National flood risk map for planning – River and Sea concur with the North Lincolnshire Strategic Flood Risk Assessment as identifying the development in a tidally dominated flood risk zone 3a.

The National map for flood risk from surface water indicates that the development site is at a **very low risk** of flooding.

## 5. Detailed Analysis of Flood Risk

### 5.1 Tidal or Sea Flooding due to Failure of Flood Defences

The site is located close to the south bank of the river Humber in an area that is potentially at risk of both fluvial and tidal flooding. The Environment Agency Flood Zone Map shows the site to be located within Flood Zone 3 at high risk of flooding. The river Humber is tidal and water levels at this location are likely to be dominated by tidal rather than fluvial flooding upstream.

Flood defences are present along the entire south bank. Flooding could occur if water levels in the river exceed the bank levels. Water would drain onto the south floodplain. The extent and depth would depend on the duration of the event and volume of flood storage available on the plain.

Flooding of the site could also occur if there was a breach of the flood defence. Water could spill to the floodplain. The extent of the flooding would depend on the magnitude, location and duration of the breach.

The Environment Agency has provided the flood level data for the 1 in 200 year tidal flood event for South Ferriby in the table below.

**Table 1: Predicted flood levels in the River Humber at South Ferriby**

Return period (years)	Predicted flood level (mAOD)	Predicted flood level with climate change allowance to 2055 (mAOD)
1	4.90	5.19
10	5.29	5.58
25	5.45	5.74
50	5.56	5.85
100	5.68	5.98
200	5.80	6.09
500	5.96	6.25
1000	6.07	6.36

The flood zone mapping details the 1 in 200 year tidal flooding extends to the south of Dam Road approximately 600m south of the site. Ground level at this point is about 4.00m AOD. The predicted 1 in 200 year tidal flood level of 5.80m AOD and with climate change 6.090m AOD. These are in excess of the 4.00m level.

**Water level and wave height combination for an 0.5% probability of occurring for eastern coastal area are detailed in the table below.**

Humber Bridge		Immingham		Cleethorpes	
Water level (mOD)	Wave ht (m)	Water level (mOD)	Wave ht (m)	Water level (mOD)	Wave ht (m)
5.44	0.0	4.93	0.0	4.56	0.0
5.25	0.6	4.60	1.0	4.43	1.5
4.80	0.8	4.05	1.5	4.20	2.2
4.14	0.9	3.25	1.8	3.60	3.2

Table H.1 - Water level and wave height combinations with a 0.5% probability of occurrence; Eastern Coastal Area

The predicted levels in the above table are lower than the 2006 Environment Agency 2006 data. The peak 1:200 year tidal water level is 5.44mAOD compared to the 5.80m AOD in the 2006 data. Consideration to the joint high-water level and wave height results in a combined maximum of 5.85m AOD.

Levels on the full site detail that they range from 2.79mAOD at the south eastern corner to 3.09m AOD at the western boundary. Floor level of the existing workshop building is 4.05m AOD and road level at the junction with Far Ings Road is 3.180m AOD.

To assess the impact of a breach or overtopping, no hydraulic modelling has been undertaken for the south bank of the Humber. Modelling has been undertaken as part of the Hull City Council SFRA and results from that provide a useful basis for considering the impact of a breach at the site. The Hull City Council SFRA includes the analysis for a defence breach at Salt

End to the east of Hull where ground levels are typically around the 3.00m AOD level (Similar to the site). The defence at Salt End provide protection for a 1 in 200 year event. The defences at the site offer protection to a 1 in 20 year event. The analysis at Salt End for a 1 in 100 year event indicates that flood depth does not exceed 0.5m and over much of the area it is only 250mm. Based on this, it is unlikely that flood water due to a breach would be significantly greater than 0.5m at the site.

#### 5.2 *Tidal or Sea Flooding due to Overtopping of Flood Defences*

If overtopping of the defence should occur, it would be for a limited time period each side of high tide and water is likely to flow to the lower floodplain and unlikely to reach the site. Following the tide falling, water would drain via the existing land drainage system back into the Humber. If any flooding did occur, the depth and velocity of the flood water is not considered to present a risk to the property or its users.

#### 5.3 *Flooding from Rivers and Large Watercourses (Fluvial Flooding)*

There is one principal watercourse located 500m south of the site. Far Ings Drain that receives water from a catchment to the immediate south west of Barton-upon Humber. The drain consists of an engineered channel that flows along the south side of Far Ings Road to the western boundary of Barton-upon-Humber where it turns north to join the Humber at Barton Waterside. The drain has a large flap valve and is located between low and high tide level. As a result, the flap would close during high tide and prevent water backflowing into the drain. There are a number of situations where flooding could occur from the drain.

- 1) Overflowing due to lack of capacity in the drain
- 2) Overflowing due to tide locking of the outfall
- 3) Overflowing due to restrictions in the channel

During any of the three above possible flooding events, the total volume of flooding would be dispersed across the large catchments area and would not result in any significant flooding at the site.

#### 5.4 *Flooding from Surface Water (Pluvial Flooding)*

The national maps for surface water flooding indicates this site at very low risk.

In this area it is difficult to describe the effect of surface water flooding separately from fluvial flooding. Of note is the fact that all the surface water drainage systems in the site are reliant on free discharge to the tributary watercourses, should the tributaries become backed up for prolonged periods, surface water systems can surcharge.

#### 5.5 *Flooding from Groundwater.*

Groundwater flooding is not considered to be a risk in this area due to the clay nature of the soil

#### 5.6 *Flooding from other Local Sources*

There are no other significant risks from other local sources identified.

### 5.7 Flooding from the Development Site Itself

The proposed development will result in additional impervious roof area. The proposed car park will be pervious. If discharge of surface water is to watercourse a restricted discharge rate must to be agreed with the Lead Local Flood Authority. Initially, soakaway tests are to be carried out to determine if this is a satisfactory method for surface water drainage. Subject to a satisfactory surface water drainage system being installed, that meets current design standards, there will be no increased risk of flooding from this development site.

### 5.8 Historic Flooding.

The Environment Agency has confirmed that it has no records of any historic flooding at the site, similarly, reference to the North Lincolnshire interactive flood mapping also confirms no evidence of historic flooding at the site.

## 6. Conclusion

Analysis suggests that the most significant risk is due to the estimated overtopping or breach of existing defences on the Humber. Under the requirement of the NPPF it is necessary to demonstrate that for any new development on the site will provide adequate levels of flood protection and safe access /egress arrangements for personnel visiting or working at the site.

Existing defences are present along the entire southern bank of the river Humber in the vicinity of the site. The condition of the defences was documented in the Humber Flood Risk Management Strategy in 2008 (FRMS) the Far Ings Area is identified as area 20. The FRMS confirmed that the condition of these defences as being generally in good condition with a residual life of between 20 and 50 years. The Environment Agency gave a commitment to maintain the standard of protection. Information from the Environment Agency previously confirmed that the crest level of the defences has a level of 6.000m AOD. However, the recent SFRA states that the crest level is between 5.50m AOD and 6.200m AOD. The current flood defence level is therefore above the predicted 1 in 200year tidal flood water level, excluding wave action. There may be localised flooding due to wave action or possible backing up of the land drainage system.

### 6.1 Finished Floor Level (FFL) and flood protection.

**The proposed workshop is classes as less vulnerable with a design life of 50 years. The proposed building requires a level access for operational purposes and a finished floor level of 3.800m AOD is proposed. This level is the same as a recent building extension and is 100mm above average site level at the proposal. This should protect the building in the event of a breach of the defences where it is predicted that flooding to a depth of approx. 500mm could occur within the lower parts of the site.**

The following measures are required:

- The installation of passive flood doors and flood protection measures on vents and apertures manufactured to BS: PAS 1188 up to **600mm** above finished floor level.
- The proposed building should be constructed with water resistant materials so that in the event of a flood, the building can soon be brought back into use.
- *All new floors should be solid with appropriate waterproofing between oversight concrete and internal floors.*

- *If required, Use cement, lime and aggregate plaster on all ground floor internal walls. A premixed dry product such as “Tarmac Limelite” or similar approved should be used. Walls should be backed and skimmed with a lime plaster product and not be dry lined. Dry lined partition walls should be avoided. Use aerated concrete blocks such as “Thermalite” or similar approved product for partitions.*
- *Incoming utility supply pipes and cables should be terminated (with master switches and valves) at least **900mm** above FFL with all pipes and ducting sealed at entry points with flexible duct sealants. Internal electrical distribution systems and sockets should be wired down from the ceiling and sited at least **900mm** above FFL.*
- *Do not use composite materials such as MDF and chipboard in the construction*

## 6.2 Place of Safety / evacuation.

The surrounding area is also located within flood zone 3 and therefore at equal risk of flood inundation. The only land outside this zone is land south of Dam Road, which rises steeply to an elevation of up to 50m AOD. Upon receiving news of a catastrophic flood, it is recommended that all occupant leave the site and move immediately to the higher ground. In other circumstances evacuation should be considered based on advice from the authorities. When the site was originally developed it was recommended the owners sign up to available flood warnings and an evacuation plan be developed. This plan should be extended, if necessary, to include the current proposals.

If the property owner has not signed up to the Environment Agency Flood Warning Service, more details can be found here:

- <https://fwd.environment-agency.gov.uk>

An evacuation plan should be available to all users of the property, detailing what to do in the event of a flood.

**Report Ends**