Kemira Chemicals UK Ltd
Goole
New Potter Grange Road
Goole
DN14 6BZ

Flood Risk Assessment

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Revision 1

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kemira

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1.0 Introduction

A Flood Risk Assessment (FRA) is to be conducted in connection with an expansion project at Kemira Chemicals UK Ltd, New Potter Grange Road, Goole, DN14 6BZ. The site is situated within **Flood Zone 3a**.

Zone 3a - high probability Definition

This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Appropriate uses

The water-compatible and less vulnerable uses of land (table 1) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.

This FRA presents a review of the existing available flood-related information and sets out the requirements of The Planning Practice Guidance and those of the Environment Agency (EA) and the Local Planning Authority (LPA) in relation to flood risk and limited drainage.

2.0 Scope

This FRA is prepared for the purposes of providing a generalised indication of the potential flood risk to the site, and to identify whether there are any flooding or surface water management issues relating to the development site that may warrant further consideration. The assessment is based on information including Strategic Flood Risk Assessments (SFRA), and EA Flood Maps.

3.0 Site Summary

The site is within a business park approximately 1.5km west of the town centre of Goole. The closest water source is around 1km away from the site boundary to the south.

3.1 Site Location

Site Address	New Potter Grange Road, Goole DN14 6BZ
Grid Reference	Easting = 472987 Northing = 423546

3.2 Proposed Development

The proposed development would see an extension to the current manufacturing building, high level conveyor system from storage warehouse to the manufacturing building. The development does not extend outside of the current boundary of Kemira site and does not change the use of land which is already developed.

4.0 National and Local Policy

4.1 Planning Practice Guidance

The Planning Practice Guidance (PPG) referred to in this report was issued in March 2014. Flood risk assessment is explained more fully in the Technical Guidance Document (TGPPG) issued March 2012.

4.1.1 Flood Risk Vulnerability

The Flood Risk Vulnerability Classification for the proposed development has been determined in accordance with Table 2 in PPG[1]. As a worst case it is considered "*Less Vulnerable" (General Industry).*

4.1.2 Flood Risk Vulnerability and Flood Zone 'Incompatibility'

The TGPPG states that developments deemed as '*Less Vulnerable'* are appropriate for areas classified within Flood Zone 3a.

Table 1

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
× Development should not be permitted.

4.2 *Environment Agency Flood Risk Standing Advice*

Environment Agency Flood Risk Standing Advice is designed to help:

- Find out whether an application is lower risk;
- decide when to consult EA;
- determine what the consultation should contain;
- understand how to make a decision on lower-risk sites and
- know what information is required to make an assessment of flood risk.

[1] Technical Guidance to the National Planning Policy Framework (publishing.service.gov.uk)

4.3 *Strategic Flood Risk Assessment Principals*
The SFRA includes details of policy considerations and sets out flood risk management objectives. The considerations below should be included in the planning for this development.

i) The management of Surface Water via Sustainable Drainage Systems (SUDs);
"The management of rainfall (surface water) is considered an essential element for reducing future flood risk to both the site and it surroundings, The Environment Agency expect attenuation of runoff from development sites to be restricted to green field rates and SUDs provide an opportunity for achieving this."
In addition the SFRA includes guidance for the application of SUDs for new developments, and recommends that the future ownership and management is addressed at an early stage.

ii) Improve Flood Awareness and Emergency Planning;
"Flood warnings are issued using a set of four codes, each indicating the level of risk with respect to flooding."
The site needs to consider arrangements for communication and actions in response to flood warning alerts.

5.0 Climate Change
Additional considerations incorporated on the migration of policy from PPS25 to PPG includes quantitative considerations for the effects of climate change.

"In preparing . . . . a site-specific flood risk assessment, the allowances for the rates of relative sea level rise [should be] *shown*[1]*"*

The changing climate should be viewed in relation to the project's design life;
"*Category 1 – Temporary structures, not including structures or parts of structures that can be dismantled with a view to being re-used – 10 years*
Category 3 – Agricultural and similar buildings – 15 to 30 years
Category 4 – Building structures and other common structures – 50 years
Category 5 – Monumental building structures, bridges and other civil engineering structures – 100 years[2]"

5.1 Sea Level Change
FCDPAG3 - Flood and Coastal Defence Appraisal Guidance gives guidance on the application of sea level changes to projects. Forecasted rises over the project's design life are in the order of 495 mm. This site is mapped as being influenced by tidal flooding.

	Net sea level rise (mm per year) relative to 1990			
	1990 to 2025	**2025 to 2055**	**2055 to 2085**	**2085 to 2115**
East of England, east midlands, London, south-east England (south of Flamborough Head)	4.0	8.5	12.0	15.0
South-west England	3.5	8.0	11.5	14.5
North-west England, north-east England (north of Flamborough Head)	2.5	7.0	10.0	13.0

[1] TGPPG - 11
[2] BS EN 1990, Eurocode - Basis of structural design

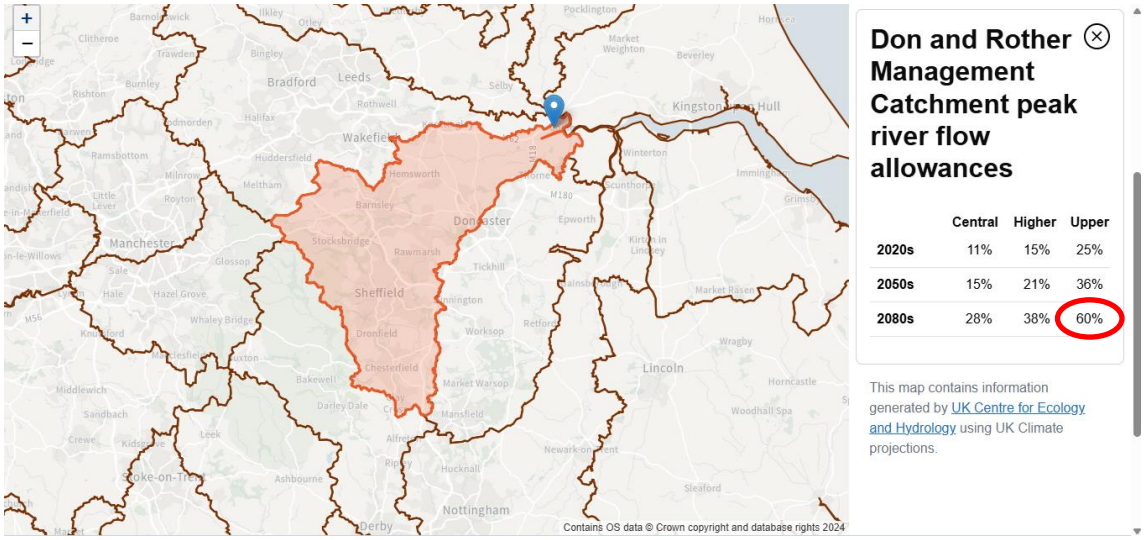
5.2 Climatic Conditions

Climate change allowance for the design of surface water drainage is sourced from the Environment Agency. These climatic conditions are to be taken in to account where Surface Water Management features, such as attenuation tanks and SUDs are included in the development.

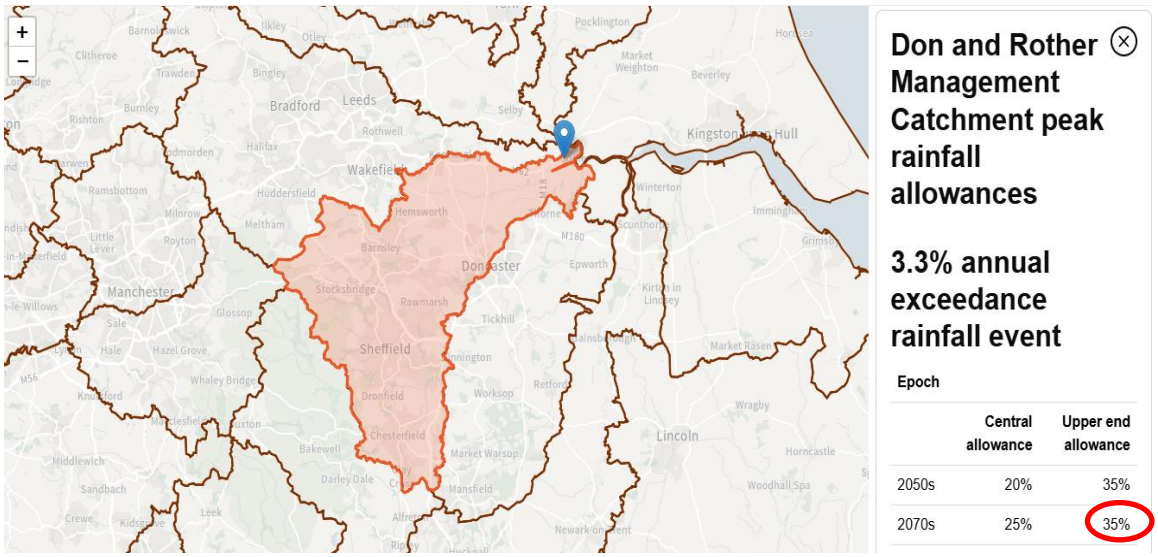
Attenuation feature scaling (where applicable) should reflect the upper end allowance, unless this can be shown to make the development unfeasible. Further risk assessment would be necessary if this was the case.

Assuming this development has a 50 year lifespan the allowances highlighted in red should be considered.

The map below shows the allowance for peak river flow



The following map shows peak rainfall allowances



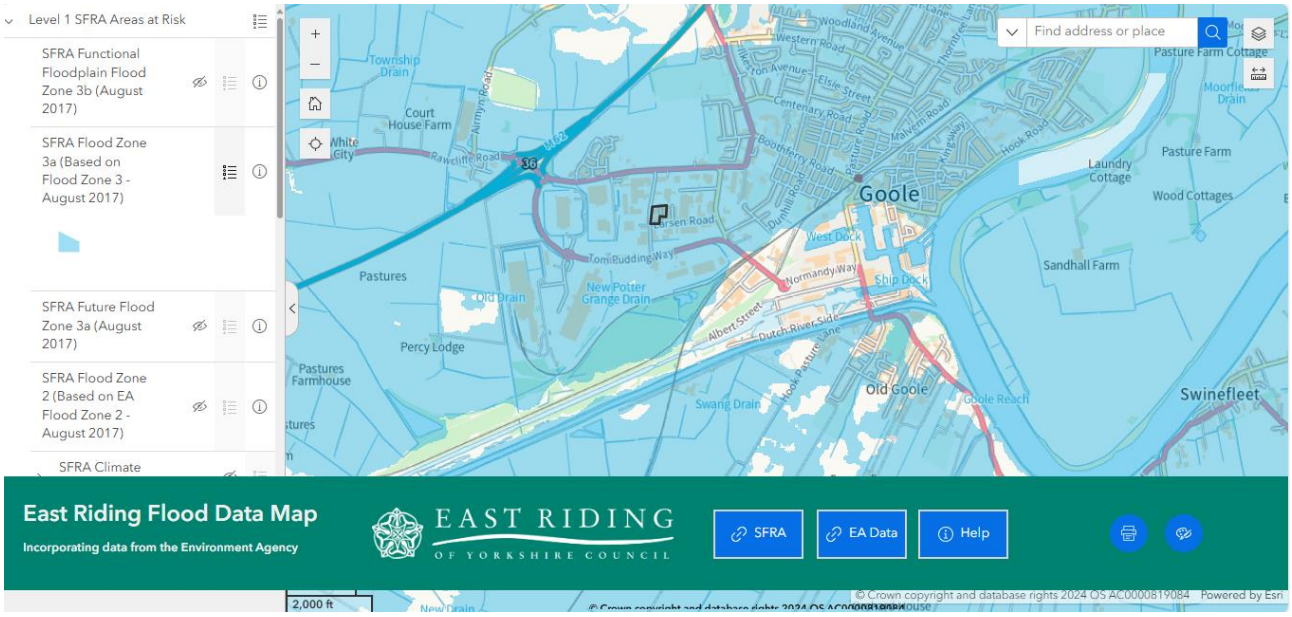
6.0 Flood Depths & Flood Zones

The site resides within flood zone 3a. The site is within an industrial business park surrounded by other industrial units.
The Environment Agency Long Term risk of flooding assessment for the site is:

- very low risk for surface water flooding
- medium risk for river and sea flooding

Overall the assessment is there is a 1 to 3.3% annual flood risk.

Map 1



6.1 Strategic Flood Risk Assessment (SFRA)

There is an SFRA available for viewing on the East Riding of Yorkshire Council website[1].

6.2 Flood Risk Maps

The available maps indicate that the proposed development at Kemira Chemicals Goole is within flood zone 3a.

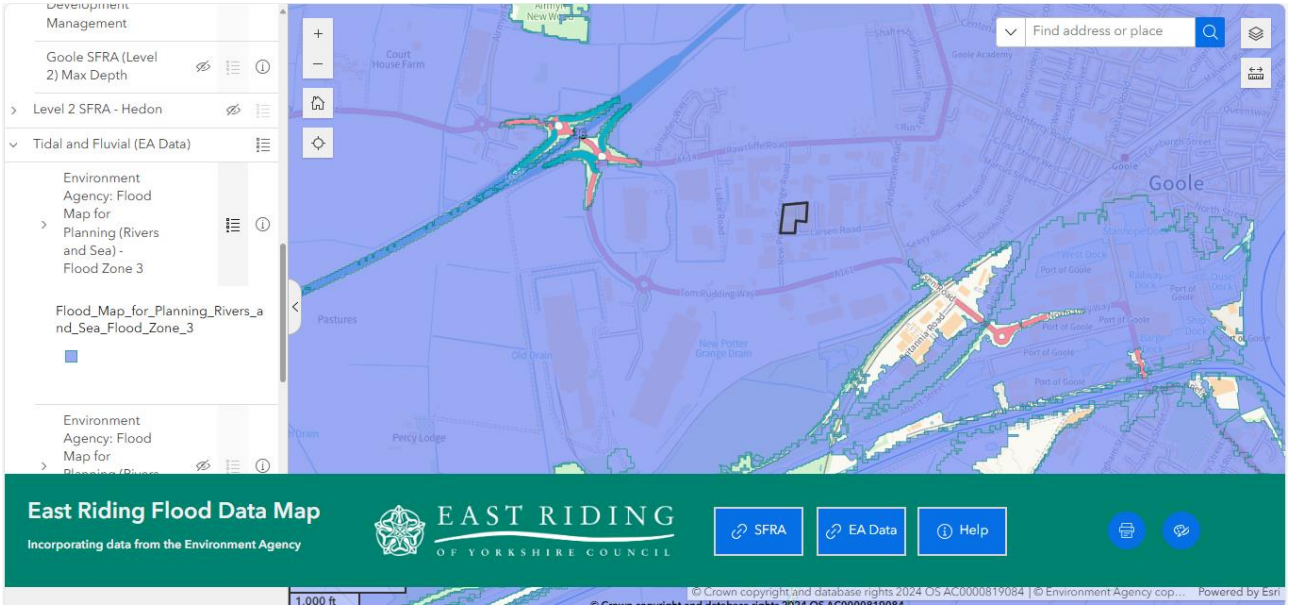
Flood Zone 3a is defined in TGNPPF – Table 1.
"This zone comprises land assessed as having a 1 in 200 or greater annual probability of river flooding (>0.5%), or a 1 in 1000 or greater annual probability of flooding from the sea (>0.1%) in any year."

1 East Riding Flood Data Map v2 (arcgis.com)

6.3 Flood Level Data

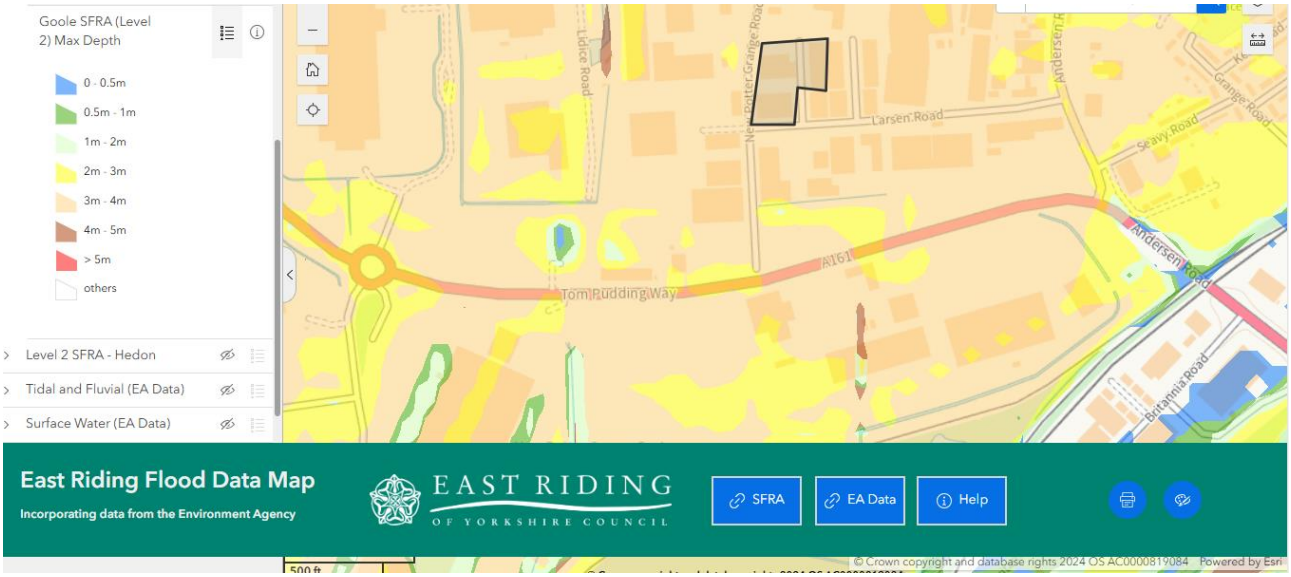
Mapping below shows the flood map for planning (rivers and sea) comprising the flood zone 3. The development site is highlighted in the black polygon.

Map 2



Flood depth data has been sourced from East Riding of Yorkshire SFRA. Showing a maximum depth of 3 – 4m for the development site.

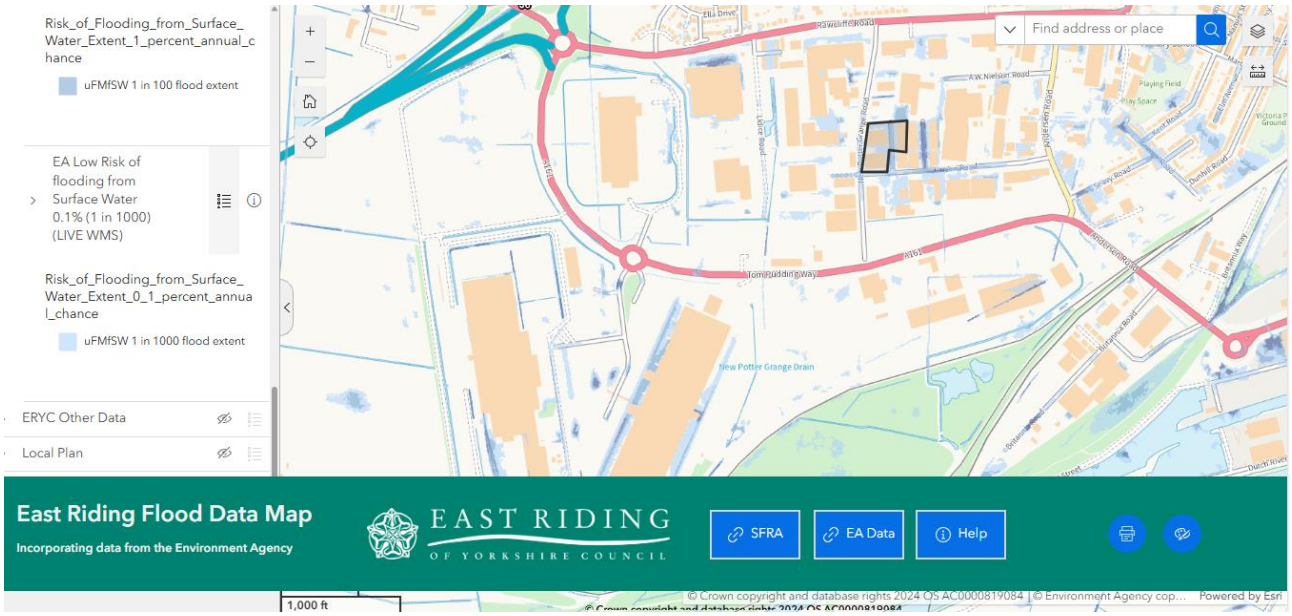
Map 3



6.4 Sources of Flood Risk

It is confirmed that the site is within flood zone 3. As can be seen from the map 2 above primarily this is from fluvial and tidal water sources. However, surface water flooding (see map 4) should also be taken in to account, although this is assessed as low risk.

Map 4

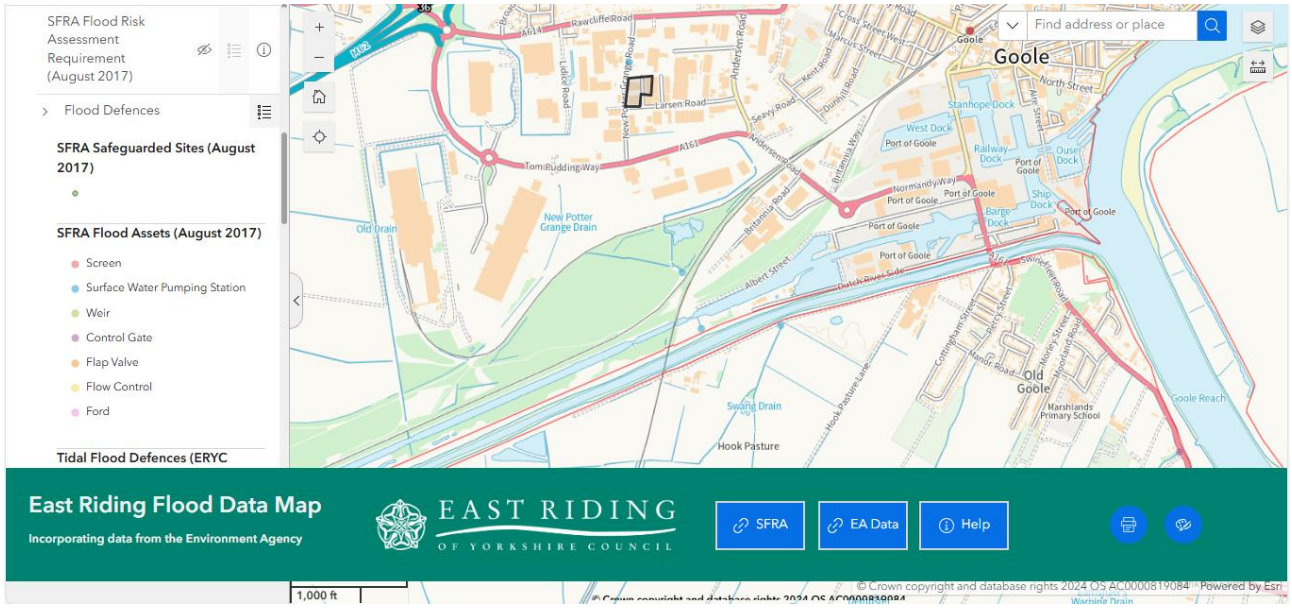


6.5 Location of Existing Flood Defences

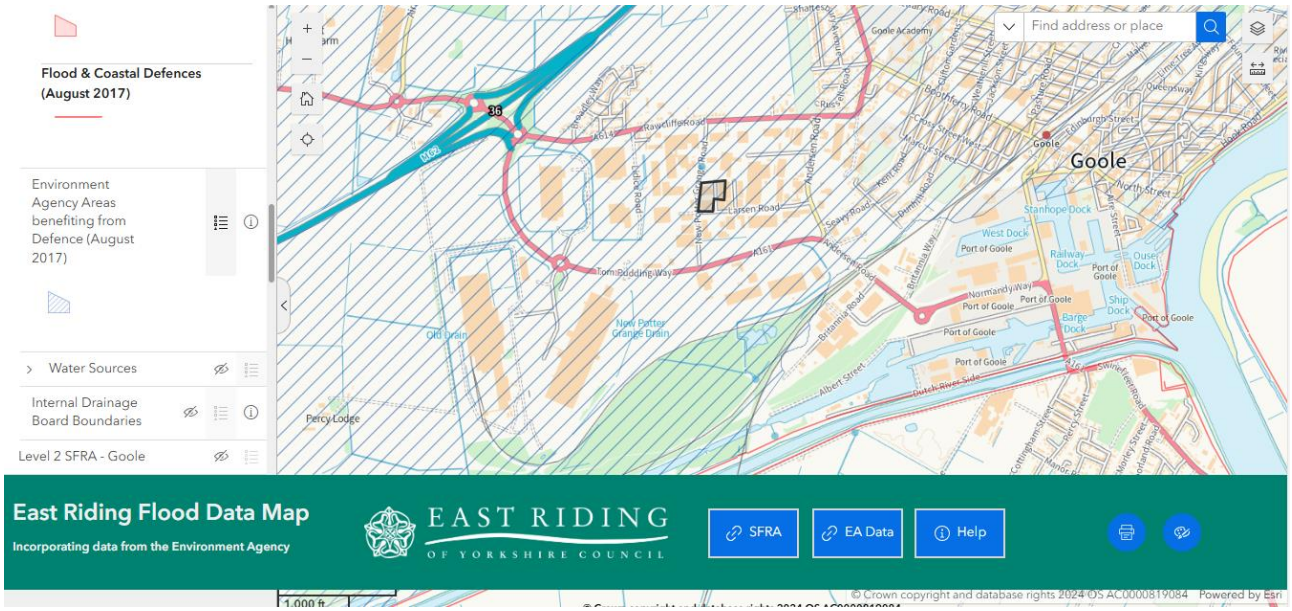
There are tidal and coastal flood defences in the form of “high ground” along the banks of the River Ouse to the south east of the site and along the Dutch River canal to the south of the site. There is a surface water pumping station approximately 145m to the north of the site (Map 5).

The development site is within the area identified by the EA as benefitting from defence 2017 (Map 6).

Map 5



Map 6



6.6 Historic Flooding

The site was flooded in 2011 when flood waters in Goole did rise due to very intense localised rainfall and inadequate sewer system capacity.

Further flooding took place in Goole in 2012 this was due to pump failure; this was quickly rectified by the installation of temporary pumping with pipelines to be permanently installed to allow even quicker action should such an occurrence happen again.

In 2013 the East coast encountered the highest storm conditions and surge tides in more than 60 years, Goole's flood defence remained intact.

7.0 Surface Water Management Plan

Foul water from the sites operation is current contained on site and reused. Surface water run off is currently discharged into the municipal surface water drainage system. It is proposed to improve management of surface water by redirecting to on site collection point and re-use in the process. Production consumes 400,000ltrs+ per day. Reuse of surface water would reduce consumption of towns mains water.

Large storage tanks on site can be used to hold water in the event of a flood.

Regular inspection and repair of the site drainage system to ensure and maintain functionality.

8.0 The Sequential Test

There are no alternative locations for this development. It is required to ensure the expansion of the current sites operational activity.

9.0 Exceptions Test

The development represents a "*less vulnerable"* development situated in Flood Zone 3a and as such **is not** subject to the exceptions test. See table 1.

10.0 Flood Awareness and Emergency Planning

The EA have a text message (SMS) alert service for flood warnings. Kemira Chemicals UK should sign up to this service as it provides valuable preparation time prior to a flood event.

11.0 Conclusions

The proposed development is considered as appropriate for the site within the current regulatory framework. The development should include mitigation where reasonable and practicable against foreseen future flooding events, in terms of property and infrastructure**.**

12.0 Certification

Responsibility for building design/services and resulting levels of resistance, resilience or drainage performance rests with the appointed designed and developer. This assessment gives no assurance that planning permission will be forthcoming for the intended use.
This report is produced for use by Kemira Chemicals UK Ltd, and no responsibility of any kind, whether for negligence or otherwise, can be accepted for any Third Party who may rely upon it.
The conclusions and recommendations given in this report are based on our understanding of the future plans for the site and based on flood risk information currently available in public forums.