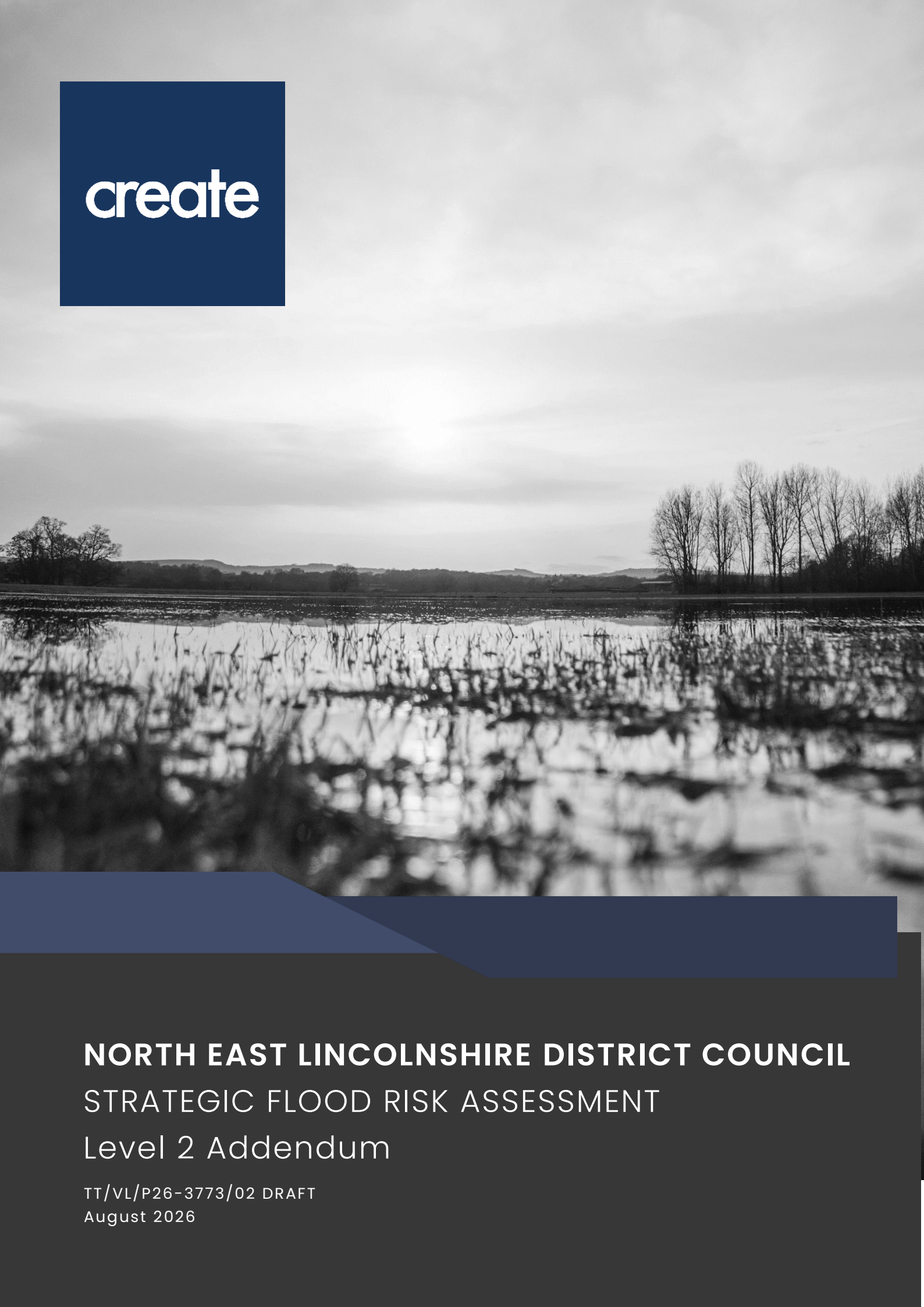




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NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
Level 2 Addendum

TT/VL/P26-3773/02 DRAFT
August 2026

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- A Site specific flood risk review pro-formas – Residential allocations
- B Site specific flood risk review pro-formas – Commercial allocations
- C Hold the Line Defence Costings

Glossary

Flood Zone – Classification of land based on probability of flooding
Surface Water Flooding – Flooding from rainfall exceeding drainage capacity
Groundwater Flooding – Flooding from rising water tables
Pro Forma – Standardised template used for site-by-site assessment

Abbreviations

EA – Environment Agency
SFRA – Strategic Flood Risk Assessment
SuDS – Sustainable Drainage Systems
FRA – Flood Risk Assessment
QGIS – Geographic Information System Software

EXECUTIVE SUMMARY

This Level 2 Strategic Flood Risk Assessment (SFRA) builds on the findings of the Level 1 SFRA Addendum and provides a more detailed assessment of flood risk at specific development sites.

The assessment uses the best available data at the time of preparation. As new information becomes available, this document may need to be updated. In most cases, developers will still need to carry out their own detailed Flood Risk Assessment.

A consistent approach has been used to assess each site, supported by mapping and data analysis within a Geographic Information Systems (GIS). A standard assessment template (Pro forma) has been developed to ensure all sites are reviewed in the same and consistent format.

The report supports planning decisions by:

- Identifying the suitability of sites for development
- Highlighting flood risk constraints
- Recommending appropriate mitigation measures

SFRA Maintenance

The SFRA is a live document intended to be periodically updated as new information and guidance becomes available. It has been developed using the best available information at the time of preparation. Its outcomes and conclusions may not be valid in the event of future changes to the data. It is the responsibility of the user to ensure they are using the most up to date available information. It may also be necessary for the user to undertake their own assessment, for example a site-specific flood risk assessment or climate change modelling.

1.0 Introduction

1.1 Overview and Context

- 1.1.1 This Level 2 Strategic Flood Risk Assessment (SFRA) has been prepared to support the emerging Local Plan and inform the allocation of development sites within the study area.
- 1.1.2 It builds upon the findings of the Level 1 SFRA Addendum and incorporates updated Environment Agency flood mapping, surface water modelling, climate change allowances, and where available, hydraulic modelling outputs.
- 1.1.3 The Level 2 SFRA provides a detailed, site-specific assessment of flood risk to support planning decisions and ensure that development is directed to the most appropriate locations in accordance with national policy.

1.2 Purpose of the Level 2 SFRA

- 1.2.1 The primary purpose of this Level 2 SFRA is to:
 - Assess flood risk at proposed site allocations in greater detail than the Level 1 SFRA,
 - Support the application of the Sequential Test and Exception Test,
 - Determine the suitability of sites for development from a flood risk perspective,
 - Identify constraints to development and areas requiring mitigation,
 - Inform the preparation of Local Plan policies and site allocation decisions, and
 - The SFRA forms part of the technical evidence base supporting sustainable development planning.

1.3 Study Area Overview

- 1.3.1 The study area comprises the administrative boundary covered by the Local Plan.
- 1.3.2 Flood risk within the area is influenced by a combination of natural and artificial systems, including:
 - Main rivers and tributaries,
 - Large expanse of coastline and coastal development,
 - Ordinary watercourses and drainage channels,
 - Surface water runoff in urban and rural catchments,
 - Groundwater emergence in permeable geological formations,
 - Existing drainage and flood defence infrastructure, and
 - Local topography and low-lying floodplain areas.
- 1.3.3 Key characteristics influencing flood behaviour include:
 - Concentrated development in urban areas increasing runoff rates,
 - Low-lying floodplains adjacent to main river corridors,
 - Coastal development both residential and commercial,
 - Localised surface water flow paths during intense rainfall events, and
 - Areas of constrained drainage capacity.

- 1.3.4 This context is essential in understanding site-specific flood mechanisms assessed within this report.

1.4 Relationship to Level 1 SFRA

- 1.4.1 This Level 2 SFRA should be read in conjunction with the Level 1 SFRA Addendum, and the previous full SFRA, which together provide the strategic baseline for assessment of flood risk across the study area.
- 1.4.2 The Level 1 SFRA addendum establishes:
- Flood Zone mapping at a strategic scale,
 - Surface water flood risk overview,
 - Climate change allowances, and
 - Broad identification of flood risk areas.
- 1.4.3 The Level 2 SFRA builds upon this by:
- Undertaking detailed site-by-site assessments,
 - Interpreting flood depth, hazard, and residual risk,
 - Identifying development constraints at allocation level,
 - Providing mitigation recommendations, and
 - Supporting Sequential and Exception Test decision-making.
- 1.4.4 Together, the Level 1 and Level 2 SFRAs form a comprehensive flood risk evidence base for plan-making.

1.5 Use of GIS in the Assessment

- 1.5.1 Geographic Information Systems (GIS) have been used extensively throughout the assessment process to ensure a consistent and efficient analysis of spatial data.
- 1.5.2 Key functions of the GIS-based approach include:
- Overlaying multiple flood risk datasets to identify areas of constraint,
 - Extracting site-specific data for each allocation,
 - Supporting the application of the sequential approach within sites, and
 - Enabling repeatable and auditable analysis.
- 1.5.3 This approach ensures that the assessment is both transparent and scalable, allowing for future updates as new data becomes available.

1.6 Scope and Limitations

- 5.2.1 This assessment has been prepared using the best available flood risk information at the time of preparation, including national datasets and locally available modelling.
- 5.2.2 However, several limitations should be acknowledged:
- Many national datasets (e.g. surface water mapping) are strategic in nature and may not reflect site-specific conditions,

- Detailed hydraulic modelling is not available for all watercourses or flood events,
- Groundwater flood risk data is indicative rather than predictive, and
- Climate change projections are subject to uncertainty and ongoing updates.

5.2.3 As a result, this SFRA provides a strategic and comparative assessment of flood risk rather than a definitive site design tool.

5.2.4 All proposed development, subject to specific policy thresholds, will still require a site-specific Flood Risk Assessment (FRA) to be completed as part of any planning application, to confirm inherent flood risks and appropriate management and mitigation techniques.

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2.0 Policy and Guidance Framework

2.1 Overview

- 2.1.1 The detailed policy and guidance framework for flood risk is set out in full within the Level 1 Strategic Flood Risk Assessment (SFRA) Addendum. That document should be read as the primary reference for national and local planning policy, technical guidance, and climate change requirements.
- 2.1.2 This Level 2 SFRA does not repeat the full policy framework and instead relies on the Level 1 SFRA as the baseline and focuses on applying that framework at a site-specific level.
- 2.1.3 Accordingly, this section provides a brief summary of the key policy principles relevant to the Level 2 assessment.

2.2 National Planning Policy Framework (NPPF)

- 2.2.1 Flood risk is managed through the planning system in accordance with the National Planning Policy Framework (NPPF) and supporting Planning Practice Guidance (PPG). These documents set out the requirement for a risk-based approach to development in flood risk areas.
- 2.2.2 Key principles include:
 - Application of the Sequential Test to steer development to areas of lowest flood risk,
 - Application of the Exception Test where development in higher-risk areas is necessary,
 - Requirement to ensure development is safe for its lifetime, and
 - Consideration of all sources of flooding, including climate change impacts.
- 2.2.3 Full policy wording, interpretation, and technical application are provided in the Level 1 SFRA Addendum.

2.3 Planning Practice Guidance (PPG)

- 2.3.1 The Planning Practice Guidance (PPG) provides detailed guidance supporting the NPPF, particularly in relation to flood risk and coastal change. Further detail is included within the Level 1 SFRA.
- 2.3.2 The PPG is a critical reference for determining development suitability within this SFRA.

2.4 Environment Agency Guidance

- 2.4.1 Technical flood risk datasets and guidance issued by the Environment Agency form the evidence base for both the Level 1 and Level 2 SFRA, including:
 - The Flood Map for Planning,
 - Climate change allowances for peak river flow and rainfall,
 - Standing Advice for Flood Risk,
 - Guidance on finished floor levels and freeboard, and
 - Flood risk standing advice for planning applications.

- 2.4.2 These datasets have been used directly within the Level 2 assessment to support site-specific analysis.
- 2.4.3 Further detail on data sources, assumptions, and policy interpretation is contained within the Level 1 SFRA Addendum.

2.5 Climate Change Allowances

- 2.5.1 Climate change allowances are a key component of national flood risk policy and are fully set out within the Level 1 SFRA.
- 2.5.2 The Level 2 SFRA applies these allowances at site level to assess future flood extents, hazard conditions, and development resilience over the lifetime of proposed development.

2.6 Sustainable Drainage Systems (SuDS)

- 2.6.1 The requirement for Sustainable Drainage Systems (SuDS) is established through national policy and detailed technical guidance referenced in the Level 1 SFRA.
- 2.6.2 SuDS are required to manage surface water runoff in new development and must:
- Mimic natural drainage processes,
 - Reduce runoff rates and volumes,
 - Improve water quality, and
 - Provide amenity and biodiversity benefits.

2.7 Local Planning Policy

- 2.7.1 Local planning policy relating to flood risk, drainage, and climate adaptation is set out within the adopted Local Plan and is supported by the Level 1 SFRA.
- 2.7.2 This Level 2 SFRA does not repeat local policy wording but applies it in the context of site-specific flood risk assessments.
- 2.7.3 It is intended to support:
- **Site allocation decisions**
To inform the suitability of sites being considered for allocation in development plans, particularly in relation to flood risk vulnerability, surface water drainage capacity, climate change allowances, and any necessary mitigation measures. The Level 2 SFRA provides a more detailed, site-specific understanding of flood risk constraints to help ensure that allocated sites are deliverable and compliant with national and local planning policy requirements.
 - **Development management decisions**
To support the determination of planning applications by providing detailed, site-specific flood risk evidence. This includes assessing whether proposed development is appropriate in flood risk terms, identifying any required mitigation or design responses (such as finished floor levels, safe access/egress routes, SuDS integration,

or floodplain compensation), and helping decision-makers apply the Sequential and Exception Tests where relevant.

- ***Policy compliance assessment***

To assist in evaluating whether proposed development aligns with adopted Local Plan policies relating to flood risk management, sustainable drainage, and climate resilience. This includes checking compliance with strategic flood risk objectives, ensuring consistency with the requirements of national planning policy on flood risk, and supporting the identification of where exceptions or departures from policy may need robust justification.

2.8 Summary

2.8.1 This policy and guidance framework ensures that:

- Flood risk is managed in a consistent, transparent, and policy-compliant manner,
- Development is directed to the lowest risk areas wherever possible, and
- Where development in higher-risk areas is necessary, it is safe, resilient, and sustainable

2.8.2 The framework provides the foundation for all site assessments within this Level 2 SFRA and should be used to guide both plan-making and development management decisions.

3.0 Methodology

3.1 Approach

- 3.1.1 This Level 2 SFRA adopts a structured, risk-based methodology to assess flood risk across all proposed site allocations within the study area.
- 3.1.2 The methodology has been developed in accordance with the National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG), Environment Agency guidance, and the strategic evidence established within the Level 1 SFRA Addendum.
- 3.1.3 The purpose of the methodology is to provide a consistent and transparent framework for assessing flood risk at a site-specific level and to support the application of the Sequential Test and Exception Test where required.
- 3.1.4 The assessment considers all relevant sources of flooding and identifies:
- The nature and extent of flood risk affecting each site,
 - The likely constraints to development,
 - The suitability of development within flood-prone areas,
 - The need for mitigation measures, and
 - The implications of climate change and residual risk.
- 3.1.5 This approach supports both residential and commercial development planning.

3.2 Data Integration and GIS-Based Assessment

- 3.2.1 A GIS based workflow has been used to undertake the assessment of flood risk across all proposed site allocations.
- 3.2.2 GIS provides a consistent spatial framework for integrating multiple datasets and enables direct comparison between sites.
- 3.2.3 The GIS assessment has been used to assess:
- Environment Agency Flood Map for Planning,
 - Surface Water flood risk mapping,
 - Reservoir flooding mapping,
 - Groundwater information,
 - Historic flood records,
 - Available modelling data, and
 - Climate change allowances.
- 3.2.4 This allows for consistent interrogation of multiple datasets and ensures repeatability of results across all sites.
- 3.2.5 Key GIS functions include:
- Overlay analysis of site boundaries with flood risk datasets,
 - Extraction of flood zones,

- Identification of flood flow paths and ponding areas,
- Mapping of climate change extents where available, and
- Identification of interactions between multiple flood sources.

3.2.6 All mapping and analysis has been undertaken within a georeferenced environment to ensure auditability and repeatability.

3.3 Site Assessment Pro Forma

3.3.1 Each proposed allocation site has been assessed using a standardised methodology to ensure consistency across the study area.

3.3.2 The site assessment process includes:

Stage 1 – Data Review

3.3.3 Initial review and collation of all available flood risk datasets relevant to the site and its surrounding area. This stage establishes the baseline evidence base and ensures that all relevant sources of flooding and supporting datasets are identified prior to detailed assessment. This includes:

- **Flood Zone classification** – Review of Environment Agency Flood Zones 1, 2, and 3 and Flood Zones plus Climate Change as provided by the Flood Map for Planning, to establish fluvial and tidal flood probability and spatial extent affecting the site.
- **Surface water flood mapping** – Assessment of surface water flood risk using national mapping datasets to identify areas susceptible to pluvial flooding during rainfall events of varying severity.
- **Historic flooding records** – Review of recorded flood events from local authority, Environment Agency, and other available sources to understand previous flooding mechanisms, extents, and impacts.
- **Groundwater susceptibility** – Assessment of geological and hydrogeological conditions to determine the likelihood of groundwater emergence or high groundwater levels contributing to flood risk.
- **Reservoir flood risk** – Consideration of reservoir inundation mapping to identify potential residual risk associated with reservoir storage failure or uncontrolled release.
- **Existing modelling availability** – Identification of any detailed hydraulic models (fluvial, surface water, or tidal) that may provide refined flood extents, depths, velocities, or hazard information for the site.

Stage 2 – Spatial Assessment

3.3.4 GIS-based spatial interrogation of the site boundary and surrounding area against identified flood risk datasets. This stage enables a detailed understanding of how flood risk interacts with the site in both spatial and functional terms. This includes:

- **Areas affected by flood extents** – Identification of which parts of the site fall within defined flood zones or modelled flood extents, including consideration of depth and extent variation.
- **Flood flow paths** – Mapping of overland flow routes and drainage pathways to understand how water moves across and through the site during rainfall and flood events.

- **Potential access constraints** – Assessment of how flooding may affect vehicular and pedestrian access routes, including safe access and egress during flood conditions.
- **Floodplain interaction** – Evaluation of how the site interacts with the functional floodplain, including displacement of flood storage and potential impacts on flood conveyance.
- **Climate change influence** – Consideration of how climate change allowances may alter flood extents, depths, and risk exposure over the lifetime of the development.

3.4 Climate Change and Future Flood Risk

- 3.4.1 Climate change has been incorporated into this Level 2 SFRA in accordance with the assumptions and allowances established within the Level 1 SFRA Addendum.
- 3.4.2 The Level 1 SFRA provides the detailed policy context, and guidance on the appropriate allowance selection, river basin district, and climate change scenarios adopted across the evidence base.
- 3.4.3 This Level 2 SFRA applies those assumptions at site level to assess the future implications of flooding on proposed allocations.
- 3.4.4 Climate change is considered through:
- Increased peak river flows
 - Increased rainfall intensity
 - Increased sea level
 - Increased flood extents and depths
 - Increased flood hazard
 - Greater exceedance risk within drainage systems
- 3.4.5 Where climate change modelling is available, these outputs have been incorporated directly into the assessment.
- 3.4.6 Where detailed modelling is unavailable, a precautionary approach has been adopted.
- 3.4.7 Climate change considerations inform:
- Site suitability
 - Development layout
 - Finished floor levels
 - Residual risk interpretation
 - Mitigation requirements
- 3.4.8 Development should be designed to remain safe over its lifetime, typical lifetimes include:
- 100 years for residential development
 - 75 years for commercial development

3.5 Residual Risk Assessment

- 3.5.1 Residual risk refers to flood risk that remains following the application of flood defences, mitigation measures, or drainage systems.

3.5.2 Residual risks can arise from:

- Overtopping of flood defences
- Breach or failure of flood defences
- Culvert blockage
- Drainage exceedance
- Extreme rainfall events beyond the design event
- Infrastructure failure

3.5.3 Residual risk has been considered within each site assessment where relevant.

3.5.4 The assessment considers:

- Speed of onset of flooding
- Depth and velocity of floodwater
- Ability to evacuate safely
- Potential for safe refuge
- Impact on access routes

3.5.5 Residual risk is particularly important where development is proposed behind defended floodplains or near critical drainage infrastructure.

3.6 Safe Access and Egress

3.6.1 Safe access and egress are critical considerations in determining whether development can be safely occupied during flood events.

3.6.2 The assessment considers:

- Whether dry access can be maintained during design flood events
- Depth and hazard along access routes
- Duration of potential inundation
- Availability of safe refuge within or outside the site
- Availability of alternative escape routes
- Emergency access capability

3.6.3 Where dry access is not achievable, development may still be acceptable subject to:

- Safe refuge provision
- Emergency planning strategies
- Demonstration of acceptable risk under the Exception Test
- Flood warning availability
- Managed evacuation procedures

3.6.4 Access and egress assessments are undertaken proportionately based on the level of flood risk affecting each site.

3.7 Limitations of the Methodology

3.7.1 The assessment is based on strategic and site-specific datasets that represent the best available information at the time of preparation.

3.7.2 However, the following limitations should be noted:

- National flood datasets are generally modelled at a strategic scale and may not capture localised conditions
- Detailed hydraulic modelling is not available for all watercourses or flood scenarios
- Groundwater flood risk mapping is indicative and not predictive at site level
- Climate change projections are subject to uncertainty and periodic revision
- Site-specific ground conditions and drainage capacity require detailed investigation at planning application stage

3.7.3 The Level 2 SFRA provides strategic planning evidence base and should not be interpreted as a replacement for detailed site-specific Flood Risk Assessments.

3.7.4 Further technical assessment will be required at planning application stage to confirm detailed design requirements and mitigation measures.

3.8 Summary

3.8.1 This methodology provides a robust, policy-compliant framework for assessing site-specific flood risk achieved by combining:

- GIS-based spatial analysis
- Standardised Pro Forma reporting
- Hazard-based assessment
- Policy-aligned decision-making

4.0 Data Sources and Evidence Base

4.1 Overview

- 1.4.1 This section identifies the datasets, modelling outputs, and supporting information used to inform the Level 2 Strategic Flood Risk Assessment (SFRA) and describes the principal sources of flood risk considered within the assessment.
- 1.4.2 The assessment has been undertaken using the best available information at the time of preparation and builds upon the evidence base established within the Level 1 SFRA Addendum.
- 1.4.3 The datasets and flood risk sources identified below have been selected to provide a consistent understanding of flood risk across all proposed allocation sites.
- 1.4.4 Where available, locally refined datasets and detailed hydraulic modelling outputs have been prioritised over national-scale mapping to improve accuracy and support site-specific interpretation.
- 1.4.5 The assessment considers flood risk as a multi-source system, where different mechanisms may interact under a range of rainfall, tidal, and operational conditions.

4.2 Relationship to Level 1 SFRA Data Sources

- 4.2.1 The detailed inventory of flood risk datasets, modelling assumptions, and policy evidence is provided within the Level 1 SFRA Addendum.
- 4.2.2 This Level 2 SFRA applies those datasets at site-specific level and supplements them through additional spatial interrogation of individual allocation sites.
- 4.2.3 This ensures consistency with the wider flood risk evidence base while enabling more detailed interpretation of localised flood mechanisms and constraints.

4.3 Core Datasets Used in the Assessment

Fluvial and Tidal Modelling

- 4.3.1 Fluvial flood risk and tidal flood risk has been assessed using the Environment Agency Flood Map for Planning, supported by the Environment Agency adopted detailed hydraulic modelling outputs where available.
- 4.3.2 Flood Zones 2 and 3 provide the primary national planning indicators of fluvial and tidal flood risk. Where detailed models exist, these have been prioritised over national generalised mapping. Modelled flood extents incorporating climate change allowances have been used where available

- 4.3.3 These datasets allow for a more refined understanding of flood mechanisms, depths, and extents at a site-specific level.
- 4.3.4 Discussions with the EA have provided greater insight into how the recent Flood Map for Planning (FMfP dataset) Flood Zones plus Climate Change layer has been modelled, and how this is intended to be utilised by both Local Planning Authorities and Developers when determining flood risk.
- 4.3.5 The EA confirmed that the Flood Zones plus climate change mapping should be used to inform developers of the need for a site specific flood risk assessment and can be used by local and national policy makers to help inform site allocation. The dataset however, does not constitute a definitive assessment of development constraints and should not be relied upon in isolation to determine the suitability of land for development or to exclude sites from further consideration.
- 4.3.6 The EA also confirmed that the Flood Zones plus Climate Change data for the North East Lincolnshire administrative area is heavily dominated by tidal flooding as the principle source of flood risk. This data set is a composite of both the undefended and defended model results, using whichever data set is greater. The Flood Zone data set does not include breach flood extents for any scenario, it is the undefended floodplain.
- 4.3.7 Given the above, and in agreement with the EA, it is North East Lincolnshire's intention that the Flood Map for Planning data is used as a trigger for requiring a site-specific FRA, including detailed assessment of both tidal and fluvial flooding on-site, together with the application of appropriate climate change allowances.
- 4.3.8 Potential development sites identified to be within this flood extent may therefore require detailed modelling of flood risk over the lifetime of development, alongside a detailed assessment of mitigation measures, and flood resistance strategies.
- 4.3.9 However, inclusion within this dataset does not automatically render development unacceptable, provided that existing flood defences continue to provide the assumed standard of protection.
- 4.3.10 The above approach is dependent on the continued maintenance and improvement of flood defences, including consideration of future climate change and sea level rise. Funding mechanisms for these defences have recently been re-structured as detailed in the following sections. This should be considered in site-specific FRAs when determining if a development will benefit from these defences during its full lifetime.

Surface Water Modelling

- 4.3.11 Surface water flood risk has been assessed using the Risk of Flooding from Surface Water (RoFSW) dataset, which provides mapping for:
- High probability events (1 in 30 year)
 - Medium probability events (1 in 100 year)
 - Low probability events (1 in 1,000 year)

- 4.3.12 This dataset identifies pluvial flooding resulting from rainfall exceeding infiltration and drainage capacity.
- 4.3.13 It is particularly relevant in urban areas where impermeable surfaces increase runoff and concentrate flow pathways.

Groundwater Flooding Data

- 4.3.14 Groundwater flood risk has been assessed using British Geological Survey (BGS) groundwater susceptibility mapping, supplemented by local authority datasets where available.
- 4.3.15 This provides a strategic indication of areas where groundwater emergence may occur, particularly in low-lying or permeable geological settings.
- 4.3.16 The dataset is indicative in nature and does not provide predictive modelling of groundwater levels at site scale.

Reservoir Inundation Mapping

- 4.3.17 Reservoir flood risk has been assessed using Environment Agency reservoir inundation maps.
- 4.3.18 These maps identify the maximum potential extent of flooding in the event of reservoir failure.
- 4.3.19 Whilst such events are of very low probability, they represent high consequence scenarios and therefore constitute a residual risk consideration within the assessment.

Historic Flooding Records

- 4.3.20 Historic flood records have been used to support validation of modelled outputs and to identify previously affected locations.
- 4.3.21 These include:
 - Environment Agency recorded flood outlines
 - Local Authority and Lead Local Flood Authority records
- 4.3.22 These records provide important contextual evidence of past flood events, although coverage may be incomplete in some areas.

Sewer Flooding

- 4.3.23 Sewer flooding has been considered where data is available from water company records and Local Authority datasets.
- 4.3.24 This form of flooding is typically associated with exceedance of drainage capacity during intense rainfall events and may interact with surface water flooding.

Climate Change Considerations

- 4.3.25 Climate change is a fundamental component of flood risk assessment and has been incorporated in accordance with Environment Agency guidance.

4.3.26 This includes:

- Increased peak river flows
- Increased rainfall intensity affecting surface water flooding
- Increased sea level
- Consideration of future flood extents where model data allows

4.3.27 Where available EA mapping includes climate change scenarios, these have been used to inform site suitability and mitigation requirements.

4.4 Data Limitations and Assumptions

4.4.1 While the datasets used represent the best available information, several limitations should be recognised.

4.4.2 These include:

- Strategic-scale mapping may not reflect local conditions or site specific conditions,
- Hydraulic modelling is not available for all watercourses,
- Surface water mapping is indicative and may not capture drainage infrastructure performance,
- Groundwater mapping is broad-scale and not site-specific,
- Historic flood records may be incomplete, and
- Climate change projections remain subject to uncertainty and periodic revision.

4.4.3 A precautionary approach has therefore been adopted where uncertainty exists.

4.5 Flood Risk Evidence Base and Sources of Flood Risk

Interaction Between Flood Sources

4.5.1 Flood mechanisms rarely occur in isolation and often interact during extreme weather events, catchment saturation, or periods of tidal influence.

4.5.2 Multiple sources of flooding can occur together or concurrently and therefore there may be an increase to overall flood hazard, depth, duration, and spatial extent beyond that indicated by any single dataset.

4.5.3 Key examples of flood source interaction include:

- Surface water flooding (rainfall) coinciding with high fluvial or tidal river levels, reducing drainage capacity and increasing ponding duration, or a storm event occurring while a previous storm is progressing through the catchment,
- Groundwater emergence during prolonged wet periods reducing infiltration capacity and increasing surface runoff,
- Sewer surcharge or exceedance occurring alongside intense rainfall and surface water flooding events,
- High tidal or fluvial water levels restricting outfall discharge, resulting in hydraulic backing-up within drainage systems, and

- Floodplain inundation reducing available storage capacity and increasing pressure on adjacent drainage networks.

- 4.5.4 The significance of these interactions varies across the study area and is influenced by topography, geology, drainage infrastructure, and proximity to fluvial and tidal systems.
- 4.5.5 In urban areas, interactions between surface water and sewer flooding are particularly significant due to high levels of impermeable surfacing and constrained drainage capacity.
- 4.5.6 In low-lying or coastal-influenced areas, interactions between tidal locking, fluvial backwater effects, and surface water accumulation may be more pronounced.
- 4.5.7 Flood risk should therefore be assessed holistically, rather than as a series of independent sources.
- 4.5.8 Where multiple flood sources interact or overlap, a precautionary approach has been adopted within the assessment to ensure combined effects are appropriately reflected in site-level conclusions.

4.6 Summary

- 4.6.1 This Level 2 SFRA is underpinned by a comprehensive evidence base comprising national datasets, local records, hydraulic modelling outputs, and climate change projections.
- 4.6.2 Flood risk within the study area arises from multiple interacting sources, requiring site-specific interpretation rather than reliance on any single dataset.
- 4.6.3 The evidence base is dynamic and subject to change; therefore, future updates to datasets may necessitate reassessment of site conclusions.

5.0 Development Constraints, Mitigation and Implications for Planning

5.1 Overview

- 5.1.1 This section considers the implications of the updated Level 2 SFRA findings, including for previous FRAs prepared in support of current site allocations.
- 5.1.2 The updated assessment reflects the latest available datasets, including revised flood mapping, updated hydraulic modelling (where available), and current climate change allowances in accordance with Environment Agency guidance.
- 5.1.3 The purpose of this section is to:
- Translate flood risk findings into planning implications
 - Identify appropriate mitigation responses
 - Support site allocation decisions
 - Provide consistency in interpreting site suitability
 - Inform future site-specific Flood Risk Assessments (FRAs)
- 5.1.4 The Level 2 SFRA is intended to support plan-making and should be read alongside the Level 1 SFRA Addendum.
- 5.1.5 Mitigation measures identified within this section are strategic in nature and do not replace detailed design work required at planning application stage.

5.2 Review of 2018 Site Allocations

- 5.2.1 A review of site allocations identified in 2018 has been undertaken to determine whether updated flood risk information materially affects their suitability for development.
- 5.2.2 Previous site-specific Flood Risk Assessments may have been prepared in support of earlier planning submissions or allocation processes. This Level 2 SFRA does not replace those assessments but provides updated strategic evidence using current datasets and climate change assumptions.
- 5.2.3 Existing FRAs require review where:
- Flood Zone extents have changed or new extents have been published
 - Surface water mapping has been updated
 - Hydraulic modelling has been revised
 - Climate change allowances have changed
 - Residual risk has been reinterpreted
- 5.2.4 Where material changes in flood risk have been identified, this may affect the outcome of the Sequential Test and the applicability of the Exception Test, the scale and type of development considered appropriate and the nature and extent of any required mitigation.

5.3 Environment Agency Memorandum of Understanding

5.3.1 Where relevant, existing agreements with the Environment Agency, including any Memorandum of Understanding (MoU), have been reviewed.

5.3.2 This ensures that:

- Development assumptions remain aligned with current flood risk policy
- Agreed mitigation strategies remain appropriate
- Any changes in risk are reflected in future planning decisions

5.3.3 Where updated data indicates a change in flood risk, previously agreed positions may require review in consultation with the Environment Agency.

5.4 Changes to Allocations due to Refreshed Input Data

5.4.1 The incorporation of updated datasets may result in changes to site suitability or development capacity. Key factors include:

- Revised flood extents (including climate change scenarios)
- Improved understanding of flood depth and hazard
- Identification of new surface water flow paths or ponding areas
- Updated groundwater susceptibility mapping

5.4.2 These changes may require:

- Reconfiguration of site layouts
- Reallocation of land uses within sites (applying the sequential approach)
- Additional or enhanced mitigation measures
- Preparation of updated site-specific FRAs

5.5 Mitigation Measures

5.5.1 This section sets out a framework linking flood depth and hazard to appropriate development responses and mitigation measures. It provides a practical tool to support site-specific assessment and the application of the Sequential and Exception Tests.

Flood Depth, Hazard and Mitigation Framework

5.5.2 Flood hazard is influenced by a combination of flood depth, velocity and the presence of debris, all of which affect the potential risk to people and the ability to safely access or evacuate a site during a flood event. Consideration of flood hazard is therefore essential in determining whether development can be occupied and operated safely, including the provision of safe access and egress routes for the lifetime of the development..

5.5.3 The mitigation framework set out in this guidance is informed by national flood risk policy, recognised industry best practice, and methodologies developed by DEFRA and the Environment Agency, including the FD2320/TR2 flood hazard rating methodology.

5.5.4 This methodology categorises flood hazard based on the combined effects of flood depth, flow velocity and debris, and is commonly interpreted through four hazard classifications: low hazard, danger for some, danger for most, and danger for all. Hazard classifications assist in

understanding the potential risks posed to people during flood events and in assessing whether safe access, egress and emergency evacuation can be achieved.

5.5.5 Safe access and egress are critical to ensuring that development remains safe during flood events.

- Dry access routes are preferred wherever feasible
- Where dry access is not achievable, a safe access route must be demonstrated, taking account of:
 - Hazard to people (depth + velocity thresholds)
 - Duration of flooding
 - Availability of safe refuge
- Emergency plans must align with local authority and Environment Agency flood warning systems

5.5.6 Where safe access cannot be achieved, provision of Safe refuge above design flood levels and robust Emergency evacuation procedures must be clearly defined within site-specific FRAs.

5.5.7 All emergency planning should align with Environment Agency flood warning systems and Local Authority emergency response frameworks.

5.5.8 Mitigation measures should be proportionate to the level of flood risk and informed by site-specific Flood Risk Assessments (FRAs).

Flood Resistance and Resilience Measures

5.5.9 Flood resistance measures are intended to prevent or reduce the ingress of floodwater into buildings and are generally most effective in areas of lower flood hazard and relatively shallow flooding (typically up to around 600 mm, depending on site conditions). Measures may include:

- Raised door thresholds and flood-resistant doors/barriers
- Sealing of service entry points and penetrations
- Air brick covers and non-return valves
- Use of water-resistant materials at ground level and water-tolerant materials at lower ground floor levels

5.5.10 Resistance measures are generally suited to short-duration, low-velocity flooding where structural stability is unlikely to be affected. Their effectiveness reduces as flood depths increase, particularly beyond approximately 600–900 mm, due to increased hydrostatic pressure, flow velocity, prolonged inundation, and debris loading. In such cases, resilience measures should also be incorporated.

5.5.11 Flood resilience measures assume that some water ingress may occur and focus on minimising damage, supporting safe occupation where appropriate, and enabling faster recovery following a flood event. Measures may include:

- Raising electrical services and sockets above predicted flood levels
- Use of resilient materials (e.g. tiled floors, concrete, closed-cell insulation)

- Designing internal layouts to allow easy cleaning, drying and recovery of affected spaces
- Incorporation of sacrificial or easily replaceable finishes at lower levels
- Provision for safe access, ventilation, and post-flood reinstatement strategies

5.5.12 Flood resistance and resilience measures should be informed by recognised industry standards and best practice guidance, including DEFRA and Environment Agency research such as the FD2320/TR2 Flood Hazard Research Programme¹, CIRIA guidance including Code of Practice for Property Flood Resilience (C790)², British Standard BS 85500:2015 Flood resistant and resilient construction³, Environment Agency guidance on property flood protection⁴, and relevant national planning policy and guidance within the NPPF⁵ and Planning Practice Guidance relating to flood risk and safe development.

Finished Floor Levels (FFL)

5.5.13 FFL should be set in accordance with site-specific flood levels and in line with Environment Agency guidance:

- A freeboard of at least 600mm above the design flood event (1% AEP plus climate change) should be used for all development locations,
- This may be able to be reduced to 300mm if there is a high level of certainty about the estimated flood level.
- Greater freeboard than 600mm may be required where there is increased uncertainty or residual risk (e.g. defence breach scenarios)

5.5.14 In higher-risk areas, raising land may not be appropriate, and alternative approaches such as:

- Raised floor construction (e.g. stilts or podiums)
- Split-level design

5.5.15 These approaches should be considered to avoid loss of floodplain storage.

Additional Technical Considerations

5.5.16 Flood risk mitigation measures must be developed in accordance with the risk-based approach set out in the National planning framework and supporting guidance. The application of mitigation should follow the hierarchy of:

- Avoidance (steering development away from highest risk areas)
- Substitution (locating less vulnerable uses in higher risk areas)
- Design and mitigation (reducing residual risk to acceptable levels)

5.5.17 This approach aligns with the principles of the NPPF and associated PPG on Flood Risk and Coastal Change, as well as guidance from the Environment Agency.

¹ Department for Environment, Food and Rural Affairs (DEFRA) and Environment Agency research on property flood resilience, including the FD2320/TR2 Flood Hazard Research Programme

² CIRIA guidance, including *Code of Practice for Property Flood Resilience (C790)*

³ British Standards Institution guidance, including *BS 85500:2015 Flood resistant and resilient construction*

⁴ Environment Agency guidance on flood resilience and resistance measures for property protection

⁵ MHCLG / DLUHC guidance within the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG) relating to flood risk and safe development

5.6 Sequential and Exception Tests

- 5.6.1 The application of the Sequential and Exception Tests at site level is informed by the policy framework set out in Section 2.0 and the site-specific hazard assessments presented in this report.

5.7 Floodplain Compensation and Storage

- 6.5.1 For development within Flood Zones 3a and 3b, any loss of floodplain storage must be mitigated through:

- Level-for-level and volume-for-volume compensatory storage
- Maintaining Hydraulic connectivity with the existing floodplain
- Design that ensures no increase in flood levels elsewhere

- 6.5.2 In accordance with Environment Agency guidance, opportunities should be taken to deliver betterment, enhancing floodplain function and biodiversity where possible.

5.8 Sustainable Drainage Systems (SuDS)

- 5.8.1 Surface water arising from all development proposals must be managed through the incorporation of Sustainable Drainage Systems (SuDS), designed in accordance with the following national policy and technical guidance:

- The Ministry of Housing, Communities and Local Government's National Planning Policy Framework (NPPF)
- Planning Practice Guidance relating to flood risk and climate change
- The National standards for sustainable drainage systems (SuDS) published by Department for Environment, Food and Rural Affairs
- Relevant guidance issued by the Lead Local Flood Authority, Internal Drainage Board, sewerage undertaker and the Environment Agency

- 5.8.2 Development proposals must demonstrate that surface water runoff will be managed as close to its source as reasonably practicable through a management train approach, prioritising infiltration and above-ground drainage features wherever feasible.

- 5.8.3 Applicants must submit sufficient information to demonstrate that the proposed drainage strategy is deliverable, maintainable for the lifetime of the development, and capable of functioning effectively during extreme rainfall events, taking account of climate change allowances.

- 5.8.4 Development proposals within areas of flood risk, critical drainage areas, or locations known to experience surface water flooding must demonstrate that:

- Flood risk will not increase elsewhere
- Existing surface water flow routes are maintained or appropriately managed
- Finished floor levels and site layout respond appropriately to flood risk constraints
- Surface water drainage infrastructure remains operational during extreme weather conditions
- Safe access and egress can be maintained

5.8.5 Major development proposals must be accompanied by a site-specific drainage strategy proportionate to the scale and nature of development. This should include, where relevant:

- Existing and proposed runoff rates and volumes
- Greenfield runoff calculations
- Climate change allowances
- Exceedance flow routing plans
- Ground investigation and infiltration testing results
- Hydraulic modelling outputs
- Maintenance and management arrangements
- Details of proposed SuDS components and treatment stages

5.8.6 Development proposals should seek opportunities to contribute to wider catchment resilience, ecological networks and water environment improvements through the use of multifunctional blue-green infrastructure and nature-based drainage solutions.

5.9 Residual Risk and Climate Change

5.9.1 All proposed mitigation must consider residual risks, including and not limited to:

- Overtopping or breach of flood defences
- Blockage or failure of drainage infrastructure
- Extreme events exceeding design standards

5.9.2 Climate change allowances must be incorporated in accordance with Environment Agency guidance, with development designed to remain safe over its lifetime (typically 100 years for residential development).

5.10 Application of Mitigation Within Sites

5.10.1 Development layouts should apply an internal sequential approach, locating more vulnerable uses in areas of lowest flood risk and reserving higher-risk areas for water-compatible or less vulnerable uses. This is a key requirement in demonstrating compliance with national planning policy.

5.10.2 The assessment recognises that different types of development have different levels of vulnerability as set out within the NPPF and associated guidance. The below provides a summary in line with these documents however this is not exhaustive, and reference should still be made to the above documents including any updates since the publication of this document.

Residential Development

- More sensitive to flood risk
- Requires the highest standard of safety
- Must demonstrate:
 - Safe access/egress
 - Appropriate FFLs
 - Lifetime safety under climate change
 - Floodplain compensation

- Often subject to the Exception Test in Flood Zones 2 and 3

Commercial Development

- Greater flexibility in higher-risk areas
- May be appropriate in:
 - Parts of Flood Zone 3a (subject to mitigation)
- Design measures may include:
 - Flood-resilient construction
 - Floodplain compensation

Mixed-Use Sites

- Apply a sequential approach within the site, locating:
 - Residential uses in lowest-risk areas
 - Commercial or water-compatible uses in higher-risk zones
- Design measures may include:
 - Raised or sacrificial ground floor uses (e.g. parking, storage)

5.11 Summary

5.11.1 Flood risk mitigation must be risk-led, proportionate, and policy-compliant. The key principles are:

- Avoid development in the highest risk areas wherever possible
- Apply resistance measures at shallow flood depths
- Transition to resilience measures as flood risk increases
- Ensure development remains safe for its lifetime, accounting for climate change and residual risk

5.11.2 In all cases, mitigation must be supported by robust, site-specific Flood Risk Assessments and agreed with the Environment Agency and relevant Local Planning Authority.

6.0 Flood Defence Funding

6.1 Overview

- 6.1.1 In all cases, mitigation must be supported by robust, site-specific Flood Risk Assessments and agreed with the Environment Agency and relevant Local Planning Authority.
- 6.1.2 The aim of the new North East Lincolnshire Local Plan is to ensure new growth is delivered in a sustainable manner, with development directed toward areas shown to provide a suitably safe and accessible environment whilst also meeting the needs of new residents locally.
- 6.1.3 The intent of this Level 2 SFRA is to inform the preparation of a new Local Plan which incorporates the recently introduced mandatory house building targets set by The Ministry for Housing and Local Government alongside updated flood risk mapping and the findings of the Humber 2100+ Understanding Tidal Risk Project. The intention is to direct development to sustainable locations, with previous site allocations now requiring updated assessment in terms of flood risk, in line with recent policy changes and hydraulic modelling updates, as outlined in the above sections.
- 6.1.4 As discussed above the EA the EA Flood Zones data set including the EA Flood Zones with Climate change will be used to inform site selection and the requirement for a site specific FRA.

6.2 Current Modelling

- 6.2.1 To aid with site assessment, it is proposed that the 2010 Northern Tidal Model outputs including the 0.1% AEP, 2115 future epoch Breach Hazard mapping is used to inform residual risk to proposed development locations. The conceptual justification for the use of this data set is set out in detail within the Level 1 SFRA Addendum document however, a summary is included below for reference.
- 6.2.2 Typically, residual breach risk (failure of the raised tidal defences) should consider the 0.5% AEP event, however the current 2010 NTM Model modelling only shows the next 89 years rather than the required minimum of 100 years. The 0.1% AEP event has been used as a surrogate for the 0.5% AEP event. This provides suitable uplift to the design storm levels to account for differences in climate change and sea level rise between 89 years and 100 years.
- 6.2.3 Discussion with the EA has confirmed the calculation methodology required to demonstrate the feasibility of using the 0.1% AEP breach mapping as a proxy for the 0.5% AEP breach mapping up to 2136 (covering lifetime of development and additional 10 years to account for delivery of the Local Plan). This approach recalculates the future design extreme sea level for the 0.5% AEP 2136 year and compares it with the provided 2115 0.1% AEP sea level.
- 6.2.4 After completing the calculations, the recalculated the 0.5% AEP 2136 extreme sea level is found to be 0.360 m higher than the 0.1% AEP 2115 extreme sea level. This means that with the inclusion of a suitable freeboard in design and data review, the 0.1% AEP 2115 data set is a reasonable proxy for the 2136 0.5% AEP data set.
- 6.2.5 An assessment of the limitations of taking this approach has included consideration of any additional recommendations which may be needed to manage any uncertainties. These

include fundamental limitations in sea level estimation and the projected rates of sea level rise.

- 6.2.6 Furthermore, the analysis compares water levels at the coastline outside of the flood defences, there is no consideration of how this difference would propagate inland. i.e. if there is a 360mm difference at the breach mouth what that translates to at the furthest inland point. The theory suggests that the magnitude of the difference is greatest at the source (at the breach location) and then reduces as the flood water propagates inland as other elements of flow dynamics become more important. Full detailed modelling would be required to understand this fully.
- 6.2.7 Based on the above and in agreement with the EA, it is North East Lincolnshire's intention that the Flood Map for Planning is used to represent tidal and fluvial flood risk for site allocation and site review, and the 2115 0.1% AEP breach data set is used to represent the residual risk for site allocation and site review. Given the shortfalls in both data sets it is proposed that affected sites are not automatically rendered unfavourable, provided appropriate long-term mitigation is incorporated and current flood defences are maintained to their existing standard of protection.

6.3 Existing Coastal Flood Defences

- 6.3.1 The characteristics of the North East Lincolnshire coastline predominantly comprises of a wide, commercially developed floodplain, protected by long stretches of hard defence structures including seawalls, revetments and docks. These are owned and maintained by Associated British Ports in the vicinity of Grimsby and by North East Lincolnshire Council in other areas, such as surrounding Cleethorpes.
- 6.3.2 Following the coastline from Cleethorpes to the southeast, these hard defences give way to North East Lincolnshire owned dune embankments, which have been reinforced with gabions, a groyne field and sandy beaches (formerly saltmarsh). Secondary lines of EA owned earthen bank defences also exist in this area, around the Humberston Fitties, which is predominantly rural and high value agricultural land with small hamlets or villages, although it is noted that a number of chalets are situated between the lines of defences.
- 6.3.3 Beaches comprising of shallow sands and underlying fine sediments front the majority of defences along the North East Lincolnshire coastline. The beach material is predominantly eroded from the cliffs at Holderness to the north and deposited along the outer banks of the Humber Estuary by tidal processes.
- 6.3.4 Tidal mudflats and salt marsh are also present along both the north and south banks of the Humber between the outer estuary and the Donna Nook. The foreshore is wide, with significant marshy and sandy flats between the defences and deeper water. An area of managed realignment of defences has taken place to the northwest of Donna Nook, rerouting embankments 500-1000 m further inland to provide approximately 106 ha of intertidal habitats.
- 6.3.5 In this region, the historic rate of sea level rise is just over 1.10 millimetres per year, based on measurements taken at Immingham over the period between 1960 and 1995. In order to keep pace with the predicted rates of sea level rise, a considerable additional volume of sediment is likely to be required in the future in inter-tidal areas.

6.4 Likely Future Scenario

- 6.9.1 Currently, the defences between Immingham and Pyewipe provide a 0.5% AEP standard of protection, however with the ongoing trend of foreshore lowering and erosion in this area is expected to continue long term.
- 6.9.2 Under the '*with present management*' scenario, the current reinforcements made to the toe of the revetment (defences) in this area would need to be increased in terms of frequency and extent to maintain defences. The crest height of defences would also need to be raised to maintain this standard of protection as sea levels rise.
- 6.9.3 The hard defences and port at Grimsby, and the defences at Cleethorpes, currently provide a 0.5% AEP standard of protection. Repairing and raising the crest level of defences to account for sea level rise will be required long term to maintain this standard of protection. The locks and dock gates are noted as low points in the defences in this area, and the existing flood storage facility designed to mitigate this will also need to be upgraded to accommodate sea level rise and protect the residential areas of Grimsby.
- 6.9.4 Sediment accretion along the foreshore is expected to continue southeast of Grimsby as erosion of the cliffs at Holderness is expected to increase over time with the changing climate. The foreshore is likely to also steepen over time with sea level rise. Dune building and saltmarsh progradation is predicted to match, or outpace, the rising sea levels in this area due to increased sediment supply.

6.5 Land Value Assessment

- 6.5.1 The stretch of the Outer Humber Estuary which covers the North East Lincolnshire administrative area includes several major industries, many of which are of national importance including power stations, refineries and one of the country's largest port complexes providing trade internationally.
- 6.5.2 The towns of Grimsby and Cleethorpes are situated along this coastline and benefit from the proximity of these industries as a main source of employment. The urban and developed areas are also surrounded by notably high-grade agricultural land and internationally important wildlife reserves.
- 6.5.3 These areas are predominantly located within the tidal floodplain and as such rely on existing coastal defences to protect residents and industrial installations from flooding.
- 6.5.4 In order to qualify for Flood and Coastal Erosion Risk Management (FCERM) funding to maintain and improve these defences, a cost/benefit assessment is needed. This process is outlined in future sections however, an assessment of land value is needed to balance this assessment against the estimated costs of maintaining defences.
- 6.5.5 The process for estimating land value is detailed within the Flood and coastal erosion risk management funding policy and guidance documents provided by Department for Environment, Food & Rural Affairs (Defra)⁶. This states that the benefits assessed by projects should include the cost of flood damages avoided, but also wider benefits such as natural

⁶ <https://www.gov.uk/government/consultations/flood-and-coastal-erosion-funding-reform/outcome/flood-and-coastal-erosion-risk-management-funding-policy>

capital, which adds up all environmental benefits. Value for money is defined as using public resources to deliver policy objectives in a way that creates and maximises public value.

- 6.5.6 Projects in places at higher risk of flooding, erosion, or both, and with a higher density of assets such as properties, tend to have higher benefits in terms of damages avoided. This means the value for money approach incorporates an element of risk assessment.
- 6.5.7 Value for money is based on both monetised and non-monetised benefits. Monetisable benefits are appraised as set out in the Environment Agency's FCERM Appraisal Guidance, which is Green Book compliant. The Green Book is guidance issued by His Majesty's (HM) Treasury on how to appraise policies, programmes and projects⁷. This is currently being updated to move away from strict benefit-cost ratio being used to prioritise projects and towards ensuring non-monetised impacts are considered.
- 6.5.8 FCERM schemes can generate a wide range of benefits. These benefits can be grouped into 3 categories:
- Flood and erosion benefits which are benefits to people, property, businesses and infrastructure from increased resilience to flooding or erosion
 - Wider benefits which are non-flood or erosion benefits that occur as a by-product of increasing resilience to flooding or erosion (for example, carbon sequestration from NFM, or increased tourism from beach nourishment)
 - Enhancement benefits which are actions delivered as part of the FCERM project, but which are not necessary to deliver increased resilience to flooding or erosion (for example, public art installations, active travel infrastructure or visitor facilities)
- 6.5.9 The above can be further broken down into the following benefits to be assessed in line with the FCERM appraisal guidance:
- Direct damage to buildings and contents – avoided damage to contents and avoided costs of refurbishment for damage to buildings. This includes residential property, commercial property and publicly owned buildings such as schools and hospitals.
 - Infrastructure damage – avoided damage to infrastructure. Most floods will also affect transportation routes and utilities leading to disruption and outages.
 - Vehicle damages – avoided costs of replacement and repair of vehicles.
 - Emergency Services – avoided costs to the emergency services and local authorities.
 - Evacuation and temporary accommodation – avoided costs of re-homing people while their properties are repaired. Impacted people may need to stay out of their homes from a period of several weeks to a year, depending on severity and impact.
 - Mental health treatment costs – avoided NHS treatment costs for anxiety, depression and post-traumatic stress disorder, which increase after a flood. Research from the UK Health Security Agency shows sustained and elevated levels of mental health impacts for victims of flooding.
 - Risk to life – avoided fatalities, valued using an approach based on the value of a statistical life used in Department for Transport guidance.
 - Recreation benefits – we include the benefits of avoiding lost recreation, for example, beaches, promenades, footpaths and open spaces.

⁷ <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

- Agriculture damages – avoided damage to crops and agricultural land. The FCERM appraisal guidance for agricultural land takes account of individual floods, long term change and total loss of agricultural land. The damage values are updated annually. Agricultural damages can be combined with ecosystem services damages to build a holistic picture of the impact on the land.
 - Net carbon benefits – these are the carbon emissions avoided by not flooding property and cars, minus the whole life carbon costs of the scheme.
 - Environmental and heritage damages – environmental damages avoided are valued using the ecosystem services approach. Heritage is also valued too.
- 6.5.10 These benefits will be included in the ranking of projects for the purposes of funding and prioritisation.
- 6.5.11 The below sets out an assessment of the coastal plain value that is predicted to be at risk due to climate change and sea level rise up to 2136. This assessment is broken down into the above categories.

Economic Landscape

- 6.5.12 In respects to income, North East Lincolnshire supports a sizable employment base relative to its population, supporting approximately 67,375 full-time equivalent (FTE) jobs with a job density of around 70.5 FTE per 100 working age residents. This makes North East Lincolnshire a strong jobs economy compared to similar Northern and Midlands coastal areas⁸.
- 6.5.13 This economy translates to a £4.36 billion total Gross Value Added (GVA) to the economy per annum, or £64,674 per FTE. This positions the area at or above many comparable, peer areas. The GVA numbers are part of a wider rise in productivity and earnings which has grown by 35% since 2015, significantly outperforming competitors⁹.
- 6.5.14 Assuming a 2% annual inflation rate the cumulative GVA by several key future dates is outlined in table 6.1

Item	2026 cost billion £	2040 cost billion £	2136 cost billion £
Employment base	4.36	75.54	1745.70
TBC			

Table 6.1: Land Value Assessments

6.5.15 Note to NE Lincolnshire: Other Costs to be confirmed once Defence costing methodology is completed

6.6 Existing Coastal Flood Management Strategy

- 6.6.1 There are a number of coastal management plans which cover the North East Lincolnshire area, these are:

- EA Flamborough Head to Gibraltar Point Shoreline Management Plan (SMP),

⁸ North East Lincolnshire County Council 2026. Employment Topic Paper Draft

⁹ North East Lincolnshire County Council 2026. Employment Topic Paper Draft

- Humber Estuary Coastal Authorities' Group Shoreline Management Plan,
- North East Lincolnshire Local Flood Risk Management Strategy,
- Humber 2100+ Project, and
- Grimsby and Ancholme Coastal Flood Risk Management Plan.

- 6.6.2 These plans all recognise the importance of protecting North East Lincolnshire and the Humber Estuary from coastal flooding. Each plan recognises the high economic value of the area, much of which is located within the tidal floodplain. Across the documents, there is consistent support for a long-term "Hold the Line" approach, whereby existing flood defences are maintained, improved, and replaced where necessary to protect people, property, infrastructure, and the local economy.
- 6.6.3 The plans also make clear that allowing existing defences to deteriorate, fail, or be removed would significantly increase flood and erosion risk across developed areas of the coastline. This would have serious consequences for local communities, public safety, businesses, and key infrastructure, including port and industrial operations that are important to the regional and national economy.
- 6.6.4 The documents further recognise that climate change, including rising sea levels and more frequent extreme weather events, will increase pressure on coastal defences over time. As a result, they consistently support continued investment in resilient and sustainable flood protection measures to ensure effective long-term protection for communities and critical economic assets.
- 6.6.5 The Humber Estuary 2100+ Project in particular highlights the challenges of managing flood risks across the estuary. The area being a nationally important site for many land uses including industry, shipping, agriculture, residential and nature conservation whilst also being subject to highly dynamic natural processes such as erosion and sedimentation. All of which will be affected by sea level rise and climate change.
- 6.6.6 The Humber 2100+ Project identified that simply raising all defences in line with climate change and sea level rise, rather than solving the problem, would create significant challenges by trapping greater volumes of water within the estuary itself, generating a funnelling effect putting greater pressure on upstream defences, raising residual risks of defence failure and propagating risks beyond the study area. In order to safely manage the increasing risks as the climate changes, the estuary must be considered as an interconnected system with trade offs being made between defending certain areas and making space for floodwater storage in others.

6.7 Hold the Line Costing

- 6.7.1 A costing exercise is currently underway to estimate the prospective costs to ensure a Hold the Line approach for the North East Lincolnshire Area. The costing includes climate change flood risk up to 2136.
- 6.7.2 The proposed methodology uses a data base and weighting assessment to estimate likely project costs for specific categories of defence upgrades required. These categories include such defence typologies as urban, hard defences all the way to rural embankment realignment.
- 6.7.3 The process uses national and international coastal or fluvial defence projects to compile a register of costs per km of defence. These costs are then sorted by the same typologies as

are present in North East Lincolnshire and attributed a weighting for relevance. Relevance is assessed by proximity to the site, similarity in defence typology and upgrade scale. Once categorised and weighted the data base costs per km are averaged and applied to the existing North East Lincolnshire defences.

- 6.7.4 A full technical note detailing the methodology is appended. This has been shared with the EA for comment and the costing procedure will begin once approval of the method is provided.

6.7.5 Note to NE Lincolnshire: Other Costs to be confirmed once Defence costing methodology is completed

6.7.6

6.8 Current Funding Application Process

- 6.8.1 A scheme's eligibility for Flood and Coastal Risk Management Grant in Aid (FCRM GiA) funding has historically been made on the basis of the benefits the scheme delivers. Schemes which have a benefit/cost ratio of greater than 1:1 are eligible for further consideration. However, the amount of FCRM GiA funding available cannot cover every scheme proposed. Projects with the greatest benefit cost ratios are generally prioritised over ones with lower benefit cost ratios, although other factors are also considered.

- 6.8.2 The process for applying to secure flood defence funding was updated in late 2025¹⁰ with further guidance on the new process published in 2026¹¹.

- 6.8.3 The new process aims to speed up building flood and coastal erosion schemes improving the standard of protection to homes, businesses and agricultural land across towns, cities and rural areas. The policy requires development projects to apply for funding with each application being prioritised based on the following judgement criteria:

- Value for money,
- Reducing flood and coastal erosion risk,
- Focusing on deprived areas - at least 20% of FCERM investment will be directed to the most deprived quintile, and at least 40% to the 2 lowest quintiles combined, over both the next 3-year and 10-year periods,
- Increasing investment in natural flood management (NFM) - at least 3% of FCERM investment over the next 3 years, and 4% of FCERM investment over the next 10 years is directed to NFM, and
- Prioritising projects with contributions from others.

- 6.8.4 FCERM projects that are prioritised will be eligible for FCERM funding to the following levels, depending on project size and whether the funding is for refurbishing existing projects or for building new projects:

- For existing projects and assets - eligible for 100% of costs for refurbishing existing assets
- For new or improved projects and assets - eligible for 100% for the first £3 million, and 90% for costs above £3 million

¹⁰ <https://www.gov.uk/government/consultations/flood-and-coastal-erosion-funding-reform/outcome/flood-and-coastal-erosion-risk-management-funding-policy>

¹¹ <https://www.gov.uk/government/publications/flood-and-coastal-erosion-risk-management-funding-policy-guidance/flood-and-coastal-erosion-risk-management-funding-policy-guidance>

- 6.8.5 The above then passes to Stage 2, which is where the cost benefit analysis comes in as to whether the scheme is viable in terms of what it is protecting. However, weight is likely to be given to projects in deprived communities.
- 6.8.6 There is also a separate route for 'mega' projects which are likely to cost £10 billion upwards.
- 6.8.7 All proposals will be required to bid for funding once the initial stages have been met and partnership funding secured if needed.
- 6.8.8 The Government have estimated that to be considered eligible for funding a scheme should deliver an overall benefit cost ratio of approximately 6.5:1. This is not a 'target' figure but does give an indication of the sort of benefit cost ratio which could be required for flood defence schemes to be successful in securing formal funding.
- 6.8.9 In the sections above the cost of the hold the line approach to North East Lincolnshire has been costed up to 2136 at a value of between XXX and YYY. The value of the land behind the defences has also been costs up to 2136 to a value of between XXX and YYY. Therefore based on these values the ratio of benefit cost is between X:X and Y:Y.
- 6.8.10 This funding mechanism requires North East Lincolnshire to bid for funding based on the criteria set out above, if successful North East Lincolnshire will be required to match funding of 10% of the estimated costs equating to a minimum of £X million upfront before full funding is confirmed.
- 6.8.11 The likelihood that the existing defence level will be maintained at their current level of protection is therefore....
- 6.8.12 **Note to NE Lincolnshire: Other Costs to be confirmed once Defence costing methodology is completed**

6.9 Stakeholder Consultation

- 6.9.1 The above has been provided to the EA for comment – TBC once response received.

7.0 Proposed Site Allocations

7.1 Overview

- 7.1.1 This section summarises the outcomes of the Level 2 Strategic Flood Risk Assessment (SFRA) for proposed site allocations.
- 7.1.2 The assessment supports:
- Local Plan site allocation decision-making,
 - Application of the Sequential and Exception Tests,
 - Identification of flood risk constraints, and
 - Development suitability and mitigation requirements.
- 7.1.3 Detailed findings for each site are provided within the Site Pro-Forms.
- 7.1.4 Each proposed allocation has been assessed using a standardised Pro Forma to ensure a consistent approach across all sites. The Pro-Forms provide the detailed evidence base supporting the summary conclusions in Section 7.
- 7.1.5 Each site assessment typically includes:
- Site reference, name, and proposed use,
 - Flood Zone and surface water flood risk,
 - Other flood sources (groundwater, reservoirs, historic flooding),
 - Climate change and residual risk considerations,
 - Access and egress constraints,
 - Mitigation requirements, and
 - Development suitability outcome.

7.2 Summary

- 7.2.1 The majority of the assessed sites are located within Flood Zone 2-3 when accounting for climate change flood extents, with many also subject to high surface water flooding risk and groundwater flooding constraints. Several locations, including Central Parade/Yardborough Estate/Freshney Green, Humberston Country Club, YMCA, Chantry Lane and Duchess Streetcar Park, are particularly constrained due to overlapping risks including defence residual risk, reservoir inundation risk and inclusion within flood warning areas.
- 7.2.2 Sites at Immingham, Cleethorpes and across Grimsby also demonstrate widespread exposure to surface water flooding, with some areas identified as high risk.
- 7.2.3 A number of sites, including the West Urban Extension, Garth Lane and Cricket Field/Littlefield Lane, are affected by residual risks in relation to reservoir breach, further increasing flood vulnerability.
- 7.2.4 Only a limited number of sites present comparatively lower secondary flood constraints, such as Land at Cartergate, Bursar Primary School and 260 Macaulay Lane, where surface water and/or groundwater risks are lower despite the presence of fluvial flood risk designations. Overall, flood risk is a significant and recurring constraint across the portfolio and is likely to

require detailed mitigation, sequential testing and site-specific flood risk assessment to support future development proposals.

- 7.2.5 The Site Pro Forms provide the detailed technical evidence underpinning the SFRA conclusions. They should be read alongside the main report sections to fully understand flood risk implications for each allocation.

DRAFT

8.0 Conclusions and Recommendations

8.1 Overview

- 8.1.1 This Level 2 Strategic Flood Risk Assessment (SFRA) provides a detailed, site-specific assessment of flood risk to support the Local Plan process and inform the allocation of development sites.
- 8.1.2 It builds upon the strategic framework established in the Level 1 SFRA Addendum and applies updated datasets, hydraulic information, and GIS-based analysis to individual site allocations.
- 8.1.3 The purpose of this section is to summarise the key findings and set out clear recommendations for plan-making and future development management.

8.2 Key Conclusions

- 8.2.1 The assessment confirms that flood risk across the study area is varied and arises from multiple interacting sources, including fluvial, surface water, groundwater, and residual mechanisms.
- 8.2.2 Key conclusions are as follows:
 - Flood risk is most significant along main river corridors and low-lying floodplain areas,
 - Surface water flooding presents a widespread constraint, particularly in urbanised locations,
 - Some sites are affected by multiple flood sources, increasing overall risk complexity,
 - Climate change is expected to increase flood extent, depth, and hazard over time, and
 - Residual risk remains an important consideration, particularly behind defences and within drainage catchments.
- 8.2.3 Flood risk does not necessarily prevent development, but it is a key factor influencing site suitability, layout, and mitigation requirements.

8.3 Site Assessment Outcomes

- 8.3.1 Sites have been classified into four principal categories:
 - Suitable for development,
 - Suitable subject to mitigation,
 - Requires Exception Test, and
 - Not suitable for development.
- 8.3.2 These classifications reflect the application of national planning policy, flood risk vulnerability, and site-specific hazard assessment.
- 8.3.3 In some cases, only parts of sites are suitable for development due to internal variations in flood risk.

8.4 Planning Implications

- 8.4.1 The findings of this SFRA should be used to inform:

- Selection, refinement, and justification of site allocations,
- Application of the Sequential and Exception Tests,
- Internal site layout and master planning,
- Identification of developable and undevelopable areas within sites, and
- Requirement for mitigation measures and design responses.

8.4.2 The Sequential Approach should be applied both between sites and within individual site boundaries.

8.5 Mitigation Approach

8.5.1 Where development is considered acceptable, mitigation should follow a risk-based and proportionate approach, including:

- Avoidance of high-risk flood areas wherever possible,
- Use of appropriate finished floor levels (FFLs) based on flood modelling and climate change allowances,
- Integration of Sustainable Drainage Systems (SuDS),
- Provision of floodplain compensation where necessary,
- Ensuring safe access and egress routes can be achieved, and
- Incorporation of flood resistance and resilience measures.

8.5.2 All mitigation proposals should be confirmed through site-specific Flood Risk Assessments (FRAs) at planning application stage.

8.6 Recommendations

8.6.1 It is recommended that:

- This SFRA is used as part of the Local Plan evidence base,
- Site allocations reflect the flood risk constraints identified in this assessment,
- The Sequential Test is applied to guide development towards lower-risk areas,
- The Exception Test is applied where required by national policy,
- Site-specific FRAs are prepared for all relevant development proposals,
- Development layouts adopt an internal sequential approach, and
- The SFRA is updated as new data and modelling become available.

8.7 Final Statement

8.7.1 This Level 2 SFRA provides a robust and proportionate evidence base for understanding flood risk across proposed site allocations.

8.7.2 It supports the delivery of sustainable development by ensuring that flood risk is properly considered in planning decisions and that future development is directed, designed, and managed to remain safe over its lifetime, taking account of climate change and residual risk.

8.8 Updates and Review

8.8.1 This Level 2 Strategic Flood Risk Assessment (SFRA) is a living evidence document and should be kept under review to ensure it remains consistent with the most up-to-date flood risk information, policy guidance, and technical datasets.

8.8.2 Flood risk information is subject to ongoing change due to:

- Updates to Environment Agency flood mapping,
- Publication of new or revised hydraulic modelling,
- Changes to climate change allowances and scenarios,
- Local flood investigation findings and historic event records,
- Improvements in surface water and drainage datasets, and
- Changes in land use, development, or drainage infrastructure.

8.8.3 As a result, the conclusions of this SFRA may be affected over time and future updates may be required where:

- New national or local flood risk data becomes available,
- Significant changes occur to Flood Zone extents or surface water mapping,
- Updated climate change guidance is published,
- Site allocations are revised or new sites are introduced, and
- Further detailed modelling is undertaken for specific watercourses.

8.8.4 Where updates occur, they should be reflected in both:

- The Level 1 SFRA evidence base (strategic context and policy assumptions), and
- This Level 2 SFRA (site-specific assessments and conclusions).

8.8.5 It is the responsibility of the Local Planning Authority to ensure that the SFRA remains current and is used in conjunction with the latest available datasets when informing plan-making and development management decisions.

8.8.6 In all cases, users of this document should confirm that they are applying the most recent version of the SFRA and supporting flood risk datasets prior to reliance on its conclusions.

APPENDICES

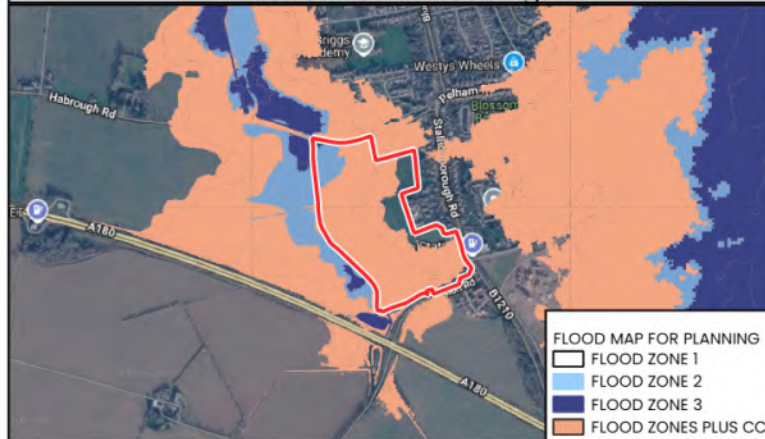
APPENDIX A

Site Specific Flood Risk Review Pro-formas – Residential Allocations

NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 1 of 21

Settlement Details	Site Reference	HOU005
	Settlement Name	Immingham
	Site Description	Land to the west of Stallingborough Road
	Centroid Coordinates	517409, 413952
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding to occur at surface
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	Not in a Flood Warning Area
	Access and Egress	Via the B1210 to the east of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

Risk of Fluvial Flooding



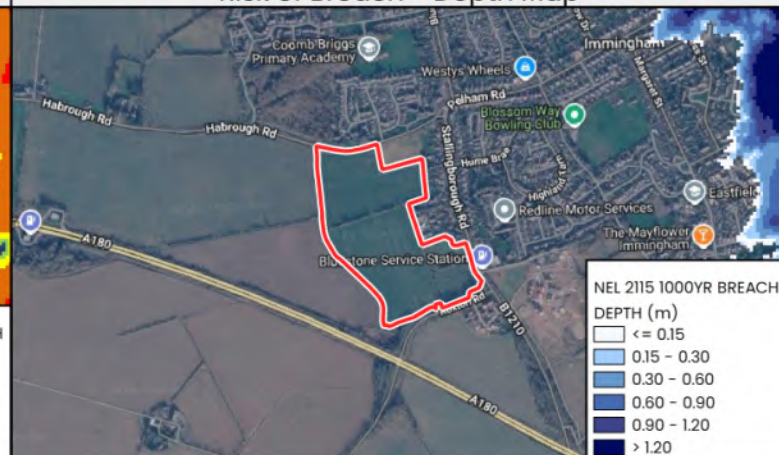
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



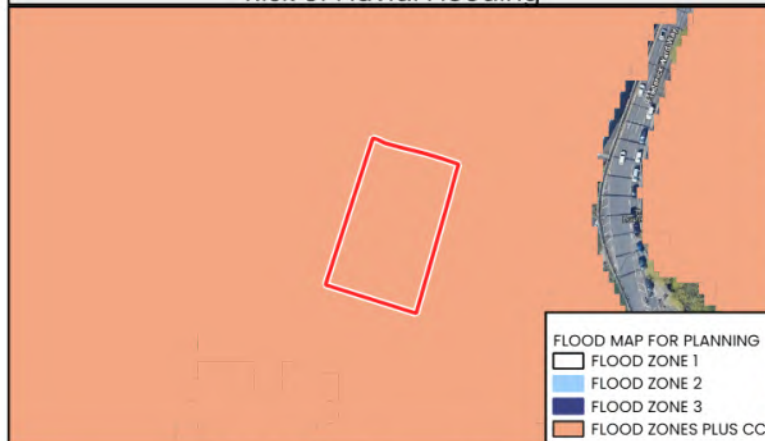
Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 2 of 21

Settlement Details	Site Reference	HOU037
	Settlement Name	Grimsby
	Site Description	Land West of Cartergate
	Centroid Coordinates	526479, 409172
Sources of Flood Risk	Fluvial/Tidal	Flood Zones plus Climate Change
	Surface Water	Low Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	Via Cartergate to the east of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

Risk of Fluvial Flooding



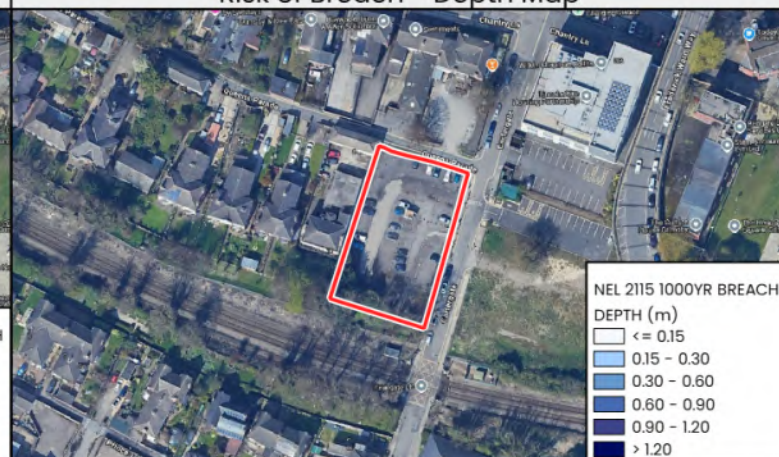
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 3 of 21

Settlement Details	Site Reference	HOU042
	Settlement Name	Cleethorpes
	Site Description	Site of Former Clifton bingo, Grant Street
	Centroid Coordinates	530571, 409053
Sources of Flood Risk	Fluvial/Tidal	Flood Zones plus Climate Change
	Surface Water	Low Risk
	Reservoir	No Risk
	Groundwater	Limited Potential for groundwater flooding to occur
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	Not in a Flood Warning Area
	Access and Egress	Via College Street to the west of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

Risk of Fluvial Flooding



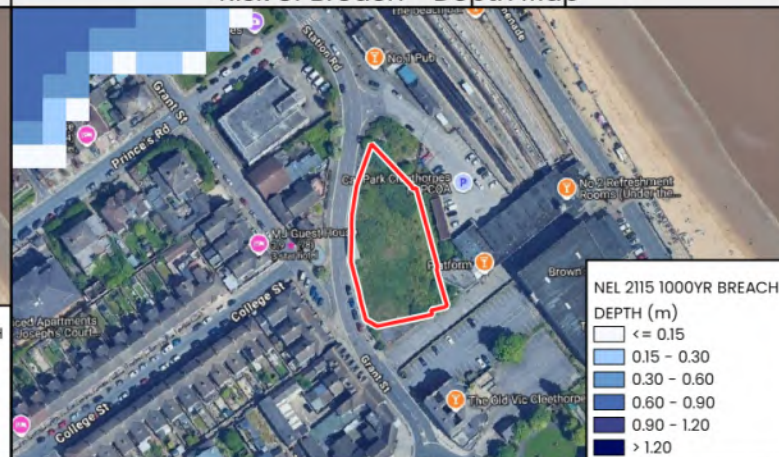
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



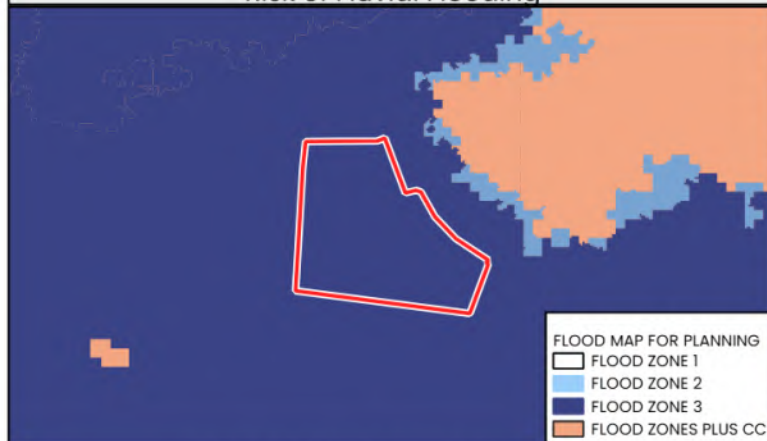
Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 4 of 21

Settlement Details	Site Reference	HOU045
	Settlement Name	Grimsby
	Site Description	Land at Cricket Field and Little Field Lane
	Centroid Coordinates	525845, 408798
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	Wet Day Risk
	Groundwater	Potential for groundwater flooding to occur at surface
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 5 of 21

Settlement Details	Site Reference	HOU061A
	Settlement Name	Grimsby
	Site Description	Weelsby Road Depot, Weelsby Road
	Centroid Coordinates	527602, 407632
Sources of Flood Risk	Fluvial/Tidal	Flood Zones plus Climate Change
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	Not in a Flood Warning Area
	Access and Egress	Via Wellsby Avenue to the west of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



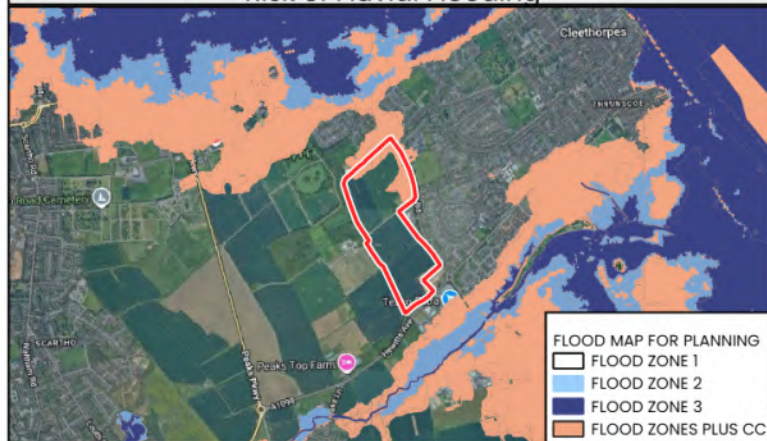
Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 6 of 21

Settlement Details	Site Reference	HOU074B
	Settlement Name	Cleethorpes
	Site Description	Land north and west of Pennels Garden Centre, Weelsby Hall Farm, Humberston Road
	Centroid Coordinates	529146, 407154
Sources of Flood Risk	Fluvial/Tidal	Flood Zones plus Climate Change
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	Not in a Flood Warning Area
	Access and Egress	Via Hewitts Avenue to the south of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

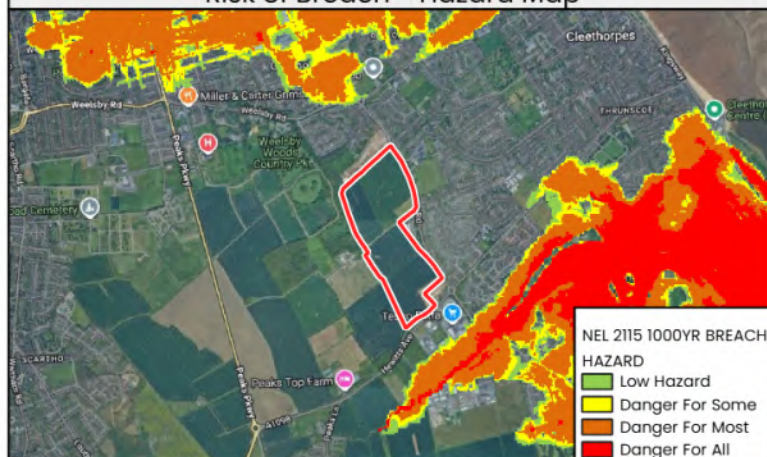
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



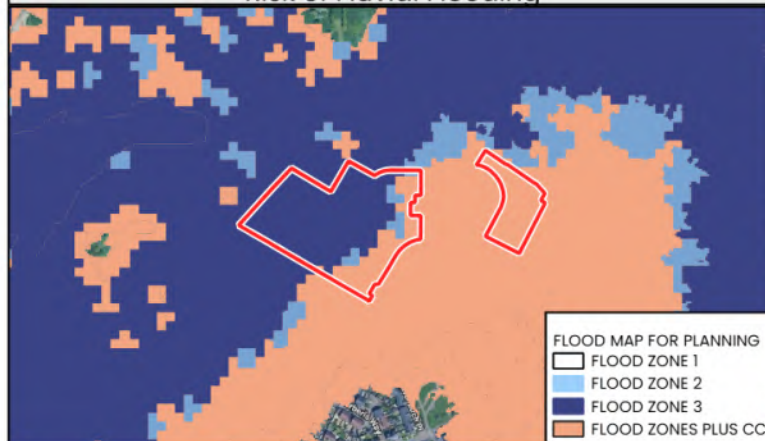
Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 7 of 21

Settlement Details	Site Reference	HOU118
	Settlement Name	Grimsby
	Site Description	Central Parade - Yarborough Estate - Freshney Green
	Centroid Coordinates	525099, 409305
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3 and Flood Zones plus Climate Change
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	Via Central Parade to the south of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

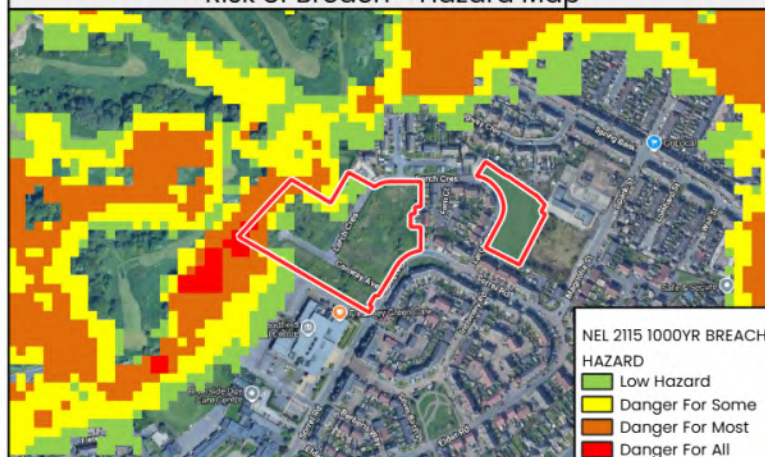
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



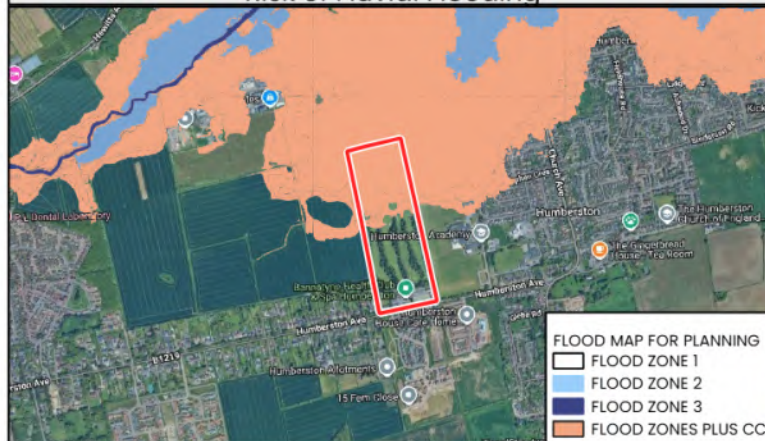
Risk of Breach - Depth Map



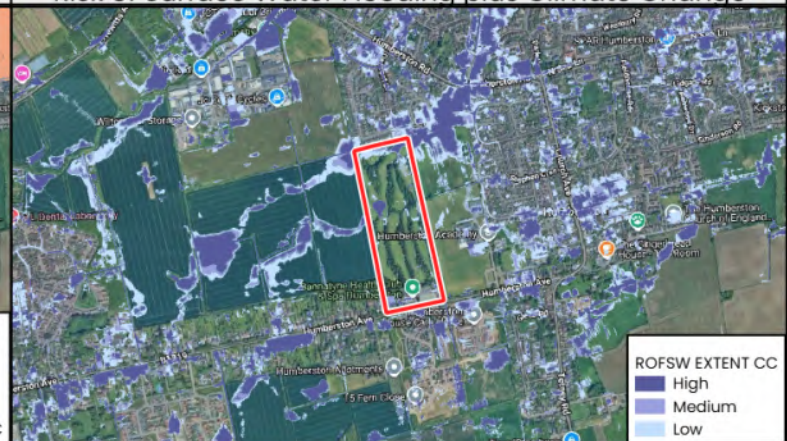
NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 8 of 21

Settlement Details	Site Reference	HOU139
	Settlement Name	Humberston
	Site Description	Land to the North of Humberston Avenue (Country Club)
	Centroid Coordinates	530311, 405481
Sources of Flood Risk	Fluvial/Tidal	Flood Zones plus Climate Change
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding to occur at surface
	Flood History	June 2007 Flood
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	Not in a Flood Warning Area
	Access and Egress	Via the B1219 at the south of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

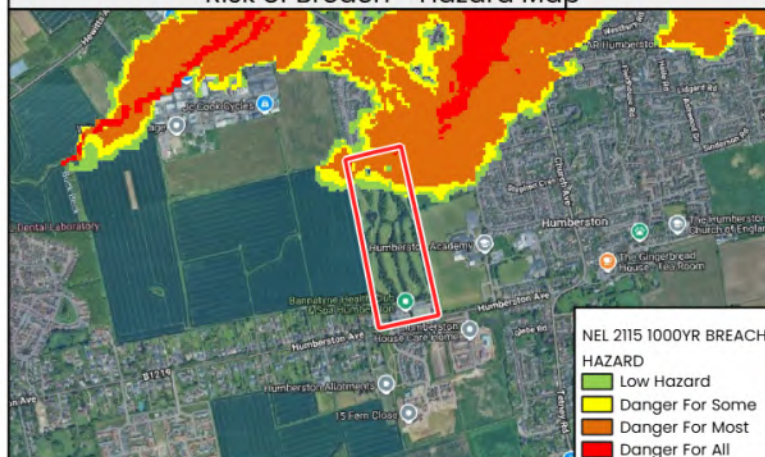
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 9 of 21

Settlement Details	Site Reference	HOU154
	Settlement Name	Grimsby
	Site Description	YMCA, Peakes Lane
	Centroid Coordinates	527768, 407557
Sources of Flood Risk	Fluvial/Tidal	Flood Zones plus Climate Change
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	Not in a Flood Warning Area
	Access and Egress	Via Peaks Parkway to the west of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



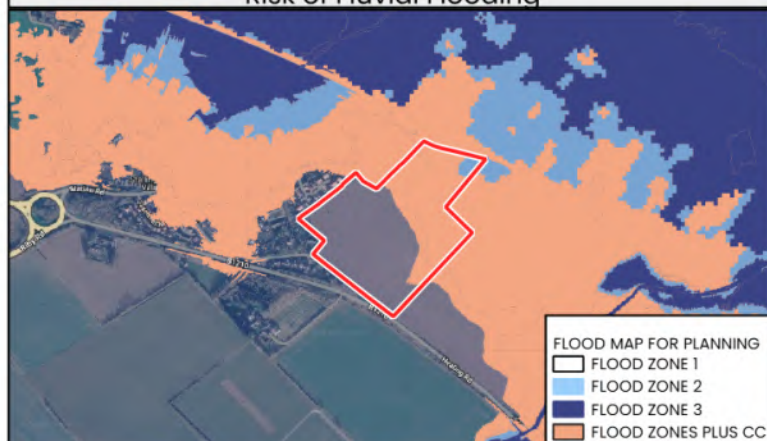
Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 10 of 21

Settlement Details	Site Reference	HOU190A
	Settlement Name	Stallingborough
	Site Description	Land east of Ayscough Avenue and north of Healing Road
	Centroid Coordinates	520358, 411304
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 2
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding to occur at surface
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	Not in a Flood Warning Area
	Access and Egress	Via B1210 to the south of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



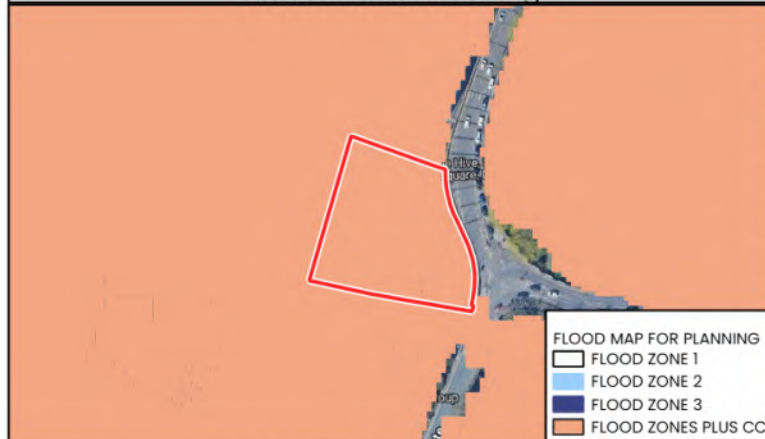
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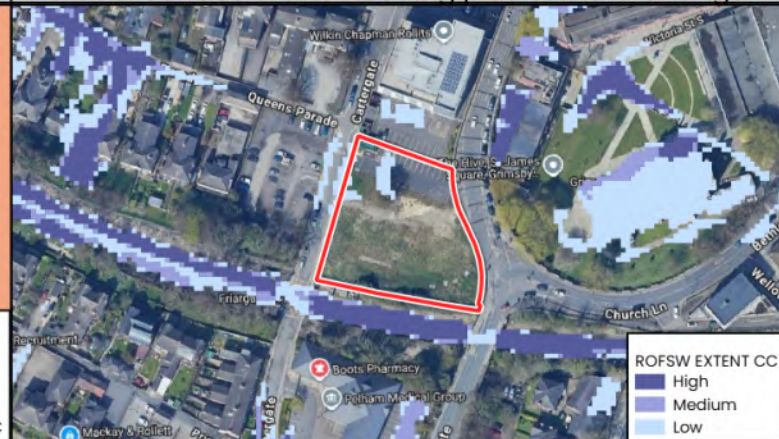
NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 11 of 21

Settlement Details	Site Reference	HOU272A
	Settlement Name	Grimsby
	Site Description	Land at Cartergate
	Centroid Coordinates	526531, 409151
Sources of Flood Risk	Fluvial/Tidal	Flood Zones plus Climate Change
	Surface Water	Low Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



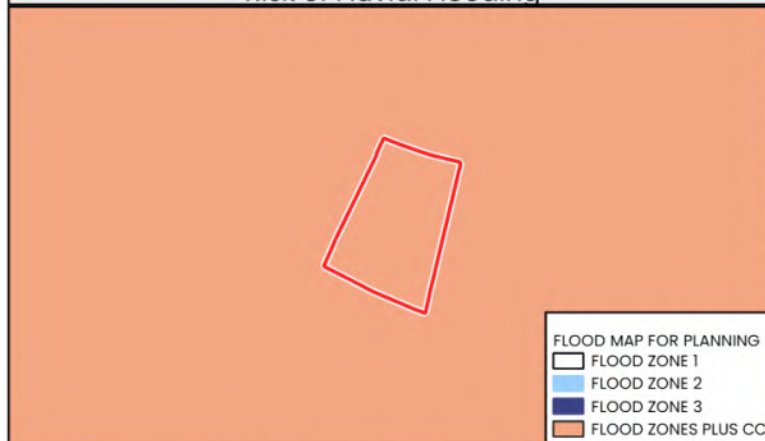
Risk of Breach - Depth Map



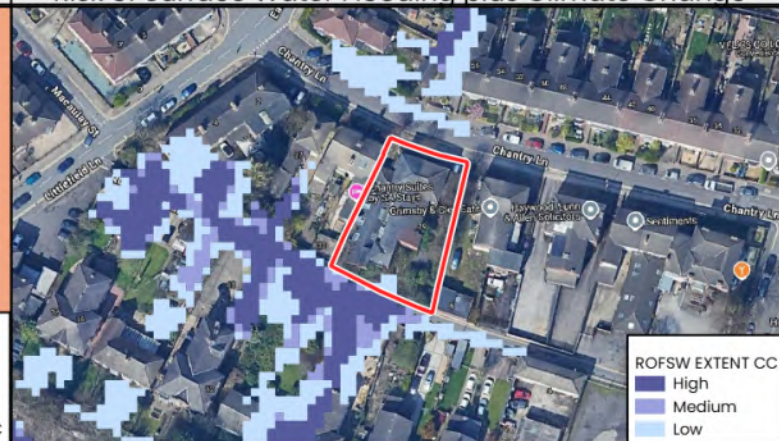
NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 12 of 21

Settlement Details	Site Reference	HOU303
	Settlement Name	Grimsby
	Site Description	29 - 31 Chantry Lane
	Centroid Coordinates	526428, 409242
Sources of Flood Risk	Fluvial/Tidal	Flood Zones plus Climate Change
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



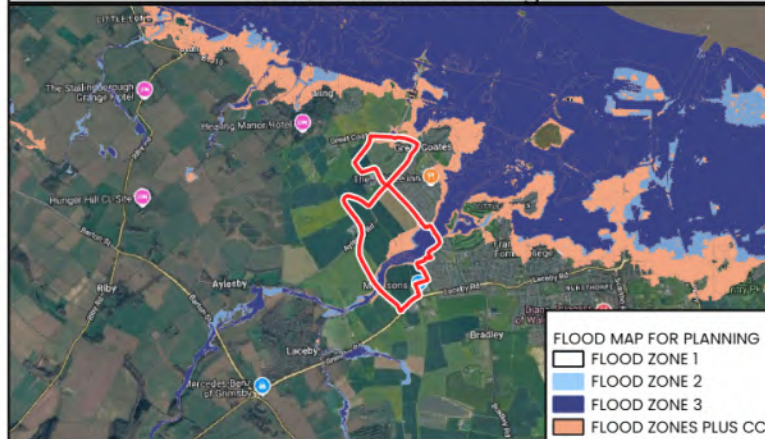
Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
Sheet 13 of 21

Settlement Details	Site Reference	HOU342
	Settlement Name	Grimsby
	Site Description	Grimsby West Urban Extension, Land west of Great Coates (North Parcel)
	Centroid Coordinates	522848, 408577
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	Dry Day Risk
	Groundwater	Potential for groundwater flooding to occur at surface
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	Via Grimsby Road to the south of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

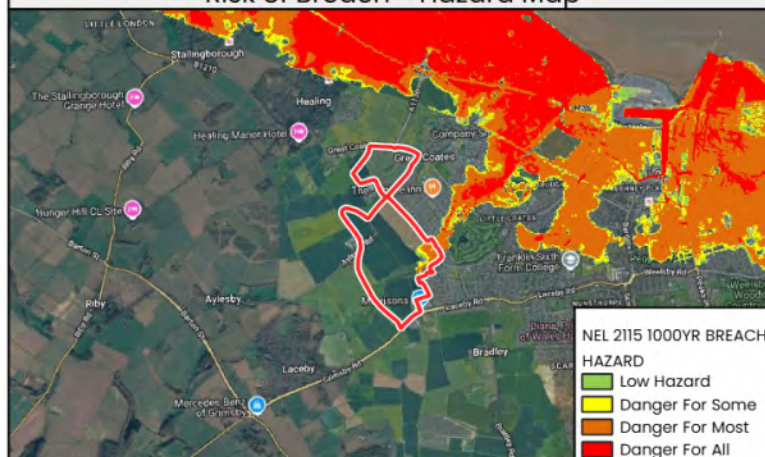
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



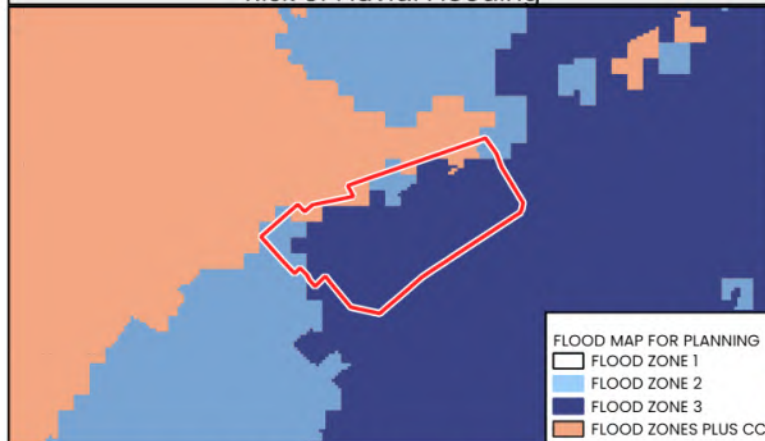
Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
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Settlement Details	Site Reference	HOU354A
	Settlement Name	Grimsby
	Site Description	Duchess Street car park
	Centroid Coordinates	526888, 409082
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



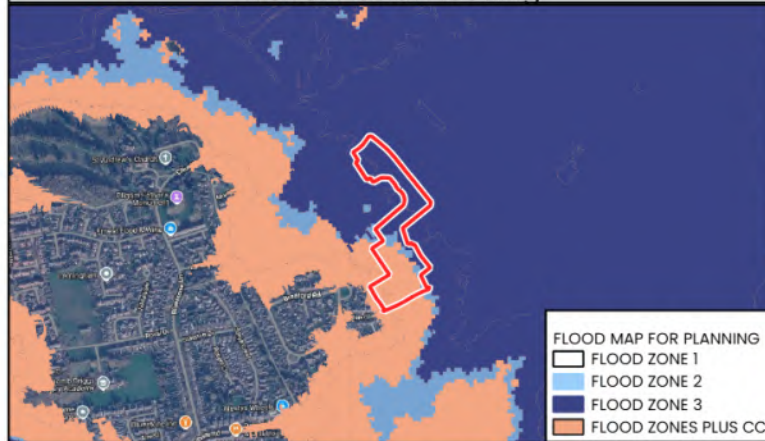
Risk of Breach - Depth Map



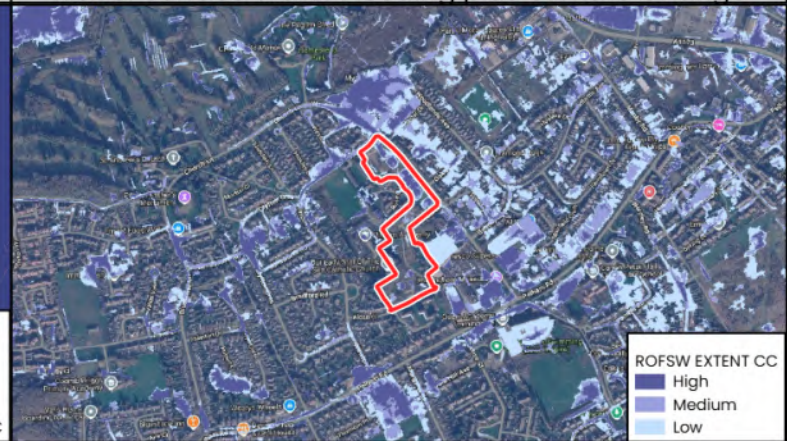
NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
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Settlement Details	Site Reference	HOU373
	Settlement Name	Immingham
	Site Description	Land of former tower blocks Washdyke Lane
	Centroid Coordinates	518119, 414902
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	June 2012 Flood
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

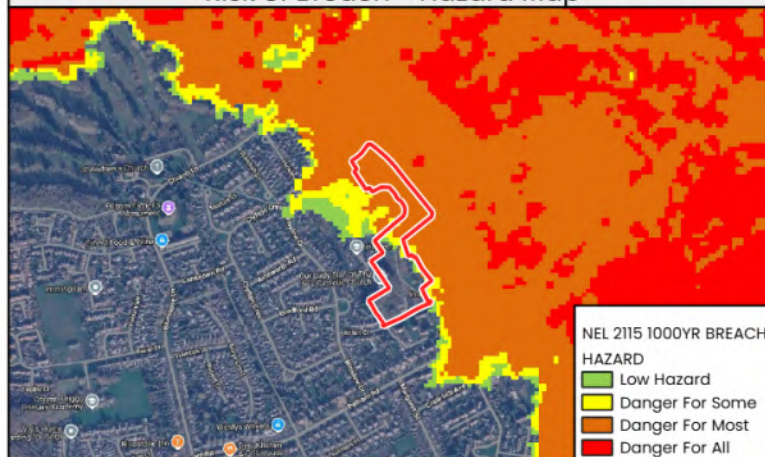
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



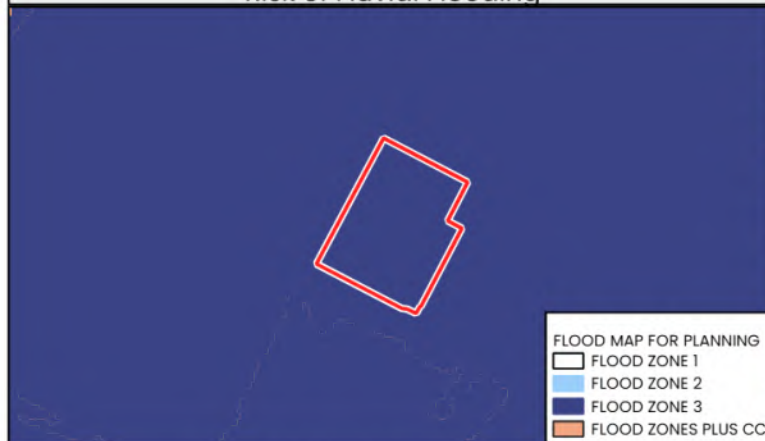
Risk of Breach - Depth Map



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STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
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Settlement Details	Site Reference	HOU375
	Settlement Name	Grimsby
	Site Description	260 Macaulay Lane
	Centroid Coordinates	525789, 409710
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	Low Risk
	Reservoir	No Risk
	Groundwater	No Groundwater flood risk
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

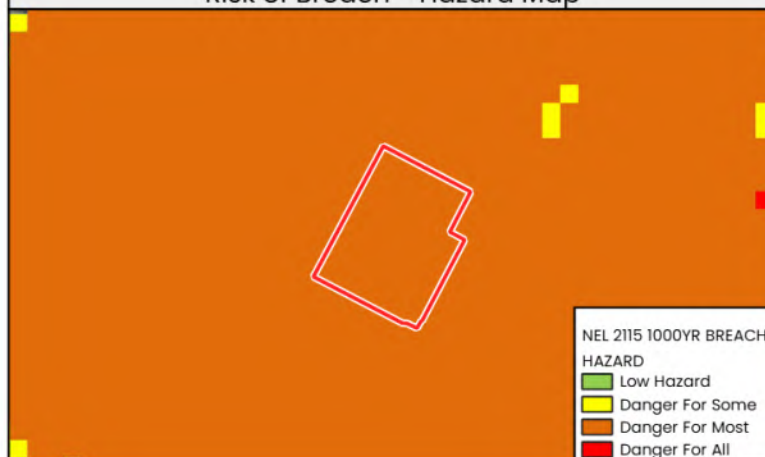
Risk of Fluvial Flooding



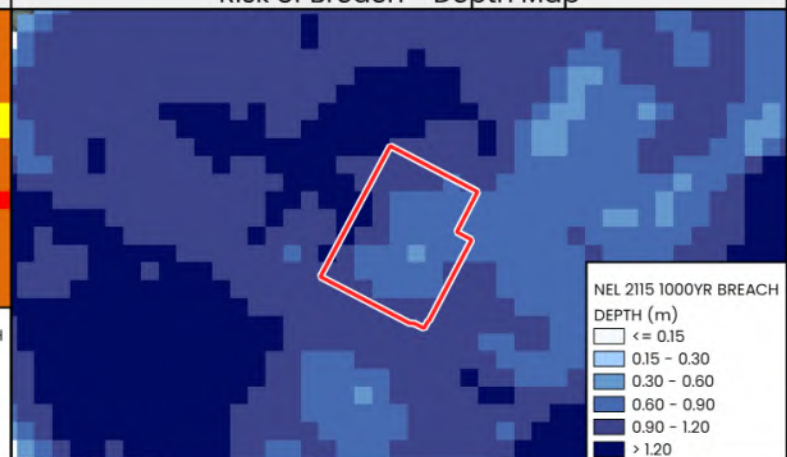
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



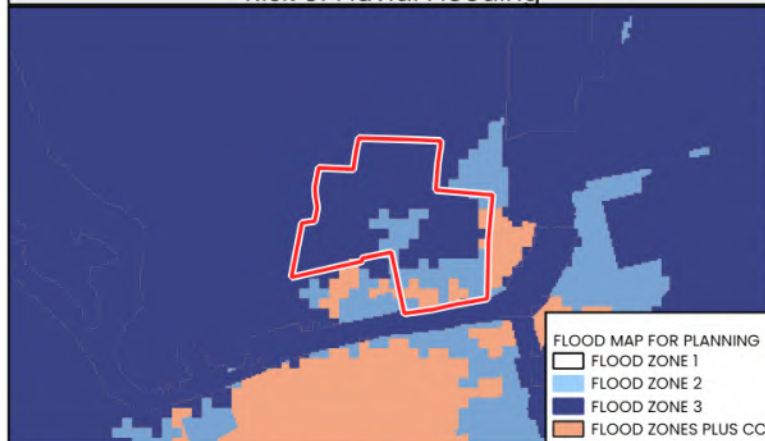
Risk of Breach - Depth Map



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STRATEGIC FLOOD RISK ASSESSMENT
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Settlement Details	Site Reference	HOU380
	Settlement Name	Grimsby
	Site Description	Garth Lane (Alexander Docks)
	Centroid Coordinates	526902, 409638
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	Wet Day Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

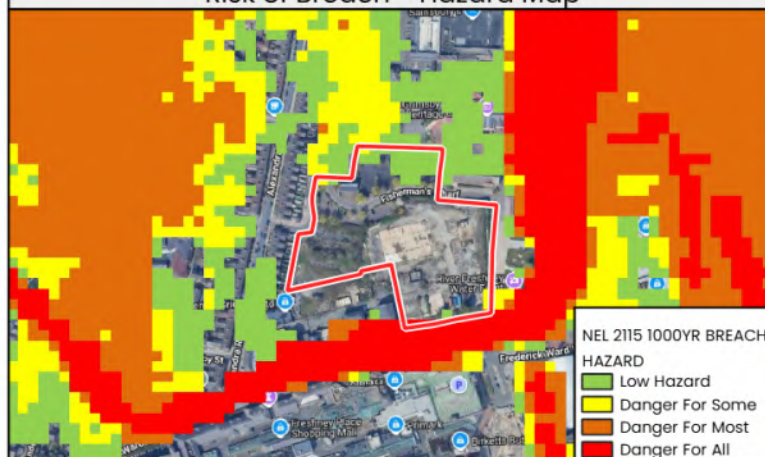
Risk of Fluvial Flooding



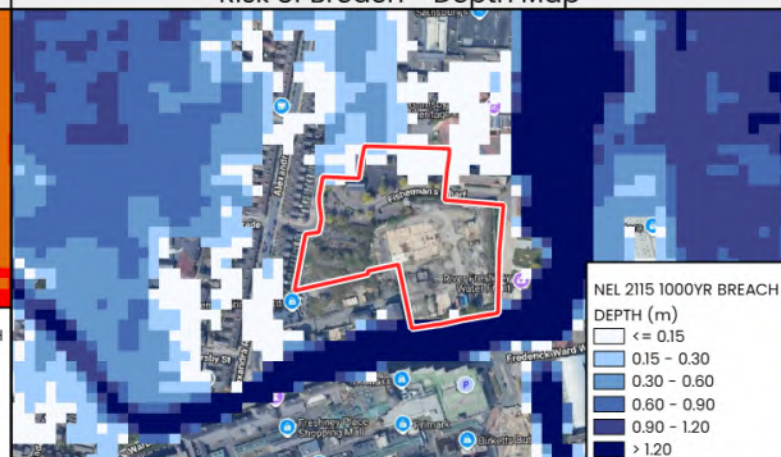
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
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Settlement Details	Site Reference	HOU381
	Settlement Name	Cleethorpes
	Site Description	Bursar Primary School, corner Bursar Street and Frederick Street
	Centroid Coordinates	530230, 408781
Sources of Flood Risk	Fluvial/Tidal	Flood Zones plus Climate Change
	Surface Water	Low Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	Via Bentley Street to the southwest of the Site
Flood Risk Management Infrastructure	Defence Residual Risk	No Residual Flood Risk

Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



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STRATEGIC FLOOD RISK ASSESSMENT
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Settlement Details	Site Reference	HOU386
	Settlement Name	Grimsby
	Site Description	R/o 73 to 105 Granville Street (Garages)
	Centroid Coordinates	527831, 408696
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	Medium Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

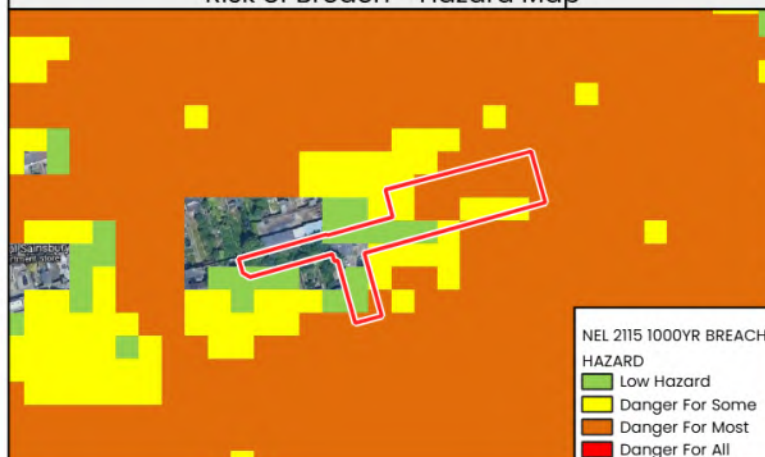
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



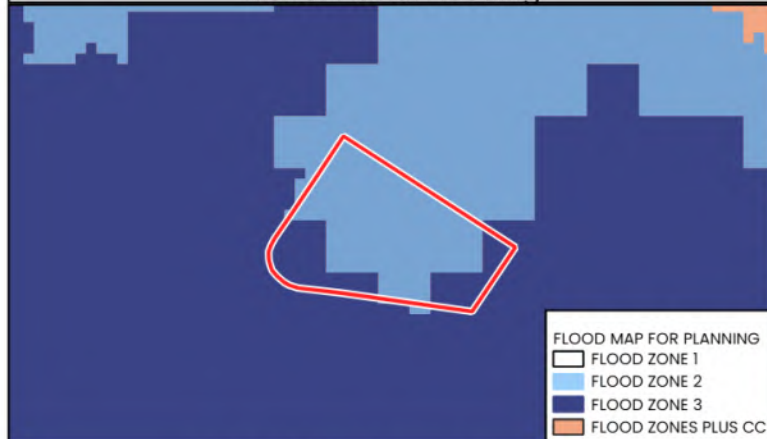
Risk of Breach - Depth Map



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Settlement Details	Site Reference	HOU388
	Settlement Name	Grimsby
	Site Description	Eleanor House, 19 Eleanor Street
	Centroid Coordinates	527791, 409553
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	Low Risk
	Reservoir	No Risk
	Groundwater	No Groundwater flood risk
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

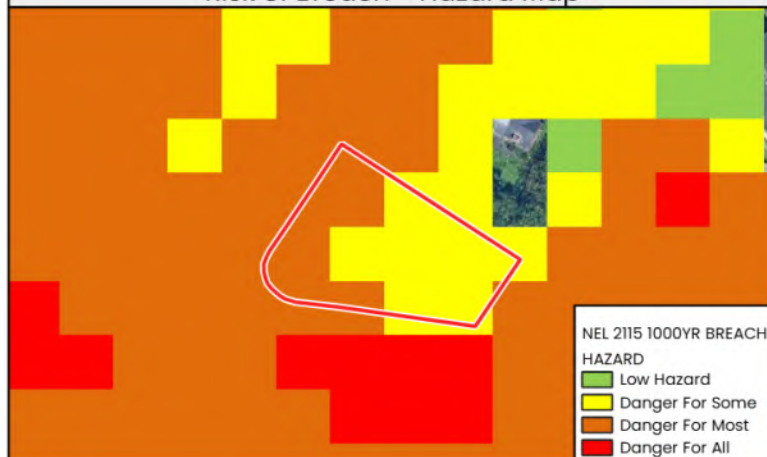
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



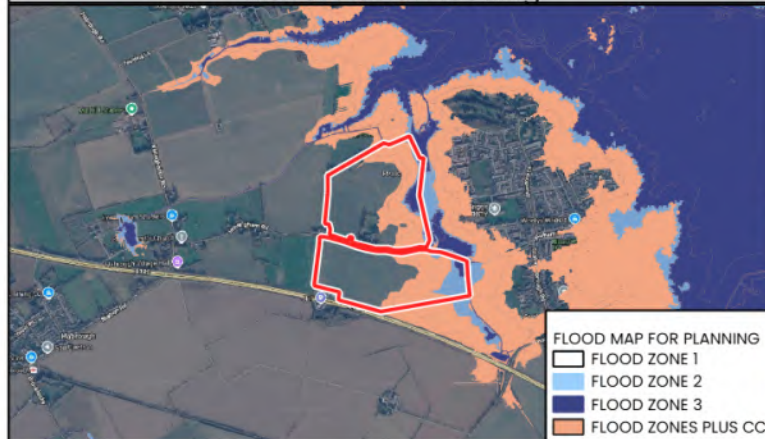
Risk of Breach - Depth Map



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STRATEGIC FLOOD RISK ASSESSMENT
RESIDENTIAL SITE PRO FORMA SHEET
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Settlement Details	Site Reference	HOU394
	Settlement Name	immingham
	Site Description	Habrough Road
	Centroid Coordinates	516699, 414356
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Risk
	Groundwater	Potential for groundwater flooding to occur at surface
	Flood History	No history of flooding
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	Via Immingham Road to the west the Site
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

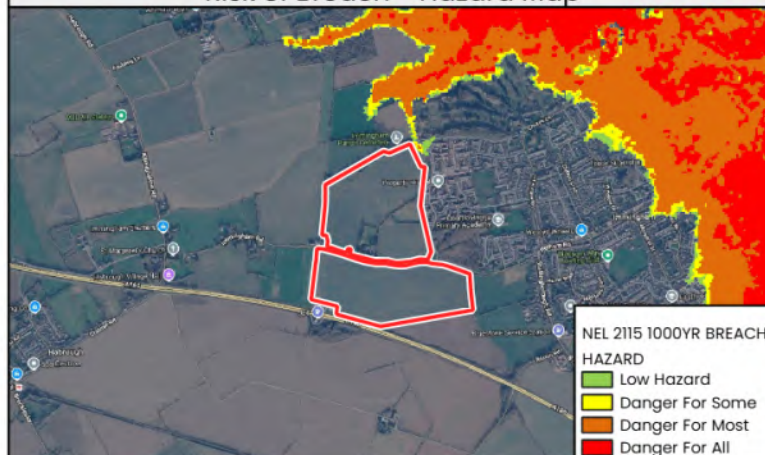
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



APPENDIX B

Site Specific Flood Risk Review Pro-formas – Commercial Allocations

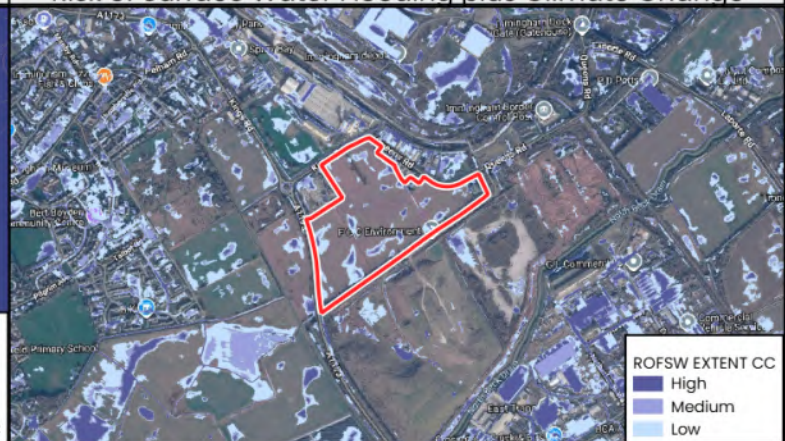
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Settlement Details	Site Reference	ELR001
	Settlement Name	Immingham, Kings Road
	Site Description	Immingham, Kings Road
	Centroid Coordinates	519906, 414595
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of groundwater flooding
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

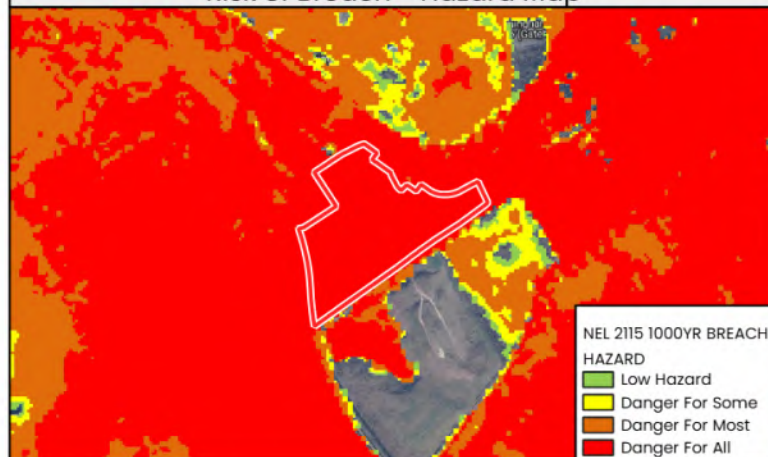
Risk of Fluvial Flooding



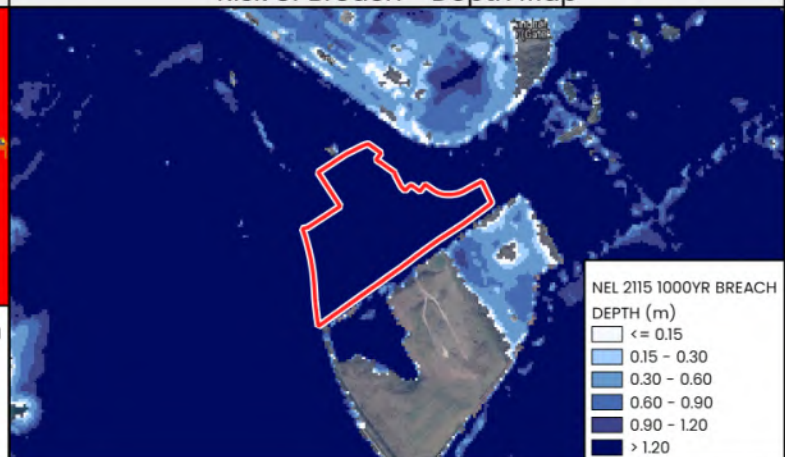
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR005
	Settlement Name	Former Huntsmen Tioxide Site, Moody Lane
	Site Description	Former Huntsmen Tioxide Site, Moody Lane
	Centroid Coordinates	525500, 411317
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	Potential for groundwater flooding of property below ground level
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

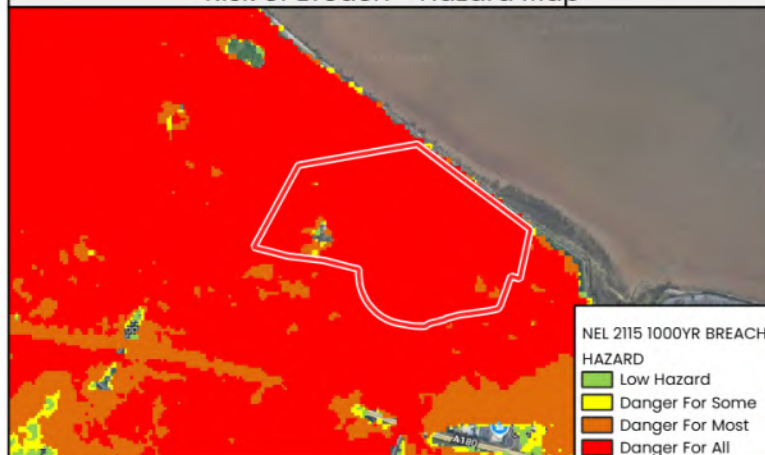
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR007
	Settlement Name	Land at Hall Park Way
	Site Description	Land at Hall Park Way
	Centroid Coordinates	518852, 415288
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	Medium Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of groundwater flooding
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

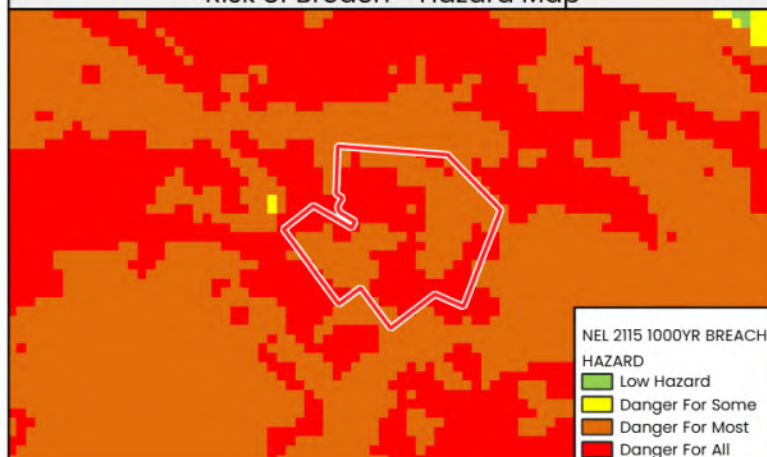
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR008a
	Settlement Name	Europarc Phase III
	Site Description	Europarc Phase III
	Centroid Coordinates	523558, 411571
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of groundwater flooding
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

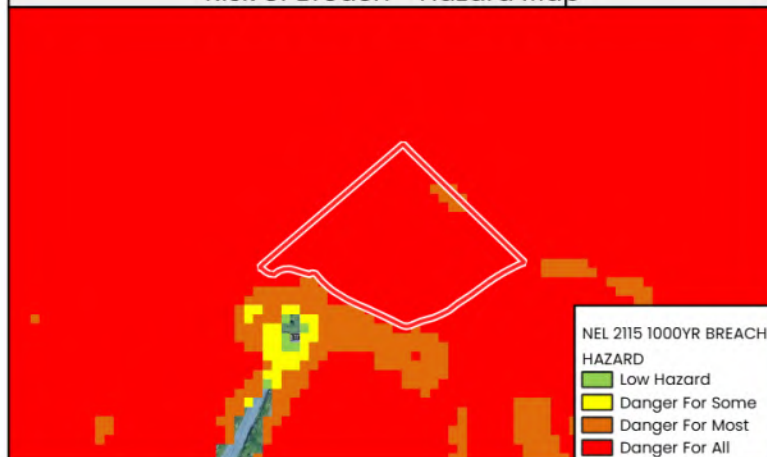
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR008b
	Settlement Name	Europarc Phase III
	Site Description	Europarc Phase III
	Centroid Coordinates	523548, 411286
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of groundwater flooding
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

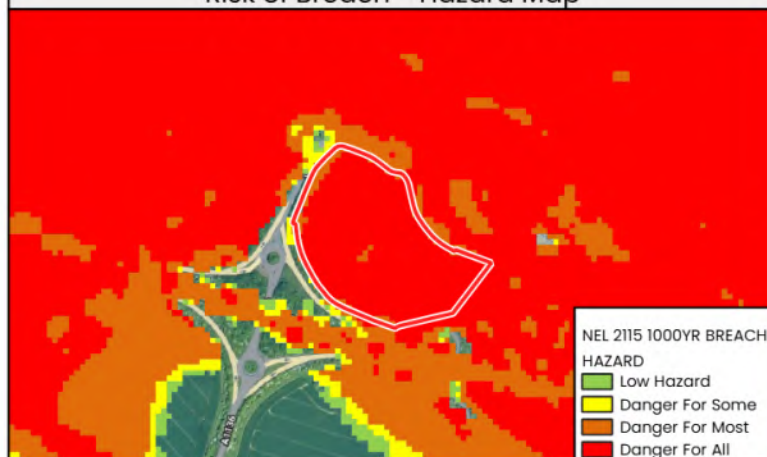
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

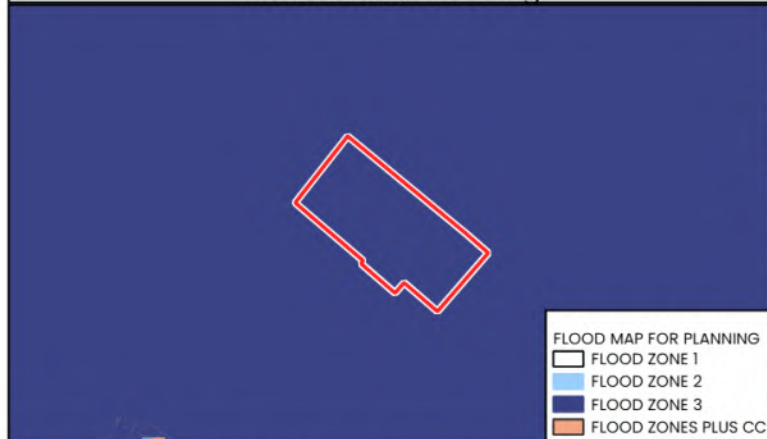


Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR008c
	Settlement Name	Europarc Phase III
	Site Description	Europarc Phase III
	Centroid Coordinates	524060, 411488
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of groundwater flooding
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

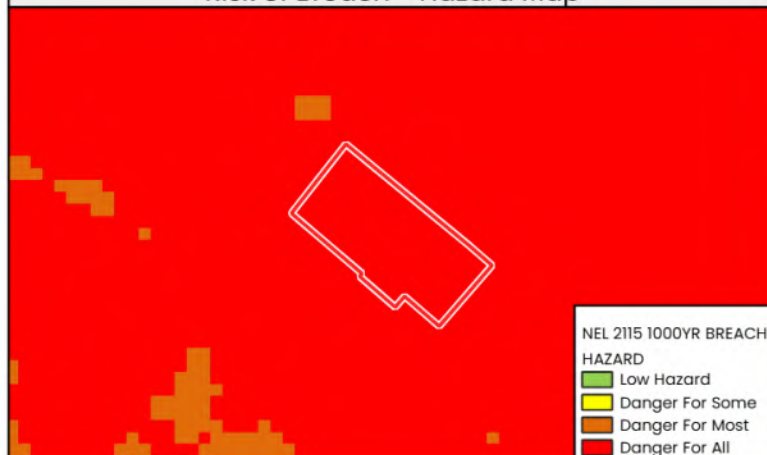
Risk of Fluvial Flooding



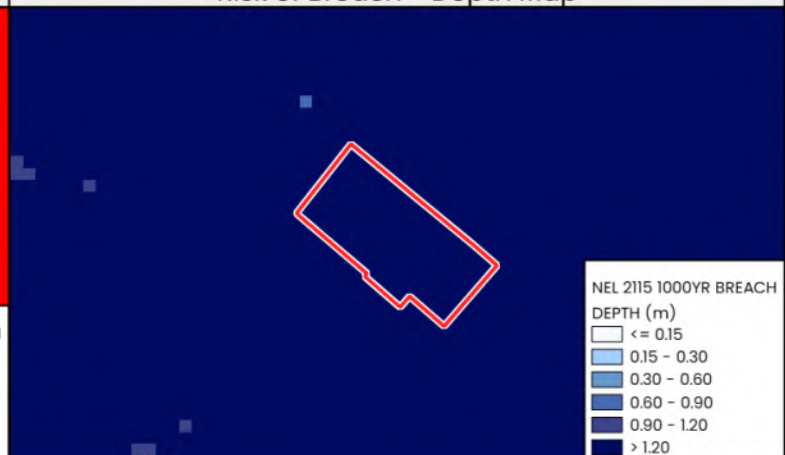
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

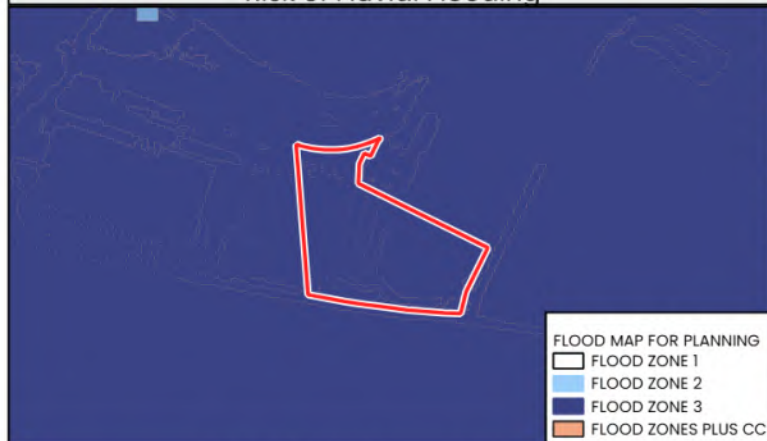


Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR008e
	Settlement Name	Europarc Phase III
	Site Description	Europarc Phase III
	Centroid Coordinates	524071, 411078
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of groundwater flooding
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

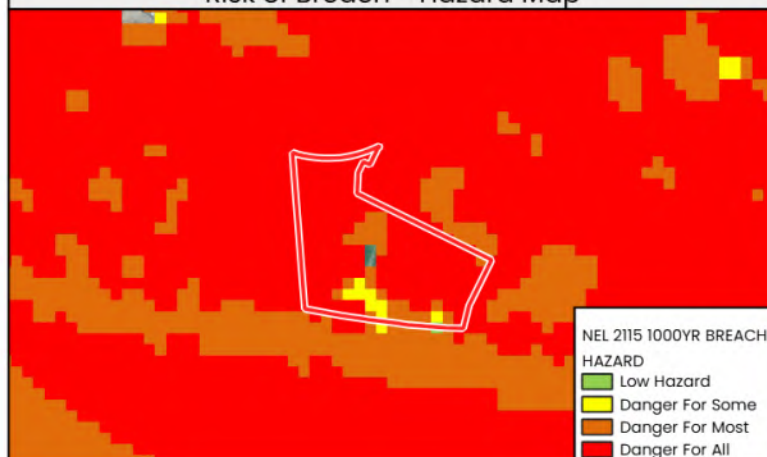
Risk of Fluvial Flooding



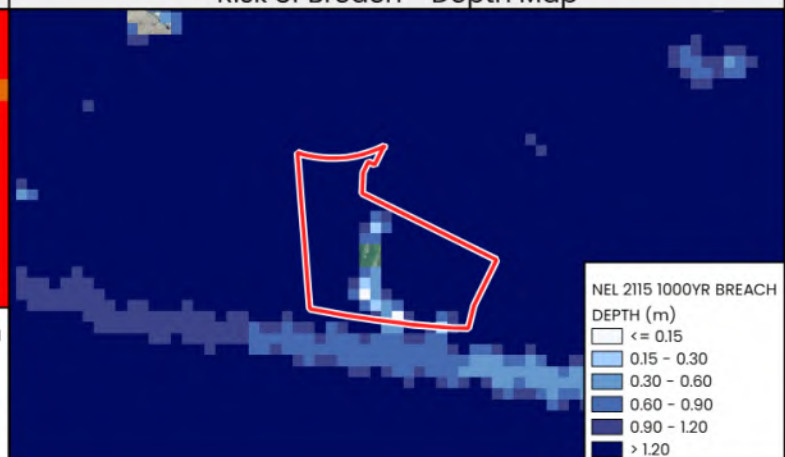
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
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Settlement Details	Site Reference	ELR011
	Settlement Name	Europarc Phase IV
	Site Description	Europarc Phase IV
	Centroid Coordinates	522892, 411893
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of groundwater flooding
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

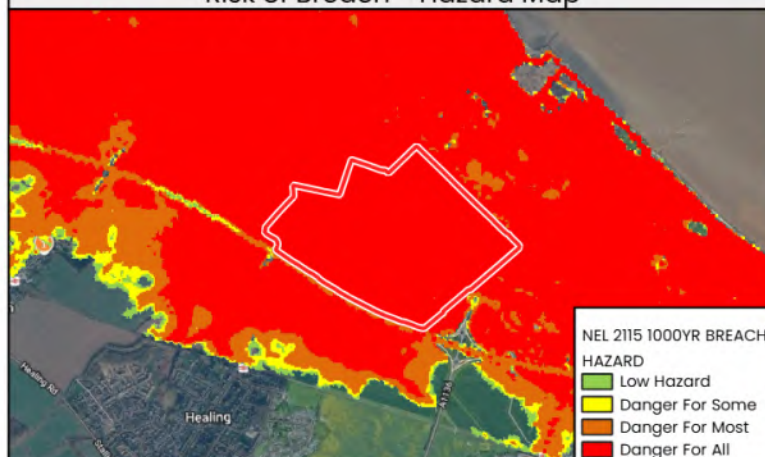
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR015a
	Settlement Name	reat Coates Business Park Moody Lane
	Site Description	reat Coates Business Park Moody Lane
	Centroid Coordinates	523788, 412751
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of groundwater flooding
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

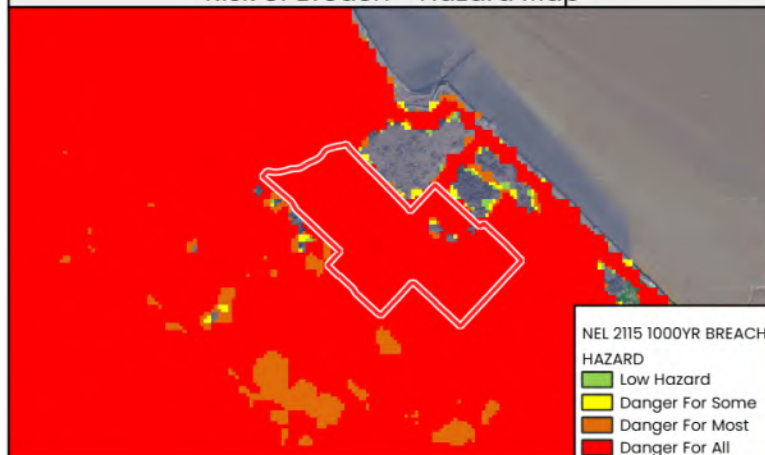
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



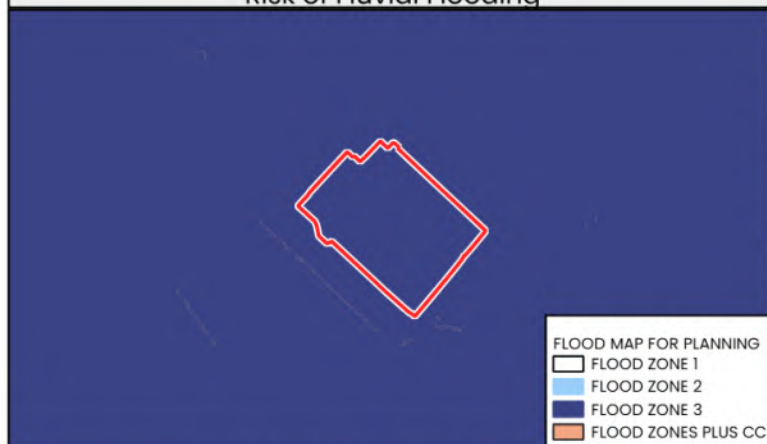
Risk of Breach - Depth Map



NORTH EAST LINCOLNSHIRE DISTRICT COUNCIL
STRATEGIC FLOOD RISK ASSESSMENT
COMMERCIAL SITE PRO FORMA SHEET
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Settlement Details	Site Reference	ELR015b
	Settlement Name	Great Coates Business Park Moody Lane
	Site Description	Great Coates Business Park Moody Lane
	Centroid Coordinates	523795, 412100
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of groundwater flooding
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

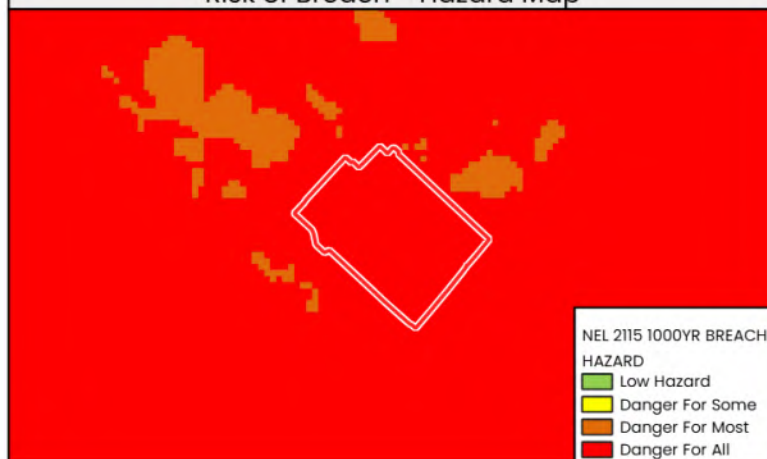
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

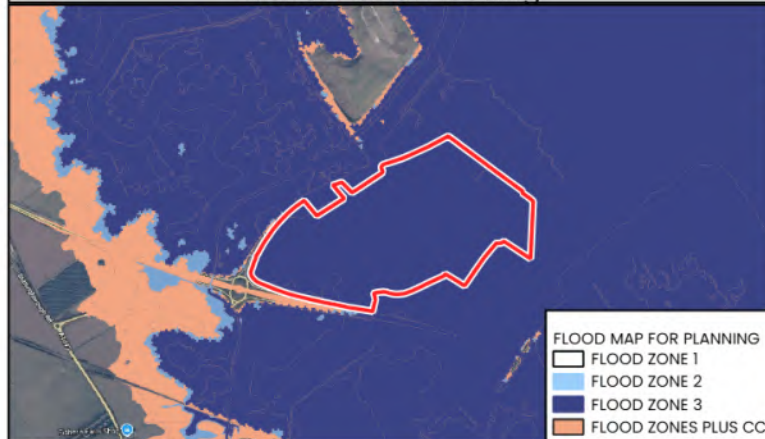


Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR016a
	Settlement Name	Stallingborough Interchange
	Site Description	Stallingborough Interchange
	Centroid Coordinates	520280, 413061
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	Potential for groundwater flooding of property below ground level
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

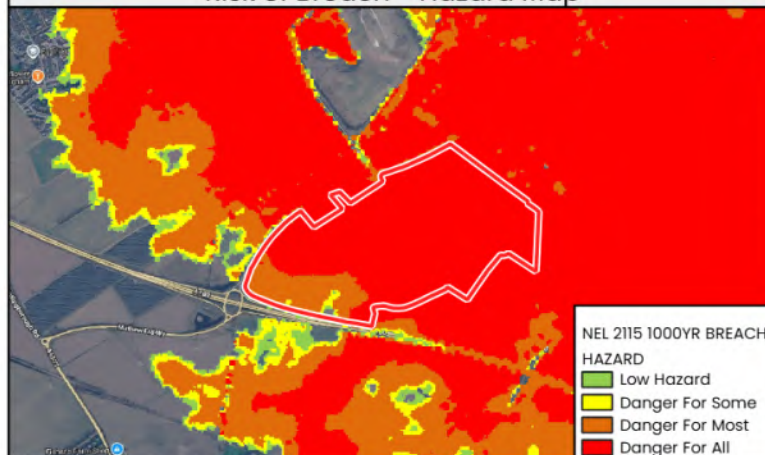
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR016b
	Settlement Name	Stallingborough Interchange
	Site Description	Stallingborough Interchange
	Centroid Coordinates	519866, 413381
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	Potential for groundwater flooding to occur at surface
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

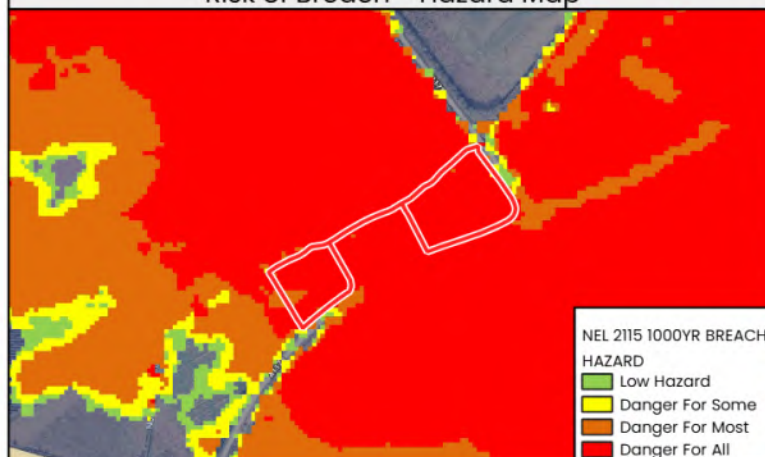
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

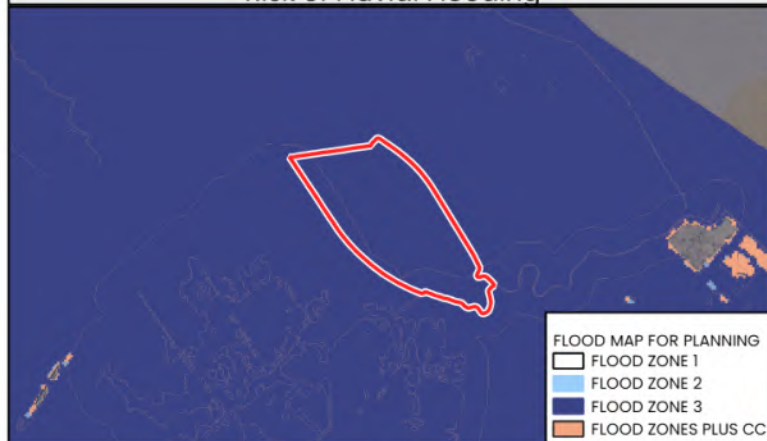


Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR019
	Settlement Name	Abengoa Site, Hobson Way
	Site Description	Abengoa Site, Hobson Way
	Centroid Coordinates	522494, 413085
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

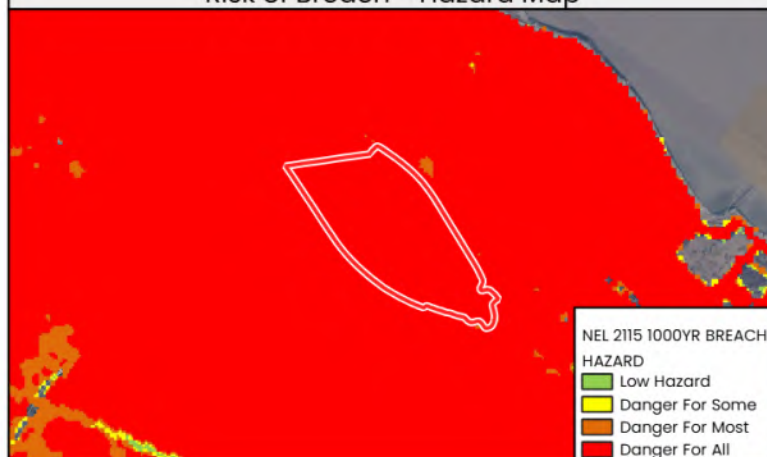
Risk of Fluvial Flooding



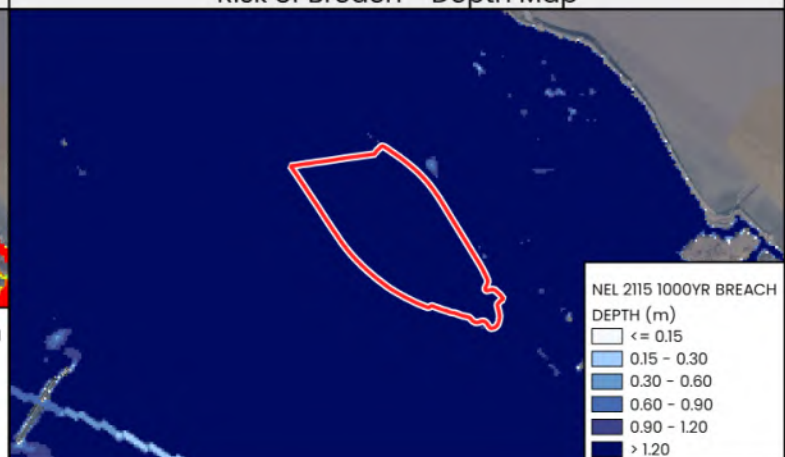
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR020
	Settlement Name	RWE/Helius Site Hobson Way
	Site Description	RWE/Helius Site Hobson Way
	Centroid Coordinates	523202, 413049
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

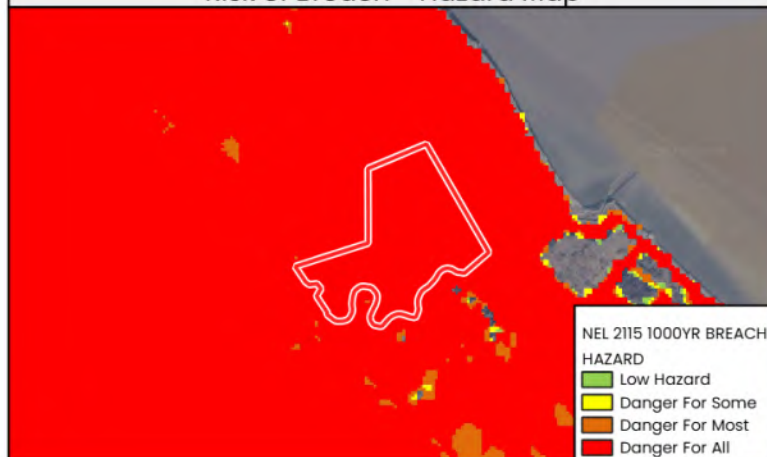
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map

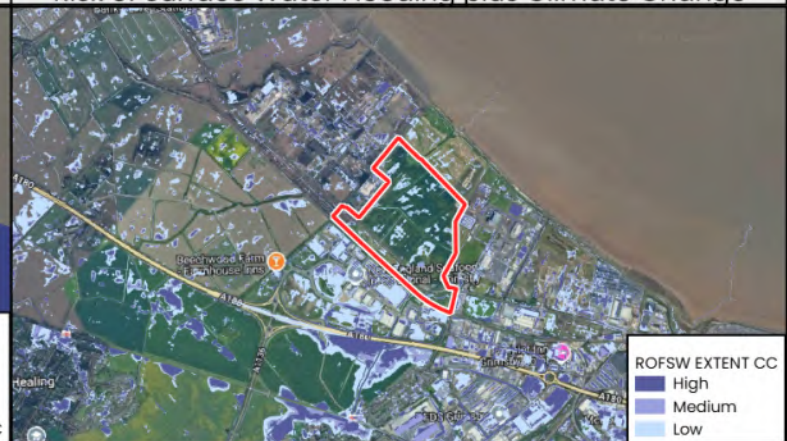


Settlement Details	Site Reference	ELR021
	Settlement Name	Novartis Moody Lane
	Site Description	Novartis Moody Lane
	Centroid Coordinates	524317, 411801
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

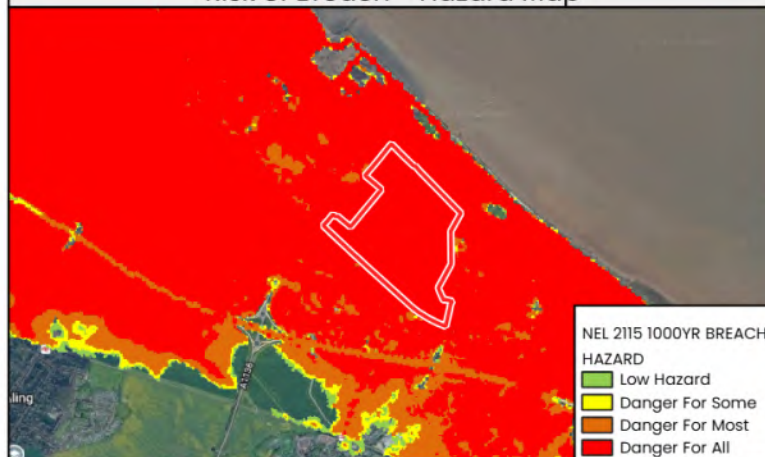
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR022
	Settlement Name	Plot Q Kiln Lane
	Site Description	Plot Q Kiln Lane
	Centroid Coordinates	5211119, 414298
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

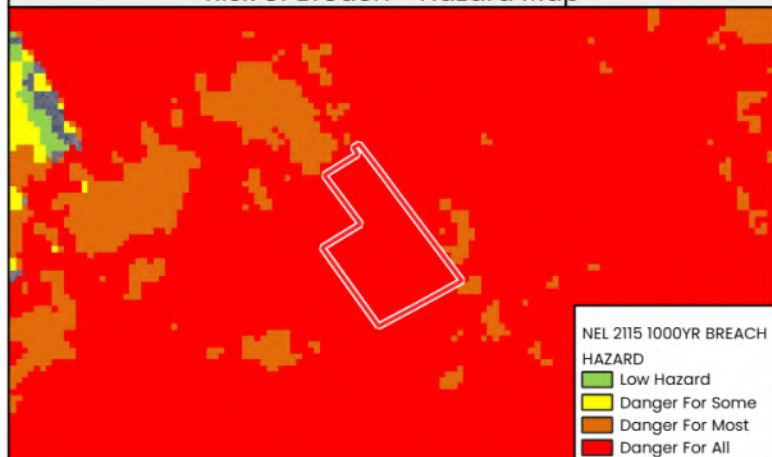
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR025a
	Settlement Name	Cristal/Tronox, Laporte Road
	Site Description	Cristal/Tronox, Laporte Road
	Centroid Coordinates	521291, 415270
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

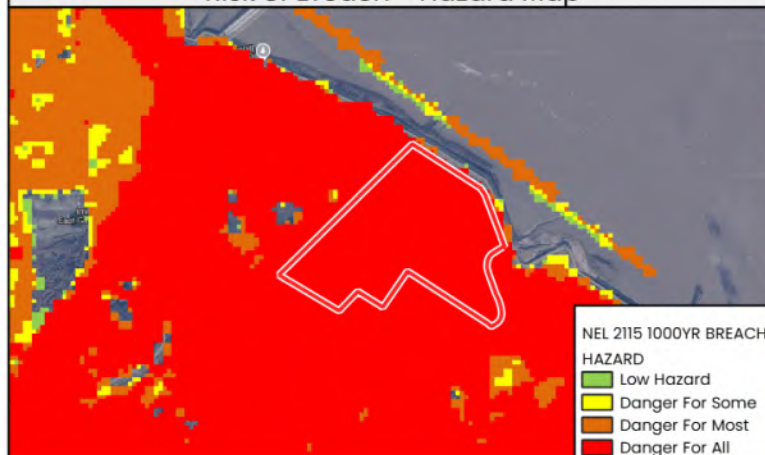
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR025b
	Settlement Name	Cristal/Tronox, Laporte Road
	Site Description	Cristal/Tronox, Laporte Road
	Centroid Coordinates	521259, 414623
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

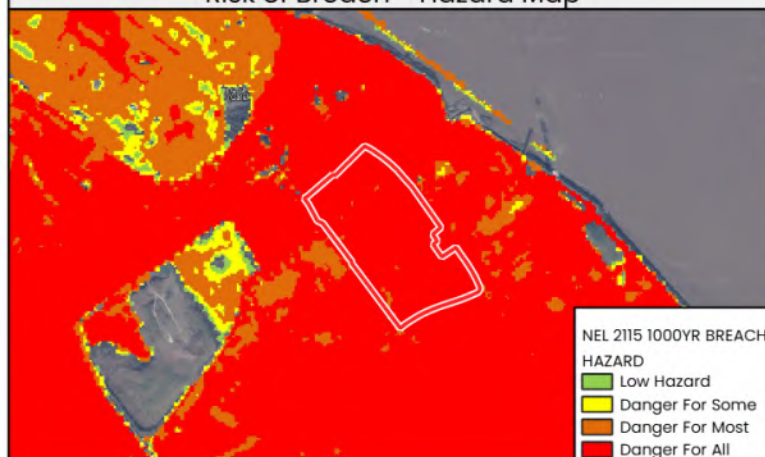
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR025c
	Settlement Name	Cristal/Tronox, Laporte Road
	Site Description	Cristal/Tronox, Laporte Road
	Centroid Coordinates	522202, 414078
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

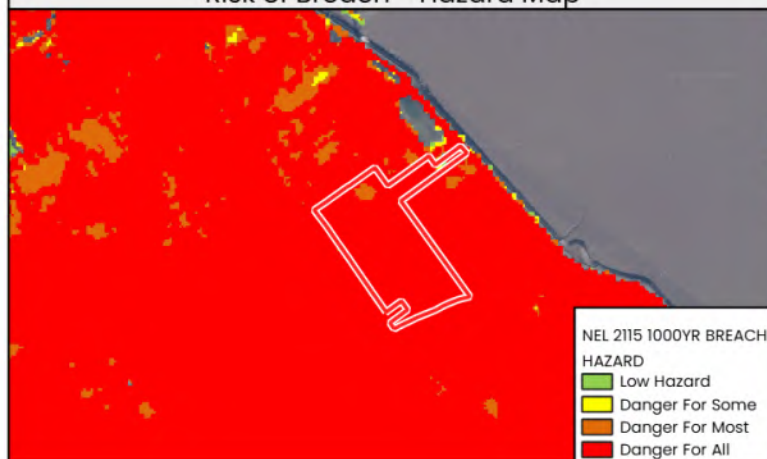
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

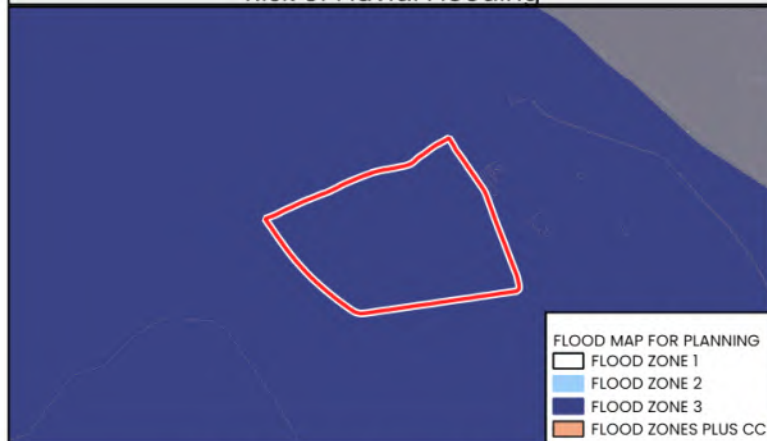


Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR025d
	Settlement Name	Cristal/Tronox, Laporte Road
	Site Description	Cristal/Tronox, Laporte Road
	Centroid Coordinates	522580, 413647
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

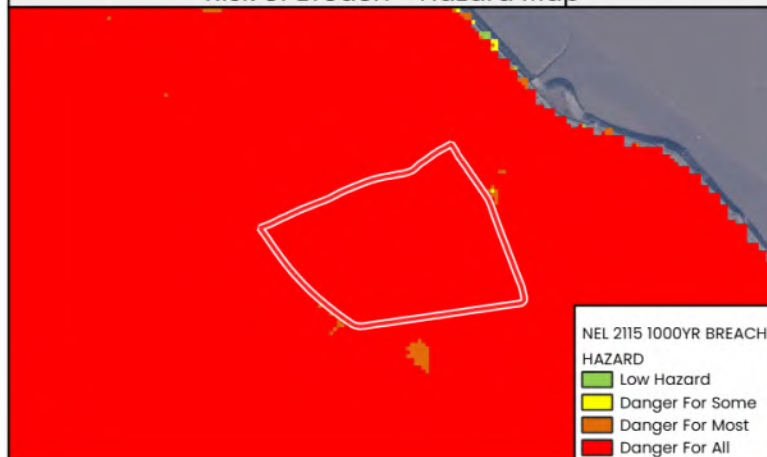
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

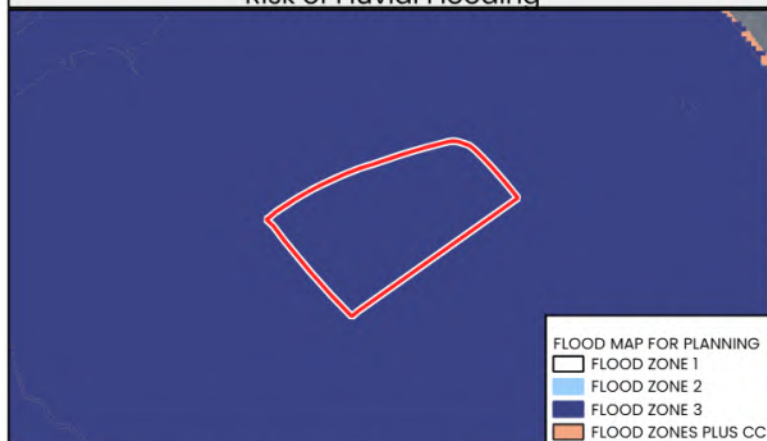


Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR025e
	Settlement Name	Cristal/Tronox, Laporte Road
	Site Description	Cristal/Tronox, Laporte Road
	Centroid Coordinates	521570, 414169
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

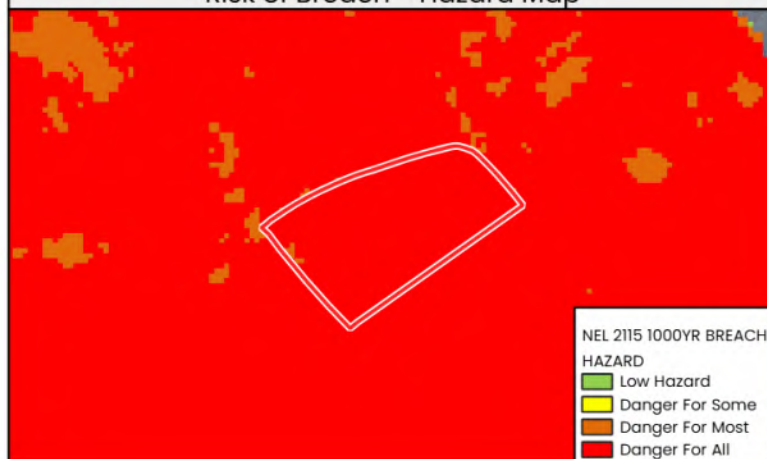
Risk of Fluvial Flooding



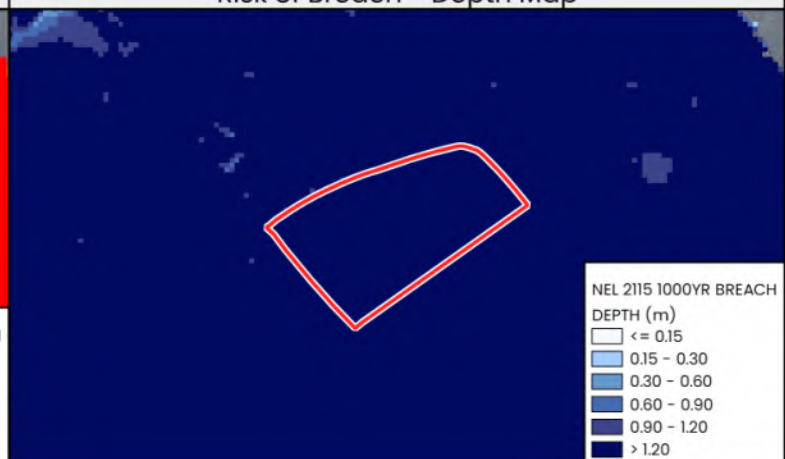
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR027
	Settlement Name	Land east of Queens Road
	Site Description	Land east of Queens Road
	Centroid Coordinates	520645, 414732
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

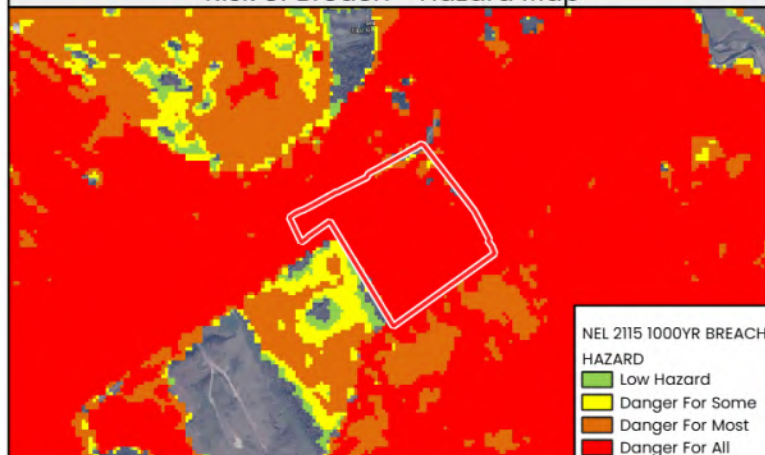
Risk of Fluvial Flooding



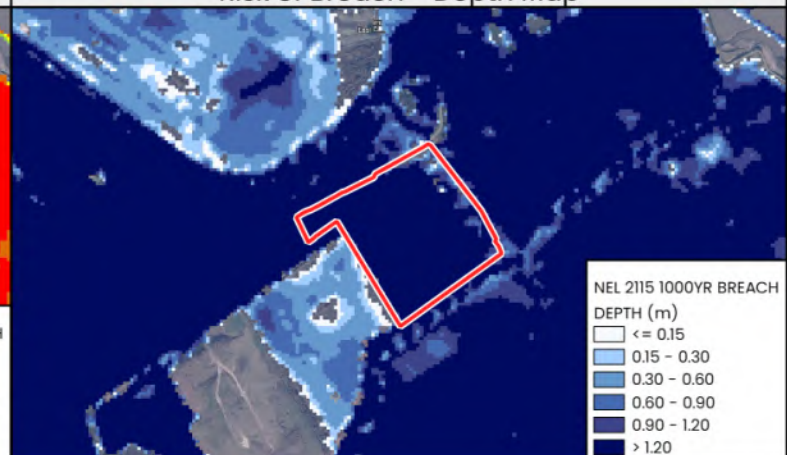
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

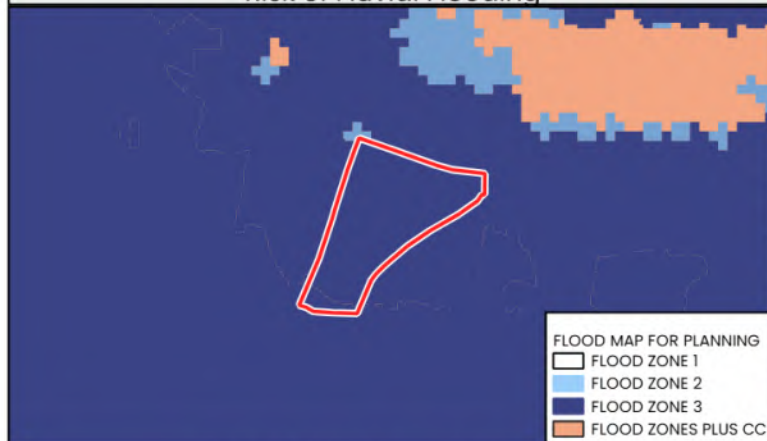


Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR036
	Settlement Name	Land at Westgate Park
	Site Description	Land at Westgate Park
	Centroid Coordinates	526244, 410228
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	Wet Day Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

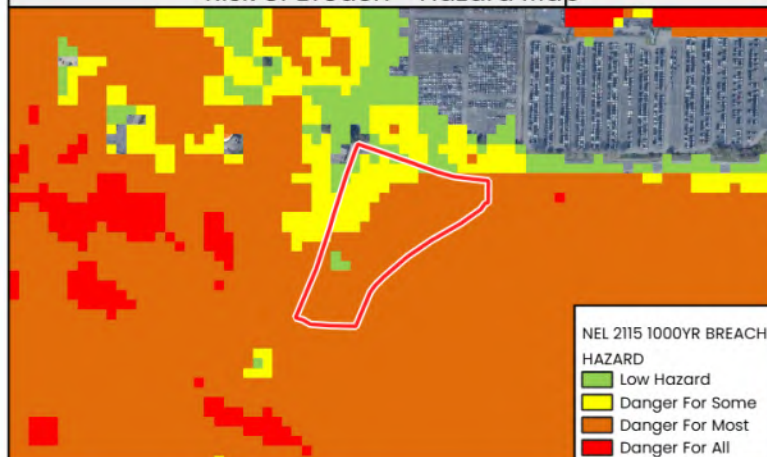
Risk of Fluvial Flooding



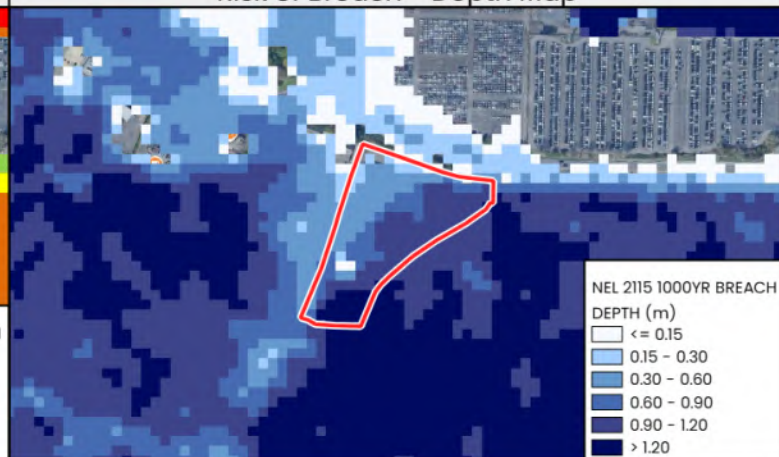
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR037
	Settlement Name	Land r/o Marlin House
	Site Description	Land r/o Marlin House
	Centroid Coordinates	519270, 414946
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

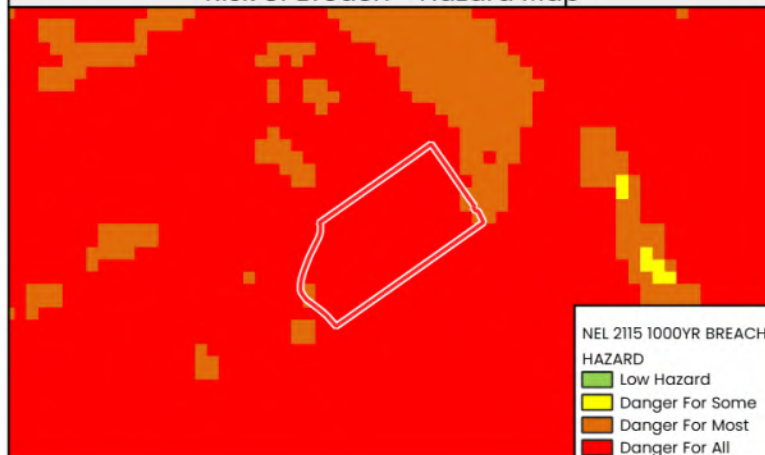
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

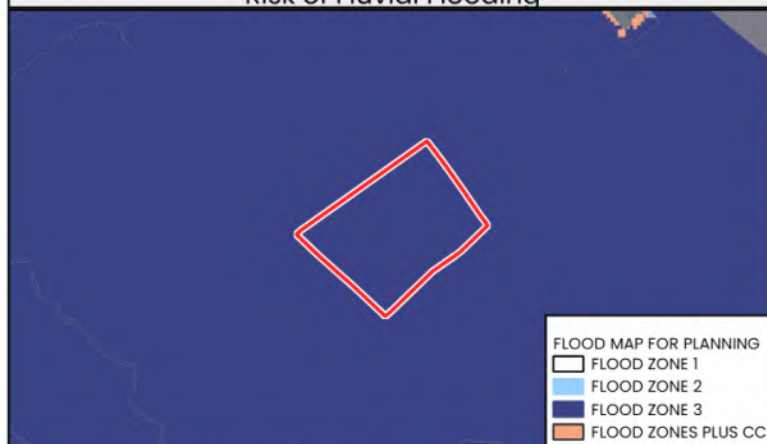


Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR039a
	Settlement Name	BOC
	Site Description	BOC
	Centroid Coordinates	521755, 413982
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

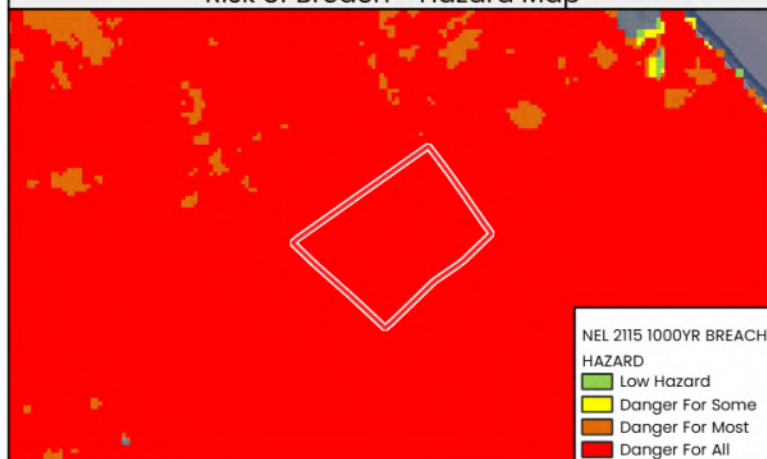
Risk of Fluvial Flooding



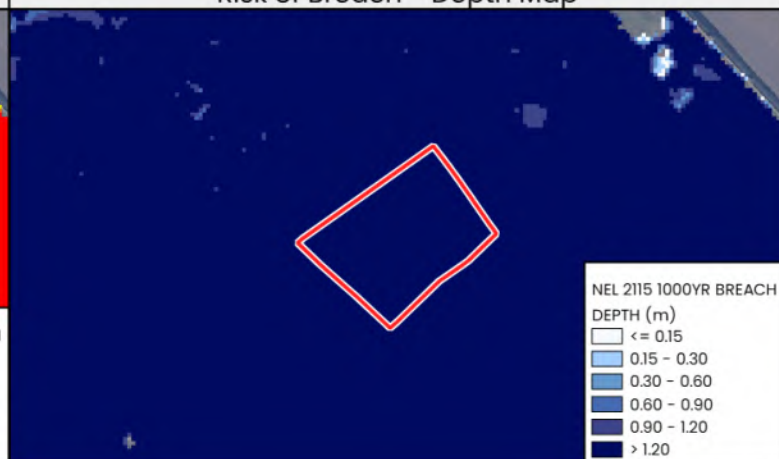
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR039b
	Settlement Name	BOC
	Site Description	BOC
	Centroid Coordinates	522211, 413538
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

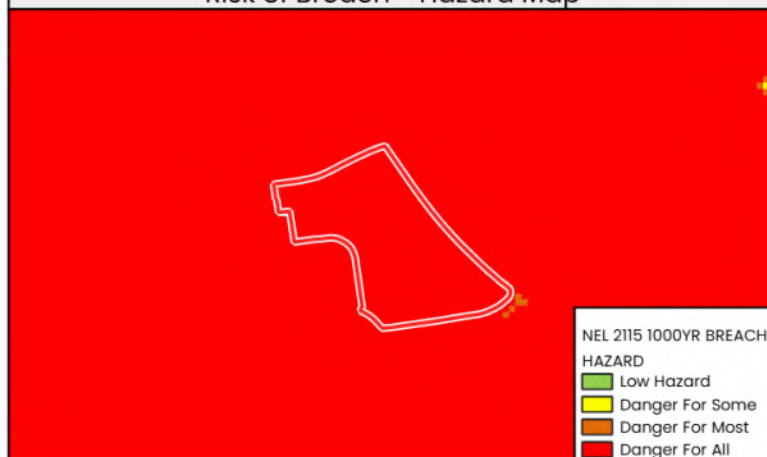
Risk of Fluvial Flooding



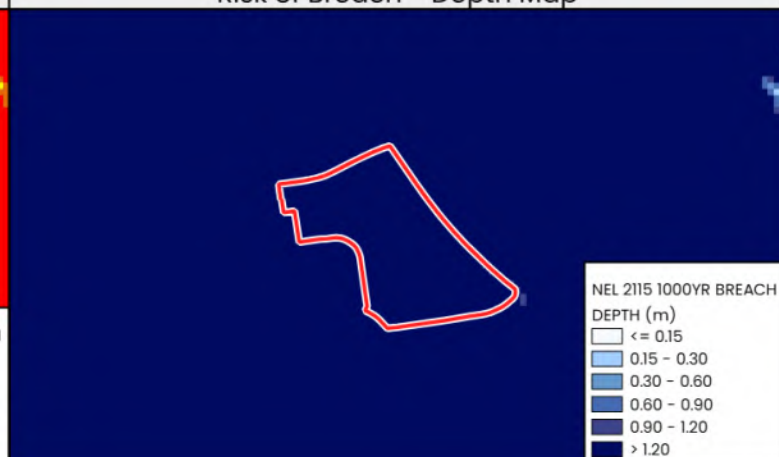
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR041
	Settlement Name	Land west of Kings Rd, Immingham
	Site Description	Land west of Kings Rd, Immingham
	Centroid Coordinates	519377, 414797
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

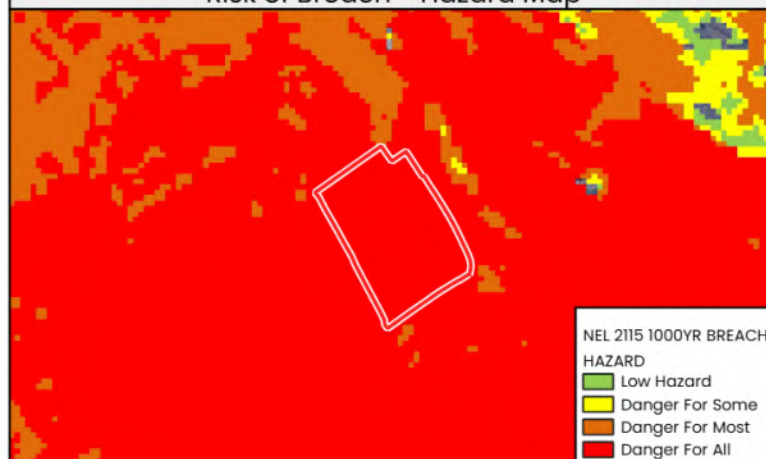
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR042
	Settlement Name	Former Novertis factory site, Grimsby
	Site Description	Former Novertis factory site, Grimsby
	Centroid Coordinates	524910, 411709
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	Potential for groundwater flooding of property situated below ground level
	Flood History	June 2007
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

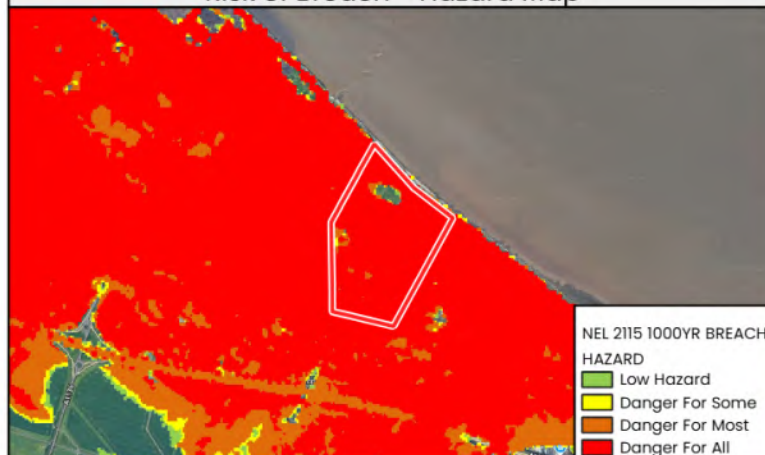
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

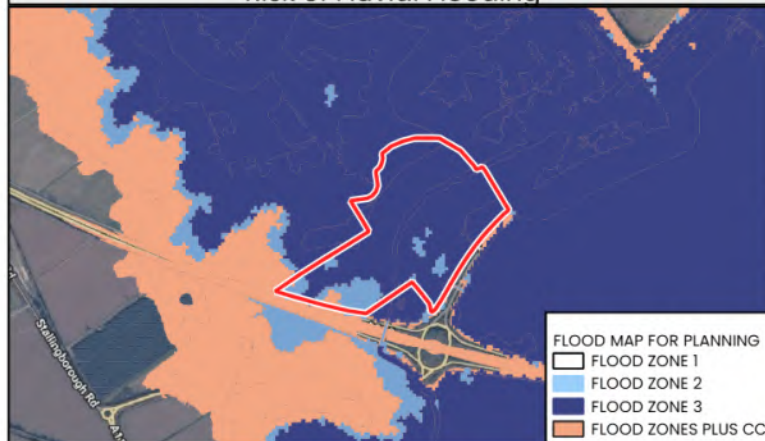


Risk of Breach - Depth Map



Settlement Details	Site Reference	ELR043
	Settlement Name	Mauxhall Farm, Stallingborough Road, Immingham
	Site Description	Mauxhall Farm, Stallingborough Road, Immingham
	Centroid Coordinates	519319, 413097
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	Potential for groundwater flooding to occur at surface
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

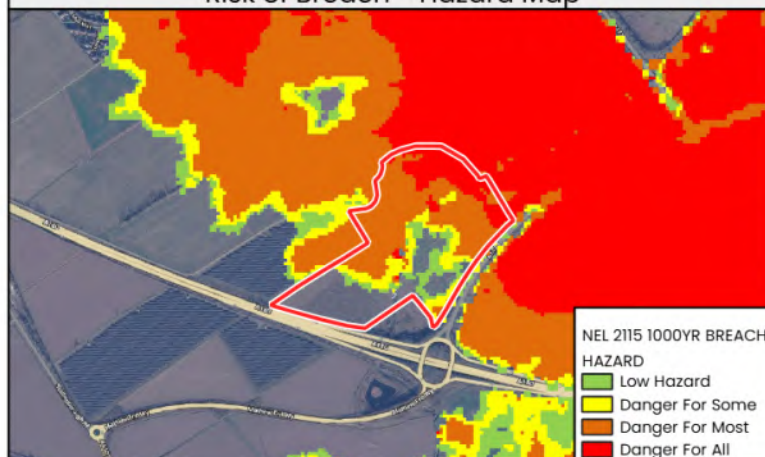
Risk of Fluvial Flooding



Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map

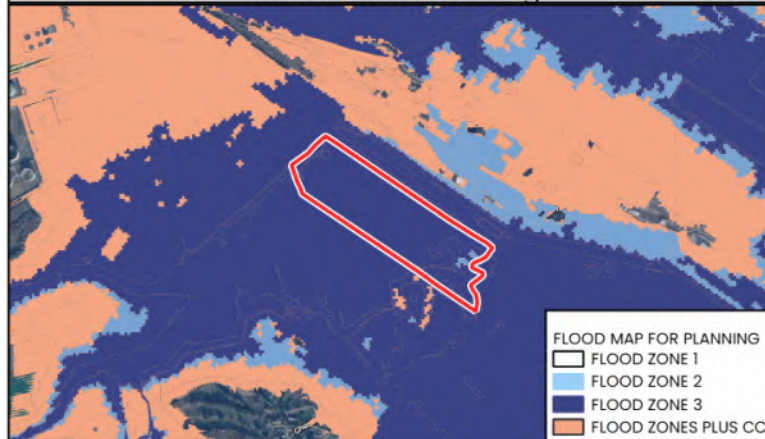


Risk of Breach - Depth Map

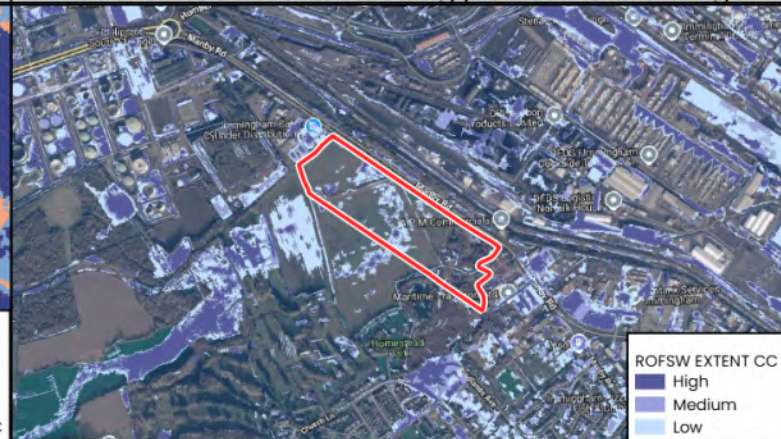


Settlement Details	Site Reference	ELR044
	Settlement Name	Manby Road, Immingham
	Site Description	Manby Road, Immingham
	Centroid Coordinates	517900, 415858
Sources of Flood Risk	Fluvial/Tidal	Flood Zone 3
	Surface Water	High Risk
	Reservoir	No Reservoir Flood Risk
	Groundwater	No risk of flooding from groundwater
	Flood History	No historic flooding at this Site
Emergency Planning: Fluvial/Tidal Flood Zone	Flood Warning	In a Flood Warning Area
	Access and Egress	No safe access or egress
Flood Risk Management Infrastructure	Defence Residual Risk	Beach nourishment programme aiming to protect against a 1 in 200 year (0.5% in any year) tidal flood by increasing the level of the beach and reducing the risk of waves reaching the main defences and over the seawalls. It protects the clay foreshore against further erosion and prevents rapid deterioration of the defences.

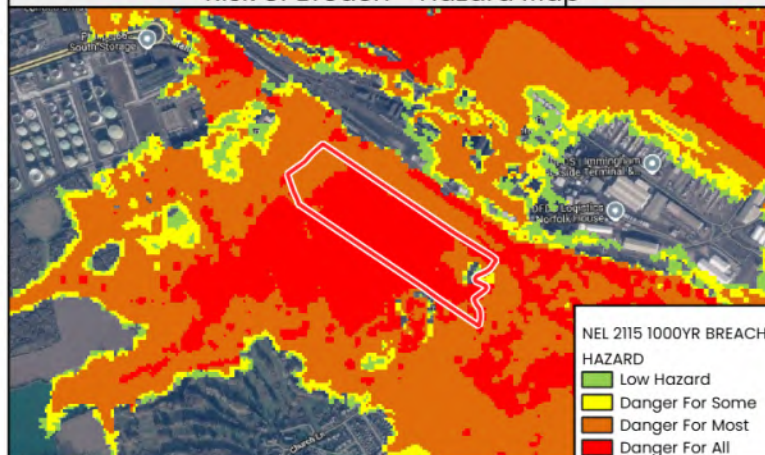
Risk of Fluvial Flooding



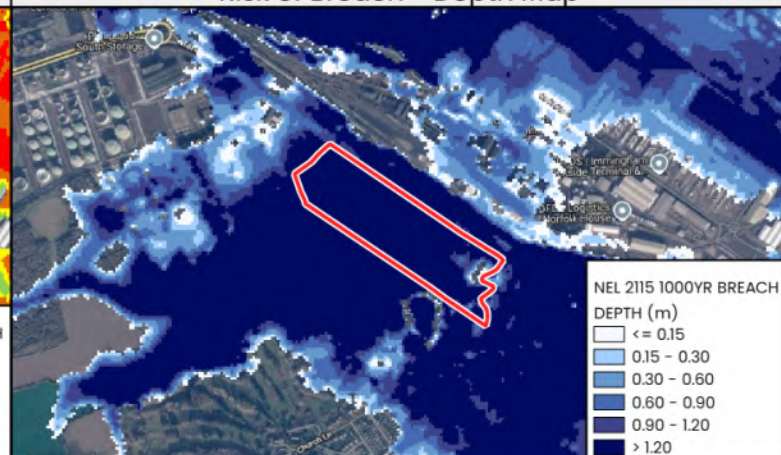
Risk of Surface Water Flooding plus Climate Change



Risk of Breach - Hazard Map



Risk of Breach - Depth Map



APPENDIX C

Hold the Line Defence Costings

TECHNICAL NOTE

Date: August 2026

File Ref: HM/TT/P26-3773/01TN

Subject: Defence Improvement Costing

Project: North East Lincolnshire, SFRA

1.0 INTRODUCTION

The below technical note sets out the methodology proposed to produce high level cost estimates for defence upgrades within North East Lincolnshire, including both coastal and some strategic inland areas. These defence upgrades are required to ensure a continued standard of defence up to and including 2140 (which is 100years plus the local plan development period).

These cost estimates will be used to inform a wider cost benefit analysis, to be undertaken as part of works to inform the North East Lincolnshire Strategic Flood Risk Assessment Addendum. The cost benefit assessment itself is the current methodology used to determine whether the District will be eligible for government supported funding for defence upgrades, as per the latest government guidance on funding applications. The valuation of the County assets will be completed separately.

2.0 Methodology

Overview

The fundamental approach to the costing process will look to utilize both UK and International coastal defence projects embarked on in the last 20 years as reference material. These projects will be categorised by typology (coastal/Fluvial, Sea Wall/Embankment, realignment/groynes etc) and location (UK/Global, urban/semi-urban, rural/industrial).

The cost per km of defence completed will be calculated by a straightforward division of the overall project costs against the linear metre of defence.

The results of each category and location combination will be applied to similar areas of coastal defence along the North East Lincolnshire coast to estimate a median, P25, P75 and P90 statistical cost estimate for each section of the coast which can then be combined to estimate the full coastal improvement.

A workflow graphic is provided in Figure 1. The methodology to arrive at each step of this process is outlined in detail in the sections below.

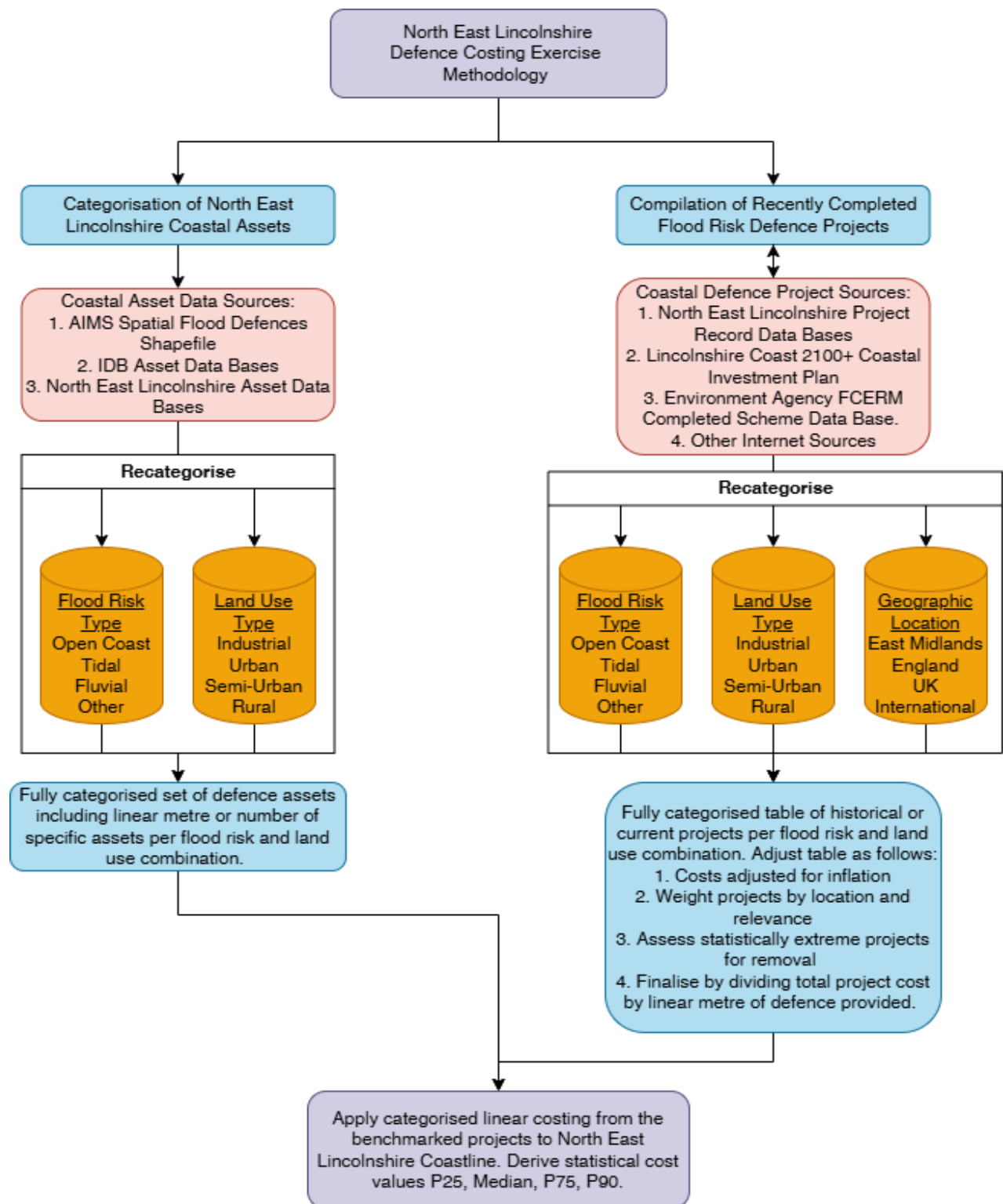


Figure 1: Flow Chart Overview for Costing Estimation Process

North East Lincolnshire Coastal Defence Assets

This data will be primarily sourced from the EA Asset Information Management System Database. This spatially projected data set shows a comprehensive and up to date list of flood defences currently owned, managed or inspected by the EA. The data base will be cropped to include only those defences within the North East Lincolnshire County Boundary. A further Linear stretch of new embankment will be added as necessary along the southern border and northern border.

The resulting map of linear flood defences (both fluvial and coastal/tidal) will be categorised into the following categories:

1. Flood Risk Type: Coastal, Tidal, Fluvial.
2. Location: Industrial, Urban, Semi-Urban, Rural
3. Defence Type: Hard Defence, embankment, realignment.

This reclassification will result in a linear distance of each combination of defence type that requires upgrading. An example of how the resulting reclassified table will appear is shown below:

Table 1: Asset Data Base

Asset ID	Protection	Location	Defence Typology	Length (m)
757000	Coastal	Urban	Hard Defence	
757001	Tidal	Semi-Urban	Embankment	
757002	Fluvial	Rural	Realignment	
...	...	...	...	...

On top of the linear defences there are other secondary assets that will require upgrading in tandem. These primarily include pumped outfalls for the fluvial systems within the coastal plain. The location and count of these assets will be collected from North East Lindsey IDB, North East Lincolnshire District Council and EA sources.

Benchmarking of Costs – Existing Project Tabulation

Using UK Government resources, as well as local council resources and other internet searches a data set of English, UK and International coastal and fluvial flood defence projects will be collected. In the same way as the North East Lincolnshire Defence Attribute data set, the benchmarking data set will be split by defence protection, Location and Typology.

An example of how the resulting data set might look is shown below. Each project will have initial cost identified, then adjusted for inflation and compared with the linear distance of defence provided to return a 2025 adjusted cost per km of flood defence. Each project will be categorised into flood defence protection type (Coastal/Tidal/Fluvial), into location (Urban/Semi-Urban/Rural) and then into Defence Typology (Hard Defence/Embankment/Realignment).

Statistical Average Costs for each of the defence typology combinations will be derived and tabulated using the median values from the categorised projects.

Table 2: Project List Data Base

ID	Name	Nation	Length (km)	Original Cost (£m)	Completion	2025 Cost £m	2025 Cost £m/km	Defence Type Category
UK-CD-001	Alkborough Flats	England	1.5	10.2	2006	16.9	11.3	Coastal - Rural - Realignment
UK-CD-002	South Withernsea Coastal Defence	England	0.4	7.0	2020	8.4	21.0	Coastal - Semi-Urban - Embankment
UK-CD-003								
UK-CD-004								

Table 3: Statistical Cost Values per Defence Type Category

Defence Type Category			Statistical Assessment of Costs			
Protection	Location	Defence Typology	Median	P25	P75	P95
Coastal	Rural	Embankment				
Tidal	Urban	Hard Defences				
Fluvial	Semi-Urban	Realignment				
...	...	...				

Calculating Costs

Once the P25, Median, P75 and P90 statistical costs per linear metre of each defence type category have been derived from the historical infrastructure data base these costs will be applied to the North East Lincolnshire area. The costs will be applied to the linear length of each defence based on matching categories.

The final combined costs will be subject to a 30% uplift for all pre planning works and applications. The total combined costs in millions GDP will be presented in the SFRA as the defence improvement costs.

Table 4: Combined Defence Asset Table with Statistically Derived costing

Asset ID	Protection	Location	Defence Typology	Length (m)	P25	Median	P75	P90
757000	Coastal	Urban	Hard Defence					
757001	Tidal	Semi-Urban	Embankment					
757002	Fluvial	Rural	Realignment					
...	...	...	...	...				

3.0 Conclusion

The methodology outlined above uses an evidence-based and statistical approach to develop high-level cost estimates for delivering the flood defence improvements required within the North East Lincolnshire administrative area to maintain a 'hold the line' position.

The cost estimates are based on completed infrastructure projects from across the UK and internationally. These historic project costs have been adjusted to 2025 prices, categorised and weighted according to their relevant defence typology, and then applied to the types of flood defence infrastructure specific to North East Lincolnshire. This approach provides a consistent, evidence-based basis for estimating the potential costs of the required defence improvements.

Once the cost estimates have been established, they are intended to be compared with the value of the land and assets protected by the defences. This comparison will provide a high-level cost-benefit analysis ratio and help assess the potential economic case for maintaining the 'hold the line' position.

The purpose of this work is to inform the Strategic Flood Risk Assessment Addendum Report currently being prepared and, ultimately, to support the determination of sustainable development opportunities within the emerging North East Lincolnshire Local Plan.

Note By: Harry Mansfield (MSc) BSc

Approved By: Claire Burroughs MSc DIC, MEng (Hons), MCIWEM

Enclosed: N/A



create

Create Consulting Engineers Ltd
15 Princes Street | Norwich | NR3 1AF

createconsultingengineers.co.uk