The Great Grid Upgrade

North Humber to High Marnham

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North Humber to High Marnham

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nationalgrid

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Executive Summary

Purpose of this Report

National Grid Electricity Transmission plc (National Grid) is developing the North Humber to High Marnham Project (the Project), a proposed new 400 kV electricity transmission connection between East Riding of Yorkshire and Nottinghamshire. The Project would reinforce the national electricity transmission network, enabling the connection of new low carbon energy generation and supporting the delivery of the UK Government's clean power and net zero ambitions. The Project is a Nationally Significant Infrastructure Project (NSIP) for which development consent is being sought through a Development Consent Order (DCO) under the Planning Act 2008 (HM Government, 2008). It is recognised as a critical reinforcement to provide the network capacity required to meet future electricity demand and support the transition to a low-carbon energy system.

Multiple main rivers, ordinary watercourses and drains flow through land within the Order Limits. The Environment Agency Flood Map for Planning (Environment Agency, 2025), updated in March 2025, shows that much of the land within the Order Limits lies within Flood Zones 2 and 3, with some areas in Flood Zone 1.

This Flood Risk Assessment (FRA) has been produced to accompany the application for development consent and the Environmental Statement. This FRA documents the assessment undertaken to understand whether the Project is likely to be at risk of flooding or is likely to increase flood risk elsewhere, in accordance with the requirements set out in relevant national policy.

Scope of the Assessment

This FRA has focused on the flood risk from fluvial, pluvial (surface water), coastal and tidal, and groundwater sources, from which the Project is most vulnerable to flooding, and which the Project has the potential to detrimentally impact. Flood risk from reservoirs or other artificial sources has been considered in less detail as the Project is considered less vulnerable to these sources and has negligible potential to contribute to flood risk from these sources.

The assessment has used published data sources, including the January 2025 and March 2025 updates to the National Flood Risk Assessment (NaFRA2) (Environment Agency, 2025) and Flood Map for Planning (Environment Agency, 2025), and detailed flood model results provided by the Environment Agency, to identify the risks relevant to the Project. National Grid has also undertaken consultation with relevant stakeholders, including the Environment Agency, East Riding of Yorkshire Council, North Lincolnshire Council, Nottinghamshire County Council, Internal Drainage Boards (IDBs) and local communities, to help inform this report.

Results of the Assessment

A sequential approach has been taken to siting temporary infrastructure for the Project, particularly those elements that are vulnerable to inundation. Six proposed temporary construction compounds are located in Flood Zone 1. However, there are three construction compounds, one just south of Ousefleet, one east of Ealand, and one north of Misterton which

are located in Flood Zone 3. These three compounds have been sited following the application of a sequential approach and a lack of proximate feasible alternatives. Due to its linear nature and the geographical extent of the Project, some temporary Project components for the construction phase of the Project, including haul roads and construction access, must necessarily be located in areas with a medium and high risk of flooding (Flood Zones 2 and 3).

Due to its linear nature and the geographical extent of the Project, some operational Project components, namely pylons, must necessarily be located in areas with a medium and high risk of flooding (Flood Zones 2 and 3). The Exception Test is therefore triggered, and this FRA provides the evidence of how the Project satisfies this test.

Fluvial and tidal flooding pose a risk to some temporary construction worksites, given the location of parts of the Project within the combined fluvial and tidal floodplains of the River Ouse, River Trent, and Humber Estuary. These risks would be reduced and managed by implementing a range of mitigation measures set out in **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments**, including those detailed in a Flood Warning and Evacuation Plan, and by programming construction activities in floodplains to avoid periods of likely high river levels where practicable. With these measures in places, the residual risk from these sources during the construction phase has been assessed as medium.

Surface water (pluvial) sources pose a risk to some temporary construction worksites. These risks would be reduced and managed by implementing a range of mitigation measures set out in **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments**. With these measures in place, the residual risk of flooding from these sources during the construction phase has been assessed as low.

Groundwater flood risk across the Project during its construction has been assessed as low and therefore no bespoke mitigation for this form of flood risk is proposed.

During operation over the Project lifetime, flood risk from fluvial, surface water, tidal and groundwater sources is assessed to be low, as operational infrastructure on the ground is limited to pylon bases. The residual risk, associated with the pylons in areas of medium to high risk, is assessed as low due to the low vulnerability of this type of infrastructure to inundation.

1. Introduction

1.1 Overview

1.1.1 National Grid Electricity Transmission plc (National Grid) owns and maintains the national high voltage electricity transmission network throughout England and Wales.

1.1.2 The transmission network connects the power from where it is generated to the regional distribution network operators who then supply businesses and homes.

1.1.3 National Grid holds the Transmission Licence for England and Wales, and its statutory duty is to develop and maintain an efficient, coordinated and economical system of electricity transmission and to facilitate competition in the generation and supply of electricity, as set out in the Electricity Act 1989.

1.1.4 National Grid has developed plans for the North Humber to High Marnham Project (the Project). The Project would support the UK government's net zero target through the connection of new low carbon energy generation and by reinforcing the transmission network.

1.1.5 The Project would establish a new 400 kilovolt (kV) transmission connection approximately 90 kilometre (km) in length between a new substation to be built in the vicinity of Birkhill Wood, located to the north of Hull near Creyke Beck in the East Riding of Yorkshire, and a new substation at High Marnham in Nottinghamshire.

1.1.6 The reinforcement is needed because the existing transmission network, even with current upgrading, will not have sufficient capacity for the new renewable energy (a substantial proportion of which would be generated by offshore wind) that is expected to connect to the network over the next 10 years and beyond. Completion of the Project, together with other new reinforcements across the country, will meet this future energy transmission demand across the UK.

1.1.7 The Project is a Nationally Significant Infrastructure Project (NSIP), and National Grid is seeking development consent under the Planning Act 2008. NSIPs require a type of planning permission known as a Development Consent Order (DCO). Instead of applying to the local authority for planning permission, the developer must apply to the Secretary of State via the Planning Inspectorate for a DCO.

1.1.8 National Grid has submitted an application for development consent to the Planning Inspectorate for the Project. The Examining Authority (consisting of one or more examining inspectors), after a period of public examination, will make its recommendation to the Secretary of State for Energy Security and Net Zero, who in turn will decide on whether development consent should be granted.

1.1.9 The Project has been identified as being critical to delivering a network which supports the clean power pathways for 2030 delivery.

1.1.10 Full details are provided in Environmental Statement (ES) Chapter 4 (Application Document 6.4 Environmental Statement Chapter 4 Description of the Project).

1.2 Purpose of this Report

1.2.1 This report presents the Flood Risk Assessment (FRA) for the Project. The FRA is required to accompany the application for development consent under the Planning Act 2008 (HM Government, 2008). It has been prepared to meet the requirements of the Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero, 2025), the National Policy Statement for Electricity Networks Infrastructure (EN-5) (Department for Energy Security and Net Zero, 2025), the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2026), and the associated Flood Risk and Coastal Change Planning Practice Guidance (PPG) (Ministry of Housing, Communities and Local Government, 2025).

1.2.2 The purpose of this FRA is to assess the risk of flooding to the Project over its lifetime and to demonstrate that the Project would not increase flood risk elsewhere, in accordance with relevant national planning policy and flood risk guidance. The assessment considers flood risk during both the construction and the operational phases of the Project, including the effects of climate change over the Project's lifetime.

1.2.3 This FRA describes baseline flood risk to land within and surrounding the Order Limits, identifies relevant sources of flood risk, and assesses the Project's vulnerability to flooding from fluvial, tidal, surface water and groundwater sources. It also sets out the measures to be implemented to manage flood risk and demonstrates how residual risks would be reduced.

1.2.4 This report should be read in conjunction with the following application documents:

- **Application Document 6.4 Environmental Statement Chapter 4 Description of the Project**;
- **Application Document 6.11 Environmental Statement Chapter 11 Water Environment** and associated figures;
- **Application Document 7.2 Outline Code of Construction Practice**; and
- **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.2.5 This report is structured as follows:

- Section 1 introduces the Project, its purpose, scope and consultation undertaken to inform the FRA.
- Section 2 sets out relevant legislation, policy and guidance governing development and flood risk, drainage and climate change.
- Section 3 outlines the environmental baseline of the Project, including land use, topography, geology, watercourses, and flood defences.
- Section 4 identifies and assesses flood risk from all relevant sources during both construction and operation.
- Section 5 outlines how the Sequential Test and Exception Test have been applied and satisfied.
- Section 6 presents the overall conclusions of this FRA.

1.2.6 The methodology for this FRA involved a review of relevant legislation, planning policy and technical guidance to establish the assessment framework, followed by the collection and review of baseline flood risk information from published datasets, Environment Agency flood mapping, detailed hydraulic modelling outputs and relevant local authority flood risk documents. All potential sources of flooding to the Project were identified and screened, with fluvial, tidal, surface water and groundwater assessed in detail. The vulnerability of the Project to flooding and its potential to affect flood risk elsewhere were assessed for the construction and operational phases. The sequential approach to siting was applied, and where required, the Exception Test was undertaken. Further details on how the tests were applied are provided in section 5.

1.2.7 This FRA is supported by two appendices:

- Appendix A Flood Compensation Storage Technical Note
- Appendix B Framework Construction Surface Water Management Plan

1.3 Consultation and Engagement

1.3.1 Stakeholder engagement has formed a key part of the Project development since its inception. In accordance with the Planning Act 2008 (HM Government, 2008), supporting guidance and good practice, National Grid has undertaken consultation with relevant bodies and the feedback received has informed the development of the Project.

1.3.2 National Grid has undertaken non-statutory consultation in 2023, localised non-statutory consultation in 2024 and statutory consultation in 2025. Further details on the consultation events can be found in **Application Document 5.1 Consultation Report**.

1.3.3 National Grid has also undertaken a number of environmental and thematic meetings with environmental organisations to gather information about the baseline environment, scope of the assessment and potential effects and proposed mitigation. This FRA has been informed by consultation and engagement with the relevant flood risk management authorities (the Environment Agency and Lead Local Flood Authorities (LLFAs) (East Riding of Yorkshire Council, North Lincolnshire Council, Nottinghamshire County Council)) and the Internal Drainage Boards (IDBs).

1.3.4 Table 1.1 provides a summary of the key comments raised during the thematic meetings and flood risk and drainage topic meetings that have shaped and informed this FRA.

Table 1.1 – Summary of flood risk consultation

Reference	Comment	Project response
Environment Agency	Assess Flood Zones and distinguish between Flood Zone 3a and 3b*. Represent this on a map with the Order Limits.	Data to define the extents of Flood Zone 3b have been collected from the relevant Strategic Flood Risk Assessments (SFRAs) ((East Riding of Yorkshire Council, 2019), (North Lincolnshire Council and North East Lincolnshire Council, 2022) and (Bassetlaw District Council, 2019)), and where data were

Reference	Comment	Project response
		not available, NaFRA2 high risk flood zone (Environment Agency, 2025) has been used as a proxy. The data are presented in **Application Document 6.11.F2 Environmental Statement Figure 11.2 Environment Agency Flood Zones 2 and 3**. This figure does not distinguish between Flood Zone 3a and 3b.
	Construction compounds should avoid Flood Zone 3b. Where there is a loss of fluvial floodplain storage, associated level for level and volume for volume compensation will be required.	Floodplain storage losses have been calculated, and where appropriate, land to accommodate compensatory storage for losses for fluvial floodplain has been provided within the Order Limits, as shown in **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design.** Agreement to this approach is documented in the Statement of Common Ground between the Applicant and the Environment Agency **Application document 5.8.1 Statement of Common Ground - Environment Agency** A Technical Note outlining the floodplain storage loss calculations and compensation areas is provided in Appendix A Flood Compensation Storage Technical Note.
Isle of Axholme & North Nottinghamshire Water Level Management Board	The potential loss of floodwater storage, conveyance and habitats must be fully considered. Where proposals are likely to result in a loss of floodwater storage, conveyance or habitat the Boards expect appropriate mitigation measures to be provided at the applicant's expense.	The Project's potential effects on floodwater storage and conveyance are presented in section 4.8. Mitigation measures are also set out within this FRA (sections 4.8 to 4.10). Agreement to this approach is documented in the Statement of Common Ground between the Applicant and the Environment Agency **Application document 5.8.1 Statement of Common Ground - Environment Agency.** The potential for effects on habitats is presented in **Application Document 6.8 Environmental Statement Chapter 8 Ecology** and are secured by commitments in **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments**.
Yorkshire and Humber IDB	Engineering design parameters discussed for works in/over/under and in proximity to Board drains, for	The Project has proposed controls on works in/over/under and in proximity to Board drains, including a range of measures to manage and control construction work site runoff, in terms of both quantity and quality, as described

Reference	Comment	Project response
	example, clearances, rainfall runoff rates and measures to avoid siltation.	within **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments**. Agreement to this approach is document in **Application Document 5.8.13 Statement of Common Ground - Yorkshire & Humber IDB.**

**Flood Zone classifications are set out in section 2.2, Table 2.2*

1.4 Scope of Assessment

1.4.1 This FRA has focused on the flood risk from fluvial, pluvial (surface water), tidal, and groundwater sources, as these are the sources of flooding that the Project has potential to have detrimental impacts on. The Project would have very limited interaction with reservoirs and other artificial sources and therefore limited means of contributing to flood risk from reservoirs or other artificial sources, as described in section 4. Consequently, these have been considered in less detail.

1.4.2 This FRA refers to a study area applied around the Order Limits. While 500 m is common as effects are often unlikely to propagate further than this, this FRA adopts a larger study area so that the potential for effects at the local catchment scale can be considered. This is further described in Appendix A Flood Compensation Storage Technical Note**.**

1.4.3 Assessment of the decommissioning phase of the Project was scoped out of the assessment, in accordance with **Application Document 6.5.A2 Environmental Statement Appendix 5.2 Scoping Opinion**, and as explained in **Application Document 6.5 Environmental Statement Chapter 5 Environmental Impact Assessment Approach and Methodology**.

2. Legislation, Policy and Guidance

2.1 Introduction

2.1.1 The following legislation and policy at a national and local level have been considered when producing this FRA:

- Flood and Water Management Act 2010 (HM Government, 2010);
- Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero, 2025);
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (Department for Energy Security and Net Zero, 2025);
- National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2026);
- Flood Risk and Coastal Change Planning Practice Guidance (PPG) (Ministry of Housing, Communities and Local Government, 2025);
- Flood Risk Assessments: Climate Change Allowances (Environment Agency, 2022); and
- Environmental Permitting (England and Wales) Regulations 2016 (HM Government, 2016).

2.2 National Policy and Guidance

Overarching National Policy Statement for Energy (EN-1)

2.2.1 The Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero, 2025) provides specific guidance on the developments of energy infrastructure in relation to flood risk for the lifetime of a project. The sections of relevance to this FRA are:

- Section 4.10, which discusses climate change adaptation; and
- Section 5.8, which discusses flood risk setting out the minimum requirements of an FRA, as well as information on the application of the Sequential and Exception Tests.

2.2.2 EN-1 (Department for Energy Security and Net Zero, 2025) confirms that an FRA is required to assess flood risk for the lifetime of a project. It states that the FRA needs to identify, among other aspects, flood risk reduction and management measures. Residual risks would also require assessment to consider their acceptability.

2.2.3 EN-1 (Department for Energy Security and Net Zero, 2025) states that the scope of the FRA must be proportionate to the risk and appropriate to the scale of development that is proposed. The FRA must consider different sources of flooding and their effects, as well as the impact of climate change. These overarching principles have been followed as all sources of flooding are assessed in this FRA

(with the main focus on fluvial, pluvial (surface water), coastal and tidal, and groundwater sources).

2.2.4 EN-1 (Department for Energy Security and Net Zero, 2025) also includes several additional requirements that are specific to energy infrastructure. Table 2.1 summarises these and identifies where they are addressed in this FRA.

Table 2.1 – EN-1 requirements relating to flood risk relevant to the Project and where they are addressed in this FRA

Topic	EN-1 requirement	Where addressed in this FRA
Flood risk management	The development proposal should be in line with any relevant national and local flood risk management strategies (Paragraph 5.8.36).	Section 2, section 4.5
	Where necessary, the development should be appropriately flood resilient and resistant, and it should be demonstrated that any residual risk can be safely managed over the lifetime of the development (Paragraph 5.8.7).	Section 4
Operation of the site	The development should be designed to remain operational when floods occur (Paragraph 5.8.7).	Section 4
Functional floodplain	The development should not result in a net loss of floodplain storage and any deflection or constriction of flood flow routes should be safely managed within the site (Paragraph 5.8.12 and 5.8.41).	Section 4.8
Flood Warning and Evacuation Plan	The receipt of and response to warnings of floods is an essential element in the management of the residual risk of flooding. Flood warning and evacuation plans should be in place for those areas at an identified risk of flooding (Paragraph 5.8.33).	Section 4.8
Climate change	The impacts of climate change should be considered when planning the location, design, build, operation and, where appropriate, decommissioning of a project (Paragraph 4.10.8).	Sections 2.2 and 2.3
Climate change	The Secretary of State should be satisfied that applicants for new energy infrastructure have taken into account the potential impacts of climate change using the latest UK Climate Projections available at the time the Environmental Statement was prepared to ensure they have identified appropriate mitigation or adaptation measures. This should	Sections 2.2 and 2.3

Topic	EN-1 requirement	Where addressed in this FRA
	cover the estimated lifetime of the new infrastructure, including any decommissioning period (Paragraph 4.10.13).	
Climate change	Where energy infrastructure has safety critical elements, the applicant should apply a credible maximum climate change scenario. It is appropriate to take a risk-averse approach with elements of infrastructure which are critical to the safety of its operation (Paragraph 4.10.12).	Sections 2.2, 2.3, and 4.8
Climate change	Applicants should demonstrate that proposals have a high level of climate resilience built-in from the outset and should also demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario (Paragraph 4.10.11).	Sections 2.2, 2.3, 4.8, and 4.9
Adaptation	Any adaptation measures should be based on the latest set of UK Climate Projections, the government's latest UK Climate Change Risk Assessment (Department for Environment, Food & Rural Affairs, 2022), when available, and in consultation with the Environment Agency's climate change allowances for FRAs (Environment Agency, 2022)(Paragraph 4.10.17). Adaptation measures should be required to be implemented at the time of construction where necessary and appropriate to do so (Paragraph 4.10.19).	Sections 2.2, 2.3, 4.8, and 4.9
Drainage and sustainable drainage systems (SuDS)	SuDS should be used unless there is clear evidence that their use would be inappropriate (Paragraph 5.8.36).	Table 3.1 and section 4.9, Appendix B.
Drainage and SuDS	The Development Consent Order, or any associated planning obligations, would need to make provision for appropriate operation and maintenance of any SuDS throughout the Project's lifetime. Where this is secured through the adoption of any SuDS features, any necessary access rights to property would need to be granted (Paragraph 5.8.38).	Table 3.1 and Appendix B.
Drainage and SuDS	Site layout and surface water drainage systems should be designed to cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or	Table 3.1, Sections 2.3, 4.9 and Appendix B.

Topic	EN-1 requirement	Where addressed in this FRA
	conveyed from the site without any adverse impacts (Paragraph 5.8.26).	
Drainage and SuDS	The volumes and peak flow rates of surface water leaving the site should be no greater than the rates prior to the proposed Project, unless specific off-site arrangements are made and result in the same net effect. The predicted impacts of climate change should be accounted for (Paragraph 5.8.27).	Table 3.1, sections 2.3, 4.9 and Appendix B
Drainage and SuDS	The FRA should consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the Project may affect drainage systems (Paragraph 5.8.15).	Table 3.1, section 4.9
Sequential Test	The Sequential Test and sequential approach should be applied (Paragraphs 5.8.9, 5.8.21 to 5.8.23).	Section 5.1
Exception Test	The Exception Test, where necessary, should be applied (Paragraphs 5.8.10, 5.8.11).	Section 5.2
Vulnerability and safe access	The FRA should consider the vulnerability of those using the site, including arrangements for safe access and escape (Paragraph 5.8.15).	Table 3.1, sections 4.8 and 5.2
Reducing flooding overall and natural flood management	The FRA should identify and secure opportunities to reduce the causes and impacts of flooding overall, making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management (Paragraph 5.8.15).	Table 3.1, sections 4.8 and 4.9

2.2.5 In addition to the requirements described above, EN-1 (Department for Energy Security and Net Zero, 2025) also details the following:

'Exceptionally, where an increase in flood risk elsewhere cannot be avoided or wholly mitigated, the Secretary of State may grant consent if they are satisfied that the increase in present and future flood risk can be mitigated to an acceptable and safe level and taking account of the benefits of, including the need for, nationally significant energy infrastructure…' (Paragraph 5.8.42).

National Policy Statement for Electricity Networks Infrastructure (EN-5)

2.2.6 The National Policy Statement for Electricity Networks Infrastructure (EN-5) (Department for Energy Security and Net Zero, 2025) is specific to electricity

infrastructure and with regard to flood risk, reiterates the requirements set out in EN-1 (Department for Energy Security and Net Zero, 2025), detailed above. Paragraph 2.3.3 of EN-5 (Department for Energy Security and Net Zero, 2025) states that the project's resilience to climate change should be assessed and the policy states that an FRA should be prepared.

2.2.7 Application Document 6.11 Environmental Statement Chapter 11 Water Environment assesses the Project's resilience to climate change.

National Planning Policy Framework and Guidance

2.2.8 The NPPF (Ministry of Housing, Communities and Local Government, 2026) sets out the government's planning policies for England to ensure that flood risk is considered at all stages of the planning and development process, to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk of flooding. To achieve this, the NPPF (Ministry of Housing, Communities and Local Government, 2026) advocates taking a risk-based approach when identifying suitable locations for development, taking into account all sources of flood risk and the current and future impacts of climate change. This should be achieved by applying the Sequential Test, described in Policy 5. Development on land at low risk of flooding is preferentially supported. Where there are no reasonably available sites, for example in Flood Zone 1 and at low risk of surface water flooding, reasonably available sites in Flood Zone 2/medium surface water flood risk zones should be considered. Only when there are no reasonably available sites for development in Flood Zones 1 and 2, should the suitability of sites in Flood Zone 3/high risk surface water flood zones be considered.

2.2.9 The sequential approach should be used in areas known to be at risk now or in the future. The Flood Risk and Coastal Change PPG (Ministry of Housing, Communities and Local Government, 2025) requires other sources of flooding to be considered consistently with risks from rivers and the sea so that the sequential approach can be applied with respect to all forms of flooding (Section 18 of the NPPF (Ministry of Housing, Communities and Local Government, 2026)).

2.2.10 Further details of the requirements for sequential testing are provided in the paragraphs below.

Sequential testing

2.2.11 The Sequential Test should be applied to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development proposed.

2.2.12 The Flood Risk and Coastal Change PPG (Ministry of Housing, Communities and Local Government, 2025) supports the NPPF (Ministry of Housing, Communities and Local Government, 2026) with additional guidance on flood risk vulnerability classifications and managing residual risks. The PPG (Ministry of Housing, Communities and Local Government, 2025) provides further description of Flood Zones (Table 2.2) and a vulnerability and compatibility matrix (Table 2.3) in order to assess the suitability of a specific site for a certain type of development.

Table 2.2 – Summary of Flood Zone definitions

Flood Zone	Probability of flooding	Definition
1	Low	Land having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)
2	Medium	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%); or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%).
3a	High	Land having a 1 in 100 or greater annual probability of river flooding (≥1%); or land having a 1 in 200 or greater annual probability of sea flooding (≥0.5%)
3b	High – Functional floodplain	Land where water has to flow or be stored in times of flood, identified by local planning authorities (LPAs) in SFRAs. Identification of functional floodplain should take account of local circumstances and not be solely defined on rigid probability parameters. Functional floodplain normally comprises: • Land having ≥ 3.3% annual probability of flooding (with any existing flood risk management infrastructure operating effectively); or • Land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).

Table 2.3 – Flood risk vulnerability and Flood Zone 'compatibility'

Flood Zone risk vulnerability classification (see Table 2.2)	Essential Infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	✓	Exception Test required	✓	✓
Flood Zone 3	Exception Test required	✓	X	Exception Test required	✓
Flood Zone 3b 'Functional floodplain'	Exception Test required	✓	X	X	X

Key:

✓ Development is appropriate

X Development should not be permitted

2.2.13 Policy 6 in Section 18 of the NPPF (Ministry of Housing, Communities and Local Government, 2026) states that in addition to satisfying the Sequential Test in policy F5 where applicable, development will only be appropriate where an 'exception test' is satisfied.

2.2.14 For the Exception Test to be passed, it must be demonstrated that, based on a site-specific flood risk assessment:

- The development provides wider sustainability benefits to the community that outweigh flood risk; and
- The development would be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Sustainable drainage

2.2.15 The Flood Risk and Coastal Change PPG (Ministry of Housing, Communities and Local Government, 2025) supports the NPPF (Ministry of Housing, Communities and Local Government, 2026) with additional guidance on managing flood risk. Policy F2 states that new development presents opportunities to reduce the causes and impacts of flooding through the use of natural flood management techniques. Further, policy F8 stipulates that development proposals which could affect drainage on or around the development site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, in ways which are proportionate to the nature and scale of the proposal.

2.2.16 In order to manage surface water within the Order Limits, it is necessary to consider the appropriateness of various SuDS measures, with reference to the National Standards for SuDS (Department for Environment, Food and Rural Affairs, 2025) and using the SuDS hierarchy set out in paragraph 056 of the PPG (Ministry of Housing, Communities and Local Government, 2025) and listed below with the most favourable option first and least preferable last:

1) Into the ground (shallow infiltration in areas of low contamination risk);
2) To a surface waterbody;
3) To a surface water sewer, highway drain, or another drainage system; and
4) To a combined sewer.

2.2.17 The Environment Agency classifies surface water flood risk into four categories: 'very low', 'low', 'medium', and 'high' (Table 2.4) (Environment Agency, 2025).

2.2.18 In addition to national SuDS guidance (Department for Environment, Food and Rural Affairs, 2025), the guidance from relevant LLFAs has been considered, including the East Riding of Yorkshire Interim Standing Advice (East Riding of Yorkshire Council, 2015), Nottinghamshire County Council Highways Drainage guidance (Nottinghamshire County Council, 2020) and the North Lincolnshire Council SuDS guidance (North Lincolnshire Council, 2025).

Table 2.4 – Flood risk from surface water definitions

Probability of surface water flooding	Return period
Very Low	Land with less than 1 in 1,000 annual probability of surface water flooding (<0.1%)
Low	Land with between 1 in 1,000, and 1 in 100 annual probability of surface water flooding (0.1% – 1%)
Medium	Land with between 1 in 100, and 1 in 30 annual probability of surface water flooding (1% – 3.3%)
High	Land with greater than 1 in 30 annual probability of surface water flooding (>3.3%).

2.2.19 Surface water flooding can be managed through SuDS. Application Document 7.2 Outline Code of Construction Practice and Application Document 7.3 Register of Environmental Actions and Commitments describe the control and management measures, including SuDS, for managing surface water flood risk that would be adopted. During the operation of the Project, permanent impermeable surfaces would be localised around the four bases of each pylon, where the steel lattice form meets ground level. Rainfall runoff from these areas would be attenuated by surrounding reinstated vegetation and would soak back into the ground.

Flood Risk Assessments: Climate Change Allowances

2.2.20 The United Kingdom Climate Projections (Met Office, 2025) are a set of climate change projections that are interpreted by the Environment Agency to develop a set of allowances to be applied to assess the predicted impact of climate change on a range of parameters.

2.2.21 The Environment Agency's online advice note: Flood Risk Assessments: Climate Change Allowances was published in February 2016 and most recently amended in May 2022 (Environment Agency, 2022) to take account of an update to recommended climate change allowances for rainfall intensity.

2.2.22 The allowances applicable to this FRA are for fluvial (peak river flow), tidal (sea level rises) and peak rainfall intensities. The fluvial and tidal climate change allowances are summarised in Table 2.5 for the management catchments the Project would be located within. The higher river flow allowance is shown in Table 2.5, given the Flood Risk Assessments: Climate Change Allowances advice note (Environment Agency, 2022) states this should be used for essential infrastructure, which the Project is classified as. Rainfall is addressed in the following section.

Table 2.5 – Environment Agency fluvial and tidal climate change allowances applicable to the Project

Management catchment	Peak river flow allowance (2080s[1])
Hull and East Riding	33%
Lower Trent and Erewash	39%
Idle and Torne	39%

2.2.23 Fluvial and tidal climate change allowances have been considered in relation to permanent infrastructure associated with the Project. If consented, construction is forecasted to be completed in the near future (by 2031). Reinstatement activities, including the removal of all temporary infrastructure and reinstatement of land, are part of the construction phase of assessment. These activities will extend beyond the end of construction. However, it is anticipated all reinstatement activities will be completed within the near future, and therefore, impacts of climate change would be limited and allowances for climate change have not been applied to the construction phase assessment.

Rainfall allowance for drainage

2.2.24 As indicated in Table 2.5, the Project is located within three management catchments. For these, the Environment Agency climate change allowances suggest peak rainfall intensity is anticipated to increase by 40% in the design lifetime of the Project.

2.2.25 Given the nature of the Project, with the only above ground operational infrastructure comprising pylons, there is not a need to consider the effects of climate change on rainfall intensity. This is because there would be no formal drainage around the pylon bases. Following their construction, the ground would be levelled to ensure no localised depressions that would encourage water to accumulate. Water from the four small, above ground concrete muffs at each of the pylon's bases would shed to ground and soak away in accordance with the baseline regime.

2.2.26 As secured by commitment DE18 in **Application Document 7.3 Register of Environmental Actions and Commitments**, for temporary features serving construction, drainage design considers a 1 in 10-year (10% Annual Exceedance Probability) event, plus a 40% allowance for climate change resilience).

2.3 Local Planning Policy and Guidance

2.3.1 This section refers to local planning policy, guidance documents and flood-risk related reporting that have informed this FRA. Whilst these do not form the final basis for determining the application for development consent for the Project, Paragraph 4.1.12 of EN-1 (Department for Energy Security and Net Zero, 2025) acknowledges that the Secretary of State will consider Development Plan documents or other documents in the Local Development Framework relevant to its decision making.

[1] Given the 80-year development lifetime applied to the Project.

2.3.2 In addition to the national and local planning policy, there are various flood risk management-related documents relevant to the Project, prepared by either the LPA or the LLFA for the area. The Strategic Flood Risk Assessments (SFRAs), Preliminary Flood Risk Assessments (PFRAs) and Local Flood Risk Management Strategies (LFRMSs) are addressed in section 4 of this FRA.

2.3.3 The remainder of this section lists the relevant Local Plans for the Project and provides an overview of their content relevant to the FRA.

East Riding of Yorkshire Council

East Riding Local Plan Update 2020 – 2039

2.3.4 The East Riding Local Plan Update 2020 – 2039 (East Riding of Yorkshire Council, 2025) sets out strategic policies for managing flood risk across the borough, ensuring alignment with the NPPF (Ministry of Housing, Communities and Local Government, 2026) and local circumstances. Key measures include:

- Avoiding inappropriate development in areas at risk of flooding;
- Applying the Sequential and Exception Tests to steer new development to areas of lowest flood risk wherever possible;
- Ensuring new development does not increase flood risk elsewhere through appropriate site design and mitigation measures; and
- Promoting the use of SuDS in new developments unless there is clear evidence that SuDS would be inappropriate.

2.3.5 These policies are detailed in the Local Plan Update (East Riding of Yorkshire Council, 2025), notably Policy ENV6 (Managing Environmental Hazards), and are supported by the council's SFRA. All relevant planning applications must be accompanied by site-specific FRAs and demonstrate compliance with national and local flood risk management requirements.

Cottingham Neighbourhood Plan and Design Guide 2015 – 2029

2.3.6 The Cottingham Neighbourhood Plan (Cottingham Parish Council, 2018) sets out strategic policies for managing drainage across the neighbourhood. Key measures include:

- Development should incorporate suitable drainage measures to ensure surface water is managed in such a way that existing flooding problems are not exacerbated (Policy GP3 Sustainable Drainage).

North Lincolnshire Council

North Lincolnshire Local Development Framework Core Strategy

2.3.7 The North Lincolnshire Local Development Framework Core Strategy (North Lincolnshire Council, 2011) sets out strategic planning policies within the area. The objectives, strategic policies and development management policies that are relevant to flood risk are outlined below:

- Development should be sited to avoid high flood risk areas through the application of the Sequential Test (Policy CS18 and CS19).
- Proposals must demonstrate that they will not increase flood risk elsewhere and, where possible, will reduce flood risk overall (Policy CS19).
- Surface water management measures should be incorporated into proposals to prevent an increase in runoff rates and volumes. SuDS should be used unless it can be demonstrated that they are impracticable (Policy CS19).

Nottinghamshire County Council

2.3.8 In the Nottinghamshire County Council area, the Local Development Plans are produced by the district, city or borough councils. The Order Limits pass through one district council area: Bassetlaw District Council, within which the Clarborough and Welham neighbourhood is situated.

Bassetlaw Local Plan 2020-2038, Adopted 2024

2.3.9 The Bassetlaw Local Plan (Bassetlaw District Council, 2024) sets out strategic planning policies within the area. The objectives, strategic policies and development management policies that are relevant to flood risk are outlined below:

- In line with national policy, proposals must demonstrate that they pass the Sequential Test and, if necessary, the Exception Test if located away from low-risk areas (Policy ST50).
- Proposals are required to consider and, where necessary, mitigate the impacts of proposed developments on flood risk (Policy ST50).
- Proposals must be accompanied by an FRA demonstrating the development, including access and egress, will be safe for its lifetime, without exacerbating flood risk elsewhere and, where possible, will reduce the risk of flooding overall (Policy ST50).
- All developments where practicable should incorporate SuDS (Policy ST50).

Clarborough & Welham Neighbourhood Development Plan 2016 – 2031

2.3.10 The Clarborough & Welham Neighbourhood sits within Bassetlaw District. The Clarborough & Welham Neighbourhood Development Plan (Clarborough and Welham Parish Council, 2017) outlines policies relating to the water environment and flood risk. Policy 5 states that development will be supported where it is demonstrated that it will not have a detrimental impact on surface water runoff. Developments should be self-sufficient through the incorporation of SuDS and should be designed to prevent any increase in the level of flood risk on the site.

3. The Project and Existing Environment

3.1 Project Description

3.1.1 The Project is a new 400 kilovolt (kV) electricity transmission connection of approximately 90 kilometres (km) in overall length between two proposed new substations: the 400 kV Birkhill Wood Substation and 400 kV High Marnham Substation.

3.1.2 The proposed new substations are subject to separate planning applications. For more information, see **Application Document 5.4 Consents and Licences Required Under Other Legislation**.

3.1.3 The Project comprises:

- Approximately 90 km of new overhead line (Route Code 4AF) between the proposed new 400 kV Birkhill Wood Substation and 400 kV High Marnham Substations;
- Replacement and re-alignment of a section of the existing 400 kV overhead line (Route Code 4ZQ) between Brantingham and east of Broomfleet;
- Replacement and re-alignment of a section of the existing 400 kV overhead line (Route Code ZDA) between Ealand and west of Keadby;
- Line entry connections to a proposed new 400 kV Birkhill Wood Substation;
- Line entry connections to a proposed new 400 kV High Marnham Substation; and
- The Project would include other required works, for example, temporary diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites and ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for environmental mitigation, offsetting, compensation and Biodiversity Net Gain (BNG).

3.1.4 A full description of the Project is provided in Application Document 6.4 Environmental Statement Chapter 4 - Description of the Project.

Control and management measures

3.1.5 The control and management measures are documented within **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments**. All environmental actions and commitments in **Application Document 7.3 Register of Environmental Actions and Commitments** have been given a code, e.g. GG01, to allow the measure to be easily cross referenced. The codes relevant to the FRA are outlined in Table 3.1

3.1.6 **Application Document 7.2 Outline Code of Construction Practice**, **Application Document 7.3 Register of Environmental Actions and Commitments** and associated management plans are secured through Schedule 2 of **Application Document 3.1 Draft Development Consent Order**, together with being a contractual obligation the Main Works Contactor(s) would have to follow.

Table 3.1 – Control and management measures relevant to the FRA proposed in the REAC

Ref	Control and management measure	Relevance to FRA
W01	All qualifying works within and in proximity to main rivers and flood defences will be in accordance with a method approved under environmental permits issued under the Environmental Permitting (England and Wales) Regulations (2016) or as set out in the DCO.	Working in accordance with the conditions of relevant consents and permits would safeguard the integrity of watercourses and their flow conveyance qualities and capacities, reducing flood risk.
W02	For open cut watercourse crossings associated with localised undergrounding of third-party assets, and installation of construction access track crossing points (required for construction access only), mitigation measures will include but not be limited to the following where practicable: • Reducing the working width for open cut crossings whilst still providing safe working and reinstating the riparian vegetation and natural bed of the watercourse using material removed when appropriate on completion of the works and compacting as necessary; • Installation of a pollution boom downstream of open cut works; • The use and maintenance of temporary lagoons, tanks, bunds, silt fences or silt screens as required; • Having spill kits and straw bales readily available at all crossing points for downstream emergency use in the event of a pollution incident; • The use of all static plant such as pumps in appropriately sized spill trays; • Prevention of refuelling of any plant or vehicle within 15 m of any watercourse; • Prevent storing of soil stockpiles within 15 m of a main river; and • Inspecting all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids; and • Reinstating the riparian vegetation and natural bed of the watercourse, using appropriately sized material of similar composition to that removed. As far as practicable, gravel will be retained in-channel. Reinstated material will aim to closely match what is removed, particularly gravel, at between 15 and 40 mm in size to ensure suitability for fish spawning.	The Project would cross numerous land drains, ordinary watercourses and main rivers, so these measures would reduce flood risk during construction.

Ref	Control and management measure	Relevance to FRA
W03	Riverbank and in-channel vegetation will be retained where not directly affected by installation works. Culverts in waterbodies will either preserve the natural bed or be box culverts with inverts sunk a minimum of 300 mm below the hard bed of the watercourse with natural/existing bed material placed across the inside of the culvert to existing bed level. New culverts will be as short as practicable and sized to avoid narrowing of natural channel widths. Culverts will be sized to convey flows generated by upstream catchments to maintain the current land drainage regime. Downstream flows would be maintained during culvert installation.	This would help to minimise impacts on the existing land drainage regime.
W04	Where watercourses are to be crossed by construction traffic, measures to be applied include the use of temporary culverts or temporary clear span bridges (or suitably assessed and approved alternatives). Once the culvert is installed, the area above the temporary culvert will be backfilled and construction mats or stone placed over the backfilled area to permit the passage of plant, equipment, materials and people. Where used, temporary bridges will be designed specifically to consider the span length and the weight and size of plant and equipment that will cross the bridge.	This would help to minimise impacts on the existing land drainage regime.
W05	Where new or additional surfacing is required on any access tracks and compound areas, these will be permeable surfaces where ground conditions allow. The Project will incorporate appropriate surface water drainage measures into its final design for any access tracks so that they do not lead to a significant increase in flood risk. Construction access tracks will be removed at the end of the construction phase and the ground surface will be reinstated to pre-Project levels.	This would help to minimise impacts on the existing land drainage regime and reduce risk of flooding during construction.
W06	The contractor(s) will subscribe to the Environment Agency's flood warning e-service, which provides advance notification of potential local flooding events, and subscribe to the Met Office's Weather Warnings email alerts system and any other relevant flood warning information. The Main Works Contractor(s) will implement and comply with a Flood Warning and Evacuation Plan based upon Appendix A Outline Flood Warning and Evacuation Plan within **Application Document 7.2 Outline Code of Construction Practice**, which will include appropriate evacuation procedures should a flood occur or be forecast.	This would facilitate an appropriate response to local flooding and ensure the safety of persons on the site from flooding during construction.

Ref	Control and management measure	Relevance to FRA
W09	Severance of existing land drainage routes, including agricultural field drainage systems, would be managed during construction through provision of temporary alternative drainage routes. Any affected drainage systems would be reinstated or replaced to ensure their existing function is maintained.	This would help to minimise impacts on the existing land drainage regime.
DE18	Temporary infrastructure such as construction compounds, lay down areas (as well as areas where impermeable material will be installed or where heavy equipment would be used) and construction access tracks would be drained using sustainable drainage systems (SuDS) techniques that are suitable for local ground conditions and topography and which are designed to accommodate a 1 in 10-year (10% Annual Exceedance Probability) event, plus a 40% allowance for climate change resilience. These areas will be reinstated after completion of the temporary works, as agreed with the landowner.	This would help to minimise impacts on the existing land drainage regime and reduce the risk of flooding during construction.
W10	The temporary access tracks will cross flood defences. The crossing designs would avoid impacts on the defence foundations and construction works would be undertaken using methods that limit ground movement/settlement to reduce the potential to compromise the condition and stability of the defence. In line with the requirements of the Environment Agency, should the potential for an impact to the flood defences be identified at the detailed design stage, then the flood defence would be monitored to establish a pre-construction baseline and for a period after completion of works to construct the crossings to enable detection of any effects on the structural integrity/condition of the assets during construction of the Project.	Impacts on existing flood defences would be avoided through maintaining a construction free buffer of 8 m around watercourses and 16 m around tidal watercourses.
W11	Where construction activities take place in Flood Zone 3, temporary construction compounds, laydown areas and other work sites will be laid out in accordance with the sequential approach and incorporate flood resilience measures where necessary. Land raising for construction of temporary access routes would be avoided, and materials storage areas would be located outside of fluvial floodplains, where practicable. Where this cannot be avoided, access routes and material stores would be designed and placed to avoid forming barriers to floodplain flows.	This would reduce the risk of impediment of floodplain flows during severe flood events, both in terms of disruption to construction and potential environmental impact.
W12	Where construction activities take place within surface water flood zones, including statutory undertaker works, prior to works commencing appropriate site drainage will be put in place to reduce the risk of standing water and avoid substantial delays to the construction programme, as well as to prevent off-site increases in surface water flood risk.	This would reduce the risk of surface water flooding during construction.

Ref	Control and management measure	Relevance to FRA
W13	Where construction access tracks pass within or cross watercourses and key overland flow routes, the construction access track will include flood mitigation/drainage to allow for the flow of water within the floodplain during flood events up to and including the 1% Annual Exceedance Probability event (i.e., ducting). The design of the construction access tracks themselves will include some resilience to flooding for example, incorporating suitable geo-textiles to stabilise the road surfacing. Suitable materials would be used to surface the haul roads. In some cases, bespoke construction methodologies may be used based on site constraints and ground conditions.	This would reduce the risk of impediment of floodplain flows during large flood events and limit the impact of any severe events, both in terms of disruption to construction and potential environmental impact.
W18	For events up to and including the 1% Annual Exceedance Probability flood event plus climate change, where pylons would be located in Flood Zone 3 associated with fluvial floodplains, compensatory storage within the Order Limits will be provided for loss of floodplain storage, (as shown on **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design)**.	This would reduce the risk of the Project increasing fluvial flood risk through permanent loss of floodplain storage.
DE19	Pylons would be situated a minimum of 16 m from the top of bank of any designated Main River and a minimum of 3.5 m from the top of bank of any ordinary watercourses.	This would maintain riparian corridors and reduce the risk of pylons constricting any out-of-bank flows.
GG06	Land used temporarily will be reinstated where practicable to its pre-construction condition and use. Hedgerows, fences, watercourses and walls (including associated earthworks and boundary features) will be reinstated to a similar style and/or similar or higher quality to those that were removed, unless otherwise agreed.	This will ensure minimal disruption to the existing land drainage regime.
GG19	Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. There will be no intentional discharge of site runoff to ditches, watercourses, drains (including highway drainage systems), or sewers without appropriate treatment and agreement of the appropriate authority. All practicable steps will be put in place to prevent pollution of watercourses. In the case of an emergency, protocols will be followed as per an Emergency Response Plan to be produced by the Mains Work Contractor(s) in accordance with GG25 below.	This would reduce the risk of surface water flooding during construction.

Ref	Control and management measure	Relevance to FRA
GG25	An Emergency Response Plan will be developed by the Mains Works Contractor(s) for the construction phase which will outline procedures to be implemented and to be followed in case of unplanned events, including but not limited to site flooding and pollution incidents.	This would provide a plan for any unplanned events.
GG26	Where necessary, stone pads will be installed in areas where heavy equipment, such as cranes and piling rigs, are to be used. The stone pads will provide stable working areas and will reduce disturbance to the ground. The stone pad area will be stripped of the topsoil, which will be stored and reinstated in accordance with the soil management measures contained in **Application Document 7.5 Outline Soil Management Plan**. Other soil stabilisation techniques will be considered where appropriate.	Reducing ground disturbance would help to minimise impacts on the existing land drainage regime.
W20	The Main Works Contractor(s) will develop and comply with a Construction Surface Water Management Plan (CSWMP) in accordance with **Application Document Application Document 7.13 Flood Risk Assessment Appendix B Framework Construction Surface Water Management Plan**. This will set out measures to manage surface water runoff during construction	This would reduce the risk of surface water flooding during construction both within the Order Limits and to off-site areas.
AS04	Consultation with affected landowners will be carried out to investigate the current extent of land drainage. A scheme of pre-construction land drainage will be designed with the intent of maintaining the efficiency of the existing land drainage system and to assist in maintaining the integrity of the working area during construction. The Project may include a system of 'cut-off' drains which feed into a new header drain and the Project will also take into account surface water runoff measures. The Main Works Contractor(s) will ensure any land drains within the Order Limits, affected as a result of the Project, will be reinstated to their former condition, unless otherwise agreed with the landowner. Any pre-construction land drainage that was installed to replace existing land drains that were affected by permanent infrastructure, as well as any drainage improvements resulting from the Project, would be retained.	Ensuring adequate land drainage provision would avoid an increased flood risk compared to pre-construction conditions.

3.2 Order Limits and Route Sections

3.2.1 The Order Limits are defined as the maximum extent of land within which the Project, as described in **Application Document 6.4 Environmental Statement Chapter 4 Description of the Project**, may be carried out. They include both permanent and temporary land required to construct, operate and maintain the Project. The Order Limits are illustrated on **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design**.

3.2.2 The Project has also been sub-divided into six Route Sections as described in **Application Document 6.1 Environmental Statement Chapter 1 Introduction** which are referred to herein to provide geographical context.

3.3 Construction Timeline Overview

3.3.1 Should consent be granted (which is assumed to be 2028), it is anticipated that construction of the Project would commence in 2028, likely starting with enabling works including site clearance activities, the installation of temporary construction compounds and formation of construction access tracks. It is expected that the main construction works would continue to 2031, with reinstatement works continuing to 2033.

3.4 Land Use and Topography

3.4.1 The landscape varies throughout the length of the Project. It typically comprises a flat, low-lying plateau, dissected by rivers and their tributaries, as well as numerous ditches that facilitate land drainage. The land cover within the Order Limits is largely farmland.

3.4.2 The Project passes through catchments consisting mostly of smaller urban areas, villages and farms. There are a few larger urban areas within the catchments, examples of which Brough, Crowle and Retford.

3.5 Soils, Geology and Hydrogeology

Soils

3.5.1 Soil types vary considerably within the Order Limits. In the upper sections of the Project, soils are typically loamy with some waterlogging or well drained calcareous silty soils over chalk (Route Section A). In the middle sections of the Project, soils are characterised by deep stoneless permeable calcareous fine and coarse silty soils (Route Sections A (west of A63) to E). In the lower sections of the Project, soils are characterised by clayey soils of varying characteristics (Route Sections E and F).

3.5.2 Overall, the soil profile ranges from well-drained, calcareous, and permeable types to more slowly permeable, seasonally wet, and base-rich loamy and clayey soils. Soils characterised by slow permeability or impeded drainage would be less suitable for infiltration SuDS.

3.5.3 A more in-depth analysis of soils can be found in **Application Document 6.13 Environmental Statement Chapter 13 Agriculture and Soils**.

Geology

3.5.4 The bedrock geology and superficial geology are shown on **Application Document 6.12.F1 Environmental Statement Figure 12.1 Superficial Geology** and **Application Document 6.12.F2 Environmental Statement Figure 12.2 Bedrock Geology**.

3.5.5 Superficial deposits within the Order Limits are summarised as follows (British Geological Survey, 2026):

- Route Section A comprises Devensian Till (east of A63) and Alluvium – clay silt, sand and gravel (west of A63).
- Route Sections B and C comprise Alluvium – clay, silt, sand and gravel, with areas of Warp – clay and silt.
- Route Section D, where superficial deposits are present, they comprise the above, with the addition of Sutton Sand and Peat.
- For Route Sections E and F, the superficial deposits are recorded to be absent within much of the Order Limits, and where they are present, they are dominated by the river valley deposits of Alluvium – clay, silt, sand and gravel.

3.5.6 Bedrock geology underlying the Order Limits and superficial deposits (where present) is summarised below:

- Route Section A: Burnham Chalk Formation, Flamborough Chalk Formation, Ferriby Chalk Formation, Ancholme Group Mudstone, Brantingham Member Sandstone, Kellaways Formation and Brantingham member – sandstone and siltstone, and Mercia mudstone group – mudstone, among other variations of sandstones, siltstones, limestones, mudstones and ironstones; and
- Route Sections B to F: Mercia mudstone group – mudstone, with some limited intrusions of Mercia mudstone group – siltstone, dolomitic.

3.5.7 Further detail on geology can be found in **Application Document 6.12 Environmental Statement Chapter 12 Geology and Hydrogeology**.

Hydrogeology

3.5.8 A review of the aquifer designations indicates that superficial deposits underlying the land within the Order Limits are classified as follows:

- Secondary A Aquifers: Alluvium – clay, silt, sand and gravel, Warp – clay and silt, Sutton Sand – sand, and Peat; and
- Secondary Undifferentiated Aquifers: Devensian Till.

3.5.9 The bedrock aquifers are classified as follows:

- Principal Aquifers: Burnham Chalk Formation, Flamborough Chalk Formation, Ferriby Chalk Formation, Brantingham Member Sandstone, and Upper Lincolnshire Limestone;
- Secondary A Aquifers: Kellaways Formation and Brantingham member – sandstone and siltstone;
- Secondary B Aquifers: Pecten Ironstone, Mercia Mudstone;

- Secondary Undifferentiated Aquifers: Charmouth Mudstone Formation, and Mercia mudstone group – siltstone, dolomitic; and
- Unproductive Aquifers: Ancholme Mudstone, Lower Lincolnshire Limestone, Kirton Cementstone beds, and Penarth Mudstone.

3.5.10 Principal Aquifers provide considerable quantities of water. Secondary A Aquifers are permeable layers that can support local water supplies and can be an important source of baseflow to rivers, whilst Secondary B Aquifers are usually lower permeability layers that may store and yield limited amounts of groundwater. The Undifferentiated classification is applied where it is not possible to apply either a Secondary A or B definition due to variable rock type characteristics. Unproductive Strata are considered largely unable to support water supplies.

3.5.11 The information included here provides context for section 4.10 of this FRA which focuses on flooding from groundwater. Further detail on hydrogeology can be found in **Application Document 6.12 Environmental Statement Chapter 12 Geology and Hydrogeology**.

3.6 Watercourses and Flood Defences

3.6.1 A schedule of watercourse crossings including figures of these locations are provided in **Application Document 6.4.A2 Environmental Statement Appendix 4.2 Indicative Bridge and Culvert Schedule**.

3.6.2 The Order Limits cross the following main rivers and their associated floodplains:

- Route Section A: Mill Beck, Market Weighton Canal;
- Route Section B: River Ouse;
- Route Section C: North Soak Drain, South Soak Drain, North Engine Drain, South Engine Drain, River Torne, Hatfield Waste Drain;
- Route Sections D and E: River Idle; and
- Route Section E: East Drayton.

3.6.3 There are also numerous tributaries of these rivers, classified as ordinary watercourses (including artificial land drains) and Board drains (drains managed by an IDB), that the Project crosses.

3.6.4 There are multiple places where the Order Limits cross flood defences. These defences would be oversailed by the proposed overhead line, with minimum buffers retained between new pylons and the defences and so there is very limited potential to cause any changes to their integrity. The locations where the Project would cross the flood defences shown in the Environment Agency spatial flood defences database (Environment Agency, 2025) are summarised below alongside the watercourse they are associated with:

- Route Section A: natural high ground (Mill Beck, Market Weighton Canal), wall (Market Weighton Canal), embankment (Market Weighton Canal);
- Route Section B: embankment (River Ouse);
- Route Section C: natural high ground (North Soak Drain, South Soak Drain, North Engine Drain, South Engine Drain, River Torne, Hatfield Waste Drain);
- Route Sections D and E: embankment (River Idle); and
- Route Section E: natural high ground (East Drayton).

4. Flood Risk

4.1 Flood Risk Data

4.1.1 There are readily available reports providing a context for flood risk, and specifically flood history, that are relevant to the Project and its study area, which was defined to include reaches of watercourses and floodplain cells that would be crossed by or likely to receive surface water runoff from the Project. These reports, described in sections 4.2 to 4.5, draw together a range of information and are prepared by relevant LPAs in their role as LLFAs. Information on flood history has also been obtained through stakeholder engagement.

4.1.2 The following sections provide a summary of flood risk/history data from relevant SFRAs, PFRAs, LFRMSs, Section 19 Flood Investigation Reports and stakeholder consultation, before focusing on the sources of flooding.

4.1.3 Flood risk data have also been obtained from online Environment Agency mapping (Environment Agency, 2025) (Environment Agency, 2025) (Environment Agency, 2025) (Environment Agency, 2025) and flood model outputs provided by the Environment Agency (September 2025).

4.1.4 The data summarised below are only for reported events. It is possible some flood events, such as groundwater flooding in remote areas, may have occurred without being reported.

4.2 Strategic Flood Risk Assessments

4.2.1 There are several SFRAs covering the study area. These are listed below in Table 4.1, along with a brief summary of the information within the documents which is relevant to the Project.

Table 4.1 – Summary of the SFRAs relevant to flooding in the study area

Document title	Year	Route Section	Information relevant to the Project
East Riding of Yorkshire SFRA (East Riding of Yorkshire Council, 2019)	2019	A	The East Riding of Yorkshire area has a history of documented flooding with the main sources being from fluvial, tidal, and surface water. The Humber Estuary poses significant tidal flood risk, particularly to low-lying settlements along the estuary. Significant flooding events occurred in June 2007 and December 2013. These sources of flood risk to the Project are assessed in sections 4.8 and 4.9.
North and Northeast Lincolnshire SFRA (North	2022	B to D	Historical flooding associated with tidal surges impacting the Humber bank area. June 2007 flood event caused widespread surface water flooding and fluvial flooding (River Trent).

Document title	Year	Route Section	Information relevant to the Project
Lincolnshire Council and North East Lincolnshire Council, 2022)			These sources of flood risk to the Project are assessed in sections 4.8 and 4.9.
Bassetlaw SFRA (Bassetlaw District Council, 2019)	2019	E to F	Primary flood risk is from the River Trent and the River Idle and their tributaries. Significant historical flooding occurred in June 2007 and November 2019, both caused by a combination of river overtopping and surface water. These sources of flood risk to the Project are assessed in sections 4.8 and 4.9.

4.3 Preliminary Flood Risk Assessments

4.3.1 PFRAs are high level overviews of flood risk attributable to surface water, groundwater, ordinary watercourses, sewers, and canals. They draw together a wide range of readily available information of flood risk across the counties from these sources. While PFRAs focus on these sources, some PFRAs also provide a broader flood risk context from main rivers.

East Riding of Yorkshire Council, 2011

4.3.2 Key points from the East Riding of Yorkshire PFRA (East Riding of Yorkshire Council, 2011) pertaining to historical flood events, flood risk areas, and groundwater flooding are outlined below:

- There have been several historical flood events which had significant harmful consequences. The reported incidents within the Order Limits include:
  - December 1980 Tidal surge around Goole;
  - June 2007 flood causing widespread damage and disruption; and
  - December 2013 tidal surge, which flooded communities along Humber Estuary.
- Since the December 2013 event, improvements have been made to the flood defences along the Humber Estuary.
- There are no flood risk areas which meet the Department for Environment, Food and Rural Affairs threshold of 30,000 people at risk of surface water flooding in the 1 in 200-year event. However, East Riding of Yorkshire Council adopt a more rural-focused approach and name Beverley and Goole as flood risk areas (over 5,000 people at risk). The Order Limits run between these settlements, and it is assumed that the very rural areas between them would also be at risk; however, given their low populations, there are no named flood risk areas.
- Groundwater flooding is not a widespread issue across East Riding of Yorkshire; however, localised incidents occur in low-lying rural areas with impermeable soils, and in areas adjacent to rivers. The Order Limits cross areas matching this description near Ellerker and Broomfleet.

4.3.3 The 2011 East Riding of Yorkshire PFRA was reviewed in 2017, and an addendum was published (East Riding of Yorkshire Council, 2017) which identified Kingston Upon Hill and Haltemprice, located at the northern end of the study area, as a flood risk area.

Lincolnshire County Council, 2011

4.3.4 Key points from the Lincolnshire County Council PFRA (Lincolnshire County Council, 2011) pertaining to historical flood events and groundwater flooding are outlined below:

- There have been several historical flood events within the county. Those of relevance to the Order Limits include the June 2007 event, which caused widespread flooding primarily across the south of the county.
- The PFRA identifies the Chalk Wolds and fenland areas, which are not in the vicinity of the Project, to be at notable risk of groundwater flooding. The PFRA (Lincolnshire County Council, 2011) also indicates that low-lying rural areas where the water table is high may be vulnerable to groundwater flooding.

4.3.5 The PFRA (Lincolnshire County Council, 2011) was reviewed in 2017 but no significant updates were made.

Nottinghamshire County Council, 2023

4.3.6 Key points from the Nottinghamshire County Council PFRA (Nottinghamshire County Council, 2023) pertaining to historical flood events and groundwater flooding are outlined below:

- The June 2007 flood event resulted in 801 properties flooding in the Bassetlaw District, within which the Project would lie, with significant and harmful consequences reported. Flooding during the winter of 2019/20 resulted in internal flooding of properties at East Markham and Retford, among other locations. This event was due to heavy rainfall causing overland flow, ultimately resulting in flooding from both surface water and fluvial sources.
- The PFRA (Nottinghamshire County Council, 2023) indicates that the floodplain of the River Trent is susceptible to groundwater flooding.

4.4 Flood Investigation Reports

4.4.1 Under Section 19 of the Flood and Water Management Act 2010 (HM Government, 2010), there is a statutory duty for LLFAs to investigate flood incidents if they meet certain criteria. Different LLFAs have different criteria for commencing an investigation into a flood incident. The investigations which are relevant to the Project are listed below. A search area of 500 m from the Order Limits was adopted when reviewing the flood incident information.

East Riding of Yorkshire Council

4.4.2 There are two relevant Section 19 (East Riding of Yorkshire Council, 2026) flood investigations. The locations and events covered include:

- Ellerker: October/November 2019:

Flooding was primarily caused by excessive rainfall leading to surface water runoff, sewer surcharging, and the overtopping of Ellerker Beck as it flows through the village. This was combined with high groundwater levels and limited drainage capacity. Properties, gardens, outbuildings and Ings Lane flooded as a result.

- Broomfleet, Faxfleet, Blacktoft: December 2013:

The combined effects of a concurrent high spring tide and storm surge generated by a weather system over the North Sea led to exceptionally high-water levels and the overtopping of some coastal flood defences. Minor roads around Blacktoft and Faxfleet were closed for a prolonged period of time.

North Lincolnshire Council

4.4.3 One report was identified:

- Luddington: November 2019 (North Lincolnshire Council, 2026):

  Pump failure within a sewage treatment works, combined with excess overland flow from adjacent fields due to excessive rainfall, led to the flooding of two properties on Meredyke Road.

Nottinghamshire County Council

4.4.4 No relevant Section 19 reports were identified.

4.5 Local Flood Risk Management Strategies

4.5.1 East Riding of Yorkshire Council, North Lincolnshire Council, and Nottinghamshire County Council, as the LLFAs, have a statutory requirement to produced LFRMSs. Their duties under the Flood and Water Management Act 2010 (HM Government, 2010) include the duty to '*develop, maintain, apply and monitor*' an LFRMS, which covers flooding from surface water (overland runoff), groundwater, ordinary watercourses (i.e. watercourses that are not designated as main rivers).

4.5.2 The LFRMSs draw on information within other flood-risk related documents, such as the PFRAs and SFRAs.

East Riding of Yorkshire Council

4.5.3 The LFRMS (East Riding of Yorkshire Council, 2015) identifies that the low-lying areas of much of the south and east of the East Riding of Yorkshire are especially susceptible to flooding from the sea, the Humber Estuary, and the Rivers Trent and Ouse. These areas have a history of tidal surge flooding which overtops or breaches coastal and estuarine defences. The Order Limits cross the low-lying areas on the banks of the Humber Estuary.

4.5.4 The LFRMS identifies the East Riding of Yorkshire to be susceptible to surface water flooding given much of the area is underlain by soils with a high clay content, which absorb water slowly and are largely impermeable. There have been historical surface water flooding events within the study area.

4.5.5 Locations within the study area are identified as having been investigated for groundwater flooding issues, particularly in Route Section A of the Project where the bedrock is chalk.

North Lincolnshire Council

4.5.6 The LFRMS (North Lincolnshire Council, 2016) identifies significant parts of North Lincolnshire to be at risk of flooding from the sea/coast, via the Humber Estuary, and from rivers, such as the River Trent. North Lincolnshire has a history of flooding from rivers and sea, with 2007 noted particularly in the LFRMS. The Order Limits are within areas of fluvial and tidal flood risk within North Lincolnshire, which are protected by flood defences.

4.5.7 The LFRMS (North Lincolnshire Council, 2016) identifies surface water flooding in the rural areas of North Lincolnshire, through which the Order Limits pass, to be the result of surface water runoff collecting in topographic low points. The LFRMS (North Lincolnshire Council, 2016) identifies sewer flooding as being tied to surface water flooding, particularly in more urban areas.

4.5.8 Locations within the study area are not identified as having been investigated for groundwater flooding.

Nottinghamshire County Council

4.5.9 The LFRMS (Nottinghamshire County Council, 2021) identifies several case studies within the LLFA boundary that describe historical flood events, none of which are located within the study area. However, this is not an exhaustive list of historical flood events.

4.6 Information from Consultation

4.6.1 No specific details of historical flooding events were provided by consultees during non-statutory or statutory consultation.

4.7 Sources of Flooding

4.7.1 The Project has no means to contribute to flood risk from reservoirs or other artificial sources.

4.7.2 With regard to foul water flooding, most of the land within the Order Limits is rural and in agricultural use, hence the risk of flooding from bursts and capacity exceedances of the foul sewer network is low for most of the land within the Order Limits. A review of the SFRAs did not highlight any parts of the Order Limits to be at particularly elevated risk of flooding from sewers and water mains.

4.7.3 For areas within the Order Limits in which there is more existing built development and infrastructure, the Risk of Flooding from Surface Water map (Environment Agency, 2025) has been reviewed to help identify any significant low spots or flow paths that water emanating from sewer/water main networks would travel along. No significant areas of risk were identified.

4.7.4 The Project is not anticipated to impact on or increase baseline flood risk from foul water flooding. This is because, due to the nature of the Project, foul water generation during operation (and maintenance) would be negligible and the Project would not therefore add to the loading/demand on sewer systems. During construction, foul water would be suitably managed in accordance with **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments**.

4.7.5 With regard to the risk of flooding from reservoirs and canals, the Project is at low risk of flooding from these sources. The Environment Agency Risk of Flooding from Reservoirs map (Environment Agency, 2025) indicates that in the dry day scenario, where watercourses are at a normal water level, the majority of the Order Limits lie outside flood extents. In the wet day scenario, which indicates extents if watercourses were already experiencing an extreme flood event, most of the Project lies outside mapped extents. The Environment Agency Flood Risk from Reservoirs map (Environment Agency, 2025) represents an extreme worst-case scenario of dam breach flooding, and in reality, the chances of a reservoir failing in the UK are extremely remote. This is due to the stringent inspection and maintenance requirements imposed by the Reservoirs Act 1975 (HM Government, 1975). Although the Order Limits cross several canals, the Project is anticipated to be at low risk of flooding from this source due to the monitoring and maintenance of canals. Therefore, these artificial sources of flooding have not been assessed further in the sections below.

4.7.6 This FRA therefore focuses on the following potential sources of flooding in relation to the Project as shown on **Application Document 6.11.F3 Environmental Statement Figure 11.3 Flood Risk Areas – Rivers and the Sea** and **Application Document 6.11.F4 Environmental Statement Figure 11.4 Flood Risk Areas – Surface Water**:

- Fluvial;
- Tidal/coastal;
- Pluvial (surface water); and
- Groundwater.

4.7.7 Given the nature of the Project, there is an important distinction to be made between construction risk and operational risk. The construction phase would require various temporary works in terms of working areas, excavations and other elements, which would be removed once the works are complete. In addition, third party infrastructure works would be required, largely in the form of the localised undergrounding of assets.

4.7.8 The operational phase would have a much smaller footprint, consisting of only pylons and overhead lines.

4.7.9 The assessment presented in the following sections assesses both construction and operation (and maintenance) for each source of flooding.

4.7.10 The crossing schedules produced for the Project are included in **Application Document 6.4.A2 Environmental Statement Appendix 4.2 Indicative Bridge and Culvert Schedule**. These show which watercourses would be crossed. Information is also included to confirm if the Project proposes to utilise an existing crossing structure (bridge/culvert), upgrade an existing crossing, or construct a new crossing; and whether the crossings are temporary or permanent. As detailed, the majority of crossing works would be temporary (secured by commitment W04 within **Application Document 7.3 Register of Environmental Actions and Commitments**), to facilitate either construction access tracks, or to facilitate the diversion of third-party infrastructure. The operational Project would oversail watercourses with no in-channel infrastructure and the third-party infrastructure diverted would be underground.

4.7.11 The assessment also considers both the potential impact on the Project, and the potential impacts elsewhere as a result of the Project.

4.7.12 This FRA makes a distinction between the River Ouse and Humber Estuary. The River Ouse would be crossed by the Project between proposed pylons 4AF77 and 4AF78 (approximate National Grid Reference SE 82680 24117). Trent Falls, 4 km east of where the Project would cross the River Ouse, marks the confluence of the River Ouse and River Trent, which combined become the Humber Estuary.

4.8 Risk of Flooding from Rivers and the Sea

4.8.1 Due to the location of the Project along two tidally influenced waterbodies, this FRA assesses the risk of fluvial flooding to the Project alongside the risk of tidal flooding, as along several reaches of watercourses these sources combine.

4.8.2 It is noted here that north of Gainsborough, the River Trent is tidally dominated and the River Ouse where it is crossed by the Order Limits is estuarine, with minimal fluvial influence. The River Thorne is influenced by both fluvial and tidal sources.

4.8.3 In some locations across the Order Limits, the floodplains of the River Trent, River Ouse and Humber Estuary overlap, namely in Route Section B. The stretch of the River Trent north of Keadby (Route Section B) is considered to also be influenced by the Humber Estuary and, in this section, their floodplains overlap.

4.8.4 Several datasets were available to assess the tidal and fluvial risks of flooding to the Project. These datasets have been reviewed in the following sections.

Flood Map for Planning

4.8.5 The Flood Map for Planning (Environment Agency, 2025) indicates large sections across the middle reaches (Route Section A (west of the A63) to Route Section D) of the Project are located within the extents of Flood Zones 2 and 3. Across the majority of the Project, areas of Flood Zones 2 and 3 are associated with the wide, flat, expansive floodplains of the Rivers Trent and Ouse, and the Humber Estuary. Flood Zones are detailed on **Application Document 6.11.F2 Environmental Statement Figure 11.2 Environment Agency Flood Zones 2 and 3**.

4.8.6 The upper and lower reaches of the Project (Route Section A (east of the A63) and Route Section F) are mostly located within Flood Zone 1, with small areas of Flood Zones 2 and 3 associated with local watercourse floodplains.

4.8.7 Flood Zones 2 and 3 show the combined risk of fluvial and tidal flooding to a location in an undefended scenario. However, the risk of fluvial and tidal flooding to the Project is influenced by the presence of flood defences across the Project (as outlined in section 3.6). Therefore, to better understand the fluvial and tidal risk to the Project, data from Environment Agency flood models that have simulated a range of flood events with the defences in place has been used, in addition to the Risk of Flooding from Rivers and Sea (NaFRA2) dataset, further described below.

Risk of Flooding from Rivers and Sea

4.8.8 There is another national flood mapping dataset published by the Environment Agency, from the NaFRA2.

4.8.9 The Risk of Flooding from Rivers and Sea (RoFRS) dataset (Environment Agency, 2025) shows the risk of flooding where defences have been accounted for. As such, this dataset is more appropriate in understanding the fluvial and tidal flood risk to the Project.

4.8.10 The RoFRS dataset shows that the majority of the Project is at low risk of fluvial and tidal flooding when accounting for defences. Areas of medium and high risk are typically associated with watercourse channels and their immediate riparian corridors. There is a larger area of high risk mapped immediately on the north bank of the River Ouse and Humber Estuary (between proposed pylons 4AF77 and 4AF57).

4.8.11 The RoFRS dataset does not differentiate between fluvial and tidal flooding within its extents. Therefore, detailed modelling outputs provided by the Environment Agency have been used to supplement the RoFRS dataset.

Environment Agency Modelling Outputs

4.8.12 Outputs from several detailed flood models have been provided by the Environment Agency and have been used in assessing the fluvial and tidal risk to the Project, namely the River Torne (Environment Agency, 2025), Tidal Trent (Environment Agency, 2022), and Upper Humber (Environment Agency, 2016) models.

4.8.13 The models have simulated tidal and fluvial flood events for a number of scenarios, including future scenarios accounting for climate change. Further details on the available data are provided in Appendix A Flood Compensation Storage Technical Note and mapped model extents are shown for a range of scenarios on **Application Document 6.11.F3 Environmental Statement Figure 11.3 Flood Risk Areas – Rivers and the Sea**.

Fluvial flooding from main rivers

4.8.14 The Upper Humber Defended 1 in 1000-year[2] (0.1% annual chance) fluvial flood simulation predicts flooding on some land within Route Section A and Route Section B of the Order Limits. Floodwater from the Humber is predicted to overtop existing defences and spread over the floodplain, reaching the locations where proposed pylons 4AF77, 4AF76, 4AF75, and 4AF68 would be located during operation of the

[2] *With reference to EN-1 and the NPPF, fluvial flood risk is assessed against the 1% (1 in 100) plus climate change scenario. However, the Upper Humber (2016) model does not simulate an up-to-date climate change scenario for the 1% flood, and therefore the 0.1% (1 in 1000) event has been adopted as a proxy. This approach was discussed with the EA, who were satisfied with the approach.*

Project. These are illustrated in **Application Document 6.11.F3 Environmental Statement Figure 11.3 Flood Risk Areas – Rivers and the Sea**. Associated construction sites (working areas and construction access tracks) are also located within the flood extent. Proposed pylons 4AF66 and 4AF65 would be located outside the flood extents but their associated construction areas would be located within flood extents.

4.8.15 The River Torne model simulates the 1 in 100-year (1% annual chance) fluvial event, inclusive of a higher central climate change allowance to the 2080s. The consequent flood extents encroach into Route Section C of the Project.

4.8.16 Mapped extents are however limited to areas immediately adjacent to the watercourses in this section, including the North Soak Drain, South Soak Drain, Hatfield Waste Drain, North Engine Drain, River Torne and South Engine Drain. There are no proposed pylons located within these extents, with only small sections of the construction access tracks shown to be at risk of fluvial flooding in this event.

4.8.17 The Tidal Trent models simulates the 1 in 100-year (1% annual chance) fluvial event inclusive of a higher central climate change allowance to the 2080s. The fluvial event shows that all Project infrastructure (construction work sites and operational assets) (in Route Sections E and F) is located outside the modelled flood extents.

Tidal flooding

4.8.18 The Upper Humber Defended 1 in 1000-year (0.1% annual chance) tidal flood simulation predicts flooding on some land within Route Section A and Route Section B of the Order Limits. Mapped flood extents from this scenario show much of the Project north of pylon 4AF98 (Luddington) to pylon 4AF56 (Broomfleet) to be at risk of tidal flooding from the Humber Estuary in this event, with pylons and all associated Project construction infrastructure located within flood extents.

4.8.19 The Tidal Trent model domain covers Route Sections B, C, D and part of Route Section E of the Project. The simulation of the 1 in 200-year (0.5% annual chance), inclusive of a higher central allowance for climate change, shows that the majority of Project infrastructure is located outside the mapped flood extents for this event.

4.8.20 North of Keady up to the Humber Estuary, land within the Order Limits and associated Project infrastructure (construction worksites and operational assets) are within mapped tidal flood extents from the River Trent.

4.8.21 Additionally, land within the Order Limits encroaches into tidal flood extents from the River Trent where the Project crosses other watercourses (including Adlingfleet Drain, Paupers Drain, North Soak Drain, South Soak Drain, Hatfield Waste Drain, North Engine Drain, River Torne, South Engine Drain, Ferry Drain, Warping Drain and the River Idle). However, all operational Project infrastructure (pylons) is located outside these extents and the overhead line would oversail them. Small areas of construction access swathe lie within the mapped flood extents of the Tidal Trent model.

Drains and Ordinary Watercourses

4.8.22 There are numerous land drains and ordinary watercourses that flow through the Order Limits which are not specifically represented in the models and mapping sources described above. Many of these watercourses are artificial drains, created and managed for the purposes of land drainage and flood risk management.

4.8.23 The Project would run through several IDB districts, including East Riding of Yorkshire, Isle of Axholme and North Nottinghamshire, Doncaster East, and Trent Valley, forming the Water Management Consortium. The function of these IDBs is to manage water levels in areas of special drainage need, undertake works to reduce the flood risk to people and property, and manage water levels for agricultural and environmental needs within their districts. Annual maintenance is undertaken to ensure the free flow of water and de-silting works are carried out on culverted (piped) watercourses to ensure that they are in good condition to fulfil their land drainage function.

4.8.24 The Project is therefore considered to be at low risk of flooding from these sources.

Summary of Fluvial and Tidal Flood Risk Sources

4.8.25 Overall, it is considered that the risk of flooding from rivers and sea to the Project is generally low, with some areas at both medium and high risk in defended scenarios, and accounting for climate change. The Project, by its nature as an overhead line, has a low vulnerability to flooding from rivers and the sea during its operation. However, there are areas within the combined fluvial/tidal floodplains of the River Ouse and River Trent, and Humber Estuary, which are at increased risk of flooding during the construction of the Project.

4.8.26 Reference should be made to the Flood Warning and Evacuation Plan (Appendix A of **Application Document 7.2 Outline Code of Construction Practice)** for further information on flood conditions within these higher risk areas. The data have been obtained from flood models provided by the Environment Agency.

4.8.27 Some of the third-party infrastructure works associated with the Project would be located within areas at higher risk of flooding. Risks during construction would be managed in line with the measures described below. Due to the nature of the works (largely undergrounding of cables), no change to the existing flood risk is anticipated once the third-party infrastructure works have been completed.

Construction Phase Risk Assessment

4.8.28 During construction, some of the works would take place within the floodplain (as defined by the Environment Agency flood model outputs), where the risk of flooding from rivers is defined as medium and high. However, commitments included in **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments**, and summarised in Table 3.1, would be put in place to manage fluvial and tidal flood risk during construction. These are secured by Requirements 4 and 5 respectively of **Application Document 3.1 Draft Development Consent Order**.

4.8.29 There would be a requirement to cross watercourses for temporary construction access tracks and to underground existing third-party infrastructure; however, flood risk effects would be avoided or controlled through commitments W04 and W13 and GG06 in **Application Document 7.3 Register of Environmental Actions and Commitments**. These commitments secure flood resilient construction access track design, use of clear span bridges or suitably assessed and approved alternatives (where required) and reinstatement of land at the end of construction. Information on the proposed watercourse crossings is included in **Application Document 6.4.A2 Environmental Statement Appendix 4.2 Indicative Bridge and Culvert Schedule**.

4.8.30 A small number of pylons and construction working areas would be located within areas at risk of flooding during defence overtopping in response to large (low annual chance) flood events (further detail provided in Appendix A Flood Compensation Storage Technical Note). There would also be a small number of laydown areas located within the floodplain, as well as some temporary drainage infrastructure. Given the nature and location of the Project, the overhead line could not avoid Flood Zone 2 and 3. The selection of the route corridor and the refinement of the alignment within that corridor was done via detailed routeing and siting studies and an iterative design process. More detail on the routeing and siting studies and iterative design process is provided in **Application Document 6.3 Environmental Statement Chapter 3 Main Alternatives Considered**. As recorded in commitment GG06 in Table 3.1, once the Project has been constructed, the working areas would be removed, and temporary land-take reinstated.

4.8.31 Effects on flood risk via impacts on flood defences during construction would be mitigated through commitment W10, which would safeguard the integrity of existing flood defences. These defences would be oversailed by the overhead line, with minimum buffers retained, and so there is no potential to cause any changes to their integrity.

4.8.32 The embedded mitigation and control and management measures would reduce the fluvial and tidal flood risk to the Project, as well as limit any flood risk impacts arising from Project construction activities.

Operational Phase Risk Assessment

4.8.33 During operation, the conductors would be elevated above ground.

4.8.34 Permanent above ground infrastructure for the Project on the floodplain would be limited to the pylons supporting the conductors. The requirements for compensation for loss of floodplain storage associated with the pylons is addressed in the following sub-section and secured by commitment W18 in **Application Document 7.3 Register of Environmental Actions and Commitments**.

4.8.35 The pylons would be resilient to fluvial and tidal flooding given their open, metal, lattice structure with the conductors carried by the pylons at heights significantly above anticipated flood depths. If the bases of the pylons were flooded, the Project would still be able to remain operational.

4.8.36 Furthermore, due to the open lattice design of the pylons and their small footprint at ground level, combined with their spacing over 300 m apart, constriction or blockage of floodplain flows is a very low risk.

4.8.37 There would be no permanent land raising within Flood Zone 3 (as secured in commitment W11), nor any permanent changes to the channel form of any watercourses, and land would be restored to pre-construction condition and use.

Compensatory Storage

4.8.38 As a response to the Environment Agency stipulation, detailed in Table 1.1, that compensatory storage for pylons within the floodplain would be required, a technical note was produced and shared with the Environment Agency (Appendix A Flood Compensation Storage Technical Note). The technical note sets out the approach for the assessment of storage losses which was accepted by the Environment Agency (as noted in Table 1.1).

4.8.39 The Environment Agency stipulated that consideration of compensatory storage for pylons was required where the pylons are located within the overtopping extents of defended rivers or where flow has the potential to be constricted in tidally dominated floodplains. A review was undertaken to identify pylons located within the fluvial and tidal floodplains of watercourses. Given the Project location on the floodplains of the Rivers Ouse and Trent, and Humber Estuary, detailed hydraulic flood modelling was requested from the Environment Agency. The models provided have been used in conjunction with the mapped extents from the Environment Agency Risk of Flooding from Rivers and Sea – Climate Change 1 mapping (Environment Agency, 2025). This data represents the latest available information on risk from this source accounting for predicted impacts of climate change on future risk.

4.8.40 The siting of pylons within the defended floodplain has largely been avoided along the Project route. Floodplain storage losses are therefore localised and very minor. Appendix A lists the pylons identified within the mapped flood extents and summarises the compensatory storage calculations that have been undertaken.

4.8.41 Floodplain storage compensation areas would be located on land outside of the floodplain (see Appendix A Flood Compensation Storage Technical Note for further detail), within the Order Limits. The proposed location of the compensation areas is shown on **Application Document 6.4.F1 Environmental Statement Figure 4.1 Proposed Project Design**. The compensation areas would be hydraulically linked to the area of loss, such that storage volume is replaced within the floodplain cell in which it is lost. The areas would also be designed to drain following a flood event. Given the very small volumetric losses (individually and cumulatively), it has been agreed with the Environment Agency that hydraulic modelling to demonstrate the effectiveness of the storage provision would not be required.

Conclusion

4.8.42 The FRA has concluded that the Project during its construction, while shown to be at high risk of fluvial flooding in localised areas, would have a medium vulnerability to flooding. Risks to temporary works in these areas would be reduced through embedded mitigation and control and management measures. These measures would also protect construction workers, limit damages to construction equipment and materials and also limit any impacts of the Project on fluvial flood risk.

4.8.43 During the operation (and maintenance) of the Project, there would be a low risk of fluvial flooding and there would be no increase in flood risk as a consequence of the Project's operation, subject to implementation of the recommended compensatory storage described.

4.9 Surface Water Flood Risk

Introduction

4.9.1 The Environment Agency Risk of Flooding from Surface Water Map (Environment Agency, 2025) is informed by direct rainfall modelling undertaken at a high (2 m) spatial resolution. It illustrates those areas at elevated risk of surface water flooding, in low spots down-gradient of sloping ground or in the topographic valleys associated with current or former watercourses.

4.9.2 As noted in Table 2.4, the mapping categorises land at high, medium, low, and very low risk of flooding.

4.9.3 The Risk of Flooding from Surface Water Map indicates surface water flood risk is variable along the Project as shown on **Application Document 6.11.F4 Environmental Statement Figure 11.4 Flood Risk Areas – Surface Water**. Most of the land within the Order Limits is shown to be at 'very low' risk of surface water flooding, but there are multiple areas shown to be at higher risk.

4.9.4 Due to the nature of the third-party infrastructure works, no operational effects on surface water flood risk are anticipated as they involve the undergrounding of assets, and further assessment has therefore been screened out.

Construction Phase Risk Assessment

4.9.5 Table 4.2 provides a summary of the Project interactions during construction with areas at 'high' and 'medium' risk of surface water flooding in the Environment Agency Risk of Flooding from Surface Water Map (Environment Agency, 2025).

Table 4.2 – Summary of Project interactions with areas at high and medium risk of surface water flooding – construction

Route Section	Nearest pylon location reference	Project component	Flood depths in the high-risk event (m)
A	4AF1	Construction access track	0.2 m – 0.3 m*
	4AF4	Construction access track	Less than 0.2 m
	4AF7	Construction access track	0.2 m – 0.3 m
	4AF14	Working area	Less than 0.2 m
	4AF18	Construction access track	0.2 m – 0.3 m, reaching between 0.3 m – 0.6 m in centre of flood extents
	4AF30	Bellmouth (BM-009)	0.2 m – 0.3 m
	4AF42	Construction access swathe and bellmouth (BM-018)	Less than 0.2 m
	4AF45	Third-party access track	0.3 m – 0.6 m
	4AF53	Working area	Less than 0.2 m
	4AF54	Working area	0.2 m – 0.3 m
	4AF56	Working area	Less than 0.2 m
	4AF59	Working area and construction access track	0.2 m – 0.3 m
	4AF60	Construction access track	Less than 0.2 m
	4AF61	Working area	Less than 0.2 m

Route Section	Nearest pylon location reference	Project component	Flood depths in the high-risk event (m)
	4AF62	Construction access track	Less than 0.2 m
	4AF63	Working area and construction access track	Less than 0.2 m
	4AF66	Working area	Less than 0.2 m
	4AF70	Construction access track and bellmouth (BM-037)	Less than 0.2 m*
	4AF71	Construction access track	Less than 0.2 m
	4AF73	Working area and construction access track	Less than 0.2 m
	4AF74	Construction access track	Less than 0.2 m
	4AF75	Working area	Less than 0.2 m
The Project components for Route Section A listed above are at both 'medium' and 'high' risk of surface water flooding: Construction access tracks, pylon working areas, bellmouths, third-party access track.			
B	4AF80	Construction access track	Less than 0.2 m
	4AF94	Working area	Less than 0.2 m
	4AF97	Working area and construction access track	Less than 0.2 m
	4AF98	Construction access track	Less than 0.2 m
	4AF99	Working area	Less than 0.2 m
	4AF100	Operation and maintenance access track	0.2 m – 0.3 m
	4AF113	Working area and construction access track	Less than 0.2 m
	4AF114	Working area and construction access track	Less than 0.2 m
The Project components for Route Section B listed above are at both 'medium' and 'high' risk of surface water flooding: Construction access tracks, pylon working areas, maintenance access track.			
C	4AF118	Construction access track	Less than 0.2 m
	4AF119	Construction access track	0.2 m – 0.3 m
	4AF120	Working area	Less than 0.2 m
The Project components for Route Section C listed above are at both 'medium' and 'high' risk of surface water flooding: Construction access tracks, pylon working areas.			

Route Section	Nearest pylon location reference	Project component	Flood depths in the high-risk event (m)
D	4AF130	Construction access track	Less than 0.2 m
	4AF132	Construction access track and operation and maintenance access.	0.2 m – 0.3 m
	4AF134	Operation and maintenance access track	0.3 m – 0.6 m
	4AF136	Construction access track	Less than 0.2 m
	4AF138	Construction access track	0.3 m – 0.6 m*
	4AF140	Working area	Less than 0.2 m
	4AF143 – 4AF144	Working area, construction access track, bridge working area (BC-04), maintenance access track	Typically, less than 0.2 m, some areas reaching between 0.2 m – 0.3 m
	4AF145	Construction access track and bellmouths (BM-075, BM-073, BM-077)	Typically, 0.2 m – 0.3 m, reaching between 0.3 m – 0.6 m
	4AF149	Working area	0.2 m – 0.3 m
	4AF150	Working area, construction access track	Less than 0.2 m
	4AF154	Working area, construction access track, operation and maintenance access track, bellmouth (BM-082)	0.3 m – 0.6 m
	4AF155	Working area, construction access track	Less than 0.2 m
	4AF168	Working area	Less than 0.2 m
	4AF169	Working area and construction access track	Less than 0.2 m
	4AF171	Construction access track, operation and maintenance access track	Less than 0.2 m
The Project components for Route Section D listed above are at both 'medium' and 'high' risk of surface water flooding: Construction access tracks, pylon working areas, bellmouths, maintenance access track, bridge working area.			
E	4AF172	Working area	Less than 0.2 m
	4AF175	Construction access track	Less than 0.2 m
	4AF177	Working area, construction access track, bellmouth (BM-096)	0.2 m – 0.3 m
	4AF178	Construction access track	Less than 0.2 m

Route Section	Nearest pylon location reference	Project component	Flood depths in the high-risk event (m)
	4AF180	Operation and maintenance access track	0.2 m – 0.3 m
	4AF181	Working area, construction access track, operation and maintenance access track	Typically, 0.2 m – 0.3 m, reaching between 0.3 m and 0.6 m
	4AF182	Construction access track	0.2 m – 0.3 m*
	4AF183	Working area	Less than 0.2 m
	4AF184	Construction access track	0.2 m – 0.3 m*
	4AF185	Bridge working area (B-08), construction access track	0.3 m – 0.6 m**
	4AF187	Bellmouth (BM-097, BM-098)	Less than 0.2 m
	4AF191	Bellmouth (BM-099)	Less than 0.2 m
	4AF194	Working area, construction access track, operation and maintenance access track	Less than 0.2 m
	4AF195	Construction access track	Less than 0.2 m
	4AF203	Working area, construction access track, operation and maintenance access track	0.2 m – 0.3 m
	4AF205	Construction access track	0.2 m – 0.3 m
	4AF206	Construction access track	0.2 m – 0.3 m
	4AF208	Construction access track	Less than 0.2 m
	4AF212	Working area, construction access track, operation and maintenance access track	0.2 m – 0.3 m
	4AF213	Construction access track	Less than 0.2 m
	4AF214	Construction access track	Less than 0.2 m
	4AF217	Construction access track	0.3 m – 0.6 m*
	4AF221	Construction access track	0.3 m – 0.6 m*
	4AF222	Construction access track	Typically, less than 0.2 m, small area reaching between 0.2 m and 0.3 m
	4AF235	Bellmouth (BM-004, BM-023)	0.3 m – 0.6 m

Route Section	Nearest pylon location reference	Project component	Flood depths in the high-risk event (m)
	4AF236	Operation and maintenance access track	0.2 m – 0.3 m
	4AF245	Construction access track	0.3 m – 0.6 m**
The Project components for Route Section E listed above are at both 'medium' and 'high' risk of surface water flooding: Construction access tracks, pylon working areas, bellmouths, maintenance access track, bridge working area.			
F	4AF250	Construction access track	Less than 0.2 m
	4AF251	Working area, construction access track, operation and maintenance access track	Less than 0.2 m
	4AF256	Bellmouth (BM-054)	0.2 m – 0.3 m
	4AF258 and 4AF259	Working area	Less than 0.2 m
The Project components for Route Section F listed above are at both 'medium' and 'high' risk of surface water flooding: Construction access tracks, pylon working areas, bellmouths, maintenance access track.			

**drain/watercourse culverted beneath Project components*

*** drain/watercourse crossed by clear span bridge*

4.9.6 During construction, activities would include topsoil stripping and excavation and construction of temporary access tracks and temporary construction compounds, which could temporarily change existing land surface permeabilities and influence the rainfall runoff regime. Also, there is potential for existing land drainage systems to be disrupted.

4.9.7 **Application Document 7.2 Outline Code of Construction Practice** and Application **Document 7.3 Register of Environmental Actions and Commitments** include mitigation measures to reduce the impacts of these activities on land drainage and surface water flood risk.

4.9.8 As per commitment W20, the appointed Main Works Contractor(s) would prepare a Construction Surface Water Management Plan which would demonstrate how runoff across the site will be controlled to prevent any off-site increases in flood risk and/or pollution, including consideration of exceedance flow routes. Commitment W12 states that where construction activities take place within surface water flood zones, including statutory undertaker works, appropriate site drainage would be put in place prior to works commencing. Further, suitable materials would be used to surface the construction access tracks, and the construction access tracks would have suitable drainage provisions, as per commitments W05, W13 and DE18.

4.9.9 As per commitment GG26, appropriate technology/material will be installed in areas where heavy equipment would be used to reduce disturbance to the ground and minimise impacts on the existing land drainage. **Application Document 7.5 Outline Soil Management Plan** also includes measures to help minimise impacts on the existing land drainage regime.

4.9.10 Commitment AS04 states that replacement drainage schemes would be installed where appropriate. A specialised drainage contractor(s) would review the drainage designs and provide advice to National Grid and the Main Works Contractor(s) during all relevant construction and reinstatement activities.

4.9.11 Additional information regarding the proposals for surface water management during the construction phase of the Project, with supporting calculations, is provided in Appendix B Framework Construction Surface Water Management Plan.

4.9.12 Based on the surface water drainage calculations undertaken, there is enough space within the Order Limits to accommodate the required drainage features.

Operational Phase Risk Assessment

4.9.13 The majority of the permanent Project infrastructure would be located outside of the areas shown to be at 'high' risk of surface water flooding in the Environment Agency Risk of Flooding from Surface Water Map (Environment Agency, 2025). There are 34 pylons and their associated working areas which are located in areas of 'high' risk of surface water flooding. The remaining 227 pylons are located outside of areas of 'high' risk.

4.9.14 Following post-construction reinstatement of construction work sites, the land drainage regime would revert essentially to the pre-development condition. The very small (approximately 1 m^2 footprint) concrete muff feet of the pylons would shed rainfall onto the ground adjacent, which would soak away. No formal drainage is proposed to serve these areas.

4.9.15 The measures described would manage surface water runoff and potential effects on the land drainage regime such that the Project is not anticipated to increase surface water flood risk during its operational lifetime. The Project itself during its operation would be of low vulnerability to surface water flooding.

Conclusion

4.9.16 The Project is generally at low risk of surface water flooding. There are localised areas of medium and high risk of surface water flooding associated with low points in the relatively flat topography across the Project, and where surface water flow routes and small land drains are crossed by the Order Limits. Surface water flood depths are typically less than 0.2 m During construction, surface water flood risk would be managed via a Construction Surface Water Management Plan, in accordance with Appendix B Framework Construction Surface Water Management Plan and secured via Requirement 11 of **Application Document 3.1 Draft Development Consent Order**. The Project is at low vulnerability to surface water flooding during its operation.

4.9.17 This FRA has concluded that there would not be an increase in surface water flood risk elsewhere as a consequence of the Project during its construction or operation (and maintenance), subject to implementation of the measures described.

4.10 Groundwater Flood Risk

Introduction

4.10.1 Groundwater flooding risk is not as well defined as other sources of flooding, as an assessment of risk often requires consideration of geological conditions. Groundwater flooding can occur from two general mechanisms:

- Clearwater flooding – where the water table in unconfined aquifers rise above the ground surface, associated with permeable bedrock such as chalk and common in areas where winterbourne streams are present, which may run dry for much of the year.
- River groundwater interaction – where river levels interact with permeable superficial deposits along river valleys, potentially flooding areas away from the river without necessarily overtopping the banks.

4.10.2 As part of the Environmental Statement, a groundwater risk assessment for the whole Project has been undertaken, including consideration of third party works, to identify where additional, more detailed, hydrogeological risk assessment may be required during the detailed design stage of the Project. The groundwater risk assessment is reported in **Application Document 6.12.A4 Environmental Statement Appendix 12.4 Preliminary Qualitative Groundwater Risk Assessment** and a summary of its conclusions is provided below.

4.10.3 For large areas of the new overhead line, groundwater is anticipated to be below the base of the relatively shallow excavations required to construct the pylon bases. Therefore, in conjunction with the relatively small footprint of such excavations, large scale dewatering (where groundwater is actively lowered but below a specific pre planned level) is not anticipated to be required. Consequently, changes to groundwater levels and flows are not anticipated.

4.10.4 The risk assessment has also considered the potential for ground disturbance during construction to create new groundwater flow pathways, for example where permeable materials or flow routes are introduced through trenches or permeable backfill material. The assessment concludes that due to the shallow depth of the excavations required and the anticipated depth of the groundwater (below the base of the excavations), new connections between existing aquifer units are unlikely as a result of excavations.

4.10.5 There a several locations where the foundations for the pylons may require piling. In these locations, there is the potential for ground disturbance and creation of new groundwater flow pathways. However, the effects of piling on groundwater pathways were scoped out of the assessment presented in **Application Document 6.12 Environmental Statement Chapter 12 Geology and Hydrogeology.** As such, piling is considered to have a negligible impact on groundwater flood risk.

4.10.6 Low-lying rural areas within the Order Limits are identified in the LLFA documents reviewed to inform this FRA (see sections 4.1 to 4.5 of this FRA) as being at an elevated risk of groundwater flooding, due to the flat, low-lying topography and proximity to large rivers.

4.10.7 In areas where ground conditions are suitable, infiltration drainage features will be adopted to discharge surface water runoff generated from impermeable surfaces introduced by the Project back to ground. These features would be designed with

suitable capacity to prevent any groundwater afflux. In areas where surface water attenuation basins are proposed, where necessary these would be lined to prevent groundwater ingress. This would avoid any impact on groundwater flood risk locally and from groundwater–surface water interaction.

Construction Phase Risk Assessment

4.10.8 It is considered that the construction of the Project is unlikely to increase flood risk from groundwater and, given the control and management measures that would be in place, the Project is anticipated to be at low vulnerability to flooding from groundwater during its construction.

Operational Phase Risk Assessment

4.10.9 The Project is considered to be of low vulnerability to groundwater flooding during operation (and maintenance).

4.10.10 The risk of groundwater flooding along the majority of the Project is low. There are areas which are underlain by a Principal Aquifer, as outlined in section 3.5, which would have an increased presence of groundwater in the bedrock and therefore an increased risk of groundwater flooding, given there are no superficial deposits overlying the bedrock in this area of the Project. There are also areas of superficial deposits within the Order Limits that support minor aquifers, with an associated risk of groundwater emergence. Much of the Project would be located on low-lying, flat, rural, defended fluvial floodplains, where there is an elevated risk of groundwater emergence. However, the proposed Project infrastructure is resilient to this form of flooding.

4.10.11 Furthermore, the new pylons would have concrete foundations. The effect of these foundations on groundwater flows would be very localised. It has been assessed that any impact on groundwater flooding would be negligible, and any groundwater present above ground would be attenuated by surrounding reinstated vegetation and would soak back into the ground.

Conclusion

4.10.12 Overall, the Project is at low risk of groundwater flooding, and neither construction activities nor the operation of the Project are anticipated to increase the risk of flooding from this source.

4.11 Summary of Potential Flood Sources

4.11.1 Table 4.3 provides a summary of the relative risk from all sources of flooding for both construction and operational phases.

Table 4.3 – Summary of relative risk of flooding from all sources

Source	Degree of hazard[3]	Comments
Fluvial	Construction: medium	Construction: largely medium risk due to presence of Order Limits within floodplains of the Rivers Ouse and Trent.
	Operation: low	Operation: no permanent changes to watercourses or their flow regimes. Compensatory storage provided for the minimal losses of floodplain storage associated with new pylons.
Tidal/coastal	Construction: medium	Construction: works proposed within tidally dominated floodplains.
	Operation: low	Operation: compensatory storage provided for the minimal losses of floodplain storage associated with new pylons.
Surface water	Construction: low to medium/high locally	Construction: largely low risk, with some areas at higher risk.
	Operation: low	Operation: majority of Project infrastructure is at low risk. Measures would be in place to manage surface water runoff and minimise impacts on the land drainage regime.
Groundwater	Construction: medium to low	Construction: limited groundwater interactions but Order Limits situated on land at an elevated risk of groundwater flooding locally.
	Operation: low	Operation: the Project is of low vulnerability to this source of flooding. No changes to groundwater flood risk expected due to operation (and maintenance) of the Project.

4.11.2 Table 11.10 in **Application Document 6.11 Environmental Statement Chapter 11 Water Environment** describes a range of potential design scenarios. These, for example, allow for flexibility to provide the future detailed design and build Main Works Contractor(s) with sufficient scope for 'value engineering' through innovative design and/or construction techniques and to respond to unknown information such as ground conditions.

4.11.3 The described scenarios have been reviewed and the potential for any of these to have the potential to result in new or different flood risk impacts has been appraised. The FRA concludes that with the implementation of the control and management measures and controls (described in Table 3.1), no new or different impacts are anticipated, including in scenarios where the Project interacts with other development schemes.

[3] Low hazard = where the Project is not vulnerable to flooding and where the likelihood of flooding is infrequent/associated with a large (rare) event magnitude. Medium hazard = where the likelihood of flooding is uncommon but is associated with more moderate magnitude events. High hazard = the Project is vulnerable to disruption due to flooding without suitable controls in place and the likelihood of flooding is common, linked to frequent flood events.

5. Planning Requirements

5.1 The Sequential Test

5.1.1 Section 2 of this FRA sets out the requirements of the Sequential and Exception Tests. This section summarises how these tests have been met.

5.1.2 Being a Nationally Significant Infrastructure Project for energy transmission, the Project is classed as essential infrastructure. Development is appropriate for essential infrastructure in Flood Zones 1 and 2. Where the development is located in Flood Zone 3, the Exception Test needs to be applied.

5.1.3 Given the linear nature of the Project, its large geographical scale, and its location, avoidance of all areas of fluvial/tidal floodplain and areas at high/medium risk of surface water flooding is not practicable. Works in these areas however would be largely temporary, associated with construction of the Project. During its operation, permanent project infrastructure would be limited to a small number of pylons, that are of low vulnerability to inundation. Maintenance staff can additionally time visits to the Project to avoid times of flooding.

5.2 The Exception Test

5.2.1 The Exception Test is required only for the Project infrastructure which is located within Flood Zone 3.

5.2.2 As outlined in Policy F6 of the NPPF (Ministry of Housing, Communities and Local Government, 2026), an Exception Test is required to prove:

- The development provides wider sustainability benefits to the community, that outweigh flood risk; and
- The development will be safe for its lifetime, taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

5.2.3 With regard to the first part of the test, the Project is a Nationally Significant Infrastructure Project that would play an important role in delivering renewable electricity efficiently, reliably and safely and would support the UK's move towards net zero. This is further described in **Application Document 7.17 Strategic Options Report Including Needs Case.**

5.2.4 With regard to the second part of the test, permanent Project infrastructure which lie within areas at risk of fluvial or tidal flooding comprise a small number of pylons. These pylons are resilient to flooding, given their concrete bases and metal lattice structures would not be impacted by floodwaters and so ensure the Project would be safe and could continue to operate in times of flood. A suite of measures would be adopted, as described in Table 3.1, to prevent flood risk increases during construction and operation of the Project. Temporary worksites where there is a risk of flooding from surface water or tidal/fluvial sources would operate in accordance with the protocols detailed in a Flood Warning and Evacuation Plan (in **Application Document 7.2 Outline Code of Construction Practice)** which is secured by

Requirement 4 of **Application Document 3.1 Draft Development Consent Order**, to safeguard construction personnel and prevent flood damages to construction equipment and materials.

5.2.5 The flood storage compensation proposals outlined in Appendix A Flood Compensation Storage Technical Note provides evidence that the Project, on the implementation of flood compensation areas within the same floodplain cell, will not increase the overall water level and therefore does not increase flood risk elsewhere. Furthermore, a conservative approach to calculating floodplain storages losses was taken, meaning the suggested volume for compensation areas likely exceeds the requirement. As such, there is the opportunity for the Project to reduce flood risk overall via these floodplain storage compensation areas.

5.2.6 The Exception Test is therefore concluded to be satisfied, as the Project would bring significant benefits via its delivery of safe, reliable, and renewable electricity; would not result in an increase in flood risk elsewhere; and has been designed to be resilient to flooding throughout its lifetime.

6. Conclusion

6.1.1 This FRA has been carried out in accordance with National Policy Statements EN-1 (Department for Energy Security and Net Zero, 2025) and EN-5 (Department for Energy Security and Net Zero, 2025). Reference has also been made to the NPPF (Ministry of Housing, Communities and Local Government, 2026) and the associated PPG (Ministry of Housing, Communities and Local Government, 2025) for additional guidance regarding flood risk and development.

6.1.2 This FRA has been informed through consultation with key stakeholders, including the Environment Agency, East Riding of Yorkshire Council, North Lincolnshire Council, and Nottinghamshire County Council.

6.1.3 This FRA has focused on fluvial, pluvial (surface water), tidal, and groundwater flood risk. The Project has no potential to contribute to flood risk from sewers, reservoirs or other artificial sources, and so they have been considered in less detail.

6.1.4 The predicted impacts of climate change have been included in the assessment. These include increases to peak flows, with respect to fluvial and tidal flooding, and increased rainfall intensity, with respect to surface water flooding.

6.1.5 A sequential approach has been taken in siting the Project infrastructure. However, due to the linear nature of the Project, its large geographical scale, and its location, parts of the Order Limits necessarily encroach into areas with a medium or high likelihood of flooding. This triggers the NPPF (Ministry of Housing, Communities and Local Government, 2026) Exception Test, and evidence of satisfying the requirements which must be met in respect of the part(s) of the Project that lie within these areas has been presented in this FRA.

6.1.6 National Grid has made a number of commitments around flood risk management measures and land drainage. These are documented in **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments**.

6.1.7 Flood risk to and arising from the Project during construction has been assessed and the following has been concluded:

- Parts of the Project are at medium and high risk of fluvial and tidal flooding due to temporary works being located within main river floodplains, namely the Humber, Ouse, Trent and Torne floodplains. These risks would be reduced through embedded mitigation and control and management measures which include managing these worksites in accordance with a Flood Warning and Evacuation Plan as outlined in **Application Document 7.2 Outline Code of Construction Practice**. These measures would protect workers, limit damages to construction equipment and materials and also limit any impacts of the Project on flood risk.
- With respect to surface water flooding, the Project is considered to be largely at low risk, with some areas at higher risk. Measures would be in place to manage surface water runoff and minimise impacts on land drainage regimes across the Project.

- The Project is considered to be at medium to low risk of groundwater flooding as it is mostly sited on low-lying, rural main river floodplains. Dewatering arrangements will mitigate this risk during the construction phase of the Project.

6.1.8 During the operational phase, the Project is considered to be at low risk of flooding from all sources assessed in this FRA due to the mitigation measures built into its design. The Project is not anticipated to increase flood risk elsewhere during its operation as any losses of floodplain storage would be compensated for. New impermeable surfaces would be very localised to pylon bases and rainfall runoff from these areas would be attenuated by surrounding reinstated vegetation and would soak back into the ground. Further details on the proposals for compensatory storage have been included in this FRA.

6.1.9 In conclusion, this FRA demonstrates that the requirements of EN-1 (Department for Energy Security and Net Zero, 2025), EN-5 (Department for Energy Security and Net Zero, 2025) and the NPPF (Ministry of Housing, Communities and Local Government, 2026) and its associated PPG (Ministry of Housing, Communities and Local Government, 2025) with respect to flood risk have been met. The flood risk management measures identified are secured through Schedule 2 of **Application Document 3.1 Draft Development Consent Order**. It is also concluded that there would be no new or different impacts associated with the LoD or design scenarios set out **Application Document 6.4 Environmental Statement Chapter 4 Description of the Project**, including in scenarios where the Project interacts with other development schemes.

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Appendix A Flood Compensation Storage Technical Note

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Appendix A
Flood Compensation Storage Technical Note

A.1 Introduction

A.1.1 This technical note has been produced as Appendix A of **Application Document 7.13 Flood Risk Assessment** (FRA) setting out the outline approach taken to quantify interactions between operational Project infrastructure and floodplains, including a review of whether floodplains are defended, and whether they are tidally or fluvially dominated. This information has subsequently informed an assessment of floodplain storage losses and impacts on baseline flood water levels, and a strategy for the provision of compensation to offset losses and impacts.

Project Description

A.1.2 The Project is a new 400 kilovolt (kV) electricity transmission connection of approximately 90 kilometres (km) in overall length between two proposed new substations: the 400 kV Birkhill Wood Substation and 400 kV High Marnham Substation.

A.1.3 The proposed new substations are subject to separate planning applications. For more information, see **Application Document 5.4 Consents and Licences Required Under Other Legislation**.

A.1.4 The Project comprises:

- Approximately 90 km of new overhead line (Route Code 4AF) between the proposed new 400 kV Birkhill Wood Substation and 400 kV High Marnham Substations;
- Replacement and re-alignment of a section of the existing 400 kV overhead line (Route Code 4ZQ) between Brantingham and east of Broomfleet;
- Replacement and re-alignment of a section of the existing 400 kV overhead line (Route Code ZDA) between Ealand and west of Keadby;
- Line entry connections to a proposed new 400 kV Birkhill Wood Substation;
- Line entry connections to a proposed new 400 kV High Marnham Substation; and
- The Project would include other required works, for example, temporary diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites and ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for environmental mitigation, offsetting, compensation and Biodiversity Net Gain (BNG).

A.1.5 A full description of the Project is provided in **Application Document 6.4 Environmental Statement Chapter 4 - Description of the Project**.

A.1.6 Operational infrastructure consists only of new pylons, which are flood resilient by design and classified as essential infrastructure under the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2026), with an operational lifetime of 40 years. The pylons are open lattice structures,

as illustrated in Image A.1, with a small ground level footprint, allowing water to move beneath/through them, preventing flow path obstructions.

Image A.1 – Photograph of steel lattice pylon and foundational muff



A.2 Environment Agency Engagement

A.2.1 Engagement on the topic was undertaken with the Environment Agency on 7 August 2025 and 12 September 2025 via virtual meetings. The comments provided by the Environment Agency relevant to this technical note are summarised in Table A.1

Table A.1 – Summary of engagement regarding floodplains and compensation

Environment Agency comment	Response
Compensation storage is not required in tidally dominated floodplains, unless flow is constricted.	Once flood defences are overtopped, tidal floodplains are expansive, given the relatively flat and uniform topography in large parts of the Project boundary (Order Limits). As such, compensation is not proposed for operational infrastructure within tidally dominated areas (see section A.2).
Pylons affected only by tidal influence should be distinguished from those in areas of mixed or fluvial dominant floodplains.	Table A.3 distinguishes between tidally dominated and mixed/fluvial floodplains.
Cumulative floodplain impacts should be considered, even if the individual pylon losses are minimal.	Losses per pylon have been calculated, as well as cumulative losses and impacts per floodplain cell (see section A.3).
In defended fluvial floodplains, pylons avoiding defence overtopping areas during modelled design flood event extents do not require compensation.	Modelling outputs have been reviewed for the 1 in 100 year plus climate change event. Compensation has been calculated for those pylons within the modelled overtopping extents of defended fluvial floodplains.

Flood Data Summary

A.2.2 Data from several flood models, the domains of which cover the Order Limits, have been provided by the Environment Agency and are summarised below.

A.2.3 To the north of Gainsborough, the River Trent is tidally dominated and the River Ouse in the reach that flows through the Order Limits is estuarine, with minimal fluvial influence. The River Thorne floodplain is influenced by mixed sources of flood risk.

Table A.2 – Summary of flood model data

Model name	Year model produced	Available data
Tidal Trent	2022	Defended Fluvial 100-year with higher central climate change (29% allowance)
		Defended Tidal 200-year 2071 higher central climate change allowance
River Torne	2025	Defended Fluvial 100-year 2080s higher central
Upper Humber	2016	Defended Tidal 1,000 year Defended Fluvial 1,000 year

A.2.4 The NPPF (Ministry of Housing, Communities and Local Government, 2026) advises application of the higher central climate change allowance for essential infrastructure development in Flood Zone 3. The Order Limits span two climate change management catchments. To the south of the Ouse the Project is in the Lower Trent and Erewash management catchment, where the allowance is equal to a 23% uplift on river flows for the 2050s epoch. To the north of the Ouse the Project is in the Hull and East Riding management catchment, where a 17% uplift is recommended. Where the models do not provide results for current climate change allowances, proxy data have been adopted, from the 1,000-year flood simulations.

A.2.5 The modelled flood extents were overlain with the Order Limits and proposed pylon locations to identify pylons within overtopping flood extents. In these locations, flood depth data from National Flood Risk Assessment 2 (NaFRA2) (Environment Agency, 2025) climate change dataset were used to inform the assessment.

A.3 Summary of Project Infrastructure within Overtopping Extents

A.3.1 Table A.3 presents a summary of all operational (permanent) Project infrastructure within modelled flood extents. Where Project infrastructure lies within multiple floodplains this has been noted below Table A.3.

Table A.3 – Summary of Project infrastructure within overtopping flood extents

Watercourse floodplain	Pylon reference number	Infrastructure type (quantity)
Humber Tidal	4AF56 – 4AF91	Pylon (36)
	4AF95 – 4AF98	Pylon (4)
Humber Fluvial*	4AF68	Pylon (1)
	4AF75 – 4AF77	Pylon (3)
Trent Tidal**	4AF95 – 4AF98	Pylon (4)
	4AF110 – 4AF112	Pylon (3)
Trent Fluvial	4AF160, 4AF161	Pylon (2)

** all pylons also encompassed by the Humber Tidal extents*

*** four pylons also included in Humber Tidal extents*

A.3.2 Within the Trent Fluvial flood extents there are four pylons (4AF124, 125, 127 and 128). However, the Trent model outputs in this location are conservative as the model simulates the pumping stations at Keadby, which govern interactions between flows in the Trent and the Three Rivers (comprising the River Torne, Hatfield Waste Drain, and the South Engine Drain) being switched off. A more representative assessment of flood risk in this location is provided by outputs from the River Torne model, and it is confirmed that there are no pylons located within the flood extent outputs from this model.

A.3.3 There are two pylons (4AF160 and 4AF161) located in flood extents from the Trent Fluvial model associated with the Warping Drain.

A.4 Calculations of Floodplain Storage Loss

A.4.1 Where depth data were not provided with the models supplied by the Environment Agency, predicted flood depths for the overtopped extents have been taken from NaFRA2 for the 'low' risk event. Given the operational life span of the Project, the NaFRA2 climate change scenario was used to reflect predicted changes to flood risk in the future.

A.4.2 All of the pylons within the modelled overtopping extents are of a steel lattice type with four feet embedded into a foundational muff (see Image A.1)

A.4.3 For all except two pylons (4AF77 and 4AF78), the foundational muffs each measure 1 m^2, with each pylon therefore having a total footprint at ground level of 4 m^2. Pylons 4AF77 and 4AF78 are the Ouse crossing towers and are therefore larger. A conservative estimate of 12 m^2 per leg, equalling 48 m^2 per tower, has been assumed for these two pylons.

Calculation of Storage Losses

A.4.4 The volume of floodplain storage loss is a function of the above ground footprint of the pylons and the floodwater depth, whereby:

A.4.5 Storage Loss (m^3) = Pylon Footprint (m^2) * Flood Depth (m)

A.4.6 Pylon footprints were calculated as described in paragraph A.4.3. Above the muff, storage losses would be negligible due to the lattice design.

A.4.7 The depth of floodwaters that would be experienced varies according to pylon location. Across the pylon locations assessed, predicted flood depths range from less than 0.2 m to greater than 1.2 m. Where predicted flood depths are greater than 1 m, a 1 m flood depth has been used in the calculations, as the height of the pylon muff would be exceeded and the pylon steel lattice results in negligible losses.

A.4.8 For this assessment, calculations have been completed for pylons individually (see Table A.4, Table A.5, Table A.6 and Table A.7) as well as cumulatively within the relevant floodplain cells.

Table A.4 – Humber Tidal floodplain losses

Pylon	Predicted flood depth (m)	Ground level pylon footprint (m^2)	Floodplain volume loss (m^3)
4AF56	0.6	4	2.4
4AF57	0.6	4	2.4
4AF58	1	4	4
4AF59	1	4	4
4AF60	1	4	4
4AF61	1	4	4
4AF62	1	4	4
4AF63	1	4	4
4AF64	1	4	4
4AF65	1	4	4
4AF66	1	4	4
4AF67	1	4	4
4AF68	1	4	4
4AF69	1	4	4
4AF70	0.6	4	2.4
4AF71	0.9	4	3.6
4AF72	0.9	4	3.6
4AF73	1	4	4
4AF74	1	4	4
4AF75	1	4	4

Pylon	Predicted flood depth (m)	Ground level pylon footprint (m^2)	Floodplain volume loss (m^3)
4AF76	0.6	4	2.4
4AF77	1	48	48
4AF78	0.2	48	9.6
4AF79	0.9	4	3.6
4AF80	0.6	4	2.4
4AF81	0.9	4	3.6
4AF82	0.9	4	3.6
4AF83	0.6	4	2.4
4AF84	0.9	4	3.6
4AF85	1	4	4
4AF86	1	4	4
4AF87	1	4	4
4AF88	1	4	4
4AF89	1	4	4
4AF90	1	4	4
4AF91	1	4	4
4AF95	1	4	4
4AF96	1	4	4
4AF97	1	4	4
4AF98	1	4	4
Total volume of floodplain loss (m^3)			**197.6**

Table A.5 – Humber Fluvial floodplain storage losses

Pylon*	Predicted flood depth (m)	Ground level pylon footprint (m^2)	Floodplain volume loss (m^3)
4AF68	1	4	4
4AF75	1	4	4
4AF76	0.6	4	2.4
4AF77	1	48	48
Total volume of storage loss (m^3)			**58.4**

**all above are within Humber Tidal floodplain*

Table A.6 – Trent Tidal floodplain losses

Pylon	Predicted Flood Depth (m)	Ground Level Pylon Footprint (m^2)	Floodplain Volume Loss (m^3)
4AF95	1	4	4
4AF96	1	4	4
4AF97	1	4	4
4AF98	1	4	4
4AF110	1	4	4
4AF111	1	4	4
4AF112	1	4	4
Total volume of floodplain storage loss (m^3)			**28**

Table A.7 – Trent Fluvial floodplain losses

Pylon	Predicted Flood Depth (m)	Ground Level Pylon Footprint (m^2)	Floodplain Volume Loss (m^3)
4AF160	0.6	4	2.4
4AF161	0.6	4	2.4
Total volume of floodplain storage loss (m^3)			**4.8**

A.4.9 The Humber and Trent floodplains, which are fluvial/mixed, would be subject to very minor cumulative floodplain volume loss due to pylon construction. Consequent impacts on flood levels in the relevant cells of these floodplains have been calculated, and water level increases would be limited to less than 1 mm, which is not a material impact.

A.5 Approach to Floodplain Loss Compensation

A.5.1 Across relevant floodplain cells of the Humber and Trent fluvial overtopping extents, water level increases due to operational Project infrastructure are less than 1 mm. However, guidance set out in the NPPF (HM Government, 2026) and accompanying flood risk and coastal change Planning Practice Guidance (Ministry of Housing, Communities and Local Government, 2026) indicates that floodplain compensation storage should be provided to mitigate for any increase in flood risk. Further, the National Policy Statement for energy (EN-1) (Department for Energy Security and Net Zero, 2025) outlines that where a development may result in an increase in flood risk elsewhere through the loss of flood storage, on site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided (EN-1, paragraph 5.8.30).

A.5.2 The storage area should be hydraulically connected to the same floodplain cell in which the loss occurs and as a minimum, should be provided on a volume for volume basis. Proposed areas in which to provide compensation are illustrated in **Application Document 6.4.F1 Figure 4.1 Proposed Project Design.**

A.6 Conclusions

A.6.1 The siting of pylons within fluvial floodplains is minimal along the Project route. Floodplain storage losses are therefore localised and very minor.

A.6.2 Within the Order Limits, there is sufficient space to create the necessary compensation areas within the floodplain cells where storage is lost.

Appendix B Framework Construction Surface Water Management Plan (CSWMP)

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The Great Grid Upgrade

North Humber to High Marnham

NHHM-AEC-CNS-REP-0143

North Humber to High Marnham

Volume 7: Other Documents

Document Number 7.13 Flood Risk Assessment Appendix B - Framework Construction Surface Water Management Plan (CSWMP)

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Executive summary

National Grid Electricity Transmission plc (National Grid) is developing the North Humber to High Marnham Project (the Project), a proposed new 400 kV electricity transmission connection between East Riding of Yorkshire and Nottinghamshire. The Project would reinforce the national electricity transmission network, enabling the connection of new low carbon energy generation and supporting the delivery of the UK Government's clean power and net zero ambitions. The Project is a Nationally Significant Infrastructure Project (NSIP) for which development consent is being sought through a Development Consent Order (DCO) under the Planning Act 2008 (HM Government, 2008). It is recognised as a critical reinforcement to provide the network capacity required to meet future electricity demand and support the transition to a low-carbon energy system.

Purpose of this Framework

This Framework Construction Surface Water Management Plan (CSWMP) has been prepared for the North Humber to High Marnham (NHHM) Project (the Project). The purpose of this framework is to demonstrate how surface water runoff, flood risk and water quality will be managed during the construction phase of the Project. This CSWMP has been developed based on the information available at the application stage and will be developed further by the appointed Main Works Contractor(s) as construction methodologies, phasing and site layouts are finalised. It is assumed that construction activities will be undertaken in accordance with relevant legislation, permits, consents and environmental commitments.

Construction Surface Water Management Strategy

The Project comprises approximately 90 km of proposed overhead line infrastructure and associated works. The Project is located within the administrative boundaries of East Riding of Yorkshire Council, North Lincolnshire Council and Bassetlaw District Council, which forms part of the two tier local government authority area of Nottinghamshire, where Nottinghamshire County Council is the upper tier authority. Construction activities have the potential to generate sediment-laden runoff, increase flood risk and adversely affect surface water and groundwater receptors if not appropriately managed. This framework sets out the measures required to manage these risks throughout the construction phase. The drainage strategy is based on the separation of clean and dirty water, attenuation and treatment of runoff, protection of existing drainage systems and implementation of sustainable drainage principles. Temporary drainage measures may include cut-off ditches, swales, filter drains, settlement ponds, attenuation basins, check dams and silt control measures, selected according to local site conditions and environmental sensitivities.

Flood Risk and Environmental Protection

The construction surface water management strategy has been developed to ensure there is no increase in flood risk on or off site, whilst protecting surface water and groundwater quality throughout construction. Existing drainage systems, field drains, ditches and flow routes will be maintained wherever practicable, with any temporary modifications mitigated and reinstated following completion of the works. Particular consideration has been given to sensitive receptors along the route, including ordinary watercourses, Internal Drainage Board (IDB) drains, canals, groundwater bodies, aquifers and Groundwater Source Protection Zones. This framework defines requirements for temporary drainage design, pollution prevention, dewatering, watercourse crossings, monitoring, inspection and incident response to minimise environmental impacts and maintain compliance with regulatory requirements.

Implementation and Compliance

Implementation of the CSWMP will be the responsibility of the appointed Main Works Contractor(s), who will develop detailed construction-phase drainage arrangements and method statements in accordance with the principles contained within this framework. Temporary drainage systems will be monitored, maintained and adapted throughout the construction programme to reflect changing site conditions and construction activities. The measures outlined within this framework provide a framework for managing construction surface water in a controlled and environmentally responsible manner, ensuring that drainage systems remain effective, sensitive receptors are protected and disturbed drainage features are reinstated following completion of the works.

1. Introduction

1.1 Overview

1.1.1 This Framework Construction Surface Water Management Plan (CSWMP) sets out the measures proposed to manage surface water runoff during construction of the North Humber to High Marnham (NHHM) Project. The Project is located within the administrative boundaries of East Riding of Yorkshire Council, North Lincolnshire Council and Bassetlaw District Council, which forms part of the two tier local government authority area of Nottinghamshire, where Nottinghamshire County Council is the upper tier authority. This CSWMP is a framework for application stage; the Main Works Contractor(s) will develop and comply with the construction-stage CSWMP as per W20 within **Application Document 7.3 Register of Environmental Actions and Commitments**.

1.1.2 A full description of the Project is provided in **Application Document 6.4 Environmental Statement Chapter 4 Description of the Project**.

1.1.3 The purpose of this framework CSWMP is to prevent pollution, mitigate flood risk, and ensure compliance with relevant environmental legislation and planning requirements, including the use of Sustainable Drainage Systems (SuDS), the CIRIA SuDS Manual (C753) (CIRIA, 2015), local authority standards and Internal Drainage Board (IDB) requirements and, where applicable, relevant highway authority and Design Manual for Roads and Bridges (DMRB) requirements for locally adopted roads and National Highways roads respectively.

1.2 Purpose and Structure of this Document

1.2.1 This Plan covers temporary drainage arrangements, site management, monitoring, emergency procedures, and reinstatement works following the completion of the Project. The Plan is structured as follows:

- Construction Surface Water Management Plan requirements
- Implementation and compliance

1.3 Objectives

1.3.1 The construction surface water management plan will be implemented to ensure that:

- there is no increase in flood risk on or off site as a result of construction;
- surface water and groundwater quality are protected throughout construction;
- existing drainage systems, field drains, ditches and flow routes remain operational unless temporary modifications are agreed, mitigated and reinstated;
- drainage features disturbed during construction are reinstated on completion of the works;
- discharges are controlled in accordance with consented rates; and
- discharge to a watercourse, drain or groundwater receptor occurs with the relevant permits, licences or approvals.

1.4 Document References

1.4.1 This CSWMP should be read in conjunction with:

- **Application Document 7.2 Outline Code of Construction Practice (CoCP)**
- Appendix A of **Application Document 7.2 Outline Flood Warning and Evacuation Plan**
- **Application Document 7.3 Register of Environmental Actions and Commitments**
- **Application Document 7.13 Flood Risk Assessment,** of which this Framework CSWMP forms Appendix B**. Application Document 6.4.A2 Environmental Statement Appendix 4.2 Indicative Bridge and Culvert Schedule**

1.5 Roles and Responsibilities

1.5.1 Surface water management is the responsibility of the Main Works Contractor (s), and it is anticipated that day to day responsibility will be delegated to the Main Works Contractor(s) Site Manager who will be supported by the Environmental Manager, Technical Specialist Advisors and Works Supervisors.

1.5.2 The Main Works Contractor(s) responsibilities include:

- Implementing and maintaining temporary drainage systems, flood mitigation measures and pollution prevention controls in accordance with this Framework CSWMP.
- Ensuring compliance with all relevant permits, consents, licences, planning requirements and environmental commitments.
- Undertaking routine inspection, monitoring and maintenance of temporary drainage infrastructure and surface water management measures.
- Monitoring weather forecasts, flood alerts and flood warnings relevant to the works.
- Managing surface water generated during construction activities, including dewatering operations where required.
- Ensuring pollution prevention measures required by this Framework CSWMP, **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments** are implemented and maintained to protect surface water and groundwater receptors.
- Recording and reporting flood incidents, drainage failures, pollution incidents and environmental non-compliances, including escalation to relevant regulatory bodies where required.
- Maintaining records of inspections, monitoring activities, maintenance works, incidents and corrective actions.
- Ensuring that all site personnel, subcontractors and visitors receive appropriate induction and training relating to surface water management, pollution prevention and flood risk management requirements.
- Reviewing and updating construction method statements, risk assessments and drainage management procedures as construction activities progress.

1.5.3 The Main Works Contractor(s), assisted by staff listed in section 1.4.1, is responsible for flood risk, including monitoring flood forecasts and warnings, implementing the site Flood Warning and Emergency Response Plan, ensuring vulnerable assets are appropriately protected or relocated where required, and recording and reporting any flood or pollution incidents in accordance with the project incident management procedures.

1.5.4 A full contact list and communications protocol, including emergency contacts and escalation procedures, shall be prepared by the Main Works Contractor(s) prior to commencement of construction and incorporated within the final Code of Construction Practice and associated management documentation. Responsibilities shall be reviewed and updated throughout the construction phase, with training, briefings and competency requirements implemented in accordance with **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments** and relevant health, safety and environmental management requirements.

1.6 Existing Water Features

1.6.1 The Order Limits traverse predominantly agricultural land within the River Ouse and River Trent catchments. Existing surface water drainage is characterised by a network of field drains, ordinary watercourses, IDB drains and agricultural ditches which convey runoff across the largely low-lying landscape. Drainage patterns are influenced by local topography, soil conditions and agricultural land drainage systems, with surface water generally managed through a combination of infiltration, overland flow and discharge to adjacent drainage channels. The majority of drainage features comprise modified or artificial channels maintained to support agricultural land use.

1.6.2 Sensitive receptors include ordinary watercourses, agricultural field drains, IDB drains, groundwater bodies, aquifers, canals and the Groundwater Source Protection Zone 1 located within the northern section of the route. Construction controls measures shall be selected according to receptor sensitivity and may include lined drainage systems, attenuation storage, settlement ponds, silt traps, filter drains, spill response measures and enhanced inspection regimes.

1.6.3 The baseline watercourse and surface water context is set out in **Application Document 6.11 Environmental Statement Chapter 11 Water Environment**, **Application Document 7.12 Water Framework Directive Assessment**, and **Application Document 7.13 Flood Risk Assessment** for baseline.

1.6.4 The surface water management, pollution prevention, flood risk management and drainage protection measures applicable to the Project are set out within sections 2 and 3 of this Framework CSWMP which are secured through W20 of **Application Document 7.3 Register of Environmental Actions and Commitments** and **Requirement 11 of Application Document 3.1 Draft Development Consent Order**

1.7 Proposed Surface Water Drainage

1.7.1 The proposed construction surface water drainage strategy is based on the separation of clean and dirty water, the attenuation and controlled discharge of construction runoff, the treatment of sediment-laden water prior to discharge, and the protection of existing surface water and groundwater receptors. Temporary drainage systems shall be designed to maintain existing drainage pathways, minimise flood risk, protect water quality and provide appropriate levels of treatment prior to discharge. Infiltration drainage measures shall only be used where site conditions are suitable and shall not be used within Groundwater Source Protection Zone 1 areas which are illustrated on **Application Document 6.12.F4 Environmental Statement Figure 12.4 - Hydrogeology and Hydrogeological Receptors**. Drainage measures shall be developed further by the Main Works Contractor(s) in accordance with the requirements of this Framework CSWMP.

1.7.2 Construction runoff will be managed using a combination of sustainable drainage and pollution prevention measures including clean water cut-off ditches, swales, filter drains, settlement ponds, attenuation basins, infiltration features (where suitable), check dams and silt control measures. The selection of drainage measures will be based on local topography, ground conditions, infiltration potential, proximity to watercourses and the sensitivity of receiving receptors.

1.7.3 Where practicable, clean runoff from upslope catchments will be intercepted and diverted around construction working areas. Runoff generated from construction compounds, working areas, access tracks and stockpiles will be collected within temporary drainage systems and directed to appropriate treatment and attenuation features prior to discharge or infiltration. Measures will be implemented to minimise sediment mobilisation, control runoff rates and maintain existing drainage pathways.

1.7.4 Within the Groundwater Source Protection Zone 1 (SPZ1), infiltration drainage will not be used. Surface water will be managed through lined attenuation and containment features with water removed from the SPZ where required, in accordance with the drainage strategy and environmental protection requirements. Any water generated from dewatering operations, including foundation excavations, shall be collected, stored and removed from the SPZ by tanker or other approved means, unless an alternative disposal route has been agreed with the relevant regulatory authority.

1.7.5 Site-specific drainage mitigation requirements for construction compounds, access tracks, working areas and watercourse crossings shall be implemented as part of the construction drainage management process.

1.7.6 Existing watercourses, field drains, IDB drains, ditches and other drainage features shall be protected throughout construction wherever practicable. Where temporary diversion, crossing, culverting or modification of an existing drainage feature is required to facilitate the works, appropriate mitigation measures shall be implemented to maintain drainage function, minimise flood risk and protect water quality. Any temporary disturbance to drainage features, flow paths or ground shall be reinstated following completion of the works in accordance with the **Application Document 7.3 Register of Environmental Actions and Commitments.** Consultation with affected landowners will be carried out to investigate the current extent of land drainage. A scheme of pre-construction land drainage will be designed with the intent of maintaining the efficiency of the existing land drainage system and to assist in maintaining the integrity of the working area during construction. The Project may include a system of ‘cut-off’ drains which feed into a new header drain and the Project will also take into account surface water runoff measures.

1.7.7 The Main Works Contractor(s) will ensure any land drains within the Order Limits, affected as a result of the Project are reinstated to their former functional condition, where agreed with the landowner. Any installed pre-construction land drainage to replace existing land drains affected by permanent infrastructure, as well as any drainage improvements resulting from the Project, would be retained. Any water arising from dewatering carried out during construction, for example during excavation of ground to install foundations, shall be discharged to existing watercourses in a controlled manner, or infiltrated to the ground locally, subject to verification tests and not within SPZs. See section 2.2 for details on pollution management.

2. CSWMP Requirements

2.1 Temporary Construction Surface Water Drainage System Design

2.1.1 Temporary construction drainage systems shall be designed and implemented in accordance with the requirements of this Framework CSWMP and relevant industry guidance- see section 1.1.3 for relevant guidance documentation. Temporary drainage measures shall be based on the separation of clean and dirty water, attenuation of construction runoff, treatment of sediment-laden water prior to discharge, protection of existing drainage pathways and receptors, and the management of flood risk during construction. Drainage systems shall incorporate appropriate treatment and attenuation measures, maintain existing drainage functionality where practicable, and provide controlled discharge in accordance with the requirements of the relevant drainage authority. The temporary drainage layout shall be developed by the Main Works Contractor(s) to reflect the final construction methodology, site layout and phasing proposals.

2.1.2 Temporary construction SuDS features required to provide attenuation and treatment of runoff from temporary construction areas shall be sized to accommodate the 1 in 10-year, 6-hour rainfall event plus a 40% climate change allowance. This design standard is based on the approach set out in the CIRIA C648 guidance for temporary construction drainage (CIRIA, 2006) and adopts a conservative climate change uplift for temporary construction impacts. Surface water runoff shall be attenuated and discharged at restricted greenfield rates, generally 1.4 l/s/ha, unless otherwise agreed with the relevant drainage authority.

2.1.3 The temporary drainage system is anticipated to comprise a combination of clean water cut-off ditches, swales, filter drains, settlement ponds, attenuation basins, check dams, silt traps and other sediment control measures, selected in accordance with local site conditions and receptor sensitivity. The final arrangement shall be detailed within contractor-produced construction drainage drawings prior to commencement of works.

2.1.4 Temporary drainage layouts shall be adapted as construction progresses to reflect changes in working areas, compounds, access routes, excavation activities and reinstated land. Drainage measures shall remain operational throughout all phases of construction and shall be modified where necessary to maintain effective runoff management and pollution control.

2.1.5 Water generated from construction activities, including excavation dewatering, concrete works, wheel washing, pipe testing and other construction processes, shall be managed separately from clean surface water wherever practicable. Contaminated or sediment-laden water shall be contained, treated and disposed of in accordance with relevant environmental permits, regulatory requirements and project-specific method statements.

2.1.6 Temporary drainage systems shall incorporate appropriate treatment measures to minimise the transfer of suspended solids, pollutants and contaminants to receiving watercourses and groundwater receptors. The level of treatment provided shall be

proportionate with the environmental sensitivity of the location and the nature of the construction activity being undertaken. While infiltration is first in the SuDS hierarchy for discharge, infiltration is subject to ground conditions, contamination risk, groundwater constraints and any requirements set out in **Application Document 7.3 Register of Environmental Actions and Commitments**.

2.1.7 Within SPZ1, infiltration-based drainage measures shall not be utilised. Surface water shall be managed in accordance with the requirements of the Drainage Assessment using lined containment and attenuation measures where required.

2.1.8 All temporary drainage infrastructure shall be inspected regularly by the Main Works Contractor(s) and maintained in an effective operational condition throughout the construction period. Inspection frequencies, maintenance requirements and record-keeping procedures are provided in section 3.4 of this Framework CSWMP.

2.1.9 Temporary drainage drawings, storage volumes, discharge locations and construction-phase drainage arrangements shall be developed and maintained by the Main Works Contractor(s) and made available for inspection throughout the duration of the works.

2.1.10 For rainfall events exceeding the design standard specified in paragraph 2.1.2, exceedance flows shall be directed away from sensitive receptors, temporary compounds, access routes and adjacent third-party land. Defined overland flow routes or temporary storage areas shall be incorporated, where required, to prevent uncontrolled flooding, erosion or pollution. These arrangements shall be shown on the contractor-produced drainage drawings.

2.2 Pollution Prevention and Water Quality Management

General Principles

2.2.1 Construction activities have the potential to generate sediment-laden runoff and introduce pollutants to surface water and groundwater receptors. Appropriate pollution prevention measures shall therefore be implemented throughout the construction period to minimise the risk of contamination and ensure compliance with relevant environmental legislation, permit and consent requirements, and recognised industry guidance. Pollution prevention measures shall be developed in accordance with:

- **Application Document 7.2 Outline Code of Construction Practice**
- **Application Document 7.3 Register of Environmental Actions and Commitments**
- **Application Document 7.13 Flood Risk Assessment**
- CIRIA C648 Control of Water Pollution from Linear Construction Projects (CIRIA, 2006)
- CIRIA C532 Control of Water Pollution from Construction Sites (CIRIA, C532 - Control of Water Pollution from Construction Sites , 2001), and;
- The Environment Agency's Guidance for Pollution Prevention (DEFRA, Pollution Prevention for Businesses, 2026) where applicable

Pollution Prevention Measures

2.2.2 The following pollution prevention measures shall be implemented where appropriate throughout the works:

- clean water cut-off ditches;
- swales;
- filter drains;
- sediment / silt control measures;
- lined attenuation within SPZ1;
- check dams;
- settlement ponds;
- attenuation basins;
- wheel wash facilities;
- bunded fuel, oil and chemical storage;
- drip trays beneath static plant and equipment;
- designated refuelling and plant maintenance areas; and
- appropriate spill response equipment shall be provided at locations where fuels, oils, chemicals or other potentially polluting substances are stored or used.

2.2.3 The selection and location of measures shall be reviewed throughout the construction programme to reflect site activities and local environmental sensitivities. The detailed implementation of these measures shall be developed by the Main Works Contractor(s) and incorporated within the final CSWMP in accordance with this Framework CSWMP and **Application Document 7.3 Register of Environmental Actions and Commitments**.

2.2.4 Concrete washout shall only occur within designated impermeable washout areas or proprietary washout units. Washout water shall not be discharged to ground, watercourses, field drains, surface water systems or groundwater. Hardened residues shall be removed and disposed of at suitably licensed facilities. Washout activities should be carried out in line with commitments GH08 and GH12 detailed within **Application Document 7.3 Register of Environmental Actions and Commitments.**

2.2.5 Excavation dewatering water shall be treated through settlement tanks, silt removal units or other suitable treatment systems prior to discharge. Water containing elevated suspended solids or visible contamination shall not be discharged directly to receiving receptors. In accordance with of **Application Document 7.3 Register of Environmental Actions and Commitments** dewatering should be limited to the depth and duration necessary for the works.

2.2.6 Where works are undertaken within or adjacent to watercourses, suitable isolation, over-pumping, sediment control and pollution prevention measures shall be implemented. Site-specific measures shall be developed having regard to the crossing type identified in **Application Document 6.4.A2 Environmental Statement Appendix 4.2 Indicative Bridge and Culvert Schedule**, and shall be subject to the relevant permits, consents, protective provisions and approvals.

Management of Construction Water

2.2.7 Water generated from construction activities, including excavation dewatering, concrete works, wheel washing, hydrotesting and other temporary construction processes, shall be contained and managed to prevent pollution of surface water and groundwater receptors.

2.2.8 Where required, water shall be treated through settlement, filtration or other appropriate treatment measures prior to discharge. Water that cannot be discharged in accordance with applicable environmental requirements shall be removed from site by a suitably licensed contractor.

2.2.9 Watercourse crossings will comply, with permits and site-specific method statements where required, as detailed in commitments DE1 in **Application Document 7.3 Register of Environmental Actions and Commitments.**

Monitoring and Inspection

2.2.10 Temporary drainage infrastructure, treatment systems and pollution prevention measures shall be subject to routine inspection throughout the construction period.

2.2.11 As a minimum:

- Visual inspections shall be undertaken following significant rainfall events and at regular intervals during active construction.
- Settlement features, silt fences, check dams and drainage channels shall be inspected for damage, excessive sediment accumulation and blockages.
- Evidence of erosion, sediment migration, pollution or poor drainage performance shall trigger corrective action.
- Inspection and maintenance records shall be retained by the Main Works Contractor(s).

2.2.12 Where visible contamination, discoloured water or pollution incidents are identified, additional investigation and water quality sampling shall be undertaken as required.

Groundwater and Sensitive Receptor Protection

2.2.13 Part of the Order Limits is located within a SPZ1 as illustrated on **Application Document 6.12.F4 Environmental Statement Figure 12.4 - Hydrogeology and Hydrogeological Receptors**. Additional controls shall be implemented within these areas, including restrictions on infiltration drainage and enhanced controls for fuel, oil and chemical storage.

2.2.14 Particular care shall also be taken when working adjacent to watercourses, field drains, canals and other identified surface water receptors.

Pollution Incident Response

2.2.15 Pollution incident response procedures shall be developed by the Main Works Contractor(s) as secured by GG25 of **Application Document 7.3 Register of Environmental Actions and Commitments** and the requirements of this Framework CSWMP.

2.2.16 In the event of a pollution incident:

- The source of the pollution shall be stopped where safe to do so.
- Spill containment measures shall be deployed immediately.
- Potentially contaminated drainage pathways shall be isolated where practicable.
- The Environmental Manager shall be notified.
- Relevant regulators and stakeholders shall be informed where required.
- Appropriate clean-up and remediation measures shall be implemented.
- The incident shall be recorded, investigated and corrective actions identified.

Training and Awareness

2.2.17 All personnel shall receive appropriate environmental awareness training during site induction. Personnel undertaking environmentally sensitive activities, including fuel handling, operation of pollution prevention equipment, drainage inspection and maintenance, dewatering activities and incident response, shall be suitably trained, competent and authorised prior to undertaking such work. Competence shall be demonstrated through relevant qualifications, training records, experience and, where applicable, task-specific briefings and permits. Training and competency records shall be maintained by the Main Works Contractor(s) and made available for inspection upon request.

2.3 Flood Risk Management

2.3.1 Flood risk across the Project has been assessed through the project-specific Flood Risk Assessment (FRA)and supporting technical studies set out in:

- **Application Document 6.11 Environmental Statement Chapter 11 Water Environment**
- **Application Document 7.2 Outline Code of Construction Practice, appendix A Flood Water Evacuation Plan**.
- **Application Document 7.12 Water Framework Directive Assessment,** and;
- **Application Document 7.13 Flood Risk Assessment**

2.3.2 These assessments identify that the majority of the Order limits are located within areas of low flood risk, although parts of the Order Limits and associated infrastructure are located within fluvial and tidal floodplains associated with the River Trent, River Ouse and their tributaries. The findings of the assessments indicate that, subject to implementation of the proposed mitigation measures, the Project would not result in an increase in flood risk to third parties and there are no flood risk constraints that would preclude construction of the Project.

2.3.3 The principal sources of flood risk during construction include:

- Fluvial flooding from rivers, streams, drains and ordinary watercourses.
- Surface water flooding resulting from intense rainfall events.
- Groundwater flooding in low-lying areas.

- Localised flooding associated with exceedance of temporary drainage systems.
- Residual flood risk associated with defence overtopping or failure in protected areas.

2.3.4 Construction activities shall be planned and managed to minimise flood risk throughout the works. Site-specific mitigation measures identified within the Project FRAs and supporting technical assessments shall be incorporated into the final construction design. Temporary drainage systems, attenuation features and discharge controls shall be implemented in accordance with the requirements of this Framework CSWMP.

2.3.5 Construction compounds, stockpiles, fuel storage areas and other temporary works shall be located outside areas at risk of flooding wherever reasonably practicable, although works within higher-risk areas is unavoidable in some areas as identified in the **Application Document 7.13 Flood Risk Assessment.** These locations require sequential layout, flood resilience, flow-conveyance and emergency controls.

2.3.6 Where temporary works are required within flood risk areas, they shall be located in the lowest reasonably practicable flood risk zone and designed to avoid increases in flood risk, loss of floodplain storage or adverse impacts on flood conveyance.

2.3.7 The Main Works Contractor(s) shall monitor and be signed up to receive Environment Agency flood alerts[1], flood warnings and severe weather forecasts throughout the construction period. Particular attention shall be given to construction activities located within identified flood risk areas and adjacent to watercourses

2.3.8 In advance of forecast severe rainfall or flood events, the Main Works Contractor(s) shall implement the relevant requirements of Appendix A Outline Flood Warning and Evacuation Plan within **Application Document 7.2 Outline Code of Construction Practice** and associated contractor-developed emergency response procedures. Actions shall include:

- Review planned construction activities.
- Inspect temporary drainage systems and attenuation features.
- Secure or relocate vulnerable plant, equipment and materials where practicable.
- Ensure fuel, oil and chemical stores are appropriately protected.
- Implement any necessary temporary shutdown or emergency response measures.

2.3.9 Exceedance events, including rainfall events that exceed the design capacity of temporary drainage systems, shall be managed through designated overland flow routes and temporary storage areas identified within the drainage strategy. Following an exceedance event, drainage infrastructure shall be inspected and any defects or blockages rectified as soon as practicable.

[1] Flood alerts and warnings - GOV.UK

2.3.10 Flood warning, evacuation and emergency response procedures shall be developed by the Main Works Contractor(s) in accordance with the requirements of this Framework CSWMP, **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments** and include:

- Flood warning trigger levels.
- Roles and responsibilities.
- Communication and escalation procedures.
- Site evacuation arrangements.
- Protection of vulnerable assets.
- Incident reporting and record keeping requirements.

2.3.11 Flood-related incidents, exceedance events and emergency responses shall be recorded by the Main Works Contractor(s) and reviewed to identify any additional mitigation measures required to reduce future flood risk.

2.4 Construction Methods and Method Statements

2.4.1 Construction activities with the potential to affect surface water and groundwater receptors include:

- site clearance;
- earthworks;
- landscape mitigation/BNG;
- excavation;
- construction compound establishment;
- access track construction;
- pylon foundation works;
- watercourse crossing works;
- dewatering activities;
- concrete works;
- reinstatement activities; and
- highway modifications.

2.4.2 Method statements shall identify potential risks to surface water and groundwater receptors and specify the control measures required to prevent pollution, uncontrolled runoff, sediment mobilisation, flooding and adverse effects on existing drainage systems. Construction activities shall be undertaken in accordance with the requirements of this Framework CSWMP and any relevant environmental permits or consents.

2.4.3 Water generated during construction activities, including excavation dewatering, wheel washing, concrete works and temporary construction drainage operations, shall be managed in a controlled manner. Where practicable, water shall be reused on site. Surplus water shall be treated, discharged or removed from site in accordance with environmental requirements and approved method statements.

2.4.4 Appropriate temporary drainage, sediment control and pollution prevention measures shall be installed prior to commencing activities that have the potential to generate runoff or disturb soils. Such measures shall be maintained throughout the construction period and adapted as construction activities progress and site conditions change.

2.4.5 Watercourse crossing works shall be planned and undertaken to minimise impacts on flow conveyance, water quality and aquatic habitats. Temporary works within or adjacent to watercourses shall incorporate suitable sediment control and pollution prevention measures and shall comply with any applicable permit requirements.

2.4.6 Existing field drains, ditches and land drainage pathways shall remain operational throughout construction wherever practicable. Any temporary interruption required to facilitate the works shall be agreed in advance, mitigated through temporary drainage arrangements and reinstated on completion.

2.4.7 Method statements and supporting risk assessments shall be reviewed and updated throughout the construction period to reflect changes in construction sequencing, site conditions, identified risks, lessons learned and regulatory requirements.

2.4.8 Site-specific proposals should respond to mapped surface-water routes, floodplain constraints and existing drainage.

3. Implementation and Compliance

3.1 General Requirements

3.1.1 Effective implementation and ongoing compliance are fundamental to the management of surface water, water quality and flood risk during construction of the Project. This section sets out the framework requirements for regulatory approvals, operational controls, monitoring, reporting, inspection and maintenance activities necessary to ensure compliance with the requirements of this Framework CSWMP, **Application Document 7.2 Outline Code of Construction Practice** and **Application Document 7.3 Register of Environmental Actions and Commitments**. Monitoring and reporting procedures shall be implemented to verify that drainage and flood risk controls remain effective throughout construction and that all relevant permits, approvals and DCO Requirements are complied with.

3.1.2 For the purposes of this Framework CSWMP, significant rainfall shall be defined as rainfall exceeding 25 mm within a 24-hour period (FloodBrief, 2026), or any event resulting in visible runoff, overtopping, erosion or mobilisation of sediment.

3.1.3 All relevant regulatory requirements have been identified and incorporated within the site management plan, with clear processes established for tracking consents, approvals, and planning conditions. Continuous monitoring and reporting ensure that flood risk and drainage controls remain effective, with prompt action taken in response to incidents, adverse weather, or system failures. Maintenance activities shall be undertaken throughout construction to ensure temporary drainage measures remain effective. Temporary drainage features and disturbed ground shall be removed or reinstated, as appropriate, following completion of the works.

3.1.4 Further requirements relating to consents, monitoring, reporting, inspection, maintenance and reinstatement are provided within this Framework CSWMP and should be read in conjunction with:

- **Application Document 7.2 Outline Code of Construction Practice**
- **Application Document 7.3 Register of Environmental Actions and Commitments**
- **Application Document 7.13 Flood Risk Assessment**
- Associated contractor-developed management documentation prepared in accordance with the final Code of Construction Practice

3.2 Consents and Regulatory Compliance

3.2.1 Subject to the final construction methodology and work location, consents and approvals may include:

- Land Drainage Act (HM Government, 1991) consents for works affecting ordinary watercourses.
- Environmental permits for activities regulated by the Environment Agency.

- Internal Drainage Board (IDB) consents for works affecting IDB maintained drains and assets.
- Environmental permits under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (HM Government, 2016) for regulated activities, including temporary discharges to surface water, groundwater or land where required.
- Protected species licences where environmental constraints are identified.
- Local Authority approvals where applicable.
- Any additional approvals required by statutory undertakers, landowners or regulators.

3.2.2 The Main Works Contractor(s) shall maintain a Permits and Consents Register containing all permits, licences, approvals and planning conditions relevant to the works at each location. The register shall identify:

- Consent reference numbers;
- Issuing authority;
- Relevant conditions.
- Approval dates; and
- Renewal requirements where applicable.

3.2.3 This Framework CSWMP has been prepared having regard to relevant legislation, regulatory requirements and industry guidance applicable to the management of construction surface water, flood risk and water quality. Key legislation and guidance include:

- Land Drainage Act 1991 (HM Government, 1991).
- Environmental Protection Act 1990 (HM Government, 1990).
- Flood and Water Management Act 2010 (HM Government, 2010).
- Environmental Permitting (England and Wales) Regulations 2016 (HM Government, 2016).
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (HM Government, 2017).
- Control of Water Pollution from Construction Sites – Guide to Good Practice (SP156) (CIRIA, SP156 - Control of Water Pollution from Construction Sites – Guide to Good Practice, 2002).
- Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors (C532) (CIRIA, C532 - Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors, 2001).
- Control of Water Pollution from Linear Construction Projects – Technical Guidance (C648) (CIRIA, 2006).
- Control of Water Pollution from Linear Construction Projects – Site Guide (C649) (Murnane, 2006).
- CIRIA C753 – The SuDS Manual (CIRIA, 2015).

- CIRIA C762 – Environmental Good Practice on Site Guide (Law, 2016).
- DEFRA Non-statutory technical standards for SuDS (Government, National standards for sustainable drainage systems, 2025).
- BS 8582:2013 Code of Practice for Surface Water Management for Development Sites (BSI, 2013).
- Relevant Environment Agency guidance.
- Applicable Local Authority and Internal Drainage Board requirements.

3.3 Monitoring and Review

3.3.1 Effective monitoring and review are essential to ensure that temporary drainage systems, flood mitigation measures and pollution prevention controls continue to operate as intended throughout the construction period.

3.3.2 The Main Works Contractor(s) shall undertake routine inspections of temporary drainage infrastructure, including swales, drainage channels, filter drains, settlement features, attenuation areas and discharge locations. Inspections shall be undertaken following significant rainfall events, during active construction, following Environment Agency Flood Alerts or Flood Warnings, affecting the works area, and following any drainage failure, exceedance event or pollution incident. Inspection frequencies shall be increased where high-risk activities are being undertaken adjacent to sensitive receptors.

3.3.3 Monitoring shall include assessment of:

- Drainage system condition;
- Sediment accumulation;
- Blockages and damage;
- Evidence of erosion;
- Pollution incidents;
- Watercourse conditions adjacent to construction areas; and
- Flooding and exceedance events.

3.3.4 All inspections, maintenance activities, incidents and corrective actions shall be recorded and retained within the site environmental records.

3.3.5 Any pollution incident, drainage failure, flooding event or environmental non-compliance shall be reported in accordance with the Project incident reporting procedures and, where necessary, to the relevant regulatory authority.

3.3.6 The final CSWMP shall be reviewed:

- Prior to the commencement of major construction phases;
- Following significant changes to the construction methodology;
- Following flood or pollution incidents;
- Following significant drainage failures; and
- At regular intervals during the construction programme.

3.4 Maintenance and Remediation

3.4.1 Temporary drainage and pollution prevention measures shall be maintained throughout the construction period to ensure effective operation and compliance with the objectives of this Framework CSWMP.

3.4.2 Routine maintenance activities during construction shall include:

- Removal of sediment from settlement features and drainage channels;
- Inspection and repair of swales, filter drains and cut-off drains;
- Removal of blockages from drainage infrastructure;
- Repair of erosion damage;
- Maintenance of temporary attenuation and storage features; and
- Inspection of discharge locations and outfalls.

3.4.3 Additional inspections shall be undertaken:

- Before forecast storm events;
- Following periods of significant rainfall;
- Following flood alerts or warnings; and
- Following pollution incidents.

3.4.4 In the event of a drainage failure, flooding incident or pollution event, the Main Works Contractor(s) shall implement appropriate remediation measures as soon as practicable. Remedial actions may include sediment removal, repair of damaged infrastructure, pollutant containment, drainage reinstatement and additional pollution prevention controls.

3.4.5 Records of inspections, maintenance activities, defects identified and remedial works undertaken shall be maintained throughout the construction period.

3.4.6 Upon completion of the works, temporary drainage measures, pollution prevention controls and construction compounds shall be removed where no longer required and the land reinstated in accordance with the approved restoration and reinstatement strategy.

3.4.7 All temporary drainage measures shall be removed following completion of the works unless designated for permanent retention. Disturbed drainage features, field drains, ditches, flow paths and surrounding ground shall be reinstated to their original condition or an approved alternative agreed with the relevant landowner and authority.

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