The Great Grid Upgrade

Sea Link

Preliminary Environmental Information Report

Volume: 1

Part 2 Suffolk Onshore Scheme

Chapter 5 Water Environment

Version A

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nationalgrid

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2.5 Water Environment

2.5.1 Introduction

2.5.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents information about the preliminary environmental assessment of the likely significant water environment effects identified to date, that could result from the Proposed Project (as described in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**).

2.5.1.2 This chapter describes the methodology used, the datasets that have informed the preliminary assessment, baseline conditions, mitigation measures and the preliminary water environment residual significant effects that could result from the Proposed Project.

2.5.1.3 The draft Order Limits, which outline the boundary of the Proposed Project, are illustrated on **Figure 1.1.1 Draft Order Limits** and the Suffolk Onshore Scheme Boundary is illustrated on **Figure 1.1.2 Suffolk Onshore Scheme Boundary**.

2.5.1.4 This chapter should be read in conjunction with:

- **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**;
- **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology**;
- **Volume 1, Part 1, Chapter 6, Scoping Opinion and EIA Consultation**;
- **Volume 1, Part 2, Chapter 1, Evolution of the Suffolk Onshore Scheme**;
- **Volume 1, Part 2, Chapter 3, Ecology and Biodiversity**;
- **Volume 1, Part 2, Chapter 6, Geology and Hydrogeology**; and
- **Volume 1, Part 5, Chapter 5, Water Framework Directive Screening Assessment.**

2.5.1.5 This chapter is supported by the following figures:

- **Figure 2.5.1 Water Environment Receptors**;
- **Figure 2.5.2 Flood Risk Baseline**;
- **General Arrangement Plan S42_S/IGA/PS/0002** (for Saxmundham Converter Station permanent drainage arrangement); and
- **General Arrangement Plan S42_S/IGA/SS/0008** (for Saxmundham Converter Station with co-location permanent drainage arrangement).

2.5.1.6 This chapter is supported by the following appendices:

- **Volume 2, Part 1, Appendix 1.4.A, Outline Code of Construction Practice**;
- **Volume 2, Part 1, Appendix 1.4.F, Outline Schedule of Environmental Commitments and Mitigation Measures;**
- **Volume 2, Part 2, Appendix 2.5.A, Baseline Data (tables)**; and
- **Volume 2, Part 2, Appendix 2.5.B, Assessment Criteria.**

2.5.2 Regulatory and Planning Context

2.5.2.1 This section sets out the legislation and planning policy that is relevant to the preliminary water environment assessment. A full review of compliance with relevant national and local planning policy will be provided within the Planning Statement that will be submitted as part of the application for Development Consent.

2.5.2.2 Policy generally seeks to minimise water environment effects from development and to avoid significant adverse effects. This applies particularly to the prevention of pollution of waterbodies, safeguarding water resources and the sustainable management of land drainage and flood risk.

Legislation

The Water Environment (Water Framework Directive [WFD]) (England and Wales) Regulations 20017

2.5.2.3 The Water Environment (Water Framework Directive [WFD]) (England and Wales) Regulations 2017 (as amended) (Ref 2.5.1) implemented the WFD in England and Wales. Under Section 2 of the European Union (Withdrawal) Act 2018, the 2017 Regulations continue to have effect in domestic law following the UK's withdrawal from the European Union.

2.5.2.4 The purpose of the WFD is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and ground waters to prevent further deterioration in, and enhance, water quality, and to promote sustainable water use. The 2017 Regulations require the "appropriate agency" (the Environment Agency, for England) to prepare River Basin Management Plans (RBMPs) for each river basin district (RBD), for the approval of the Secretary of State.

2.5.2.5 The RBMPs describe the current state of the water environment for each RBD, the pressures affecting the water environment, the objectives for protecting and improving it, and the programme of measures needed to achieve the statutory environmental objectives of the WFD (i.e., to enable water bodies to achieve Good status).

2.5.2.6 Under the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (Ref 2.5.2), an application for a Development Consent Order (DCO) must be accompanied by a plan with accompanying information identifying water bodies in RBMP, together with an assessment of any effects on such water bodies likely to be caused by the development (Regulation 5). This is commonly referred to as a WFD assessment.

Part 5 of the Environment Act 2021 (HMSO, 2021)

2.5.2.7 Part 5 of the Environment Act 2021 (Ref 2.5.3), brings together measures to strengthen and update the existing regulatory and long-term planning framework for water, helping to reduce environmental risks, including to water quality and land drainage. It also strengthens the regulation of water and sewerage undertakers through the newly established Office for Environmental Protection.

The Land Drainage Act 1991 (HMSO, 1991)

2.5.2.8 The Land Drainage Act 1991 (Ref 2.5.4) and the Environmental Permitting (England and Wales) Regulations 2016 (Ref 2.5.5) impose certain controls in relation to the placing of structures and the carrying out of works affecting main rivers and other (ordinary) watercourses.

National Policy

National Policy Statements

2.5.2.9 National Policy Statements (NPSs) set out the primary policy tests against which the application for a Development Consent Order (DCO) for the Proposed Project would be considered. A review of the NPS was announced in the 2020 Energy white paper: Powering our net zero future. This review was to ensure the NPSs were brought up to date to reflect the policies set out in the white paper. Table 2.5.1 and Table 2.5.2 below provide details of the elements of NPS for Energy (EN-1) (Ref 2.5.6) and NPS for Electricity Networks Infrastructure (EN-5) (Ref 2.5.7) that are relevant to this chapter, and how and where they are covered in the PEIR or will be covered within the Environmental Statement (ES).

Table 2.5.1: NPS EN-1 requirements relevant to water environment

NPS EN-1 section	Where this is covered in the PEIR
5.7.4 *"(part) Applications for energy projects of 1 hectare or greater in Flood Zone 1 in England or Zone A in Wales and all proposals for energy projects located in Flood Zones 2 and 3 in England or Zones B and C in Wales should be accompanied by a flood risk assessment (FRA). This should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account."*	An overview of baseline flood risk within the draft Order Limits is described in Section 2.5.7, and the application will be supported by a Flood Risk Assessment (FRA) that will inform the project design and the findings of the water environment chapter of the ES.
5.7.7 *"Applicants for projects which may be affected by, or may add to, flood risk should arrange pre-application discussions with the EA, and, where relevant, other bodies such as Internal Drainage Boards, sewerage undertakers, navigation authorities, highways authorities and reservoir owners and operators. Such discussions should identify the likelihood and possible extent and nature of the flood risk, help scope the FRA, and identify the information that will be required by the Infrastructure Planning Commission (IPC) to reach a decision on the application when it is submitted. The IPC should advise applicants to undertake these steps where they appear necessary but have not yet been addressed. "*	Discussions have been held with the Environment Agency, the Lead Local Flood Authority (LLFA) and the East Suffolk Water Management Board at the scoping stage, as described in Section 3.5.3. Baseline flood risk data has been requested from these flood risk management authorities and the scope of the FRA agreed with the relevant stakeholders, noted above. Engagement with these bodies will continue throughout the environmental impact assessment.

NPS EN-1 section	Where this is covered in the PEIR
5.15.1 *"Infrastructure development can have adverse effects on the water environment, including groundwater, inland surface water, transitional waters and coastal waters. During the construction, operation and decommissioning phases, it can lead to increased demand for water, involve discharges to water and cause adverse ecological effects resulting from physical modifications to the water environment. There may also be an increased risk of spills and leaks of pollutants to the water environment. These effects could lead to adverse impacts on health or on protected species and habitats (see Section 4.3 and Section 4.18) and could, in particular, result in surface waters, groundwaters or protected areas failing to meet environmental objectives established under the Water Framework Directive. "*	The water environment assessment would consider the potential for likely significant effects on surface water quality, water resources and flood risk receptors during the construction, operation, and maintenance and decommissioning of the Proposed Project. The proposed scope of the assessment is provided in Section 2.5.3. Effects on protected habitats and species and groundwaters are assessed in **Volume 1, Part 2, Chapter 3, Ecology and Biodiversity** and **Volume 1, Part 3, Chapter 6, Geology and Hydrogeology** respectively.
5.15.2 *"Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent. (See Section 4.2.) "*	Current understanding of the existing status of these aspects of the water environment is presented in Section 2.5.7. The potential for likely significant effects on water quality, water resources and the physical characteristics of the water environment is discussed in Section 2.5.9.
5.15.6 *"The IPC should satisfy itself that a proposal has regard to the River Basin Management Plans and meets the requirements of the Water Framework Directive (including Article 4.7) and its daughter directives, including those on priority substances and groundwater. The specific objectives for particular river basins are set out in River Basin Management Plans. The IPC should also consider the interactions of the proposed project with other plans such as Water Resources Management Plans and Shoreline/Estuary Management Plans. "*	Section 2.5.7 presents data from the relevant RBMP. The first stages of the Water Framework Directive Screening Assessment prepared for the Proposed Project is presented in **Volume 1, Part 5, Chapter 5, Water Framework Directive Screening Assessment.** The full assessment will be prepared to inform the ES and will reference the Essex and Suffolk Water Resource Management Plan (Ref 2.5.8) and the Lowestoft Ness to Felixstowe Landguard Point Shoreline Management Plan (Ref 2.5.9).

NPS EN-1 section	Where this is covered in the PEIR
5.15.7 *"The IPC should consider whether appropriate requirements should be attached to any development consent and/or planning obligations entered into to mitigate adverse effects on the water environment. "*	Measures to mitigate likely significant adverse effects on the water environment are described in Section 2.5.8. These will be further developed throughout the environmental impact assessment and secured, as relevant, within the application.

2.5.2.10 There are no other new or materially different policy considerations relevant to the water environment within the Draft EN-1 (Ref 2.5.10), when compared to the current EN-1 (Ref 2.5.6).

Table 2.5.2: NPS EN-5 requirements relevant to water environment

NPS EN-5 section	Where this is covered in the PEIR
2.4.1 *"Applicants should set out to what extent the proposed development is expected to be vulnerable, and, as appropriate, how it would be resilient to: flooding, particularly for substations that are vital for the electricity transmission and distribution network; effects of wind and storms on overhead lines; higher average temperatures leading to increased transmission losses; and earth movement or subsidence caused by flooding or drought (for underground cables). "*	A preliminary assessment of effects on floodplains and flood risk is presented in Table 2.5.13 and an FRA will be produced and submitted with the application. The FRA will consider all relevant aspects listed in this paragraph of the NPS.
2.4.2 *"Section 4.8 of EN-1 advises that the resilience of the project to climate change should be assessed in the Environmental Statement (ES) accompanying an application. For example, future increased risk of flooding would be covered in any flood risk assessment (see Section 5.7 in EN-1). "*	The FRA to be prepared for the Proposed Project will examine future flood risk to the Proposed Project over its lifetime, and identify mitigation measures required to ensure flood resilience, taking climate change predictions into account.
2.6.2 *"Section 4.9 of EN-1 advises that the resilience of the project to the effects of climate change should be assessed in the Environmental Statement (ES) accompanying an application. For example, future increased risk of flooding would be covered in any flood risk assessment (see Section 5.8 in EN-1). "*	As noted above, the future increased risk of flooding will be addressed within the FRA that is to be prepared for the Proposed Project.

2.5.2.11 There are no other new or materially different policy considerations for the water environment within the Draft EN-5 (Ref 2.5.11), when compared to the current EN-5 (Ref 2.5.7).

National Planning Policy Framework

2.5.2.12 The National Planning Policy Framework (NPPF) (Ref 2.5.12) has the potential to be considered important and relevant to the SoS' consideration of the Proposed Project. Table 2.5.3 below provides details of the elements of the NPPF that are relevant to this chapter, and how and where they are covered in the PEIR or will be covered within the ES.

Table 2.5.3: NPPF requirements relevant to water environment

NPPF section	Where this is covered in the PEIR
Paragraphs 153 and 154. These paragraphs advocate adoption of proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change, water supply, biodiversity and landscapes.	The Proposed Project incorporates climate change resilience measures in several ways, for example avoiding situating proposed new substations and cable sealing compounds in areas that are at risk of flooding, and by incorporating climate change allowances within the operational drainage design. Further details are provided in Section 2.5.8.
Paragraph 159*. "Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere."*	The Proposed Project will be subject to a detailed FRA the findings of which will be used to further develop the design to ensure it would be safe over its lifetime, without increasing flood risk elsewhere. The Proposed Projects avoids situating proposed new substations and cable sealing compounds in areas that are at risk of flooding.
Paragraphs 161 and 162. These paragraphs introduce and set out the aims of the Sequential Test, to steer new development to areas with the lowest risk of flooding and which is applied based on the relevant strategic flood risk assessment. NPPF advocates that the sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.	Several project design alternatives have been considered, as detailed in **Volume 1, Part 2, Chapter 1, Evolution of the Suffolk Onshore Scheme** and on balance of reason the Proposed Project design was selected.

NPPF section	Where this is covered in the PEIR
	The sequential test has been applied and development has been directed away from areas of high flood risk where possible. Where this is not possible, the exception text will be applied. The FRA to be prepared will demonstrate compliance with this policy. Essential infrastructure is permissible in areas of high flood risk, triggering the Exception Test.
Paragraphs 163 to 165. These paragraphs introduce and set out the aims and requirements of the Exception Test, stating that*: ''to pass the exception test it should be demonstrated that:* *(a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and* *(b) 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.''*	A site-specific FRA will be prepared to demonstrate compliance with the stated criteria. The sequential test has been applied and development has been directed away from areas of high flood risk where possible. Where this is not possible, the exception text will be applied. The FRA to be prepared will demonstrate compliance with this policy.
Paragraph 167. *''When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:* *(a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;* *(b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;* *(c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;* *(d) any residual risk can be safely managed; and*	A site-specific FRA will be prepared to demonstrate compliance with the stated criteria. The sequential test has been applied and development has been directed away from areas of high flood risk where possible. Where this is not possible, the exception text will be applied. The FRA to be prepared will demonstrate compliance with this policy.

NPPF section	Where this is covered in the PEIR
(e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.''	
Paragraph 169. *''Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate.''*	The Proposed Project is committed to incorporating Sustainable Drainage Systems (SuDS) to manage operational drainage. Details of the drainage design will be provided within the FRA that will be prepared, informed by the drainage strategy that is being developed.
Paragraph 174. *Planning policies and decisions should contribute to and enhance the natural and local environment by [inter alia]…) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans''.*	The existing condition of water receptors in terms of their water quality is described in Section 2.5.7. Measures to prevent the Proposed Project contributing to water pollution, and where possible, improve local conditions are described in Section 2.5.8. These will be further developed throughout the environmental impact assessment, with reference to the Anglian RBMP and secured, as relevant, within the application.

National Planning Practice Guidance

2.5.2.13 There are two National Planning Practice Guidance publications that are relevant to the water environment, the requirements of which will be covered within the ES. The flood risk and coastal change guidance (Ref 2.5.13) advises how to take account of and address the risks associated with flooding and coastal change in the planning process. The water supply, wastewater and water quality guidance (Ref 2.5.14) advises on how planning can ensure water quality and the delivery of adequate water and wastewater infrastructure.

Local Planning Policy

2.5.2.14 The Suffolk Onshore Scheme Boundary (refer to **Figure 1.1.2 Suffolk Onshore Scheme Boundary**) lies within the jurisdiction of Suffolk County Council. County planning guidance which is relevant to a study of the water environment and has informed the assessment of preliminary effects in this chapter are as follows:

- Planning a development in a flood zone (Ref 2.5.15)

2.5.2.15 The Suffolk Onshore Scheme Boundary lies within the jurisdiction of East Suffolk Council. Local planning policy for East Suffolk Council consists of two parts; the Suffolk Coastal Local Plan (Ref 2.5.16) and the Waveney Local Plan (Ref 2.5.17) (which covers the former Suffolk Coastal and Waveney Districts).

2.5.2.16 The Suffolk Onshore Scheme Boundary lies within the boundary of the Suffolk Coastal Local Plan (adopted September 2020) (Ref 2.5.16). Local Plan policies which are relevant to water environment matters and will inform the ES are detailed in Table 2.5.4.

Table 2.5.4: Local Planning Policies relevant to water environment – Suffolk Coastal Local Plan

Suffolk Coastal Local Plan – Policy	Where this is covered in the PEIR
SCLP9.5 - Flood Risk: The Strategic Flood Risk Assessment should be the starting point in assessing whether a proposal is at risk from flooding. Proposals for new development, or the intensification of existing development, will not be permitted in areas at high risk from flooding, i.e. Flood Zones 2 and 3, unless the applicant has satisfied the safety requirements in the Flood Risk National Planning Policy Guidance (and any successor). These include the 'sequential test'; where needed the 'exception test' and also a site specific flood risk assessment that addresses the characteristics of flooding and has tested an appropriate range of flood event scenarios (taking climate change into consideration). Developments should exhibit the three main principles of flood risk, in that, they should be safe, resilient and should not increase flood risk elsewhere.	The FRA that will be prepared for the Proposed Project will be in accordance with the requirements of the NPPF and associated guidance, inclusive of the Suffolk Coastal and Waveney District Councils Level 1 SFRA (Ref 2.5.18). The FRA to be prepared will identify any necessary mitigation, which will be secured within the draft DCO, to ensure that there is not an unacceptable risk of flooding to the Proposed Project or elsewhere.
SCLP9.6 - Sustainable Drainage Systems: Developments should use sustainable drainage systems to drain surface water unless demonstrated to be inappropriate. Sustainable drainage systems should: a) Be integrated into the landscaping scheme and green infrastructure provision of the development; b) Contribute to the design quality of the scheme; and c) Deliver sufficient and appropriate water quality and aquatic biodiversity improvements, wherever possible. This should be complementary of any local	Measures for the mitigation of effects on land drainage and surface water flooding risk are covered in Section 2.5.8, with further detail provided in the drainage strategy that will be produced for the application.

Suffolk Coastal Local Plan – Policy	Where this is covered in the PEIR
designations such as Source Protection Zones. Runoff rates from new development must be restricted to greenfield runoff rates wherever possible.	
SCLP10.3 - Environmental Quality: Development proposals will be expected to protect the quality of the environment and to minimise and, where possible, reduce all forms of pollution and contamination. Development proposals will be considered in relation to impacts on water quality and the achievement of Water Framework Directive objectives. The cumulative effect of development, in this regard, should be considered.	Proposed measures for avoiding pollution of the water environment are summarised in Section 2.5.8 and the subsequent preliminary assessment of effects on water quality and Water Framework Directive objectives is presented in Section 2.5.9. A WFD Screening Assessment is presented in **Volume 1, Part 5, Chapter 5, Water Framework Directive Screening Assessment**. A full Water Framework Directive Assessment will be prepared and submitted alongside the ES. The preliminary assessment of the cumulative effects of Suffolk Onshore Scheme on water environment receptors is presented in **Volume 1, Part 4, Chapter 11, Intra-project Cumulative Effects** and **Volume 1, Part 4, Chapter 12, Inter-project Cumulative Effects**.

2.5.3 Scoping Opinion and Consultation

Scoping

2.5.3.1 A Scoping Report (Ref 2.5.19) for the Proposed Project was issued to the Planning Inspectorate (PINS) on 24 October 2022 and a Scoping Opinion (Ref 2.5.20) was received from the Secretary of State (SoS) on 1 December 2022. Table 2.5.5 sets out the comments raised in the Scoping Opinion and how these have been addressed in this PEIR or will be addressed within the ES. The Scoping Opinion takes account of responses from prescribed consultees as appropriate.

Table 2.5.5: Comments raised in the Scoping Opinion

ID	Inspectorate's comments	Response
3.4.2	[*Pollution of watercourses associated with operational discharges and runoff from above ground infrastructure (AGI) – water quality effects (operation)]* This matter is proposed to be scoped out on the basis of no impact pathway given treatment through Sustainable Drainage System (SuDS) provision. The Inspectorate agrees that, provided the measures to mitigate the risks of pollution of watercourses are clearly described in the ES and secured in the draft DCO (dDCO), this matter can be scoped out of further assessment.	This matter has been scoped out of further assessment based on the measures summarised in Section 2.5.8 to treat operational runoff from AGI. Further detail will be provided in the drainage strategy and FRA that will be produced for the application.
3.4.3	[*Increased flood risk from operational discharges and runoff from AGI and loss of floodplain storage (operation)*]. This matter is proposed to be scoped out on the basis of no impact pathway given attenuation of runoff through SuDS provision. The Inspectorate agrees that, provided the operational control measures in the form of SuDS are clearly described in the ES and secured through the dDCO, this would ensure no pathway of effect to result in increased flood risk from operational discharges and runoff from AGI or loss of floodplain storage.	This matter has been scoped out of further assessment given that there would be no permanent loss of floodplain storage and based on the measures proposed (summarised in Section 2.5.8) to attenuate operational runoff from AGI. Further detail will be provided in the drainage strategy that will be produced for the application.
3.4.4	[*Physical disturbance, impact to flow regimes (watercourse crossings) from operational infrastructure (AGI and watercourse crossings)]* This matter is proposed to be scoped out on the basis that there would be no impact pathway, as there would be no physical disturbance during operation. The Inspectorate agrees that following construction further physical disturbance or impact on flow regimes at watercourse crossings is unlikely and therefore this matter can be scoped out of the assessment.	In line with the conclusions of the scoping opinion, operational effects on the flow regimes of watercourses (hydromorphology) has been scoped out.
3.4.5	[*Increased surface water runoff from converter station drainage during operation on receptors 'existing land uses and infrastructure' (operation*)]	In line with the conclusions of the scoping opinion, operational effects on existing land uses and infrastructure from increased surface water

ID	Inspectorate's comments	Response
	This matter is proposed to be scoped out on the basis of no impact pathway, given the attenuation of runoff through the SuDS provision. Table 2.5.9 indicates this applies to the operation and maintenance stages. The Inspectorate agrees that SuDS provision would remove/reduce the likelihood of surface water runoff from the convertor site during operation and thus ensure any such effects would be fully mitigated. The Inspectorate therefore agrees this matter can be scoped out of the assessment.	runoff from converter station(s) drainage during operation have been scoped out.
3.4.6	[*Increased flood risk due to permanent loss of floodplain storage/impediment of floodplain flows at the converter station site*] This matter is proposed to be scoped out on the basis that there would be no impact pathway, as there would be no permanent works in the floodplain. The Inspectorate considers it would have been helpful to overlay the converter site options with the flood mapping. The ES should include a clear plan showing the chosen converter site location (or options, where being pursued) and flood risk zones. At this stage of design and from the information provided, the Inspectorate understands that none of the converter site options are located within the floodplain and thus agrees that consideration of permanent loss of fluvial and coastal floodplain as a result of the converter site can be scoped out of the assessment. However, should this not be the case, the ES should include an assessment of any such likely significant effects.	**Figure 2.5.2 Flood Risk Baseline** presents flood mapping for the converter site options and extended Limits of Deviation (LoD) for this infrastructure. As illustrated, at this stage of design none of the converter site options, nor land within the wider LoD, are located within the floodplain, and as such this aspect is scoped out of further assessment.
3.4.7	[*Permanent physical disturbance and change to flow regime of unnamed ordinary watercourses, main rivers at the converter station option sites*] This matter is proposed to be scoped out on the basis that there would be no impact pathway as cables would be buried. Although not explicitly stated in Table 2.5.2, the Inspectorate assumes this is for the operational and	**Figure 2.5.1 Water Environment Receptors** identifies the location of watercourse receptors and their proximity to converter site options. During operation there would be no permanent physical disturbance to or impact on the flow regimes of these watercourses. This

ID	Inspectorate's comments	Response
	maintenance stage only as per Tables 2.5.1 and 2.5.9. Although it is also noted that Table 2.5.1 scopes in "…physical disturbance" at the maintenance stage. The Scoping Report does not clearly identify the location of these watercourse receptors and their proximity to converter site options. To aid the reader the ES should clearly identify these receptors on an accompanying figure. The Inspectorate agrees that following construction further physical disturbance or impact on flow regimes at watercourses during operation is unlikely and therefore permanent physical disturbance and change to flow regime effects during operation can be scoped out of the assessment. On the basis that the ES describes the maintenance activities and demonstrates how permanent physical disturbance and change to flow regime on these receptors for the identified converter site options will be avoided so that significant effects are not likely to occur, the Inspectorate agrees to scope this matter out.	matter is therefore scoped out of further assessment. On the basis of the types of maintenance activities that are envisaged, described in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project,** it is proposed to scope out effects on watercourse flow regimes.
3.4.8	[*Pollution of watercourses and physical disturbance during maintenance*] This matter is proposed to be scoped out on the basis of no impact pathway for a significant effect given the likely nature and scale of maintenance activities. As noted at point 3.4.1 of the Opinion above, Table 2.5.1 scopes in 'pollution of watercourses and physical disturbance' from maintenance activities; however, this matter is scoped out in Table 2.5.2. Summary Table 2.5.9 does not reference pollution effects during maintenance at all. The ES should make clear whether maintenance activities have been scoped in/out of the assessment.	On the basis of the types of maintenance activities that are envisaged it is proposed to scope out effects on water quality of watercourses and physical disturbance to them.
3.4.9	[*Temporary loss of floodplain storage/impediment of floodplain flows due to spoil storage during construction and decommissioning*]. This matter is proposed to be scoped out on the basis that areas of floodplain are	The Flood Risk Assessment that will be prepared to inform the water environment chapter of the ES, will demonstrates how the loss of floodplain storage/

ID	Inspectorate's comments	Response
	very localised and could be avoided. Provided the ES, supported by the Flood Risk Assessment (FRA), demonstrates how the loss of floodplain/impediment of floodplain flows will be avoided during construction and decommissioning and mitigation measures are secured through the dDCO, the Inspectorate agrees to scope this matter out.	impediment of floodplain flows will be avoided during construction and decommissioning. Subject to completion of the FRA, this matter is scoped into this preliminary assessment.
3.4.10	[*Reduced water availability to support abstractions and assimilate discharges for all stages and options*]. This matter is referenced in the Summary Table 2.5.9, but no information is provided to explain why this matter is to be scoped out of the assessment, such as a description of the 'existing water interests' receptors, the need for the Proposed Development to abstract water and the likelihood (or otherwise) of reduced water availability as a result of the Proposed Development. In the absence of supporting information the Inspectorate cannot agree to scope out this matter at this stage. The ES should provide further justification to support scoping out of this matter or an assessment, where likely significant effects could occur.	Data to characterise existing surface water abstractions has been requested from the Environment Agency and Suffolk County Council. This data will be reviewed and where the potential for likely significant effects is identified, the abstractions/water interests will be described in the ES, which would present an assessment of effects on these receptors.
3.4.11	[*Study Area*] The Scoping Report identifies a 500m buffer around the Suffolk Onshore Scheme Scoping Boundary but does not give reasons for the choice of study area. The ES should clearly define the study area, based on the ZoI from the Proposed Development, together with a justification for the selection.	Justification for the selected study area, illustrated in **Figure 2.5.1 Water Environment Receptors** is provided in Section 2.5.1.
3.4.12	[*Embedded measures/design – watercourse crossings*] The Scoping Report does not currently identify the types of crossings to be applied, but states that 'suitable crossing designs would be selected with the aim of reducing impacts'. The Applicant's attention is directed to the comments of the EA at Appendix 2 to this Opinion with	The Proposed Project is engaging with key stakeholders, including the EA and Water Management Board (WMB), to agree suitable watercourse crossing design principles. Further details will be provided within the ES. Watercourse crossing commitments are outlined in

ID	Inspectorate's comments	Response
	regards to the culverting of watercourses, which the EA would oppose.	**Volume 2, Part 1, Appendix 1.4.D, Crossings Schedule** and the proposed approach to watercourse crossings are outlined in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**.
3.4.13	[*Receptors*] Examples in this table do not reference property, businesses or people. The ES should provide justification for the receptors identified for the assessment.	Property, businesses and people have been included as potential receptors within the water environment assessment, as changes to the water environment has the potential to result in effects on these receptors.
3.4.14	[*Assessment methodology – magnitude criteria*] Examples within this table include reference to fishery value or designated nature conservation sites, although such receptor types are not explicitly mentioned in this aspect chapter. The Water Environment aspect chapter of the ES should include appropriate cross-references to other relevant aspect chapters such as Ecology and Biodiversity.	This is noted and suitable cross references to relevant aspects of the **Volume 1, Part 2, Chapter 3, Ecology and Biodiversity; and Volume 1, Part 2, Chapter 6, Geology and Hydrogeology** assessments will be provided within the Water Environment chapter of the ES.

2.5.3.2 There has been no change to the proposed scope of the assessment since the Scoping Opinion was received.

Consultation and Project Engagement

2.5.3.3 The Proposed Project has held several meetings with relevant stakeholders including the Environment Agency, the East Suffolk WMB and the Northumbrian Water Group, and has also engaged with Suffolk County Council in their role as the LLFA. The FRA scope has been discussed, as well as design parameters and principles for watercourse crossings.

2.5.4 Approach and Methodology

2.5.4.1 **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology** sets out the overarching approach which has been used in developing the preliminary environmental information. This section describes the technical methods used to determine the baseline conditions, sensitivity of the receptors and magnitude of effects and sets out the significance criteria that have been used for the preliminary water environment assessment.

Guidance specific to the water environment assessment

2.5.4.2 The preliminary water environment assessment has been carried out in accordance with the following good practice guidance documents:

- Planning Inspectorate Advice Note 18: The Water Framework Directive (Ref 2.5.21);
- National Highways Design Manual for Roads and Bridges LA113 (Ref 2.5.22);
- Construction Industry Research and Information Association (CIRIA) publications (various dates) (Ref 2.5.23); and
- Guidance for Pollution Prevention series (Ref 2.5.24).

Baseline Data Gathering and Forecasting Methods

Desk study

2.5.4.3 Baseline conditions of the Proposed Project were established during a desk study using the following sources:

- The Flood Estimation Handbook web service (Ref 2.5.25);
- Ordnance Survey maps and aerial imagery (Ref 2.5.26);
- Statutory Main River map for England (Ref 2.5.27);
- Environment Agency Flood Map for Planning (Ref 2.5.28);
- Environment Agency long-term flood risk mapping (including flood risk from surface water and reservoirs) (Ref 2.5.29);
- Environment Agency Water Quality Data Archive that provides water quality data for monitored main rivers (Ref 2.5.30);
- Anglian River Basin Management Plan (Ref 2.5.31);
- The EA Catchment Data Explorer (Ref 2.5.32); and
- East Suffolk WMB online mapping (Ref 2.5.33).

2.5.4.4 In addition, data requests have been made to the Environment Agency, Suffolk County Council (in their role as LLFA) and the East Suffolk WMB to provide information on the following aspects to support the assessment:

- Details of consented discharges to surface waters and licensed abstractions from surface waters;
- Deregulated surface water abstractions (private water supplies);
- Information on historical flood events and flood defences; and
- Modelled flood water level and flood extent data for the watercourses within the Study Area.

2.5.4.5 All of the information received has been incorporated into the baseline environment description in Section 2.5.7. Data which has not been received at this stage, for example, detailed flood modelling data and information on abstractions and discharges, would be used to inform the FRA and ES.

Site visits and surveys

2.5.4.6 No specific terrestrial water environment surveys have been or would be undertaken to inform this PEIR and the subsequent ES. This is because the baseline water environment can be robustly characterised using published data sources.

Assessment Criteria

2.5.4.7 The likely significant effects of the Proposed Project would be assessed with reference to published guidance for assessing the impacts of development on water environment receptors, considering the sensitivity (or value) of receptors within the Study Area, and the magnitude of change (impact) likely to be caused by the Proposed Project activities.

2.5.4.8 The adopted assessment methodology is drawn from the Design Manual for Roads and Bridges (DMRB) LA113 (Ref 2.5.22). Whilst primarily intended for use in assessing the impacts of highways projects on the water environment, the methodology is widely accepted as suitable for assessing the effects of other types of linear infrastructure projects on water environment receptors. The method promotes assessment that is proportionate to the scale and nature of the proposals and that considers the sensitivity of the local water environment to change.

2.5.4.9 The method provides guidance on assigning value (sensitivity) to receptors (for example, watercourses and floodplains) as well as criteria for assigning impact magnitude. These criteria consider the scale/extent of the predicted change and the nature and duration of the impact. The receptor value and impact magnitude criteria are reproduced in Table 2.5.B.1 and Table 2.5.B.2 in **Volume 2, Part 2, Appendix 2.5.B, Assessment Criteria.**

2.5.4.10 With reference to **Volume 1, Part 1, Chapter 5, PEIR Approach and Method** the adopted assessment criteria are very similar to those used in the overarching methodology. The terminology for defining receptor sensitivity is the same in both methods, and the definitions and terminology for impact magnitude it is very similar, with ‘Medium’ being equivalent to ‘Moderate’.

Sensitivity

2.5.4.11 The preliminary classification of receptor sensitivity has been guided by Table 3.70 of the DMRB LA113 (Ref 2.5.22). The criteria are reproduced in Table 2.5.B.1 in **Volume 2, Part 2, Appendix 2.5.B, Assessment Criteria.**

Magnitude

2.5.4.12 The preliminary classification of the magnitude of impact has been assigned in line with Table 3.7.1 of the DMRB LA113 (Ref 2.5.22). The magnitude of impact criteria consider the expected scale, extent and duration of change, and the magnitude is assigned following consideration of the measures embedded into the design of the development to reduce impacts. Temporary effects have been defined as those whereby the receptor can recover within a period of 1 year or less. The criteria are reproduced in Table 2.5.B.2 in **Volume 2, Part 2, Appendix 2.5.B, Assessment Criteria.**

Significance of effects

2.5.4.13 The sensitivity of receptor and magnitude of impact are combined to give an overall preliminary significance of effect using the matrix set out in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology**.

2.5.4.14 As set out in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology** the general approach taken to determining the significance of effect in this preliminary assessment is only to state whether effects are likely or unlikely to be significant, rather than assigning significance levels.

2.5.4.15 The assessment has been undertaken based on preliminary design information for the Proposed Project. The assessment is an iterative process and would be updated for the ES as the design evolves and relevant changes are accounted for.

Assumptions and Limitations

2.5.4.16 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- It is assumed there is sufficient data from the Environment Agency, LLFAs and WMB to inform a site-specific FRA and that no new flood risk models will need to be developed;
- It is assumed there is sufficient data from the Environment Agency to define the current condition and standards of protection provided by existing flood defences, and that no baseline condition surveys will be required; and
- No water quality sampling and analysis is proposed as it is considered that sufficient baseline data is available to generally characterise the water quality of surface water receptors.

2.5.5 Basis of Assessment

2.5.5.1 This section sets out the assumptions that have been made in respect of design flexibility maintained within the Proposed Project and the consideration that has been given to alternative scenarios and the sensitivity of the preliminary assessment to changes in the construction commencement year.

2.5.5.2 Details of the available flexibility and assessment scenarios are presented in **Volume 1, Part 1, Chapter 4, Proposed Project Description** and **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology**.

Flexibility assumptions

2.5.5.3 The main preliminary assessments have been undertaken based on the description of the Proposed Project provided in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project.** To take account of the flexibility allowed in the Proposed Project, consideration has been given to the potential for preliminary effects to be of greater or different significance should any of the permanent or temporary infrastructure elements be moved within the Limits of Deviation (LoD) or draft order Limits.

2.5.5.4 The assumptions made regarding the use of flexibility for the main assessment, and any alternatives assumptions are set out in Table 2.5.6 below.

Table 2.5.6: Flexibility Assumptions

Element of flexibility	Proposed Project assumption for initial preliminary assessment	Flexibility assumption considered
Lateral LoD HVDC/HVAC cables	Where there are cable crossings of watercourses the crossing technique assumed as open cut (representing the reasonable worst case) as the methodologies for individual watercourses have not yet been determined.	Initial preliminary assessment assumption relating to crossing technique (open-cut) represents a reasonable worst case. Lateral deviation of the route within the LoD would not be expected to result in a change in significance of reported effects. No new receptors would be impacted and although watercourses may be crossed at a different location, the same watercourses would be affected in the same reach lengths.
Lateral LoD Saxmundham Converter Station	Footprint of Saxmundham Converter Station as shown in Figure 1.4.2.	Potential for additional crossings of ditches/watercourses or for realignment of these features, as well as potential for works within the floodplain due to the lateral LoD of the Saxmundham Converter Station have been considered, as detailed in section 2.5.9.
Vertical LoD Saxmundham Converter Station	Parameter does not affect the likely significance of effects on water environment receptors	

Consideration of Scenarios and Options

2.5.5.5 There are three scenarios which have been considered by the preliminary assessment. These are:

- Friston substation is installed either under the current consent sought by Scottish Power Renewables (SPR) or as part of the Proposed Project, as explained in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**;
- Saxmundham Converter Station construction access is taken off the B1121 South Entrance (bellmouth BM09) or the B1121 Main Road (bellmouth BM12 via BM-11 and BM10), as explained in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project;**
- Saxmundham Converter Station permanent access is taken off the B1121 South Entrance (bellmouth BM09), B1121 Main Road (bellmouth BM12 via BM-11 and BM10) or off the B1121 The Street (bellmouth BM13), as explained in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project.**

2.5.5.6 Table 2.5.7 details where these scenarios are relevant to the preliminary water environment assessment and how they have been assessed and reported in Section 2.5.9.

Table 2.5.7: Considerations of Scenarios

Assessment scenario	How it has been considered within the preliminary assessment
Friston substation	The two options for installation of Friston substation have been considered and it is concluded that there is no material difference between the two options with regard to the potential for likely significant effects on water environment receptors.
Saxmundham Converter Station construction access	The construction access route options have been reviewed to determine any differences in the number of watercourse crossings, or difference in the extent of works within a floodplain. The overall length of the routes has also been considered in terms of effects on the existing rainfall runoff / land drainage regime. Whilst there are some small differentiators between the options with regard to these aspects, given the proposed control measures described in Section 2.5.8, it is considered there is no material difference between the options with regard to the potential for likely significant effects on water environment receptors.
Saxmundham Converter Station permanent access	The permanent access route options have been reviewed to determine any differences in the number of watercourse crossings, or difference to the extent of works within a floodplain. The overall length of the routes has also been considered in terms of effects on the existing rainfall runoff / land drainage regime. Whilst there are some small differentiators between the options with regard to these aspects, given the proposed control measures described in Section 2.5.8, it is considered there is no material difference between the options with regard to the potential for likely significant effects on water environment receptors.

Coordination including Co-location

2.5.5.7 The Proposed Project includes an option for co-location with National Grid Ventures proposed Nautilus and LionLink (formally known as EuroLink) interconnector projects as explained in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology.**

2.5.5.8 Table 2.5.8 details where the option of co-location is relevant to the preliminary water environment assessment and how this option has been assessed and reported in Section 2.5.9, preliminary assessment of effects.

Table 2.5.8: Consideration of Co-location

Element of co-location	How it has been considered within the preliminary assessment
HVDC ducts	Factors that have been considered include the increased working width and associated disturbance to the land drainage regime as well as the potential need for longer crossing of watercourses.
HVAC ducts	Factors that have been considered include the increased working width and associated disturbance to the land drainage regime as well as the potential need for longer crossing of watercourses.
Saxmundham Converter Station	The assessment has considered the potential for up to three Converter Stations to be located within the LoD at Saxmundam converter station site and the potential to disturb watercourses, waterbodies and floodplains. Therefore the assessment has considered a reasonable worst case scenario.
Friston substation	No option has been included for co-location as part of the Proposed Project. This is assessed cumulatively in **Volume 1, Part 2, Chapter 14, Suffolk Onshore Scheme Inter-project Cumulative Effects**.
Suffolk landfall	At the Suffolk landfall the Proposed Project has committed to a trenchless crossing beneath the coastal designated sites (Leiston Aldeburgh SSSI and North Warren RSPB Reserve), minimising disturbance to surface water receptors. It is therefore considered that there is no material difference between the Proposed Project and the co-location option with regards to water environment receptors.

Sensitivity Test

2.5.5.9 It is likely that under the terms of the draft DCO, construction could commence in any year up to five years from the granting of the DCO which is assumed to be 2026. Consideration has been given to whether the preliminary effects reported would be any different if the works were to commence in any year up to year five. Where there is a difference this is reported in Section 2.5.9 Preliminary Assessment of Effects.

2.5.6 Study Area

2.5.6.1 The Study Area for the PEIR is proposed to include all land within the Suffolk Onshore Scheme draft Order Limits, together with an additional 500m buffer from this boundary. The Study Area for the PEIR is illustrated in **Figure 2.5.1 Water Environment Receptors**. This Study Area is justified based on technical knowledge of similar schemes and has been set following consideration of the distance over which likely significant effects on the water environment can reasonably be expected to occur.

2.5.6.2 The FRA that would be prepared to inform the ES, may cover a larger Study Area where necessary, for example assessing the potential for changes to baseline flood risk at the local catchment scale or within a floodplain cell which may covers areas up to a several km^2. The Water Framework Directive Screening Assessment in **Volume 1, Part 5, Chapter 5, Water Framework Directive Screening Assessment** includes a Study Area that is set at the water body scale and includes all those WFD waterbodies with the potential to be affected.

2.5.6.3 The Study Areas for assessing effects on geology and the groundwater environment are described in **Volume 1, Part 2, Chapter 6, Geology and Hydrogeology**.

2.5.7 Baseline Conditions

Watercourses, their Water Quality and Hydromorphology

2.5.7.1 The Suffolk Onshore Scheme is situated in the hydrological catchments of the Hundred River and the neighbouring River Fromus, which is a tributary of the River Alde. These watercourses are designated main rivers and are waterbodies that are monitored under the WFD. The Hundred River and the Fromus rise to the north of Saxmundham. The River Fromus flows south, discharging to the River Alde near Snape. The Hundred River also follows a southerly flow path to drain to the coast south of Thorpeness.

2.5.7.2 The Hundred River has a current (2019) ecological status of Moderate and is failing with regard to its chemical status. The Fromus waterbody has a current ecological status of Poor and is also failing with regard to chemical status.

2.5.7.3 In addition to these main rivers, within the study area there are networks of ordinary watercourses, several of which are managed by the East Suffolk Water Management Board (WMB). The board manages water levels in these watercourses and maintains them.

2.5.7.4 The main receptors in the water environment are illustrated in **Figure 2.5.1 Water Environment Receptors** and their baseline WFD status is summarised in Table 2.5.9.

Table 2.5.9: Summary of WFD Status Cycle Data (Cycle 3) 2019

Waterbody	Overall Status	Ecological Status	Chemical Status
Hundred River	Moderate	Overall – Moderate Biological – Bad Physio-chemical – Moderate Hydromorphology – Supports Good	Overall – Fail Priority Hazardous Substances – Fail Priority Substances - Good

Waterbody	Overall Status	Ecological Status	Chemical Status
		Specific pollutants - High	
River Fromus	Poor	Overall – Poor Biological – Poor Physio-chemical – Moderate Hydromorphology – Supports Good Specific pollutants - High	Overall – Fail Priority Hazardous Substances – Fail Priority Substances - Good

2.5.7.5 With regard to physical form, both waterbodies are classified as being 'Heavily Modified', meaning that as a result of physical alterations by human activity they have been substantially changed in character.

2.5.7.6 The waterbodies are located in the East Suffolk management catchment. The Anglian RMBP (Ref 2.5.31) indicates reasons for waterbodies in this catchment not achieving Good status are diffuse pollution from rural areas, barriers to natural fish movements, and river channel and habitat degradation. The RMBP sets out measures for the catchment to help these waterbodies reach a target status of Good by 2027. These focus on initiatives to help restore areas of eroded saltmarsh on the River Alde, and address barriers to fish movement and morphology improvements. Further details are provided in **Volume 1, Part 5, Chapter 5, Water Framework Directive Screening Assessment**.

2.5.7.7 In accordance with Table 2.5.B.1 in **Volume 2, Part 2, Appendix 2.5.B, Assessment Criteria**, the water quality attributes of both the Hundred River and the Fromus are assigned **High** sensitivity (value), meeting the criteria of having a WFD classification shown in a RBMP and a Q95 flow of less than 1.0m^3/s. Their hydromorphological sensitivity is assigned as **Medium,** given their current 'heavily modified' status, but accounting for the measures to improve this attribute set out in the RBMP.

2.5.7.8 Sites designated for their nature conservation interest, where surface waters play a key role in sustaining the designated interest features, are also important receptors. Details of these sites are provided in **Volume 1, Part 2, Chapter 3, Ecology and Biodiversity**, and assessment of effects on such sites has been undertaken in collaboration with ecology and groundwater specialists.

Existing Water Interests (Surface Water Abstractions and Discharges)

2.5.7.9 Data to characterise existing surface water interests has been collected from the Environment Agency and district councils and with reference to a Groundsure report (April 2022). The data are illustrated in **Figure 2.5.2 Water Environment Receptors** and summarised in **Volume 2, Part 2, Appendix 2.5.A, Baseline Data.** Information on groundwater abstractions is included in **Volume 1, Part 2, Chapter 6, Geology and Hydrogeology**.

2.5.7.10 The Hundred River and River Alde, of which the River Fromus is a tributary, support several abstractions for non-potable irrigation water supplies at the local scale. The Hundred River is also receives two sewage discharges. Therefore, with regard to existing water interests, both receptors have been assigned **Medium** sensitivity.

Existing Flood Risk and Land Drainage

2.5.7.11 Based on the online Flood Maps (Ref 2.5.29), the main sources of flood risk within the Study Area are from the Hundred River, the River Fromus and the River Alde, with areas of Flood Zones 2 and 3 (medium to high risk) associated with these watercourses.

2.5.7.12 The areas of Flood Zone 2 (medium risk) and Flood Zone 3 (high risk) are largely similar in their extents: areas at risk are concentrated along the paths of the three watercourses, with a larger area around the Hundred River wetlands near Thorpeness, and along the coastline. The remainder of the Proposed Project is shown to be in Flood Zone 1 (defined as at low risk of flooding from rivers and the sea). Within the study area these rivers have relatively narrow floodplains, designated as Environment Agency Flood Zone 3. However, near their discharges to the coast and the River Alde, floodplains are more extensive, with the Hundred River floodplain shown to be benefitting from flood defences.

2.5.7.13 As the Proposed Project is classified as essential infrastructure, the floodplains of the watercourses in the Study Area are assigned **Very High** sensitivity/ value in line with the criteria presented in **Volume 2, Part 2, Appendix 2.5.B, Assessment Criteria.** As illustrated in **Figure 2.5.2 Flood Risk Baseline** there is an area of land within the Study Area benefiting from flood defences along the downstream stretch of the Hundred River and most of the Study Area is at low risk of flooding from rivers and the sea (in Flood Zone 1).

2.5.7.14 Flood risk from surface water runoff varies across the Study Area, with most areas at very low risk from this source. Areas mapped as at higher risk closely align with watercourse corridors. Within the study area ordinary watercourses and land drains perform a locally important function of managing surface water and providing drainage to allow the land to be farmed, therefore these features and the land drainage function they provide are assigned **Medium** sensitivity.

2.5.7.15 With regard to other potential flooding sources, the Environment Agency reservoir flood risk map (Ref 3.5.29) shows that an area extending north and south of the River Alde, is at risk of flooding from this source. However, it is noted that this is a residual risk and that the likelihood of reservoir failure and consequent flooding is very low. The rural setting corresponds to a low risk of flooding from sewers. Further information on the sewer network will be collected and information regarding any connections to or potential for effects on this network will be provided in the FRA.

2.5.7.16 Further assessment of the Proposed Project's interactions with groundwater aquifers is provided in **Volume 1, Part 2, Chapter 6, Geology and Hydrogeology** and groundwater as a source of flood risk to the Proposed Project will be assessed within the FRA.

Future Baseline

2.5.7.1 With regard to flood risk and drainage, future baseline conditions within the ES will be forecast, drawing on current best practice guidelines (Ref 2.5.13) taking into account the likely impacts of climate change on rainfall intensities. These future conditions will be considered to factor in climate change resilience into the Proposed Project's drainage design.

2.5.7.2 It is also anticipated that climate change will cause sea level rise which would affect coastal areas. Future baseline conditions with respect to sea level rise would be based on data provided from the Environment Agency from the Coastal Flood Boundary data set.

2.5.7.3 The implementation of future cycles of WFD management plans driving future improvements in the ecological and chemical quality of water bodies has been considered when assigning value to water environment resources and receptors.

2.5.8 Mitigation

2.5.8.1 As set out in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology**, mitigation measures typically fall into one of the three categories: embedded measures; control and management measures; and mitigation measures.

Embedded Measures

2.5.8.2 Embedded measures have been integral in reducing the water environment effects of the Proposed Project. Measures that that have been incorporated are:

- Sensitive routeing and siting of infrastructure and temporary works e.g. avoiding situating proposed converter stations and substations, and cable sealing compounds in areas that are at risk of flooding;
- Substations served with drainage systems that embed SuDS for attenuation and treatment of runoff, as illustrated in General Arrangements Plan S42_S/IGA/PS/0002 ; and
- Commitments made within **Volume 2, Part 2, Appendix 1.4.F, Schedule of Environmental Commitment and Mitigation Measures**.

Control and Management Measures

2.5.8.3 The following measures have been included within **Volume 2, Part 2, Appendix 1.4.A, Outline Code of Construction Practice** relevant to the control and management of impacts that could affect water environment receptors:

- **GG04**: The Construction Environmental Management Plan (CEMP) shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake daily site inspections to check conformance to the Management Plans. The name and contact details of person(s) accountable for issues relating to dust, waste, water, noise, vibration and soil will be displayed at site boundary.
- **GG15**: Fuels, oils and chemicals will be stored responsibly, away from sensitive water receptors. Where practicable, they will be stored >15m from watercourses,

ponds and groundwater dependent terrestrial ecosystems. Where it is not practicable to maintain a >15m distance, additional measures will be identified. All refuelling, oiling and greasing of construction plant and equipment will take place above drip trays and also away from drains as far as is reasonably practicable. Vehicles and plant will not be left unattended during refuelling. Appropriate spill kits will be made easily accessible for these activities. Potentially hazardous materials used during construction will be safely and securely stored including use of secondary containment where appropriate. Stored flammable liquids such as diesel will be protected either by double walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume. Spill kits will be located nearby.

- **GG16**: 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 or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of an emergency).
- **GG17**: Where required, wash down of vehicles and equipment will take place in designated areas within construction compounds. Wash water will be prevented from passing untreated into watercourses and groundwater. Appropriate measures will include use of sediment traps. Ensure there is an adequate area of hard surfaced road between the wash facility and the site exit, wherever site size and layout permits.
- **GG18**: Where required, wheel washing will be provided at each main construction works compound access point on to the highway. An adequate supply of water will be made available at these locations at all times. Road sweepers will be deployed on public roads where necessary to prevent excessive dust or mud deposits.
- **GG25**: An Emergency Action Plan will be developed for the construction phase which will outline procedures to be implemented in case of unplanned events, including but not limited to site flooding and pollution incidents.
- **W01**: All works within main rivers or ordinary watercourses will be in accordance with a method approved under environmental permits issued under the Environmental Permitting Regulations (Ref 2.5.5) or the protective provisions of the DCO for the benefit of the Environment Agency, and the Lead Local Flood Authorities
- **W02**: For open cut watercourse crossings and installation of vehicle crossing points, good practice measures will include but not be limited to:
  - where practicable, reducing the working width for open cut crossings of a main or ordinary watercourse whilst still providing safe working;
  - 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;
  - have 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;

- prevent refuelling of any plant or vehicle within 15m of a watercourse;
- prevent storing of soil stockpiles within 15m of a main river;
- inspect 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 the material removed when appropriate, on completion of the works and compacting as necessary. If additional material is required, appropriately sized material of similar composition will be used.

- **W03**: Riverbank and in-channel vegetation will be retained where not directly affected by installation works. Natural substrate will be provided through temporary watercourse crossings box culverts.
- **W04**: Where watercourses are to be crossed by construction traffic, measures to be applied include the use of 'flume' pipes or temporary spanned bridges. Once the flume pipe is installed, the area above the flume pipe will be backfilled and construction mats placed over the backfilled area to permit the passage of plant, equipment, materials and people. Flume pipes will be sized to reflect the span width and the estimated flow characteristics of the watercourse under peak flow conditions and kept free from debris. 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.
- **W05**: The contractor(s) will comply with all relevant consent conditions or DCO provisions regarding de-watering and other discharge activities. This will particularly be with regard to volumes and discharge rates and will include discharges to land, water bodies or third-party drains/sewers.
- **W06**: Where new or additional surfacing is required on any access tracks and compound areas, Sustainable Drainage Systems (SuDS) will be incorporated, appropriate to the existing ground conditions. The Proposed Project will incorporate appropriate surface water drainage measures into its final design for the haul roads and access tracks so that they do not lead to a significant increase in flood risk. Temporary haul routes within Flood Zone 3 and areas of high and medium risk of flooding from surface water will be removed at the end of the construction phase and the ground surface will be reinstated to pre-project levels. No construction materials should be stored within Flood Zone 3 and areas of high and medium risk of flooding from surface water, where this cannot be avoided adequate mitigation measures will be applied (as identified in the Flood Risk Assessment to be completed).
- **W07**: The contractor(s) will subscribe to the Environment Agency's Floodline service, which provides advance warning 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 contractor(s) will implement a suitable flood risk action plan, which will include appropriate evacuation procedures should a flood occur or be forecast.
- **W09**: In the event of a significant spill during construction, all relevant landowners/tenants will be contacted within 24 hours, within 250 m of the spill, to determine if there are any private water supplies that might be affected; an assessment of the likelihood of groundwater contamination reaching identified private water supplies will be undertaken, and where a private water supply is

judged likely to be affected, an alternative water supply will be provided, as appropriate.

- **W10**: Where a main river is crossed by a trenchless crossing, the cables will be laid at least 1m below the hard bed level of the river and will remain at or below this level for a distance of not less than 3m from the brink of the riverbank before rising at a slope no greater than 1 vertical in 1.5 horizontal. Marker posts shall also be positioned on each bank of the river to indicate the location of the under-crossing and the nature of the works.
- **W11**: severance of existing land drainage routes, including agricultural field drainage systems would be managed during construction through provision of temporary alternative drainage routes, and these drainage systems would be permanently reinstated or rerouted ensuring their existing function is maintained.
- **AS05**: 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 Proposed Project may include a system of 'cut-off' drains which feed into a new header drain and the Proposed roject will also take into account surface water runoff measures.

Mitigation Measures

2.5.8.4 Mitigation measures are additional topic and site-specific measures that have been applied to mitigate or offset any likely significant effects. No mitigation measures relevant to water environment receptors are included at this stage.

2.5.9 Preliminary Assessment of Effects

2.5.9.1 The preliminary assessment of the effects of the Suffolk Onshore Scheme described in this section considers the embedded, control and management and mitigation measures described in Section 2.5.8.

2.5.9.2 The preliminary water environment assessment of the effects of the Suffolk Onshore Scheme is presented in the following tables. Operational effects have been scoped out of the assessment.

2.5.9.3 Table 2.5.10 presents the preliminary assessment of effects on the water quality of watercourses during construction and decommissioning.

Table 2.5.10: Preliminary assessment of effects on the water quality of watercourses

	Preliminary assessment
Receptor	Hundred River, River Fromus and ordinary watercourses
Potential Impact	Pollution by silt, hydrocarbons and other construction materials, particularly at open cut watercourse crossings for access and for cabling
Proposed Project phase	Construction and decommissioning
Duration	Temporary (short term)

	Preliminary assessment
Mitigation	W01, W02, W10
Preliminary sensitivity	High (Hundred River and Fromus) Medium (Ordinary watercourses)
Preliminary magnitude	Negligible All of the measures detailed in Section 2.5.8 to manage and treat work site runoff and prevent pollution associated with open cut watercourse crossings would weaken the source-pathway-receptor link. The residual risk of pollution would be reduced such that there would be no effect on the use or integrity of the watercourse receptors, satisfying the criteria defining a negligible magnitude of impact with reference to Table 2.5.B.2 of **Volume 2, Part 2, Appendix 2.5.B, Assessment Criteria**. When the design flexibility is considered, the lateral position of the cables and the Saxmundham Converter Station anywhere within the LoD would not introduce pollution risks to any new receptors, nor increase the magnitude of impacts on the water quality attributes of watercourses. Under the different potential scenarios (detailed in Table 2.5.7) both of the construction access options to the Saxmundham Converter Station require a crossing of the River Fromus and a similarly minor extent of temporary works within the floodplain of the river. The route via Bellmouth 9 is shorter than the alternative route therefore requiring less earthworks (which have the risk of generating silted runoff). There is a third option with regard to a permanent access route, (via Bellmouth 13) which does not require a crossing of the Fromus and is a relatively short route. However, given the proposed control measures described in Section 2.5.8, it is considered there is no material difference between the access options with regard to the potential for likely significant effects on the water quality of water environment receptors.
Preliminary likely significance of effect	**Not Significant**
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate
Proposed Project with Co-location	
Preliminary sensitivity	High (Hundred River and Fromus) Medium (Ordinary watercourses)
Preliminary magnitude	Small Adverse

	Preliminary assessment
	A greater potential magnitude of impact has been assigned under the co-location scenario. This is on the basis of a larger working area with co-location (including a wider construction swathe for the cable routes and a bigger footprint for the converter stations). There would be more earthworks and disturbance, with increased potential to generate polluted worksite runoff and where watercourses are crossed by the cable routes, these crossings would impact a longer length of channel. There may therefore be some measurable change in water quality but insufficient change to impact on integrity or use.
Preliminary likely significance of effect	**Not Significant**
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate

2.5.9.4 Table 2.5.11 provides the preliminary assessment of effects on watercourse flow regimes and hydromorphology at watercourse crossings during construction and decommissioning.

Table 2.5.11: Preliminary assessment of effects on flow regime and hydromorphology

	Preliminary assessment
Receptor	Hundred River, River Fromus and ordinary watercourses
Potential Impact	Temporary physical disturbance and impacts on flow regime at open-cut watercourse crossings for access and the cable route
Proposed Project phase	Construction and decommissioning
Duration	Temporary (short term)
Mitigation	W01, W02, W03, W04
Preliminary sensitivity	Medium (all receptors)
Preliminary magnitude	Small Adverse As a result of all of the measures detailed in Section 2.5.8 to mitigate changes to flow regimes and hydromorphology at watercourse crossings, the magnitude of impact would be reduced to localised and temporary changes in riparian corridors at crossing sites. This satisfies the criteria for a Minor Adverse magnitude in Table 2.5.B.2 of **Volume 2, Part 2, Appendix 2.5.B, Assessment Criteria**. When the design flexibility is considered, the lateral position of the cables and the Saxmundham Converter Station anywhere withing the LoD would not impact the flow regimes or hydromorphology of any new receptors, nor increase the magnitude of impacts on these attributes of watercourses. Under the different potential scenarios (detailed in Table 2.5.7) both of the construction access options to the Saxmundham Converter Station require a crossing of the River Fromus and a similarly minor extent of temporary works within the floodplain of the river. There is a third option with regard to a permanent access route, (via Bellmouth 13) which does not require a crossing of the Fromus. However, given the proposed control measures described in Section 2.5.8, it is considered there is no material difference between the access options with regard to the potential for likely significant effects on flow regimes and hydromorphology.
Preliminary likely significance of effect	**Not Significant**
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate
Proposed Project with Co-location	

	Preliminary assessment
Preliminary sensitivity	Medium
Preliminary magnitude	Moderate Adverse A greater potential magnitude of impact has been assigned for the co-location scenario. This is on the basis of a wider construction swathe for the cable routes. Where watercourses are crossed by the cable routes, these crossings would impact a longer length of channel with overall a larger portion of the watercourses are being altered from baseline conditions, increasing the impact on hydromorphology and flow regime to Moderate.
Preliminary likely significance of effect	**Not Significant**
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate

2.5.9.5 Table 2.5.12 provides the preliminary assessment of effects on ordinary watercourses (including land drains) due to earthworks during construction.

Table 2.5.12: Preliminary assessment of effects on ordinary watercourses and land drainage due to earthworks

	Preliminary assessment
Receptor	Ordinary watercourses, land drains and existing land uses
Potential Impact	Increased runoff rates and volumes, and impact on land drainage regime due to soil stripping, earthworks and excavations
Proposed Project phase	Construction and decommissioning
Duration	Temporary (short term)
Mitigation	W01, W06, W11
Preliminary sensitivity	Medium
Preliminary magnitude	Small Adverse As a result of all of the measures detailed in Section 2.5.8 to mitigate impacts on land drainage and ordinary watercourses, increases in runoff rates would be limited such that changes to the baseline land drainage regime would be minor. When the design flexibility is considered, the lateral position of the cables and the Saxmundam Converter Station anywhere within the defined LoD would not

	Preliminary assessment
	generate additional land disturbance or impacts on the land drainage regime. Under the different potential scenarios (detailed in Table 2.5.7) for access, the construction access route via Bellmouth 9 is shorter than the alternative route therefore requiring less earthworks and change to the land drainage regime. There is a third option with regard to a permanent access route, (via Bellmouth 13) which is also a relatively short route. However, given the proposed control measures described in Section 2.5.8, it is considered there is no material difference between the temporary or permanent access options with regard to the potential for likely significant effects on ordinary watercourses and land drainage.
Preliminary likely significance of effect	**Not Significant**
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate
Proposed Project with Co-location	
Preliminary sensitivity	Medium
Preliminary magnitude	Moderate Adverse On the basis of a wider working area associated with co-location (both along the cable routes and at the Saxmundham Converter Station site), there is considered to be greater potential for impacts on ordinary watercourses and the land drainage regime. There would be additional impermeable land cover and more interaction with existing drainage features.
Preliminary likely significance of effect	**Not Significant**
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate

2.5.9.6 Table 2.5.13 provides the preliminary assessment of effects on floodplains and consequent flood risk to receptors during construction and decommissioning.

Table 2.5.13: Preliminary assessment of effects on floodplains and flood risk

	Preliminary assessment
Receptor	Coastal and fluvial floodplains, existing land uses and infrastructure

	Preliminary assessment
Potential Impact	Temporary loss of floodplain storage/impediment of floodplain flows, and increased flood risk e.g. due to spoil storage in floodplain
Proposed Project phase	Construction and decommissioning
Duration	Temporary (short term)
Mitigation	GG23, W06
Preliminary sensitivity	Very High
Preliminary magnitude	Negligible The Suffolk Onshore Scheme has largely avoided fluvial and coastal floodplains and where localised interactions occur, the measures detailed in Section 2.5.8 would reduce any temporary impacts. When the design flexibility is considered, the lateral position of the cables and the Saxmundham Converter Station anywhere withing the LoD would not impact on floodplains. Under the different potential scenarios (detailed in Table 2.5.7) both of the construction access options to the Saxmundham Converter Station require a minor extent of temporary works within the floodplain of the River Fromus. There is a third option with regard to a permanent access route, (via Bellmouth 13) which avoids interaction with the Fromus floodplain but does encroach into the floodplain of one of its tributaries. However, given the proposed control measures described in Section 2.5.8, it is considered there is no material difference between the access options with regard to the potential for likely significant effects on coastal and fluvial floodplains, existing land uses and infrastructure.
Preliminary likely significance of effect	**Not Significant**
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate
Proposed Project with Co-location	
Preliminary sensitivity	Very High
Preliminary magnitude	Negligible Land within the wider LoD of the Saxmundham Converter Station is not in a fluvial or coastal floodplain therefore co-location with three converter stations has no material difference. The wider construction swathe needed for the cables would, similarly, not interact with floodplains.
Preliminary likely significance of effect	**Not Significant**

	Preliminary assessment
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate

2.5.9.7 Table 2.5.14 provides the preliminary assessment of existing surface water interests (abstractions, discharges).

Table 2.5.14: Preliminary assessment of effects on existing surface water interests

	Preliminary assessment
Receptor	Existing abstraction and discharge licence holders, and receiving/supporting watercourses (Hundred River, River Alde)
Potential Impact	Temporary deterioration of water quality due to project discharges e.g. from dewatering or work site runoff and increased water use/reduced water availability due to construction water needs.
Proposed Project phase	Construction
Duration	Temporary (short term)
Mitigation	GG15, GG16, GG17, GG23, W02, W05, W09
Preliminary sensitivity	Medium
Preliminary magnitude	Negligible As a result of all of the measures detailed in Section 2.5.8 to mitigate changes to water quality and flow regimes, the residual risk of degradation of the integrity of watercourses to support existing water interests would reduce such that there would be minimal effect, satisfying the criteria defining a negligible magnitude of impact with reference to Table 3.5.B.2 of **Volume 2, Part 3, Appendix 3.5.B, Assessment Criteria**. When the design flexibility is considered, the lateral position of the cables and the Saxmundham Converter Station anywhere within the defined LoD would not increase the risk of effects on existing surface water abstractions and discharges. It is considered there is no material difference between the options with regard to the potential for likely significant effects on existing surface water interests.
Preliminary likely significance of effect	**Not Significant**
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate
Proposed Project with Co-location	

	Preliminary assessment
Preliminary sensitivity	Medium
Preliminary magnitude	Negligible On the basis of a wider working area associated with co-location (both along the cable routes and at the Saxmundham Converter Station site), there is not considered to be any increase in potential for impacts existing surface water interests, as watercourses in the vicinity of the Saxmundham Converter Station and associated defined LoD do not support existing abstractions or discharges.
Preliminary likely significance of effect	**Not Significant**
Sensitivity Test	No difference in significance of effect
Confidence in prediction	Moderate

2.5.10 Summary

2.5.10.1 The potential for likely significant effects on water environment receptors during operation and maintenance has been scoped out (Ref 2.5.20), as explained in Section 2.5.3. The preliminary assessment has concluded that effects of the Proposed Project, during its construction and decommissioning, would be limited to localised, temporary and small changes to the water quality attributes, hydromorphology and flow regimes of the main receptors within the Study Area (River Fromus and Hundred River), at watercourse crossings. There is also potential for small and temporary changes in rainfall infiltration/runoff rates and the land drainage regime during construction and decommissioning. The preliminary assessment has shown that there are **no likely significant effects** expected in relation to the water environment.

2.5.10.2 In accordance with paragraph 5.7.4 of EN-1 (Ref 2.5.6), the next step would be to develop an FRA to be submitted as part of the application for development consent. The FRA will document the design measures included to provide resilience to climate change and the measures secured to ensure no increase in flood risk elsewhere. In addition, a full WFD screening assessment would be undertaken. The findings of these studies would inform the full assessment of water environment effects to be reported within the ES.

2.5.10.3 The assessment undertaken in the ES would consider any design changes (e.g., as a result of stakeholder engagement or development of the design) since the completion of the PEIR.

2.5.11 References

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