Preliminary Environmental Information Report Volume 2

Appendix 12.4 Water Cycle Study

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Contents

1 Introduction

1.1 What is a Water Cycle Study?

1.1.1 The National Planning Policy Framework (NPPF) (Ref 1) expects strategic policies in development plan documents to make 'sufficient provision' for infrastructure for:

a. water supply;
b. wastewater; and
c. flood risk and coastal change management.

1.1.2 Planning Practice Guidance (PPG) (Ref 2) includes water cycle studies as one of the sources of information on the water environment. Furthermore, the Water Cycle Study (WCS) guidance notes that a WCS can help plan for sustainable growth and enable developers to provide evidence that Local Authorities can use to make sure their plans are sound. For the Great Britain onshore components of LionLink (hereafter referred to as the 'Proposed Onshore Scheme'), this WCS is used to demonstrate the potential impact of the onshore development on the local water environment and proposes mitigations for the potential impacts.

1.1.3 The Environment Agency is a statutory consultee for development plan documents and for some types of development and advises on environmental and infrastructure capacity issues across the water cycle. While water cycle studies are not required by law, they help developers and Local Planning Authorities (LPA's) to identify what is needed to ensure that strategic plans and new developments meet the Environment Agency's expectations for sustainable water resources provision.

1.1.4 A WCS is usually undertaken in two phases, according to guidance provided by the Environment Agency:

a. scoping/outline study; and
b. detailed study

Scoping or outline study

1.1.5 This is undertaken in the early stages of preparing or updating development plan documents and supporting evidence, or a planning application for a strategic development site. The scoping stage also identifies if the water infrastructure capacity could constrain growth.

Detailed study

1.1.6 This provides the evidence to inform an integrated water management strategy, including identifying the water (and flood management) infrastructure that would

mitigate the risks of too little or too much water, as well as what the Applicant may do to protect and enhance the water environment.

1.1.7 This WCS for the Proposed Onshore Scheme is a Detailed Study, providing information requested by the LPA in response to the Environmental Impact Assessment (EIA) screening request. It supports the early-stage environmental assessments prior to the submission of the Environmental Statement (ES) as part of the application for development consent.

1.2 Why this Water Cycle Study is needed

1.2.1 In preparation for the planning and consenting process for the Proposed Onshore Scheme, the Applicant initiated early environmental screening in accordance with Regulation 6 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (Ref 3). These screening requests relate to Ground Investigation (GI) works proposed at Walberswick, and Saxmundham, locations identified for early survey activities to assess the suitability of the proposed Underground High Voltage Direct Current (HVDC) Cable, the proposed Landfall and the proposed Converter Station siting.

1.2.2 Although the proposed GI works do not fall within Schedule 1 or Schedule 2 of the EIA regulations, the Applicant voluntarily submitted screening requests at the proposed Landfall Site at Walberswick due to the proximity of this site to sensitive environmental receptors, including a National Landscape and European Sites. At Saxmundham, the LPA requested a screening submission to determine whether the works could proceed under permitted development rights.

1.2.3 The proposed Landfall Site at Walberswick and the site at Saxmundham present relevant hydrological sensitivities.

Walberswick

1.2.4 Located approximately 300m inland from the Suffolk coast, north-west of the Dunwich River, the proposed Landfall Site is underlain by the Principal Crag Aquifer, a key groundwater resource. While not within a Source Protection Zone, the presence of surface water flood risk and proximity to the river necessitate pollution prevention measures during intrusive works.

Saxmundham

1.2.5 Situated on agricultural land about 600m east of the River Fromus, this site lies within a Source Protection Zone III (Total Catchment) and is also underlain by the Principal Crag Aquifer. While not within Flood zones 2 or 3, the eastern boundary is subject to variable surface water flood risk.

1.2.6 Across all locations, the primary environmental risks include potential interception of the groundwater table and increased connectivity between surface and subsurface water, with associated pollution risk from drilling fluids, machinery use, and site disturbance. These risks are addressed through best practice

measures, including the Environment Agency's groundwater protection guidance, Construction Industry Research and Information Association (CIRIA) C532 guidance on pollution control, Flood Risk Management (FRM) procedures for fluvial, pluvial, groundwater and coastal flooding, and full site reinstatement following completion of works.

1.2.7 This WCS has been prepared to assess whether these water-related constraints such as groundwater vulnerability, flood risk, and aquifer protection requirements can be appropriately managed in accordance with applicable environmental regulations, planning policy, and technical best practice. It also considers water supply and demand, and foul water services associated with the construction and operation of the Proposed Onshore Scheme, to ultimately inform the preliminary assessments outlined in **Chapter 12 Hydrology, Hydrogeology and Drainage** of this Preliminary Environmental Information Report (PEIR).

1.2.8 The WCS complements the formal EIA Scoping Report (Ref 4) submitted on 06 March 2024 and the Scoping Opinion issued by the Secretary of State on 16 April 2024 (Ref 5), both of which follow the Section 35 Direction issued on 23 August 2022, which confirmed the national significance of the Proposed Onshore Scheme and its determination under the DCO process. The WCS will be reviewed and updated for the ES.

1.3 Report context

1.3.1 A description of the Proposed Onshore Scheme, its site and surroundings, its constituent components can be found in **Chapter 2 Description of the Proposed Scheme**.

1.4 Local stakeholders and operating authorities

1.4.1 With regard to development planning and water-related issues, the key local and national stakeholders are:

a. Environment Agency;
b. East Suffolk Council (ESC);
c. Suffolk County Council (SCC);
d. Essex and Suffolk Water; and
e. Anglian Water

1.4.2 **Environment Agency:** The Environment Agency has wide-ranging powers for main rivers and groundwater bodies under the Water Resources Act 1991 (Ref 6) and the Environment Act 1995 (Ref 7). Under the Flood and Water Management Act (FWMA) 2010 (Ref 8) they have a responsibility to produce a national framework setting out requirements for the management of water resources and are a statutory planning consultee for development and flood risk issues.

1.4.3 **East Suffolk Council (ESC):** Serving as the Local Planning Authority (LPA) for the Proposed Onshore Scheme, ESC is tasked with preparing and enforcing the

Local Plan, Supplementary Planning Documents (SPDs), and related policies that guide land use, environmental protection, and management across the district. The Council acts as a statutory consultee in the DCO process and has been directly involved in EIA Screening for early works. ESC ensures that the Proposed Onshore Scheme aligns with local development objectives.

1.4.4 **Suffolk County Council (SCC):** Under the FWMA, SCC is designated as the Lead Local Flood Authority (LLFA) and has a responsibility to lead and coordinate the management of local flood risk and sustainable drainage. This includes ordinary watercourses, groundwater and surface water (including the implementation of sustainable drainage (SUDs) techniques). The Draft Order Limits for the Proposed Onshore Scheme are located entirely within the East Suffolk area.

1.4.5 **Essex and Suffolk Water (ESW):** ESW is the primary supplier of public potable water to the Proposed Onshore Scheme, with powers under The Water Industry Act 1991 (Ref 9). They operate and maintain notable infrastructure in proximity to the Draft Order Limits.

1.4.6 **Anglian Water (AW):** AW is the public sewerage undertaker under the Water Industry Act 1991 and provides sewerage services to the Suffolk region, as ESW is a water-only company. They operate and maintain notable infrastructure in proximity to the Draft Order Limits.

1.5 Data sources

1.5.1 The key data sources used in compiling this WCS were provided by the parties working on behalf of the Applicant. Publicly available information was also used to provide context as appropriate, as well as pre-planning commentary and opinions in response to submissions by the Applicant. The data and information received following a Request for Information and used for this report is listed in **Table 1.1**.

Table 1.1: Data sources utilised in the preparation of the WCS

No.	Data or Information Source	Provided By
1.	National Planning Policy Framework (Ref 1)	Publicly available
2.	Water supply, wastewater and water quality guidance (Ref 2)	Publicly available
3.	The town and country planning (EIA) regulations 2017 (Ref 3)	Publicly available
4.	LionLink Environmental Impact Assessment Scoping Report (Ref 4)	Publicly available
5.	Scoping Opinion: Proposed LionLink Multi-purpose Interconnector (Ref 5)	Publicly available
6.	Water Resources Act (Ref 6)	Publicly available
7.	Environment Act (Ref 7)	Publicly available

No.	Data or Information Source	Provided By
8.	Floods and Water Management Act (Ref 8)	Publicly available
9.	Water Industry Act (Ref 9)	Publicly available
10.	Water Cycle Study guidance (Ref 10)	Publicly available
11.	Sustainable Construction Supplementary Planning Document (Ref 11)	Publicly available
12.	Coastal Adaptation Supplementary Planning Document (Ref 12)	Publicly available
13.	Suffolk Flood Risk Management Strategy Appendix A2: Roles and responsibilities (Ref 13)	Publicly available
14.	Consenting Works on Ordinary Watercourses and Culvert Policy – Appendix B (Ref 14)	Publicly available
15.	Protocol for Local Planning Authorities – Appendix C (Ref 15)	Publicly available
16.	Suffolk SuDS Palette – Final (Ref 16)	Publicly available
17.	Essex and Suffolk Water Resources Management Plan (WRMP) 2024 (Ref 17)	Publicly available
18.	Essex and Suffolk Water Drought Plan 2022 (Ref 18)	Publicly available
19.	Anglian Water Drainage and Wastewater Management Plan (DWMP) 2022 (Ref 19)	Publicly available
20.	East Suffolk Council (2020) Suffolk Coastal Local Plan (Ref 20)	Publicly available
21.	East Suffolk Council Waveney Local Plan (WLP) 2019 (Ref 21)	Publicly available
22.	Summary Report: Converter Station Site 3 (Ref 22)	The Applicant
23.	Summary Report: Landfall G2- Walberswick (Ref 23)	The Applicant
24.	Department for Environment, Food and Rural Affairs (DEFRA) non-statutory technical standards for sustainable drainage systems (Ref 24)	Publicly available
25.	Suffolk County Council, flood and water management pre-application advice (Ref 25)	Publicly available
26.	Simple Index Tools Flood Risk Assessment (FRA) and Drainage Strategy (Ref 26)	Publicly available
27.	Suffolk Flood Risk Management Strategy – Appendix A Sustainable Drainage Systems: A local guide (Ref 27)	Publicly available
28.	Approved document H: drainage and waste disposal (Ref 28)	Publicly available
29.	General binding rules for small sewage discharges (SSDs) (Ref 29)	Publicly available

No.	Data or Information Source	Provided By
30.	Draft WRMP 2024 Consultation Statement of Response August 2023 (Ref 30)	Publicly available
31.	Water: An Action Plan for reducing water usage on construction sites (Ref 31)	Publicly available
32.	Wheel washing best practise (Ref 32)	Publicly available
33.	Construction Programme and Traffic estimates (both report and spreadsheet) (Ref 33)	The Applicant
34.	Water Management Planning Guidance for Construction Projects (Ref 34)	Publicly available
35.	Environment Agency water stressed areas classification (Ref 35)	Publicly available
36.	Revised policy to protect Suffolk's water supplies (Ref 36)	Publicly available
37.	A green future: our 25 year plan to improve the environment (Ref 37)	Publicly available
38.	WRMP24 Strategic Environmental Assessment scoping report (Ref 38)	Publicly available
39.	Waveney water cycle study (2017) (Ref 39)	Publicly available
40.	Water Act 2014 (Ref 40)	Publicly available
41.	Environment Act 2021 (Ref 41)	Publicly available
42.	The infrastructure planning regulations 2017 (Ref 42)	Publicly available
43.	Water Act 2003 (Ref 43)	Publicly available
44.	The Groundwater Regulations 2009 (Ref 44)	Publicly available
45.	Building Research Establishment Environmental Assessment Method (BREEAM) Water guides (Ref 45)	Publicly available
46.	Summary Report: Kiln Lane Substation (Ref 46)	The Applicant
47.	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 47)	Publicly available

2 Water resources planning, management and legislative context

2.1.1 The Proposed Onshore Scheme has considered several documents which are of importance from an integrated water management perspective set out in **Section 1.5** of this preliminary Water Cycle Study.

2.2 The National Planning Policy Framework

2.2.1 The NPPF (Ref 1) introduced in 2012 and revised in 2024, is the overarching planning framework guiding the development process at a national level across England. Although paragraph 5 makes clear that it does not contain specific policies for nationally significant infrastructure projects, such as the Proposed Onshore Scheme, it will be an important and relevant consideration. In terms of water resources, the NPPF states that all development should help to improve local water quality and should take a proactive approach to mitigating potential impacts on water supply and consider the impacts of climate change.

2.2.2 The NPPF states under paragraph 169 that all major developments should incorporate SuDS. This is regardless of whether the site currently experiences drainage issues, as they are intended to mitigate or improve the site's drainage to as near to greenfield run-off rates as possible.

2.2.3 Proposals for development on sites that are not allocated for development but that have been identified as being at risk of flooding (as per the Planning Practice Guidance on Flood Risk (Ref 2) will not be permitted if there are reasonably available sites appropriate for the Proposed Onshore Scheme in areas with a lower risk of flooding, as per paragraph 162 of the NPPF.

2.2.4 The NPPF requires local authorities to identify Coastal Change Management Areas (CCMAs) and mandates managing the risks from development in areas at risk of coastal change.

2.3 Sustainable Design and Construction Supplementary Planning Document

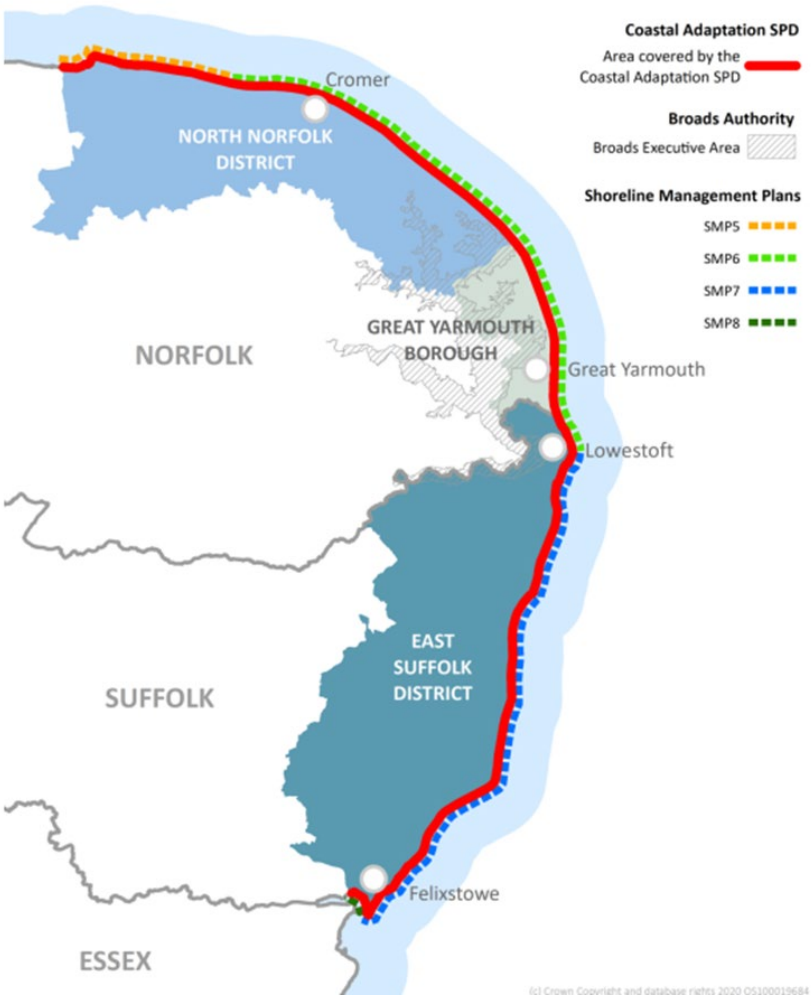
2.3.1 This is a Sustainable Design and Construction Supplementary Planning Document (SPD) (Ref 11) to the Suffolk Coastal Local Plan 2020 (Ref 20) and the Waveney Local Plan 2019 (Ref 21) and sets out the standards required to meet the visions, objectives and policies of the Local Plan as sustainably as possible. It provides further guidance on the implementation of Local Plan policies related to sustainable construction, including water efficiency, energy performance, and integrated design approach. The specific policies covered within the SPD, related to water efficiency and management, are discussed in detail in **Section 2.6**.

2.4 Suffolk flood and water supplementary planning document

Coastal adaptation Supplementary Planning Document (Ref 12)

2.4.1 This supplementary planning document provides guidance on the implementation of local plan policies along the coast from Holkham in Norfolk to Landguard Point, Felixstowe, in Suffolk (see **Inset 2.1**). It sets out the standards required to meet the visions, objectives and policies of the Local Plan as sustainably as possible.

Inset 2.1: The area to which the SPD applies

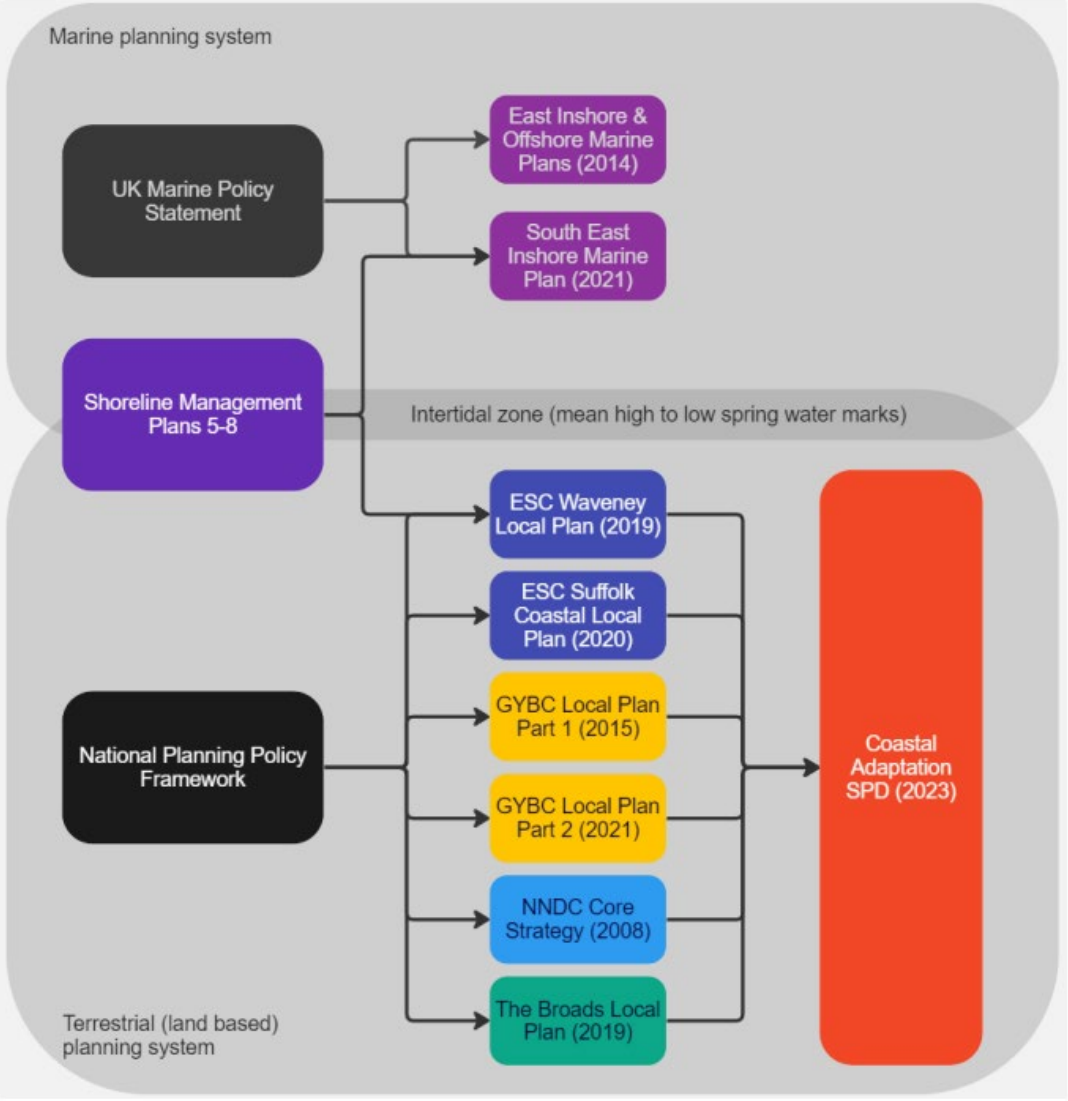


Source: Coastal Adaptation SPD

2.4.2 The Coastal Adaptation SPD for East Suffolk and partner authorities includes several key strategies and requirements that address sustainable water management in the context of development affected by coastal change. The SPD explains that the Integrated Coastal Zone Management (ICZM) approach is reflected in the NPPF. The SPD also defers to local plan policies that mandates

SuDS and runoff control, found in SCLP9.6 and WLP8.24. It also refers to the Planning Practice Guidance (PPG) on flood risk and coastal change that provides guidance as to how NPPF can be implemented. **Inset 2.2** illustrates the relationship between national and local coastal planning and planning related documents.

Inset 2.2: Flowchart showing the relationship between national and local coastal planning and planning related documents



Source: Coastal Adaptation SPD
Note: ESC – East Suffolk Council; GYBC - Great Yarmouth Borough Council; NNDC - North Norfolk District Council; SPD – Supplementary Planning Document.

Coastal Erosion Vulnerability Assessment (CEVA)

2.4.3 Development within high-risk coastal areas is strictly controlled based on type of development and location (see matrix in **Table 2.1**). It also required that the Proposed Onshore Scheme should demonstrate that it will not increase the risk of coastal erosion elsewhere, for example, from increased groundwater and

surface water runoff destabilising cliffs. Developers are expected to consult the LLFA (SCC) and/or relevant surface water drainage expert to ensure water can be managed without increasing risk to life or property.

2.4.4 A Coastal Erosion Vulnerability Assessment (CEVA), is required by LA's to establish whether proposed new development will be appropriate in a given location. CEVAs are categorised as Level A or Level B.

2.4.5 Level A CEVA requires an assessment of the risk to the development from coastal change over its anticipated lifetime, taking account of relevant Shoreline Management Plan (SMP) policies and potential changes in coastal management, and a statement acknowledging the associated risks and uncertainties in a changing coastal environment.

2.4.6 Level B CEVA is required for high-risk development and locations, as indicated in the matrix, and requires a more detailed appraisal of shoreline position under current SMP policy and a 'No Active Intervention' scenario, the potential need for intervention measures, drainage/runoff considerations, and end of life management, secured by legal agreement or planning condition.

2.4.7 The matrix below (**Table 2.1**) indicates which CEVA level applies for each development type.

Table 2.1: CEVA matrix for development types

Local Plan	Location on the coast	Permanent residential development	Non-residential development	Temporary development and uses (for example caravan)	Extensions to existing development	Modifications to existing development
East Suffolk Council (SCLP)	Within CCMA	Not permitted	Level B	Level B	Level A	Level A
	CCMA or Hold The Line areas +30m risk zone	Level B	Level A	Level A	Level A	Level A
	60m risk zone landward of coastal risk managemen t structures in areas of soft cliffs	Level B	Level A	Level A	Level A	Level A
East Suffolk Council (WLP)	Within CCMA	Not permitted	Level B	Level B	Level A	Level A
	CCMA or Hold The Line areas	Level B	Level A	Level A	Level A	Level A

Local Plan	Location on the coast	Permanent residential development	Non-residential development	Temporary development and uses (for example caravan)	Extensions to existing development	Modifications to existing development
	+30m risk zone					
Great Yarmouth Borough Council (Great Yarmouth Local Plan Part 2)	Within CCMA	Not permitted	Level B	Level B	Level A	Level A
	CCMA or Hold The Line areas +30m risk zone	Level B	Level A	Level A	Level A	Level A
North Norfolk District Council (North Norfolk Core Strategy)	Within Coastal Erosion Constraint Area (CECA)	Not permitted	Level B	Level B	Level A	Level A
North Norfolk District Council (emerging Local Plan)	Within CCMA	Not permitted	Level B	Level B	Level A	Level A
	30m risk zone in Hold The Line areas	Level B	Level A	Level A	Level A	Level A

Source: Coastal Adaptation SPD

Note: Red colour = will not be permitted, Amber colour = possibly acceptable and Level B CEVA required, green colour = possibly acceptable and Level A CEVA required.

Suffolk flood risk management strategy Appendix A: SuDS local design guide (2023) (Ref 13)

2.4.8 This is a technical guidance note by SCC that sets out local standards for implementing SuDS in development projects.

> *"Since April 2016 planning applications for all "major development" should be accompanied by a site-specific drainage strategy and/or flood risk assessment that demonstrates that the proposed drainage scheme is compliant with the National Planning Policy Framework, Planning Practice Guidance and DEFRA Technical Standards."*

2.4.9 All proposed drainage schemes must demonstrate how they address water quantity, quality, amenity and biodiversity.

"SuDS are designed to maximise the opportunities and benefits from surface water management. There are 4 main categories of benefits that can be achieved by SuDS: water quality, water quantity, amenity and biodiversity. These are referred to as the 4 pillars of SuDS design."

2.4.10 SCC's protocol for advising LPAs on surface water drainage and flood risk aspects of planning and development control is detailed in Appendix C of the Suffolk Flood Risk Management Strategy. It includes relevant policies and outlines information that can be supplied by SCC in order to assist the production of flood risk assessments or drainage strategies, such as flood records and mapping.

2.4.11 Developers must submit a surface water verification report to the LPA within 28 days of practical completion.

"The surface water drainage verification report should confirm that the surface water drainage system has been built, maintained and operates in accordance with the approved design and specification. The report shall be produced by a suitably qualified and competent engineer, independent of the developer, main contractor or subcontractor."

Suffolk flood risk management strategy Appendix B – consenting works on ordinary watercourses and culvert policy (2018) (Ref 14)

2.4.12 The document provides regulatory guidance on managing physical modifications to watercourses in Suffolk to reduce flood risk and associated impacts. SCC is responsible for granting Land Drainage Consent for any work in, over, under or near ordinary watercourses. The policy strongly discourages culverting and promotes restoring watercourses to their natural state for maintaining long-term resilience.

Suffolk flood risk management strategy Appendix C – protocol for local planning authorities and developers on suds, surface water drainage and local flood risk in Suffolk (Ref 15)

2.4.13 The document provides detailed procedures and responsibilities for managing water-related risks to development planning in Suffolk. SCC, as the LLFA, is the statutory consultee for surface water drainage in major developments (10+ dwellings or >1,000). The guidance promotes open, multifunctional SuDS and includes water efficiency measures such as rainwater harvesting and use of local land drainage water. It also encourages developers to integrate SuDS early in the design process and advises LPAs to apply a sequential risk-based approach. The guide recommends use of the Suffolk SuDS Guide, Building Research Establishment Digest 365 (BRE365) for soakage testing, and SuDS layout standards and details maintenance responsibilities and use of Section 106 agreements for long-term funding.

2.4.14 For water efficiency, the guidance advises LPAs to include explicit water efficiency provisions in their plans, though it is not a binding policy.

> *"Development will only be approved where it can be demonstrated that the proposal satisfies all the following criteria: It includes water efficiency measures such as rainwater harvesting, or use of local land drainage water where practicable."*

Suffolk SuDS palette – final (Ref 16)

2.4.15 This document is a practical guidance document jointly developed by SCC and Anglian Water Services which includes SuDS features for both residential development (under 250 dwellings) and commercial and residential development (250 dwellings and over).

Table 2.2: Extract from Suffolk SuDS palette for residential dwellings likely to be applicable to WCS

SuDs Palette: Residential Development (Under 250 Dwellings)	
SuDs Features	
Basins, sediment forebay and swales	Fescues or bent grasses (80% plus) and wildflower seed (20% or less) – wet or dry
Shallow pond and wetlands (Max 0.5m depth)	To be designed by landscape architect and ecologist
Tree pits	Bespoke design on a site-by-site basis; green-blue urban or similar
Rain gardens	Bespoke design on a site-by-site basis

Source: Suffolk SuDS Palette (SSP) Guidance

Table 2.3: Extract from Suffolk SuDS palette for commercial developments likely to be applicable to WCS

SuDs Palette: Commercial Development and Residential Development (250 Dwellings and Over)	
SuDs Features	
Basins, sediment forebay and swales	Fescues or bent grasses (80% plus) and wildflower seed (20% or less) – wet or dry
Shallow pond and wetlands (Max 0.5m depth)	To be designed by landscape architect and ecologist
Tree pits	Bespoke design on a site-by-site basis; green-blue urban or similar
Bioretention area	Norfolk reed (100%)

Source: Suffolk SuDS Palette (SSP) Guidance

2.5 Water resources legislation

2.5.1 The following legislation is also relevant to this WCS in as far as it influences the expectations on the Applicant and actions of those providing water services to the Proposed Onshore Scheme or commenting on the Proposed Onshore Scheme:

a. the Water Act 2014 (Ref 40) outlining provisions regarding water industry infrastructure;
b. the Environment Act 1995 (Ref 7)provides for the establishment of the Environment Agency and functions in relation to drainage and flood risk;
c. Water Resources Act 1991 (Ref 6), Water Industry Act 1991 , the Groundwater (England and Wales) Regulations 2009, (Ref 44) and Water Act 2003 (Ref 43) which provide requirements for regulation of water resources, water quality and pollution risk;
d. Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref 42) outline procedural requirements for assessing impacts on water resources;
e. the Environment Act 2021 (Ref 41), which operates as the UK's new framework for environmental protection. It aims to improve air and water quality, tackle waste, improve biodiversity and make other environmental improvement; and
f. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 47) set out how England and Wales implement the EU Water Framework Directive, including the legal duties for preparing River Basin Management Plans, protecting and improving water bodies, preventing deterioration, and allowing certain exemptions such as under Regulation 19[1].

2.6 Essex and Suffolk's water plans

2.6.1 The Proposed Onshore Scheme falls within East Suffolk, which falls within ESW's supply area, therefore ESW's WRMP (latest version is WRMP24) (Ref 17) is critical for this WCS. ESW supplies water to approximately 300,000 customers in the Suffolk supply area. East Suffolk falls primarily under the Hartismere Water Resource Zone (WRZ), with some areas also covered by the Blyth WRZ and Northern Central WRZ, under Northumbrian Water Group as shown in **Inset 2.3**.

[1] Under Regulation 19 of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, new modifications or new sustainable human development activities may be permitted even though they might compromise the achievement of certain environmental objectives. Such permission can be granted where the development provides overriding benefits to society that outweighs the environmental or societal benefits of meeting objectives. These benefits may include those from essential activities such as the provision of public water supply

Inset 2.3: Map of Suffolk WRZs

Source: ESW Final WRMP24, October 2024

2.6.2 The WRMP is aligned with several other strategic and statutory plans or assessments, including:

a. Government's 25 year Environment Plan (Ref 37) the national strategy focused on long term environmental sustainability. ESW's WRMP24 reflects its priorities by supporting nature recovery, applying natural capital in decision making, using a catchment-based approach, and delivering net gain for the environment.

b. The WRMP24 statutory Strategic Environmental Assessment (SEA) (Ref 38), which considers whether the proposals within the WRMP could cause "significant environmental effects," including impacts on Water Framework Directive (WFD) bodies, and to assess the potential impacts of the options that are under consideration.
c. ESW's latest Business Plan which sets out planned investment and service packages for the 2025-30 five-year Asset Management Period (AMP), which is the same period covered by WRMP24.
d. ESW's Drought Plan (Ref 18), which sets out how the company would enhance available supplies, manage customer demand, and minimise environmental impacts as the drought progresses.
e. River Basin Management Plans which set out environmental objectives and water body classifications aimed at improving and protecting the water environment. WRMP24 supports the delivery of these objectives by aligning abstraction, supply, and demand strategies with River Basin Management Plan (RBMP) requirements, contributing to achieving WFD outcomes.
f. Anglian Water's DWMP (May 2023) (Ref 19) for its wastewater management areas which includes ESW's supply area, as ESW is a water-only company. ESW's WRMP24 aligns with Anglian Water's DWMP through shared methodologies for growth and climate change assumptions.
g. ESW's drinking water safety plans (or risk assessments) are used to identify risks from catchment to customer tap by assessing hazards and hazardous events. As part of WRMP24, risk assessments have been carried out for all existing supplies and for new supply schemes in the preferred plan.
h. Local authority plans set out future development, such as housing, and ESW's WRMP24 reflects these local growth ambitions and plans.
i. Local Nature Recovery Strategies (England) drive biodiversity enhancement across England, and ESW's WRMP24 supports these through its PR24 Water Industry National Environment Programme (WINEP).

WRMP24 Context

2.6.3 ESW published its final statutory WRMP24 in October 2024 (Ref 17), covering the 25-year period from 2025 to 2050, setting out how ESW will maintain a secure, resilient and environmentally sustainable water supply across its four WRZs. The plan has been developed in line with sections 37A-37D of the Water Industry Act 1991 and follows a consultation on the draft WRMP24 and a formal Statement of Response (Ref 30) following the consultation. It also forms a key input to ESW's PR24 Business Plan.

2.6.4 WRMP24 responds to a wide range of evolving uncertainties, including:

a. The categorisation of the ESW supply region as a Serious Water Stressed Area by the Environment Agency, and the company's plan for compulsory rollout of metering and smart meters by 2030 in Suffolk and 2035 in Essex.
b. The projected impacts of climate change on rainfall patterns, river flows, reservoir refill and groundwater recharge and the proposed new strategic pipelines, water reuse scheme, and a winter storage reservoir in Suffolk.

c. completion of abstraction sustainability investigations and agreement with the Environment Agency to lower abstraction levels from 2026, which are factored into its supply forecasts.
d. Rising future demand for water and increasing per capita consumption (PCC) and strategies to reduce PCC to 110 litres/person/day (l/p/d) by 2050.
e. Programme to increase drought resilience to a 1-in-500-year event by 2039 and reduce leakage by 50% from 2017/18 levels by 2050, in line with DEFRA's planning expectations.
f. WRMP24 takes a twin-track approach, combining long-term water demand management with strategic new supplies.

2.6.5 It applies a Best Value Planning framework to identify investment solutions, and the plan is made adaptive with alternative pathways included to respond to uncertainties in demand growth, climate change and abstraction.

Challenges

2.6.6 The key water resources challenges identified in ESW's WRMP24, specific to the Suffolk region include:

a. All three Suffolk WRZs face Deployable Output (DO) reductions due to abstraction requirements under the WFD and Habitats Regulations. Blyth WRZ abstraction reductions are expected to begin as early 2026/27; Hartismere WRZ abstraction reductions have already begun (before AMP8, which started in April 2025) and continue to 2030; and in North Central WRZ, River Waveney abstraction reductions begin from 2032/33, limiting the potential/surplus for inter-zone transfers.
b. Persistent supply deficits in Hartismere WRZ, even with a moratorium on new non-domestic connections until 2032. The proposal for a strategic pipeline from Northern Central WRZ (to Hartismere WRZ) is unlikely to fully address these deficits, given the emerging constraints within the North Central WRZ itself.
c. All Suffolk supply area WRZs face significant baseline supply deficits when modelled against both the 1-in-200 year and 1-in-500-year drought scenarios. Therefore, it is likely that Suffolk supply area may not meet the 1- in-500-year drought resilience standard water companies are required to meet until AMP9, when forecast water demand savings materialise and new WRMP24 supply schemes come into effect.
d. Uncertainties driven by climate change impacts, licence capping, sustainability reductions, and WINEP outcomes.
e. High PCC and water demand trends, with the government requirement to plan to reduce PCC to 122 l/h/d by 2038 and 110 l/h/d by 2050.

Water stress designation (Suffolk region)

2.6.7 Suffolk supply region is currently classified as a serious water-stressed area by the Environment Agency as shown in **Inset 2.4**. This designation was updated in 2021, using the latest evidence from the National Framework for Water Resources (2020) and WRMP19 forecasts, and accepted by the Secretary of State following public consultation.

2.6.8 According to the 2021 Environment Agency designation document (Ref 35):

> *"Water stress applies both to the natural environment and to public water supplies. Both will be affected by climate change. Public water supplies are under pressure from reductions in abstraction to make them more environmentally sustainable. There is also a need to make public water supplies more resilient to droughts and meet additional demands associated with development and population growth".*

2.6.9 The above classification provided the regulatory basis for ESW to adopt compulsory metering, which is a key demand management option in their WRMP24.

2.6.10 As part of WRMP24, ESW confirms:

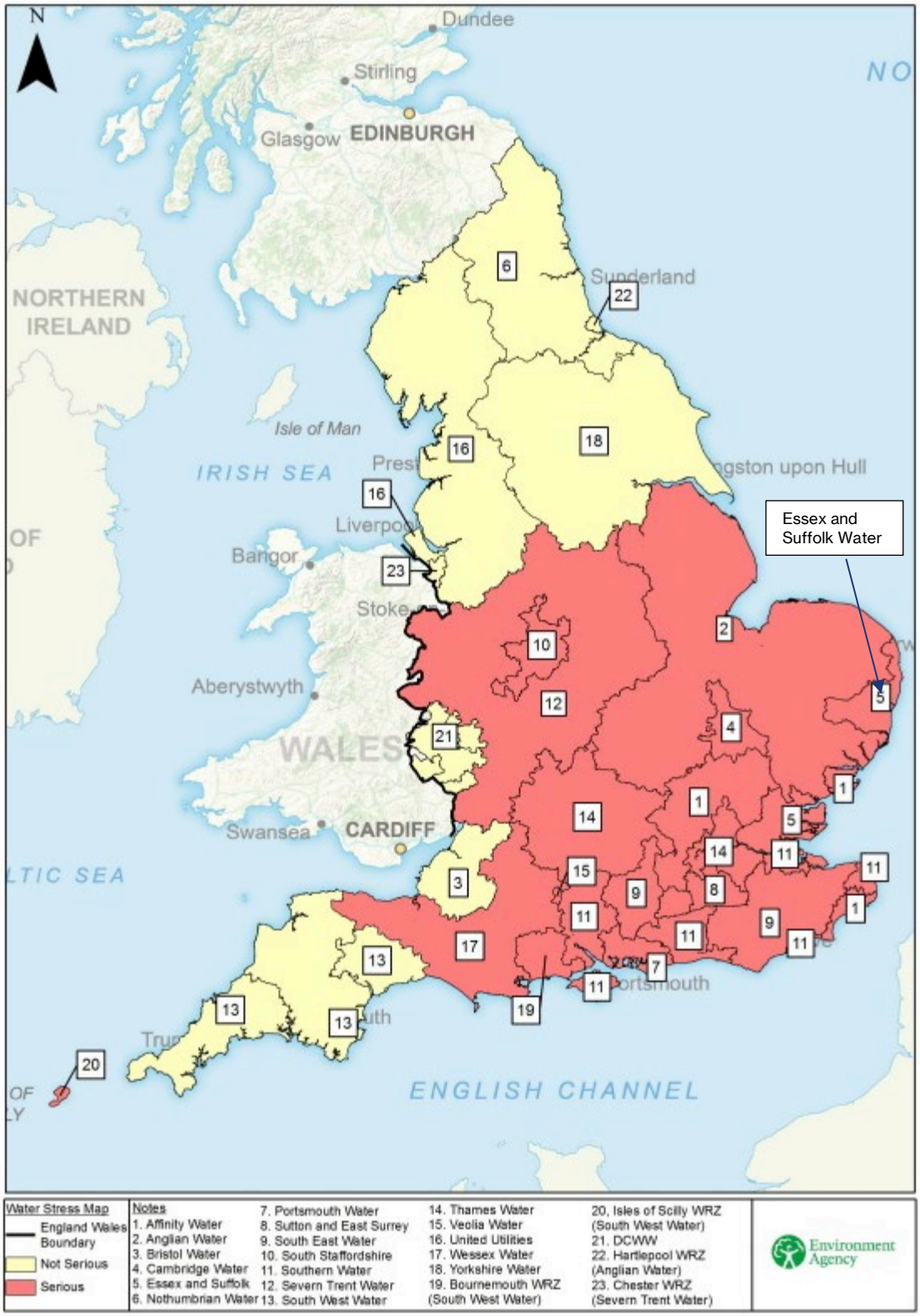
> *"Suffolk is a serious water stressed area with limited supply headroom, and we will work with businesses to consider water efficiency and water recycling in order to minimise their mains water needs."*

2.6.11 In response, ESW is implementing compulsory smart metering for all unmeasured customers in Suffolk by 2030. They are upgrading all existing meters by 2035 and delivering household and business water efficiency programmes alongside leakage reduction.

2.6.12 Furthermore, all three Suffolk WRZs are affected by water abstraction Sustainability Reductions and DO constraints under the WFD and Environmental Destination policies, as outlined in **Section 2.6.**

2.6.13 These shared pressures, along with uncertainties from climate change and population growth, supports the basis for the serious water stress designation.

Inset 2.4: Map showing results of Environment Agency Water Stress Classification



Source: Environment Agency Water stressed areas – 2021 classification

Summary of ESW's WRMP24 proposals

2.6.14 ESW's WRMP24 uses a central pathway and preferred programme representing the most likely future, based on the uncertainties, and alternative pathways and

programmes if forecasts work differently. The adoption of an adaptive planning approach justifies the phasing of all supply side schemes, demand-side options, and drought resilience measures.

2.6.15 ESW's proposed WRMP24 programme includes the following measures.

Demand-side options

a. compulsory smart metering;
b. all unmeasured properties to be metered by 2030 in Suffolk and 2035 in Essex;
c. all existing meters to be replaced with smart meters by 2035;
d. 40% leakage reduction from 2017/18 levels by 2050;
e. household water efficiency programmes such as Water's Worth Saving home visits to the highest users, the Ripple Effect educational resources for children, and Leaky Loos programme, which repairs leaking customer toilets for free;
f. non-household water efficiency programmes such as a targeted 9% reduction in business demand by 2038; and
g. reduction in PCC by 110 litres/person/day by 2050.

Supply-side options

a. strategic pipelines linking Northern Central WRZ to both Blyth and Hartismere WRZs (operational from 2028/29), including Barsham Water Treatment Works (WTW) to Saxmundham Tower and Holton WTW to Eye Airfield transfers;
b. Lowestoft Water Reuse Scheme (operational from 2031/32);
c. development of a new reservoir, North Suffolk Winter Storage targeted for 2040/41, to store excess winter flows;
d. groundwater development and raw water transfers/Bungay wells to Broome WTW transfer and Broome to Barsham WTW transfer from 2030/31;
e. Barsham nitrate reduction scheme from 2029/30; and
f. use of initial surplus in Northern Central WRZ to support supply-demand balance in the other two WRZs.

Drought resilience

a. 1 in 200-year drought resilience in Suffolk WRZs until 2032/33, increasing to 1 in 500-year drought resilience from 2033/34;
b. reduced drought action level of service: Level 1 - Appeal for Restraint changing from 1 in 10 years to 1 in 5 years, and Level 2 - Temporary Use Ban changing grom 1 in 20 years to 1 in 10 years (both more stringent);
c. implementation of a moratorium on new applications for mains water supplies where the water will be used for non-domestic purposes, to be lifted once the new supply schemes become operational; and

d. ESW has assumed that it will be granted a Regulation 19 derogation[2] under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 to delay implementation of WFD No Deterioration sustainability reductions until its new WRMP24 schemes are in supply.

Approach to non-household (business) water demand

2.6.16 In its WRMP24, ESW recognises the need for managing the non-household water demand, particularly in a water-stressed area such as Suffolk. In the Hartismere WRZ, the company has taken significant regulatory and planning action to maintain water security, as there is evidence of supply headroom being constrained.

"Supply headroom in our Hartismere water resource zone is limited due to growth in non-household demand over the previous five years."

"We are forecasting a significant increase in new non-domestic demand which is equivalent to a 35% increase in overall household and non-household demand although new supply schemes will not be delivered until 2028/29 and 2032/33 respectively. Consequently, [a] moratorium is required to protect mains water supplies to existing customers and businesses and to avoid unsustainable abstraction."

"Sustainability reductions will be applied to the annual licensed quantity on our abstraction licences in the Hartismere water resource zone in 2030, or sooner where part or all of an abstraction licence is time limited."

2.6.17 The company has imposed a moratorium on new non-household (business and industry) water supply applications demonstrating that is likely to be unable to maintain water supplies to existing customers and businesses and provide new supplies to applicants without unsustainable abstraction or failing in its water supply duties. Furthermore, ESW is targeting reduced business demand by 9% by 2037/38 (excluding growth), for which a new non-household water efficiency strategy is to be developed.

"We will work with businesses to consider water efficiency and water recycling in order to minimise their mains water needs."

2.6.18 The company plans to roll out compulsory smart metering for all unmeasured household customers by 2030.

2.6.19 The company also has taken a step forward to curb reliance on public water supply by new developments.

[2] Under Regulation 19 of the Water Environment (Water Framework Directive)(England and Wales) Regulations 2017, new modifications or new sustainable human development activities may be permitted even though they might compromise the achievement of certain environmental objectives. Such permission can be granted where the development provides overriding benefits to society that outweighs the environmental or societal benefits of meeting objectives. These benefits may include those from essential activities such as the provision of public water supply

"In terms of new development between now and 2030 when our new supply schemes come online, it is the developer's responsibility to identify solutions for ensuring that they are mains water neutral."

Licence capping to avoid environmental deterioration under WFD

2.6.20 ESW has implemented abstraction licence reductions across its three Suffolk WRZs by capping abstraction at historically sustainable levels in line with the Environment Agency's 'No Deterioration' policy under the WFD.

Hartismere WRZ

2.6.21 All the abstraction licences in this zone are time-limited and expected to have been renewed by 31st March 2025.

2.6.22 The 'No Deterioration" caps have already been incorporated into WRMP24's baseline supply-demand balance, and these caps could bring in an immediate supply deficit from 2025.

2.6.23 ESW has applied for a Regulation 19 exemption to delay the license caps until new supply schemes are operational.

Blyth WRZ

2.6.24 Capping occurs in three phases, with three sources capped from 2025 (pre-AMP8), two sources in 2026/27, and the final two capped in 2030/31.

2.6.25 A total sustainability reduction of 4.39 Ml/d will be delivered from AMP7 WINEP investigations, including capping Blyth Boreholes 7, 9, and 4 to Recent Actual Average (RAA) by 2026, and revoking Blyth Borehole 8 by 2030.

2.6.26 These, along with No Deterioration reductions from time-limited licences expiring in 2026, result in a supply deficit from 2026/27, which worsens in 2030/31, to a total loss of 6 Ml/d of DO.

2.6.27 All reductions are incorporated in WRMP24's baseline supply-demand balance.

Northern Central WRZ

2.6.28 Two abstraction sources will be capped from 2025, two more in 2026/27 and the remaining four in 2030/31.

2.6.29 A key water source at Shipmeadow intake on the River Waveney will be reduced from 20.5 Ml/d to 0.37 Ml/d from 2030/31, and then to 16 Ml/d from 2032/33.

2.6.30 The capping within the zone limits the inter-zone transfers, and ESW anticipates no internal surplus will be available until additional supply schemes become operational.

Intra-company and external water transfers

2.6.31 There are three internal water transfers operated within the Suffolk region to manage water distribution between the three zones: two transfers from North

Central WRZ to Blyth WRZ and one potable water transfer from Blyth to Northern Central WRZ.

2.6.32 In terms of external water transfers, ESW maintains small potable water exports to Anglian Water in the Northern Central WRZ, totalling 0.37 Ml/d.

2.6.33 New inter-regional transfers with Anglian Water and Thames Water were discounted by ESW in WRMP24 due to uncertainties surrounding Habitats Regulations-driven Sustainability Reductions (Broads Special Area of Conservation), the likely water quality risk rising from fluctuations in supply and demand, the potential pressure differentials in the receiving zone and network configuration challenges risking system resilience.

2.6.34 However, ESW may revisit future opportunities for water trading once key supply schemes are operational and regional stress is improved.

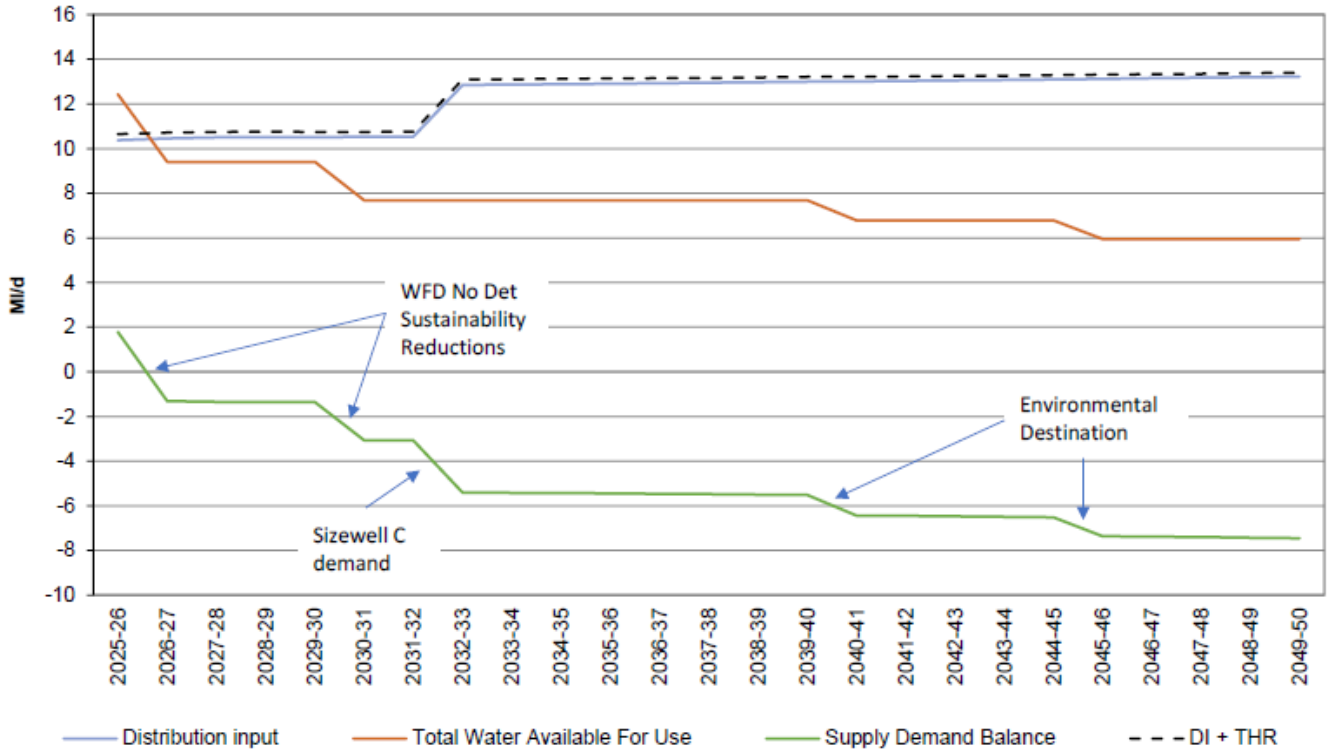
Baseline supply-demand balance

2.6.35 ESW's WRMP24 baseline forecasts identify persistent and escalating supply demand deficits across all three Suffolk WRZs, predominantly driven by the Sustainability Reductions under the WFD, climate change, and rising non-household demand. This section presents the baseline (initial) Dry Year Annual Average (DYAA) water supply demand balance for all three Suffolk WRZs, taking into account expected abstraction reductions, but not accounting for any supply-side or demand-side interventions.

2.6.36 Blyth WRZ (see **Inset 2.5**) shows an initial surplus in 2025/26 but falls into deficit from 2026/27 due to the expiry of time-limited abstraction licences and subsequent WFD No Deterioration caps, which remove all supply headroom. The deficit drops further from 2030/31 with the implementation of AMP7 WINEP sustainability reductions, causing a total loss of 6 Ml/d of DO. In 2032, the zone sees a further drop as it begins supplying the Sizewell C nuclear development. The situation worsens in 2040 and 2045 with Environmental Destination licence reductions under the Business as Usual Plus[3] (BAU+)[i] scenario, and the WRZ remains in deficit through AMP12.

[3] BAU+ is a scenario used in water resources planning that aims to achieve the Environment Flow Indicator (EFI) in all waterbodies, which also includes those currently not required by regulation, a step beyond the regulatory minimum.

Inset 2.5: Blyth WRZ - Baseline DYAA supply/demand balance and components of demand



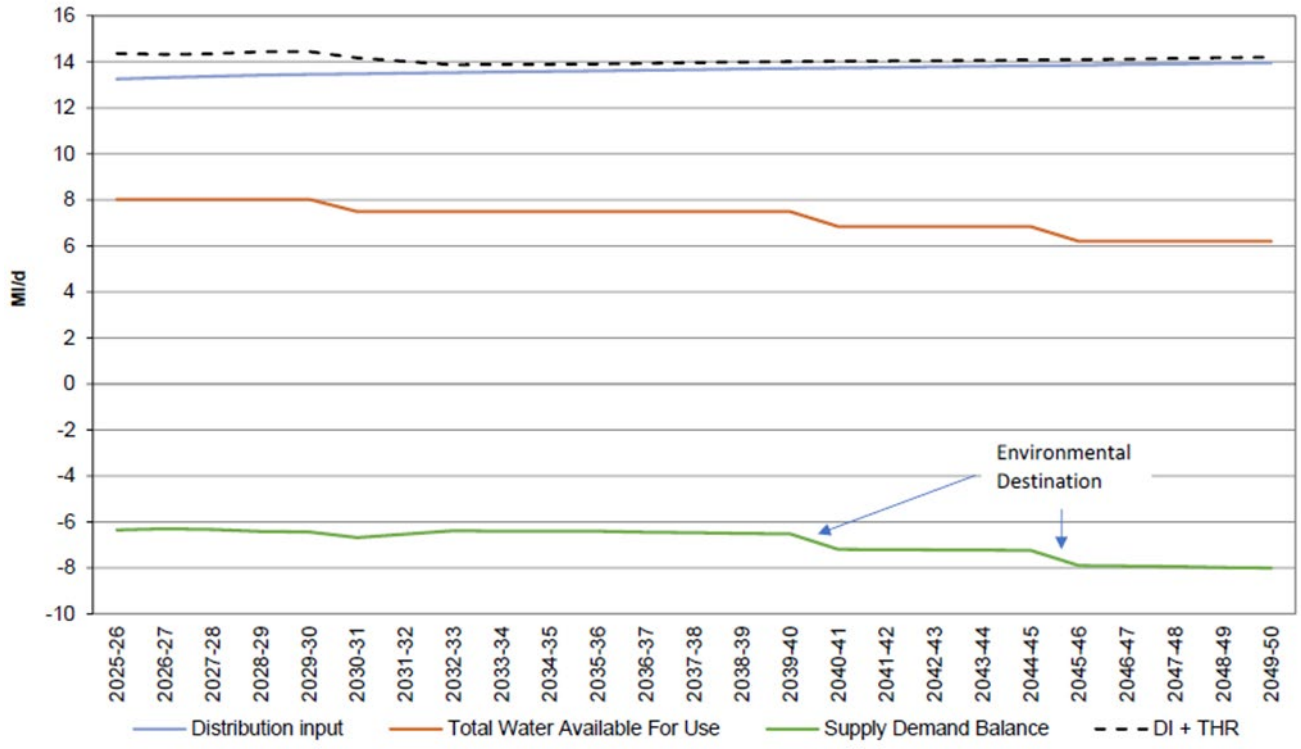
Note: No Det – No Deterioration; DI- Distribution input; THR – Target Headroom. THR (the black dashed line) is an allowance for uncertainties in both the supply and demand forecasts and has been added to the Distribution Input Forecast (Ref 17)

2.6.37 Hartismere WRZ (see **Inset 2.6**) is in deficit from the start of the planning period, primarily due to new non-household demand from the Eye Industrial Estate. The situation worsens immediately with the implementation of WFD No Deterioration licence caps, as all sources have time-limited licences expiring before AMP8 (April 2025). These are capped at recent utilisation levels on renewal, reducing Water Available For Use (WAFU) by 2.27 Ml/d from 2025/26.

2.6.38 The deficit deepens further in 2040 and 2045 due to Environmental Destination reductions. By the end of AMP12 (2050), the supply deficit would reach 8.0 Ml/d without any interventions.

2.6.39 To manage this, ESW has proposed a Regulation 19 exemption and a moratorium on new non-domestic demand until 2032, while supply-demand improvements are implemented through the Best Value Plan.

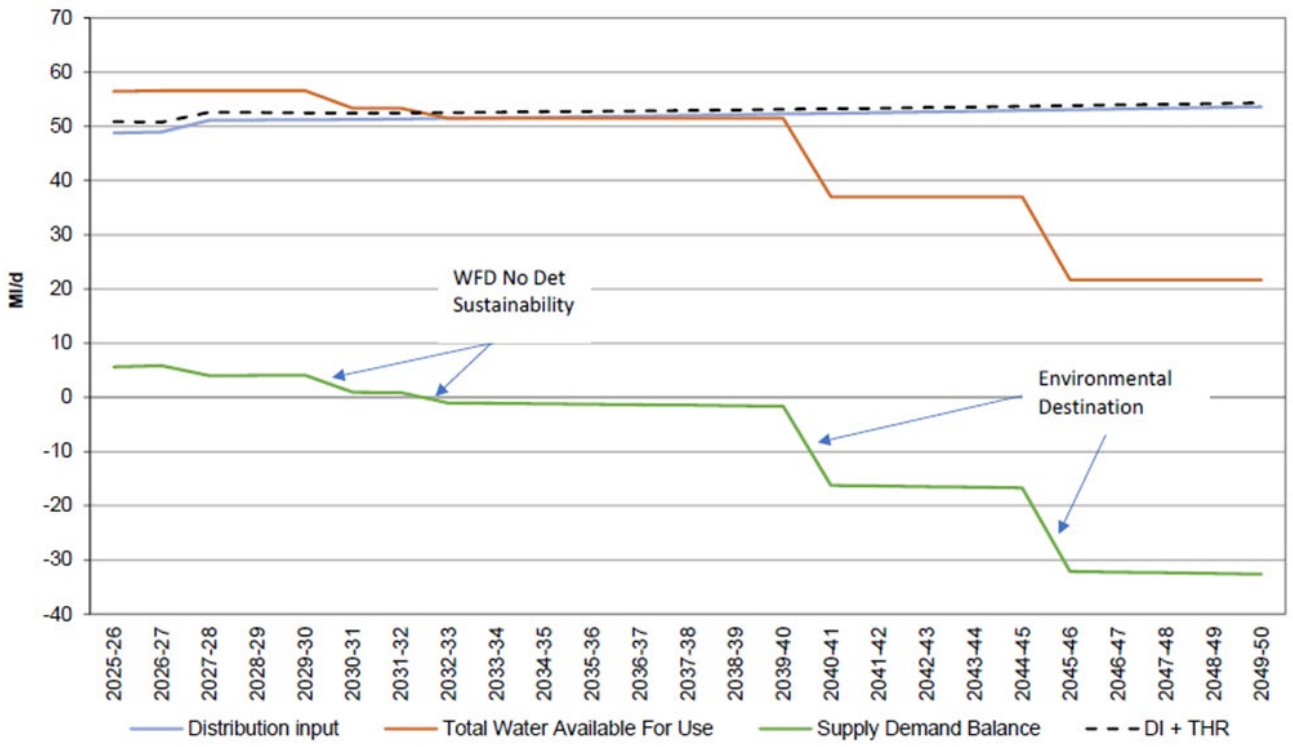
Inset 2.6: Hartismere WRZ - Baseline DYAA supply/demand balance and components of demand



Note: DI- Distribution input; THR – Target Headroom

2.6.40 Northern Central WRZ (see **Inset 2.7**) begins in supply surplus but enters deficit from 2031/32 due to increases in industrial demand (food processing) and WFD licence reductions in 2030/31 and 2032/33. The WAFU reduces in five steps; the first in 2027/28 due to rising industrial demand, followed by WFD No Deterioration licence reductions, and then two further drops in 2040 and 2045 from BAU+ Environmental Destination caps. By the end of the planning period (2049/50), the WRZ faces significant supply-demand deficits (over –32 Ml/d), severely constraining its capacity to support inter-zone transfers to Blyth and Hartismere WRZs.

Inset 2.7: Northern Central WRZ – baseline DYAA supply/demand balance and components of demand



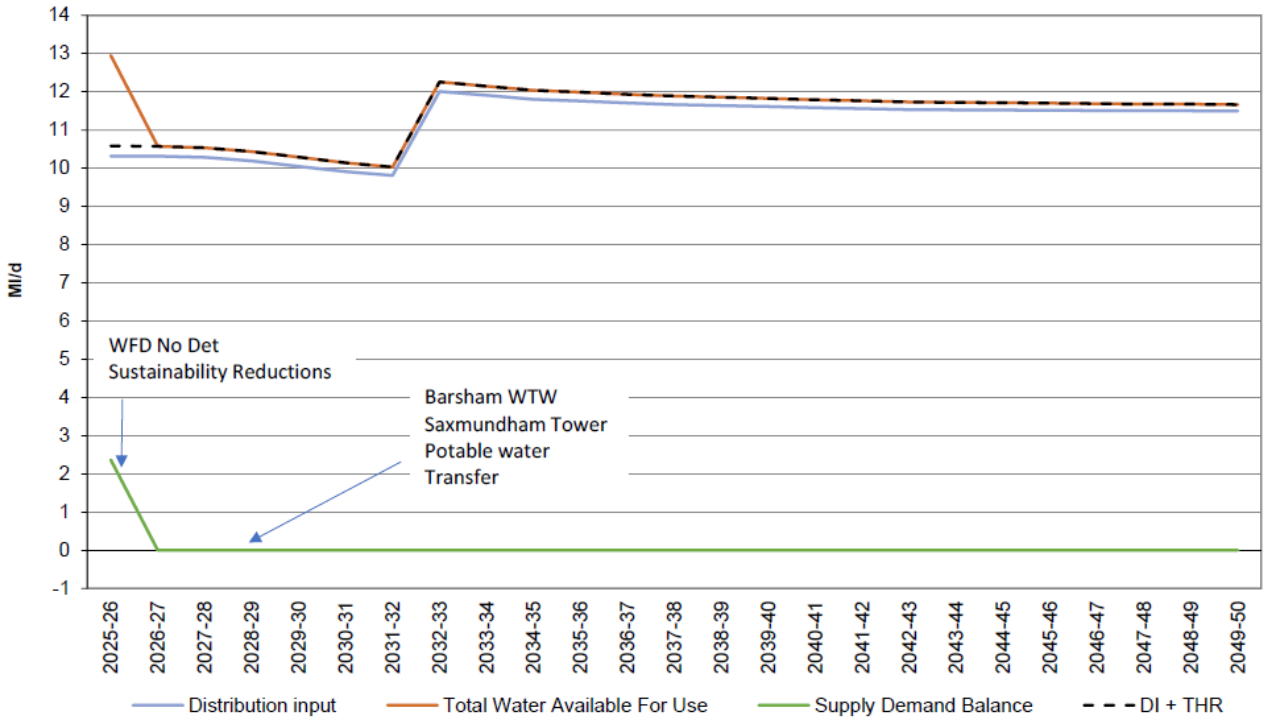
Note: No Det – No Deterioration; DI- Distribution input; THR – Target Headroom

Final WRMP24 supply-demand balance

2.6.41 In ESW's final preferred plan presented in WRMP24, all three WRZs would achieve a positive supply-demand balance over the entire planning horizon through a combination of demand management, supply schemes, and strategic transfers.

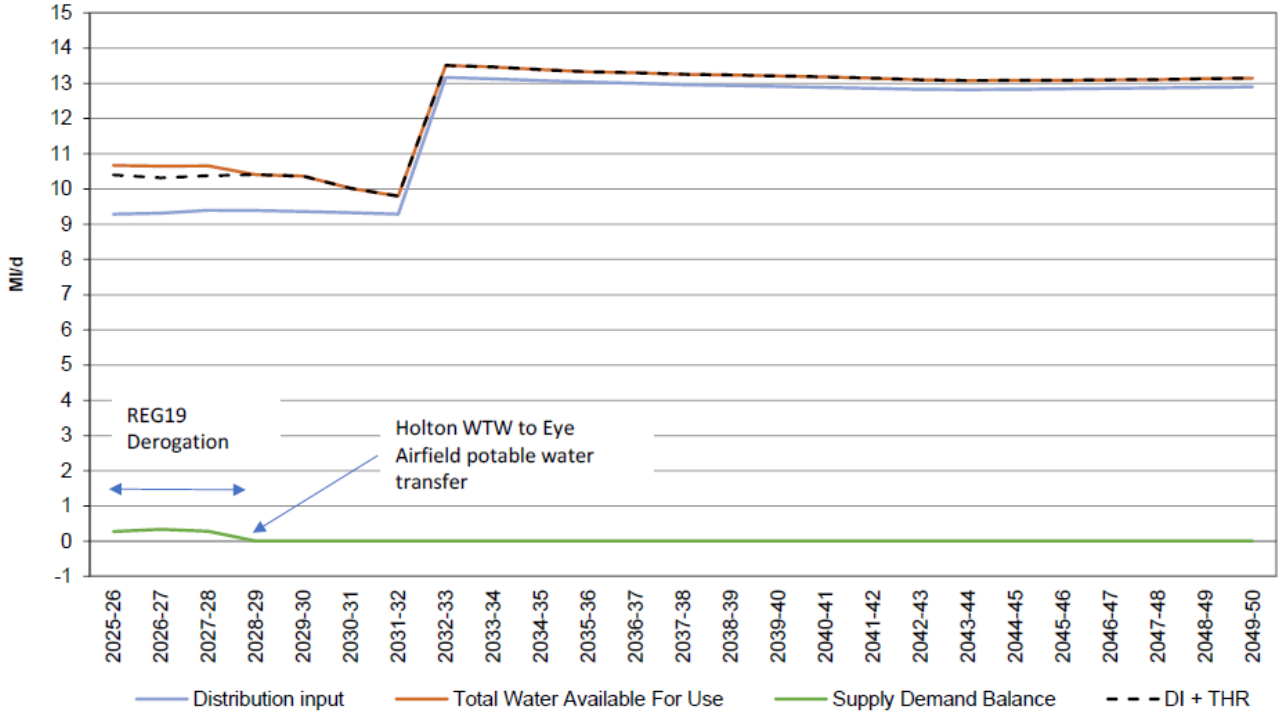
2.6.42 Blyth WRZ is initially projected to have a surplus (see **Inset 2.8**), but this is eliminated in 2026-27 due to sustainability reductions affecting three abstraction licences, which are capped from 31 March 2026. To manage the resulting deficit, a new strategic potable water transfer pipeline is planned, enabling transfers from the Northern Central WRZ starting in 2028/29. In the early phase (2026–2028), a temporary solution involves a 0.6 Ml/d reduction in potable water exports from Walpole WTW to Northern Central. From 2028 onwards, the pipeline will draw on both the baseline surplus in the Northern Central WRZ and new resources from the Bungay wells to Broome WTW, Broome to Barsham WTW transfers, Lowestoft Water Reuse, and the North Suffolk Winter Storage Reservoir. This ensures the WRZ remains in balance despite further sustainability reductions in 2030/31 and Environmental Destination reductions in the 2040s, maintaining a zero deficit across AMP8–AMP12.1

Inset 2.8: Blyth WRZ – DYAA final supply-demand balance and components of demand



Note: No Det – No Deterioration; WTW – Water Treatment Works; DI- Distribution input; THR – Target Headroom

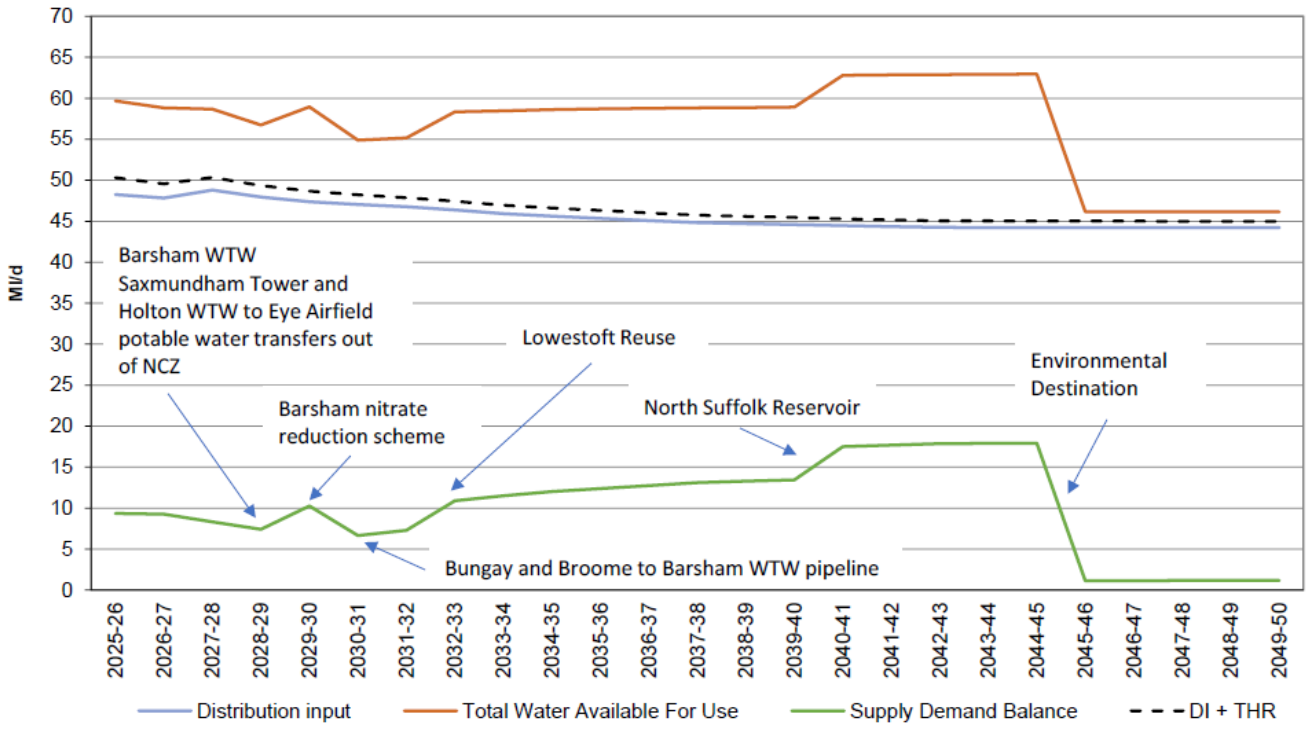
Inset 2.9: Hartismere WRZ – DYAA final supply-demand balance and components of demand



Note: REG19 – Regulation 19; WTW – Water Treatment Works; DI- Distribution input; THR – Target Headroom

2.6.43 Hartismere WRZ begins the planning period in a supply deficit due to early implementation of WFD 'No Deterioration' sustainability reductions, despite a moratorium on new non-household (non-domestic) demand. To mitigate this, ESW is pursuing a Regulation 19 (Reg19) exemption on grounds of Overriding Public Interest (OPI) to delay these reductions until additional supplies become available. From 2028/29, the strategic pipeline linking Northern Central and Hartismere WRZs becomes operational, drawing initially on baseline surplus and subsequently on new sources: Bungay wells to Broome WTW, Broome to Barsham WTW transfers, Lowestoft Water Reuse, and the North Suffolk Winter Storage Reservoir. This transition restores balance to the WRZ, as shown in the graph (see **Inset 2.9**), maintaining a supply-demand balance of 0 Ml/d from AMP9 onwards.

Inset 2.10: Northern Central WRZ – DYAA final supply-demand balance and components of demand



Note: NCZ- Northern Central Zone; WTW – Water Treatment Works; DI- Distribution input; THR – Target Headroom

2.6.44 Northern Central WRZ starts the planning period in supply surplus, but this is progressively reduced due to sustainability reductions from 2025/26, with further cuts in 2030/31 and 2032/33, including the reduction of abstraction at Shipmeadow intake from 20.5 Ml/d to 16 Ml/d (see **Inset 2.10**).

2.6.45 The zone will support transfers to Blyth and Hartismere WRZs from 2028/29, using its baseline surplus. The Barsham nitrate reduction scheme in 2029/30 will enhance supply resilience. New resources will come online with Bungay wells to Broome WTW transfers (2030/31), Lowestoft Water Reuse (2032/33), and the

North Suffolk Winter Storage Reservoir (2040/41). Although WAFU improves through the 2030s and early 2040s, Environmental Destination reductions in 2045/46 will significantly reduce supply, balancing supply and demand toward the end of the planning period.

Inset 2.11: Regional context, including rainwater harvesting and water reuse

2.6.46 **Inset 2.11** summarises ESW's key water resources proposals over the next 25 years. This includes proposals for a raw water storage reservoir, desalination, water reuse and new transfer within ESW region. As demonstrated by the description for Blyth, Hartismere and Northern Central WRZs, ESW is facing a complex water resources picture, with limited availability particularly over the next 5 – 15 years.

Summary of key stakeholder comments on Essex and Suffolk Water's WRMP24

Environment Agency

2.6.47 The Environment Agency is the environmental regulator in England and thus is a statutory consultee on WRMP's. The Water Resources Planning Guideline specifies that water companies should consult with their local Environment

Agency team about the methods to be used when developing a plan, a requirement that ESW's draft plan confirms was complied with.

2.6.48 The Environment Agency recommended improvements in data assurance, clear referencing of technical reports, and proofreading for public acceptability. It also called for clearer referencing and consistency in option descriptions, including adaptive pathways. The Environment Agency also sought clarity on New Appointment and Variations (NAV) engagement and assumptions in the demand forecast report, among other aspects.

Ofwat

2.6.49 Ofwat raised concerns that ESW is targeting only a 40% leakage reduction by 2050 from 2017/18 levels and encouraged testing the feasibility of a 50% reduction in line with national targets. Ofwat requested dry year testing for the 110 l/person/day target and a clearer reference to how ESW will reduce distribution input by 20% by 2037/38. They also requested more evidence on option utilisation and consideration of modular/scalable options. Furthermore, Ofwat emphasised more detail on temporary solutions like desalination for Sizewell C nuclear development. There were concerns raised about delivery risk in achieving demand savings and a need for clear planning around uncertainty in population growth and investment scale.

East Suffolk Council

2.6.50 The council emphasised early consultation for the Suffolk Strategic Pipelines, Lowestoft Reuse, and the North Suffolk Winter Storage Reservoir. The council urged regular review for future enhancement even though they accepted a 40% target for leakage. The council supported the pathways and investigations but wanted to ensure alignment with local growth ambitions.

Drought Plan

2.6.51 Drought is a recurring concern for ESW, and much of East England, where many areas are classified as under serious water stress. A drought plan, like the WRMP, is a statutory document that is updated at least every 5 years or sooner if significant changes occur. ESW published its latest Drought Plan in May 2022 (Ref 18), building upon the 2018 version and provided evidence to its link with other plans such as the National Drought Framework for England and Environment Agency Area Drought Plans, the Regional Water Resources Group (WRE) (though it does not currently affect ESW supply area), WRMP, Northumbrian Water Limited (NWL) Business Plan, NWL Emergency Plan (ESW extreme drought measures), River Basin Management Plan, and other water company drought plans for consistency (Anglian Water, Thames Water and Affinity Water) (Ref 18 : pg 17-21).

2.6.52 The Drought Plan (Ref 18) includes both operational and tactical responses to droughts of varying severity, with defined triggers and action levels. In the Suffolk

supply area, where groundwater from the Chalk and Crag aquifers is the primary source, drought triggers are based on observed and modelled groundwater level thresholds rather than surface water reservoir levels as is the case in Essex. The plan takes a tiered approach, with actions escalating through four levels of severity, beginning with demand reduction before resorting to supply-side interventions.

Inset 2.12: The four levels detailing the demand side and supply side measures

SEVERITY OF THE DROUGHT	LEVEL	DEMAND SIDE ACTIONS	SUPPLY SIDE ACTIONS
Drought plan	Level 1	• Communications campaign • Increased leakage control	• Optimising sources • Reducing treatment works outage • Reducing process losses • Running dry weather river support schemes including Essex Recycling Plant, the Ely Ouse to Essex Transfer Scheme and the Waveney Augmentation Groundwater Scheme
		• Formal Appeal for Restraint for voluntary reduction in water use	
	Level 2	• Temporary use bans	• Lowering borehole pumps • Road Tankering (Suffolk only)
	Level 3	• Drought Order Non-essential use ban	• Drought permits to temporarily increase licensed quantities on abstraction licences • Drought permits to temporarily reduce compensation flows; and • Ordinary drought order to obtain additional water
		• All possible actions to avoid emergency drought orders including Pressure Reduction	• All possible actions including major environmental impact drought permits and orders.
Emergency plan	Level 4	• Emergency drought orders (such as standpipes)	

Source: ESW Drought Plan, 2022

2.6.53 **Inset 2.12** illustrates the four levels detailing the demand side and supply side measures that would be implemented as drought conditions worsen.

2.6.54 Beyond these four planned levels, ESW has also prepared extreme drought measures to delay the need for Level 4 actions mentioned above (see the extract in **Inset 2.13**). These actions are implemented based on priority, with demand-side measures delivered first to minimise environmental impact.

Inset 2.13: Extreme drought measures beyond the four planned levels

ACTION	WRZ	SUMMARY OF ACTION	TRIGGER FOR ACTION	LIKELY SAVING BENEFIT	BARRIERS	ENVIRONMENTAL IMPACTS	TIMESCALES	PRIORITY ORDER
Demand	All	**Media & Communications:** National campaigns, excessive water use seen as socially unacceptable, Day Zero language, guides for customers to show how to restrict water use to 50 litres/ person/day.	Extreme measures would be implemented after all Level 3 actions have been implemented and then based on priority order in this table.	Logically, these actions will result in a reduction in demand. However, we do not believe it is possible to quantify the saving.	Hygiene - Covid.	No significant adverse environmental effects as the measure is to reduce demand and therefore abstraction.	2 weeks	1
Demand	All	**Supply pipe repairs:** Free and fast supply pipe repairs for customers.		0.14Ml/d	Need customer's permission which is not guaranteed (impacts on driveways); Availability of ESW resource (inhouse or contractors).		3 weeks	2
Supply	All (where opps. exist)	Trades/transfers: Short term trades between companies/sectors.		Would be determined on a case by case basis taking account current resource position and water availability.	Donor permission; EA Trading Policy	This option might require abstraction above recent actual levels. The action would not be pursued if it required abstraction above their own licensed quantities.	6 weeks	3
Supply	Hartismere	Emergency Treated Water Transfer from Anglian water to our Hartismere Water Resource Zone		Benefit of up to 0.75Ml/d peak	The network connection already exists. Operation of the transfer dependent on AW's supply position and their approval as per AW / NWL agreement.	This option might require AW to abstract above recent actual levels. The action would not be pursued if it required abstraction above their own licensed quantities.	2 weeks	4
Demand	All	Consideration of removal of some exceptions under TUBs and NEUBs.		Small reduction in demand. Unquantified	May need emergency powers; could impact on businesses; could be perceived as being discriminatory	No significant adverse environmental effects as the measure is to reduce demand and therefore abstraction.	Within 28 calendar days	5
Supply	All	**Full range of powers available with drought orders:** • Temporary increases to licences that have been reduced or revoked • Compensation flow reductions • Abstraction from alternative sources.		Would be determined on a case by case basis taking account current resource position and water availability.	Need for emergency drought order. Environmental impacts, WFD objectives.	Potential for long term / permanent impacts on ecology and WFD status. See section below on Overriding Public Interest	Within 28 calendar days	6
Reduced mains pressure	All	**Pressure management:** Further reduce pressure while still maintaining essential services, night time reductions and protecting vulnerable customers		Unknown	Customer support; regulatory approval.	No significant adverse environmental effects as the measure is to reduce demand and therefore abstraction.	6 weeks	7

Source: ESW Drought Plan, 2022

Drainage and Wastewater Management Plan

2.6.55 As a water-only company, ESW does not have a Drainage and Wastewater Management Plan (DWMP). The wastewater undertaker for the Suffolk region is Anglian Water, whose proposals are described in **Section 2.7**.

2.7 Anglian Water's plans

2.7.1 Anglian Water provides sewerage services in ESW's water supply area and therefore is responsible for the foul water and combined sewer (foul water and surface water) drainage in this area. In Anglian Water's plans, these services are described as 'water recycling services' (see **Inset 2.14)** which is the term adopted and used in this WCS. Water company drainage services are described in the respective statutory Drainage and Wastewater Management Plans (DWMPs) (Ref 19). Anglian Water's latest DWMP was published in May 2023.

Inset 2.14: Anglian Water service areas

Drainage and Wastewater Management Plan (DWMP), 2025-2050

2.7.2 Anglian Water's DWMP is a "*long term strategic plan setting out how wastewater systems, and the drainage networks that impact them, are to be maintained,*

improved and extended over the next 25 years to make sure they are robust and resilient to future pressures". The latest plan covers 25 years from 2025 and is aligned with the WRMP period.

2.7.3 During the development of the Plan, Anglian Water engaged with relevant county councils, district councils, LLFAs and river and environmental groups. Suffolk stakeholders engaged with included Suffolk County Council, Ipswich Borough Council, and Babergh and Mid Suffolk District Councils. Stakeholders provided feedback and information that helped Anglian Water shape its plan. Anglian Water also engaged with the Environment Agency, Internal Drainage Boards (IDBs), River and Wildlife Trusts, Natural England and Ofwat.

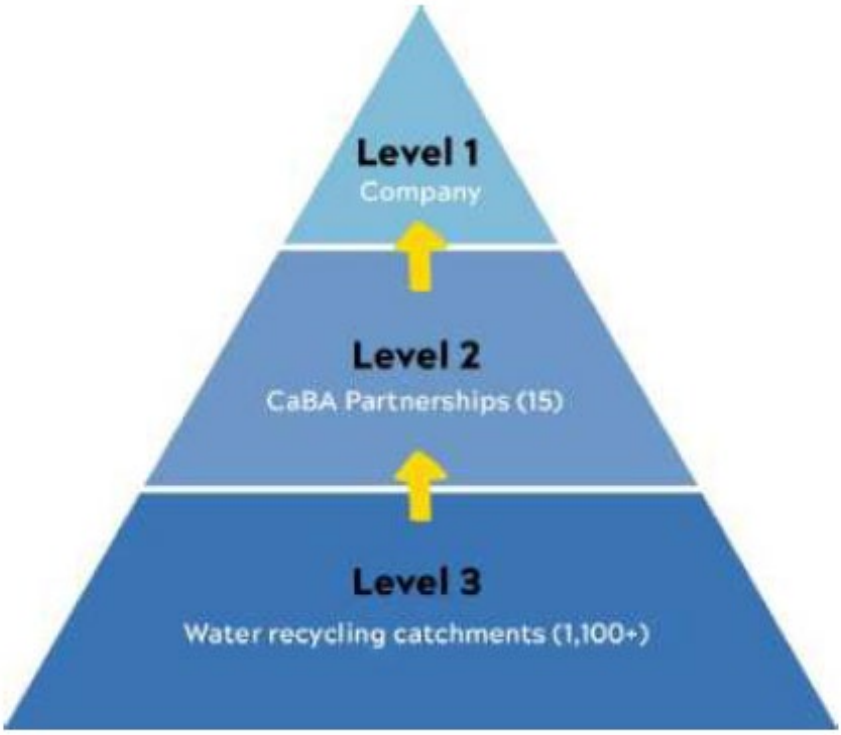
2.7.4 The outputs from the engagement helped Anglian Water to:

a. identify where risk is wider than just a water company issue;
b. prioritise where the company should focus on identifying stakeholder partnership solutions;
c. provide information for the best value assessment;
d. shape its final strategies;
e. shape its response to the Storm Overflow Discharge Reduction Plan; and
f. give the company confidence in the suitability of the DWMP.

2.7.5 Anglian Water's DWMP is structured at 3 levels (**Inset 2.15**).

a. **Level 1** - Refers to the company water recycling boundary and covers the whole of the Anglian Water service region. This includes any area where the company provides water recycling services, including those where they do not provide water (including Suffolk Water's supply area).
b. **Level 2** – Covers Catchment-Based Approach (CaBA) areas. CaBA is a community-led approach that engages people and groups from across society to help improve water environments. Anglian Water provides Level 2 information at CaBA, council boundary, Regional Flood and Coastal Committee, IDB and county levels as well.
c. **Level 3** – These catchments cover more than 1,100 water recycling catchments, ranging from small rural catchments with fewer than 50 people to large urban catchments serving more than 300,000.

Inset 2.15: Anglian Water DWMP levels



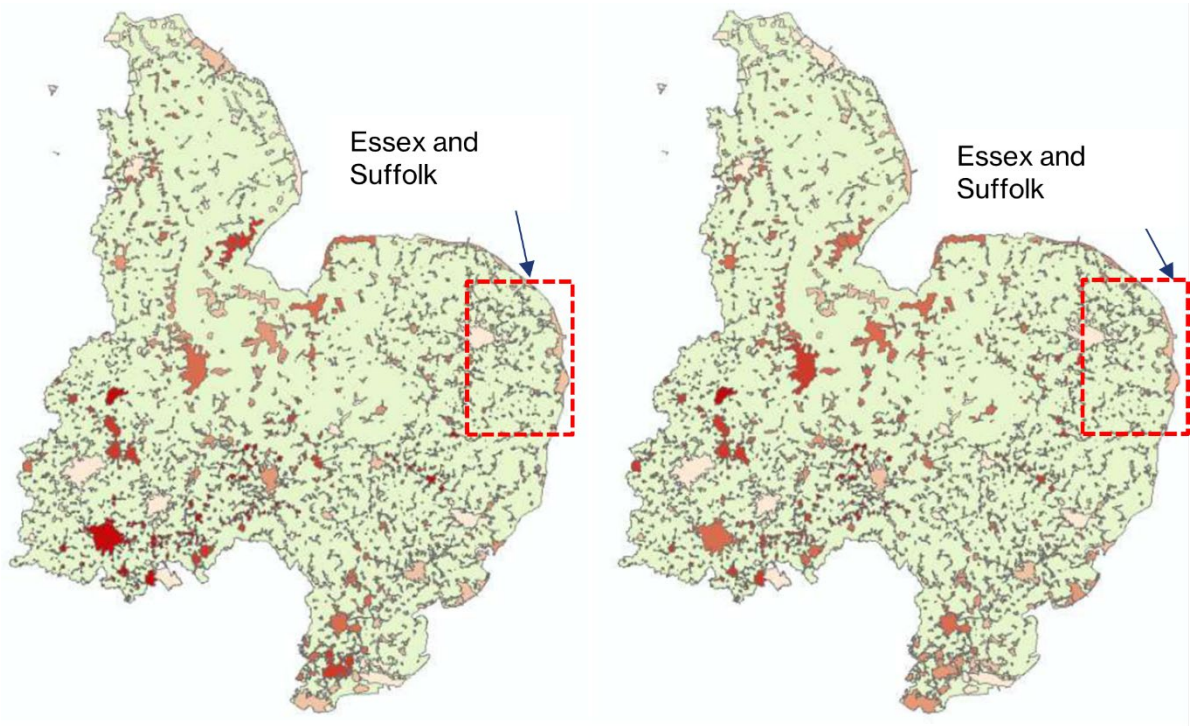
Source: Anglian Water DWMP, 2023

Growth context

2.7.6 Anglian Water's DWMP identifies growth as one of the biggest challenges for the company but also one of the areas of opportunity where the company can "*do most to support [its] customers and [the] region*." To be able to respond, therefore, the company has set out a strategic ambition in its Strategic Direction Statement (SDS) to "*enable sustainable economic and housing growth*." The company has, therefore, produced "*robust future forecasts of housing and population growth*" in its service region and presented these as medium (2027) to long-term (2045) heat maps (see **Inset 2.16**) which illustrate the expected growth in the region.

2.7.7 **Inset 2.16** appears to show medium growth in Suffolk in the medium term (2027), with no significant growth in the longer term (2045). In addition, the scale of growth proposed across the East of England, according to the DWMP, is such that government and local authorities are bringing forward large-scale development, for example, using public sector land by developing new communities, the Garden Village and Town Programme and the exploration of potential economic corridors. Many of these schemes are at an early stage and not included in adopted Local Plans (and therefore excluded from the DWMP) but would have a "*significant impact*" on Anglian Water's drainage area if implemented for example the strategic corridor of growth.

Inset 2.16: Anglian Water medium-term (2027) and long-term (2045) growth forecasts in the DWMP



Source: Anglian Water DWMP, 2023
Note: A darker red indicates more growth in that area

Influence of domestic and non-domestic consumption

2.7.8 The DWMP identifies per capita flow (PCF), which is based on forecast average household per capita consumption (PCC) and forecast domestic non-household (business) consumption, heavily influences the forecast of the timing of dry weather flow (DWF) permit revisions at water recycling centres (wastewater treatment works). The PCF is used to calculate DWF and forecast flows. Anglian Water's forecast of PCF assumes 90% of PCC and non-household domestic consumption is returned to sewers. The company's PCC is aligned with its WRMP24 and is forecast to fall from 133 l/h/d in 2020 to 110 l/h/d in 2050, which is the same target as Essex and Suffolk Water.

2.7.9 The reductions are influenced by:

a. implementation of Anglian Water's smart meter program (100% smart penetration by 2030).
b. water efficiency measures; and
c. the impact of government led interventions ('white goods' labelling).

2.7.10 The DWMP cautions, however, that there are significant uncertainties in both the forecast PCC and the relationship between PCC and PCF, which creates uncertainty in future plans.

Current outcomes for the Suffolk area

2.7.11 In order to address the risks identified in all the company's water recycling catchments, Anglian Water has defined ten 'planning objectives' against which catchments are reviewed. These are summarised in **Table 2.4,** together with the ultimate aims aligned to their Strategic Direction Statement and the outcomes expected.

Table 2.4: Anglian Water DWMP Planning Objectives

No.	Planning Objective (What is measured)	Outcomes Expected	Strategic Direction Statement Ultimate Ambition
1.	Risk of sewer flooding in a 1 in 50-year storm	Resilient business	Resilient to the risks of flooding Enable sustainable economic and housing growth Be a carbon neutral business by 2030 Work with others to achieve significant improvement in ecological quality
2	Storm overflow performance	Flourishing environment	
3.	External sewer flooding risk	Investing for tomorrow	
4.	Internal sewer flooding risk	Delighted customers	
5.	Pollution risk	Flourishing environment	
6.	Sewer collapse	Investing for tomorrow	
7.	DWF Compliance	Investing for tomorrow	
8.	Quality compliance	Investing for tomorrow	
9.	Access to amenity areas	Delighted customers	
10.	Green infrastructure	Flourishing environment	

Source: Anglian Water DWMP, 2023

2.7.12 For Suffolk, the initial assessment against the planning objectives above, resilience risk score and future strategy is summarised in **Table 2.5**.

2.7.13 **Table 2.5** summarises key baseline and projected data for each level 3 water recycling catchment in East Suffolk. The 2021 population, 2035 population, and 2050 population figures represent the estimated and forecast population equivalents served by each catchment, based on current records and approved growth forecasts. 'Passed Risk Based Catchment Screening (RBCS)' indicates whether the catchment met the RBCS criteria; catchments pass if they trigger at

least one Tier 1[4] measure, or two or more measures in total, from the screening framework. The Resilience risk score (0=low, 1= medium, 2=high) is derived from the Baseline Risk and Vulnerability Assessment (BRAVA[5]) and reflects the relative vulnerability of the catchment to service and environmental risks. The subsequent columns capture planning themes considered, stakeholder input, medium- and long-term strategies, providing concise overview of the strategic planning context for each listed catchment in **Table 2.5**.

Table 2.5: East Suffolk CaBA Level 3 details

L3 water recycling catchment	2021 population	2035 population	2050 population	Passed RBCS	Resilience risk score	Planning objective themes reviewed	Stakeholder concerns/comments	Medium term strategy	2050 Strategy
Aldeburgh	4,228	4,056	4,141	Yes	1	Escape from sewers Water Recycling Centre (WRC) compliance Environment and wellbeing	-	Network – Mixed strategies with main solution of SuDS.	25% surface water removal.
Benhall	6,033	5,768	5,894	Yes	1	Escape from sewers WRC compliance Environment and wellbeing	-	Network – Mixed strategies with main solution of SuDS.	25% surface Water removal.
Dunwich Bridge FM	306	300	303	Yes	0	Escape from sewers WRC compliance Environment and wellbeing	-	No risk identified.	Wait and see.
Halesworth	7,515	7,260	7,550	Yes	1	Escape from sewers WRC compliance	Flood risk priority catchment. Concerns	-	25% surface water removal.

[4] Tier 1 is the primary, critical risk measures which includes pollution incidents, WRC quality compliance, WRC DWF compliance, storm overflows.

[5] BRAVA is a strategic tool within the DWMP framework used to evaluate current and future risks to drainage and wastewater services.

L3 water recycling catchment	2021 population	2035 population	2050 population	Passed RBCS	Resilience risk score	Planning objective themes reviewed	Stakeholder concerns/comments	Medium term strategy	2050 Strategy
						Environment and wellbeing	around climate change.		
Leiston	5,836	5,573	5,696	Yes	1	Escape from sewers WRC compliance Environment and wellbeing	Habitats.	-	10% surface water removal.
Sotherton	25	24	25	No	0	-	-	-	-
Southwold	11,324	11,114	11,352	Yes	2	Escape from sewers WRC compliance Environment and wellbeing	Bathing water.	WRC - New process, wetland.	25% surface water removal.
Thorpeness	2,178	2,089	2,131	No	0	-	-	-	-
Tuddenham	1,223	1,494	1,513	Yes	0	WRC compliance Environment and Wellbeing	-	-	Wait and see.
Wangford	581	561	584	No	0	-	Habitats.	-	-
Wenhaston	1,675	1,615	1,643	No	0	-	Habitats.	-	-
Westleton	1,402	1,339	1,369	No	0	-	Habitats.	-	-
Yoxford	1,313	1,252	1,280	No	1	-	Habitats.	-	-

Source: Anglian Water DWMP, 2023

2.7.14 For the East Suffolk CaBA, of which the Proposed Onshore Scheme is part, Anglian Water has provided BRAVA scores for 2020 and 2050, demonstrating how risk is expected to change for each of the 10 planning objectives in **Table 2.5**.

2.7.15 The BRAVA scores for all Level 3 catchments in the East Suffolk CaBA area were aggregated and presented as a Level 2 BRAVA score, which is shown in **Table 2.6**, extracted from the DWMP.

2.7.16 The DWMP has also identified a broad range of feasible solutions for the East Suffolk CaBA area, which includes the Proposed Onshore Scheme. The options identified for possible implementation are listed in **Table 2.7** and are largely self-explanatory.

2.7.17 Anglian Water's DWMP best value plan indicates that the company expects to spend around £461 million over the next 25 years, with around £193 million by 2035.

2.7.18 The BRAVA scores in the **Table 2.6** ranging from 0 (not significant), to 2 (very significant) indicate the severity of risk across planning objectives, showing how vulnerabilities like flooding, pollution, and compliance issues are expected to intensify by 2050, thereby guiding prioritisation of interventions.

Table 2.6: BRAVA scores; extract from Table 28 of Anglian Water's DWMP

Planning Objective	2020	2050
Flooding in a storm (1 in 50)	0	0
External flooding	0	2
Internal flooding	0	2
Pollution incidents	1	2
Sewer collapses	2	-
DWF compliance	0	0
Quality compliance	1	1
Access to amenity areas	1	1
Green infrastructure	0	0

Source: Anglian Water DWMP, 2023

Table 2.7: List of feasible solutions for East Suffolk CaBA

Group	Option
Customer side management	Water efficiency - domestic
	Water efficiency - commercial
	Proactive maintenance - rehabilitation
	Increased capacity - attenuation
	Transfer between catchments
	Reduce infiltration
Surface water management	SuDS - public
	Partnership funding
	SuDS - domestic

Group	Option
	SuDS - commercial
Wastewater treatment	Process optimisation
	Increased capacity - new streams
	Increased capability - new process
	Smart consenting
	Wetlands
	Treat/pre-treat trade effluent
Other	Investigate
	Wait and see

Source: Anglian Water DWMP, 2023

2.8 Local plan and water strategies

2.8.1 On 16th May 2023 Suffolk County Council announced a revised infrastructure policy aiming at protecting Suffolk's water supplies, adapting to climate change, and supporting long-term water security. The Energy Infrastructure Policy has been revised and renamed to the Energy and Climate Adaptive Infrastructure Policy (Ref 36), expanding the scope to include water infrastructure such as reservoirs, pipelines and water recycling plants.

East Suffolk Local Plans

2.8.2 East Suffolk's approach to sustainable water management in new developments is guided by a combination of statutory planning policies and supporting technical evidence. The Suffolk Coastal Local Plan (Ref 20) (covering the former Suffolk Coastal District area) adopted in September 2020 and the Waveney Local Plan (Ref 21) (covering the former Waveney Local Planning Authority area) adopted in March 2019 both form the core of the regulatory framework, setting out clear requirements for water efficiency, drainage, and infrastructure coordination which are outlined within the plan specifically in the following policies.

Policy SCLP9.2: Sustainable Construction

2.8.3 The policy promotes sustainable construction as part of broader interest in climate change mitigation, with specific actions around water efficiency.

> *"All new residential development in the plan area should achieve the optional technical standard in terms of water efficiency of 110 litres/person/day."*

2.8.4 While the 110 l/p/d applies to residential buildings, non-residential developments are expected to comply with BREEAM standards, which also include criteria for water efficiency.

Policy WLP8.28: Sustainable Construction

2.8.5 The policy supports water efficiency in recognition of Waveney's classification as a water stressed area. The Waveney Water Cycle Study (2017) (Ref 39) justifies this standard, noting that the cost of achieving enhanced building control regulation is very low and could help contribute to achieving 52% water neutrality in the district, where the amount of water used before planned growth is the same as that after growth.

2.8.6 Proposals for major residential developments (10+ homes) and commercial developments (1,000 sqm+) should, where practical, incorporate sustainable water management measures such as the use of sustainable drainage systems, green roofs and/or rainwater harvesting systems, as part of demonstrating sustainable construction.

"Sustainable water management measures such as the use of sustainable drainage systems, green roofs and/or rainwater harvesting systems."

"All new residential development in the District should achieve the optional technical standard in terms of water efficiency of 110 litres/person/day unless it can be demonstrated that it is not viable or feasible to do so."

Policy SCLP9.7: Holistic Water Management

2.8.7 The policy is based on a CaBA for integrated water management, emphasising collaboration with neighbouring authorities and stakeholders. Infrastructure development will be phased to ascertain water and wastewater systems are in place when needed, where such improvements are not required or will be delivered in time, phasing will not be necessary. The Council will work with water companies, Natural England and the Environment Agency to address water-related needs continuously. The Council also promotes examples like the Deben Holistic Water Management Pilot, which uses techniques such as attenuation ponds and managed aquifer recharge to improve water quality and river flow.

"All development will be expected to demonstrate that water can be made available to support the development and that adequate foul water treatment and disposal already exists or can be provided in time to serve the development. Development will be phased to allow water and water recycling infrastructure to be in place where needed.

All new developments will be expected to incorporate water efficiency and re-use measures to maximise the opportunities to reduce water use. This includes, but is not limited to:

a. grey water recycling;

b. rainwater harvesting; or

c. water use minimisation technologies.

Infrastructure that leads to a reduction in the amount of water released to the sewer system and allows for natural infiltration into groundwater tables will be favoured in this instance."

Policy SCLP9.6: Sustainable Drainage Systems

2.8.8 The policy mandates the use of SuDS and supports water management by requiring developments to manage surface water runoff in ways that prevent downstream flooding, water quality improvement and biodiversity enhancement. The policy promotes integration of SuDS into green infrastructure and landscaping, use of blue-green surface infrastructure over underground solutions, and alignment with guidance such as the CIRIA SuDS manual, the Suffolk FRM strategy and LLFA at Suffolk County Council.

"Developments should use sustainable drainage systems to drain surface water. Developments of 10 dwellings or more, or non-residential development with upwards of 1,000 sqm of floor space or on sites of 1 hectare or more, will be required to utilise sustainable drainage systems, 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 designations such as Source Protection Zones.

Runoff rates from new development must be restricted to greenfield runoff rates wherever possible. Where a site is previously developed, the proposed runoff rates should be restricted as close to the greenfield rates, or at the very minimum a betterment of at least 30% should be considered over the brownfield runoff rates. No surface water connections should be made to the foul system and connections to the combined or surface water system should only be made in exceptional circumstances where there are no feasible alternatives. Foul and surface water flows should also be separated."

Policy WLP8.24 Flood Risk

2.8.9 The policy supports the use of SuDS in the Waveney region to manage surface water, reduce pressure on combined sewers, water quality and align with WFD goals. The approach links strategic planning through Strategic Flood Risk Assessment with site level design to make sure that new developments manage water in a sustainable manner.

"Development proposals should consider flooding from all sources and take into account climate change. Proposals at risk of flooding (taking into account

impacts from climate change) should only be granted planning permission if it can be demonstrated that:

a. there are no available sites suitable for the proposed use in areas with a lower probability of flooding;

b. the development provides sustainability benefits which outweigh flood risk; and

c. a site-specific flood risk assessment has been submitted which demonstrates that the flood risk can be satisfactorily mitigated over the lifetime of the development. This should address as a minimum: finished floor levels; safe access and egress; an emergency flood plan; flood resilience/resistance measures; any increase in built or surfaced area; and any impact on flooding elsewhere including on the natural environment."

"New residential development on sites not allocated in this Local Plan or a Neighbourhood Plan will not be permitted on sites at risk from flooding."

"Developments should use sustainable drainage systems to drain surface water. Sustainable drainage systems should be integrated into the landscaping scheme and the green infrastructure provision of the development and not detract from the design quality of the scheme. They should deliver water quality and aquatic biodiversity improvements wherever possible."

"No surface water connections should be made to the foul system and connections to the combined or surface water system should only be made in exceptional circumstances where there are no feasible alternatives (this applies to new developments and redevelopments). Foul and surface water flows should also be separated where possible."

"Neighbourhood Plans can allocate land for development, including residential development, in areas at risk of flooding providing it can be demonstrated:

a. there are no available sites suitable for the proposed use within the Neighbourhood Area;

b. the development provides sustainability benefits which outweigh flood risk; and

c. evidence is provided that it is possible for flood risk to be mitigated to ensure development is safe for its lifetime."

2.8.10 The Strategic Flood Risk Assessment should be the starting point in assessing whether a proposal is at risk from flooding. Developments should use sustainable drainage systems to drain surface water.

2.8.11 **Table 2.8** summarises the water efficiency requirements for new homes (households) and non-residential (non-household) developments.

Table 2.8: Water efficiency requirements for new developments in the East Suffolk Region

Development Type	Year	Requirement
New Homes	2020 (SCLP9.2) 2019 (WLP8.28)	Must meet optional higher water efficiency standard of 110 litres/person/day
New Schools and offices (Waveney Only)	2019	Must achieve 'Very Good' BREEAM standard (enhanced sustainability)
Other Non-Residential	-	No specific water efficiency requirement stated, though BREEAM is encouraged for sustainability

2.9 Summary

2.9.1 In summary, national, regional and utility-level water strategies reviewed in this chapter provide the strategic context and key regulatory expectations for the management of water use, drainage, and efficiency within the Proposed Onshore Scheme.

2.9.2 At national level, the NPPF (2024) sets out a requirement for developments to address water supply pressures, climate change risks, and flooding, including a mandatory expectation for SuDS in all major developments. This requirement is further detailed in East Suffolk's planning and technical guidance documents, such as the Sustainable Construction SPD (2022), the Suffolk and East Suffolk Flood and Water Supplementary Planning Document (2019), and the Suffolk FRM strategy and SuDS Design Guide.

2.9.3 Regarding potable water demand and wider supply demand resilience, ESW's WRMP24 discusses the region's serious water stress designation and sets out measures such as compulsory smart metering by 2030, reduction of per capita consumption to 110 litres/person/day by 2050, and delivery of new water resources including the North Suffolk Winter Storage reservoir and strategic inter-zone pipeline transfers. It also sets out the varying water resource availability across ESW's supply area over both the short and long-term, and the issues causing the variability and deficits. The Proposed Onshore Scheme spans the Blyth and Hartismere WRZs, both of which rely on Chalk and Crag aquifers and are affected by sustainability reductions and are expected to rely on receiving strategic water transfers from the Northern Central WRZ, which highlights the regional interdependence for supply resilience.

2.9.4 As the relevant wastewater service provider, Anglian Water has sets out its long-term strategies for the next 25 years for wastewater and surface water management in East Suffolk in its latest DWMP (2023). The plan identifies growth, per capita water use, and environmental compliance as key challenges

and emphasises the need for strategic interventions such as reducing surface water flows to sewers, implementing SuDS where feasible, and improving dry weather flow compliance. It also supports demand management through smart metering and water efficiency measures. The Proposed Onshore Scheme aligns with these priorities by integrating a drainage strategy that limits surface water discharge to sewers and encourages compliance with planning objectives in the East Suffolk CaBA area.

2.9.5 Overall, the Proposed Onshore Scheme is well placed to limit its impact on the local water environment and adherence to relevant national policies and local plan provisions, also supporting the wider aspirations for water management in the East Suffolk area. However, local issues may arise given the number and size of the proposed primary and secondary construction compounds.

3 Water Cycle Study assumptions and limitations

3.1 Assumptions

3.1.1 The following assumptions and limitations have been applied in preparing the WCS:

a. projected water use across the whole Proposed Onshore Scheme has been based on best available information at PEIR. This data has been reviewed and, where deemed reliable, utilised in the assessment. Information considered unreliable has not been utilised at this stage;
b. the WCS estimates water demand using typical unit water use per person or per unit area, and based on standard, typical or similar buildings, as appropriate. However, it should be noted that information will be refined as the design of the Proposed Onshore Scheme progresses. The estimates within this WCS are considered conservative, as they do not include expected water efficiency amounts, which will be become clear as the design develops.
c. site drainage information for a few components is based on two studies (Ref 22) (Ref 23);
d. the Essex and Suffolk WRMP24 published in October 2024 is the version that has been reviewed, and the information within this version of the plan taken to be the latest available; and
e. this preliminary WCS assesses both Kiln Lane Substation Scenarios; both proposed Underground HVAC Cable Corridor options; and both proposed Underground HVDC Cable Corridor options falling within the Draft Order Limits, which are presented in **Chapter 2 Description of the Proposed Scheme** of this PEIR. For the HVAC Cable Southern Route Option, the HVAC Cable Route LionLink Infrastructure and ducting for Sea Link Scenario has been assessed as the worst case.

3.2 Relevant previous studies

3.2.1 Refer to **Section 1.5** which lists the published studies.

3.3 Water Cycle Study review

3.3.1 The WCS guidance (Ref 10) states that a WCS should be reviewed when development plans are reviewed or when new strategic changes occur to ensure that the study remains consistent with any changes.

3.3.2 It is intended that this WCS will be reviewed and updated as new information becomes available which results in significant changes. Such changes are anticipated to be, but not limited to:

a. design updates in future stages;
b. updates to Anglian Water's DWMP (expected 2028);

c. updates to Essex and Suffolk's WRMP (expected 2030); and
d. updates to the East Suffolk Local Plan.

4 Baseline information

4.1.1 This section summarises the existing water use and management situation regarding the Proposed Onshore Scheme.

4.1.2 A study area of 500m from the Proposed Onshore Scheme Draft Order Limits has been used for the baseline as outlined in **Chapter 12 Hydrology, Hydrogeology and Drainage**.

4.2 Draft Order Limits description

4.2.1 The Draft Order Limits are located in the county of Suffolk, between the towns of Friston to the south and Walberswick to the north. The Proposed Onshore Scheme includes the proposed Landfall, the proposed Underground Cable Corridors, the proposed Converter Station, and Kiln Lane Substation. It also includes several key hydrological and hydrogeological features, including River Minsmere and Hundred River (designated rivers); Crag Principal Aquifer, and the Minsmere Walberswick Heaths and Marshes Groundwater Dependent Terrestrial Ecosystems.

4.2.2 The Draft Order Limits have an elevation ranging from 5 to 36 mAOD, gradually decreasing towards the coast and along surface water features. The proposed Landfall is at approximately 8 mAOD, the proposed Converter Station is at approximately 21 mAOD, and Kiln Lane Substation is at approximately 20 mAOD.

4.3 Surface water

4.3.1 There are 13 watercourses within the Draft Order Limits, including two unnamed tributaries of Hundred River (east of Section B), Minsmere Old River with five unnamed tributaries crossing the corridor,River Fromus and an unnamed tributary of Fromus River (west of Section A), and Dunwich River and Dunwich River (tidal) at the Walberswick proposed Landfall. Smaller drains and tributaries also exist across the Draft Order Limits.

4.3.2 There are six Water Environment Regulations (WER) surface water bodies and three transitional (TraC) water bodies within 500m of the Draft Order Limits.

4.3.3 The surface water WER bodies are:

a. The River Blyth (downstream of Halesworth) Water Framework Directive (WFD) surface waterbody catchment is situated in the northern region of the Draft Order Limits along Section D of the proposed Underground Cable Corridor (see **Figure 2.1 Zoning Plan**). The River Blyth has a Q95 flow rate exceeding 66 litres per second, as measured at Holton.
b. The Wenhanston WFD surface waterbody catchment is located west of the Draft Order Limits and intersects Section C of the proposed Underground Cable Corridor. The Wenhanston watercourse ultimately flows into the River Blyth downstream.

c. The Leiston Beck WFD surface waterbody catchment is positioned to the east of Section C of the proposed Underground Cable Corridor.
d. The Minsmere Old River WFD surface waterbody catchment crosses the proposed Underground Cable Corridor along Section C.
e. The Hundred River WFD surface waterbody catchment traverses the proposed Underground Cable Corridor along Section B.
f. The Fromus River WFD surface waterbody catchment is located to the west of the proposed Underground Cable Corridor, within Sections A and B.

4.3.4 Given the nature and location of the works associated with the Proposed Onshore Scheme, it is not anticipated to affect the Wenhanston, Blyth and Leiston Beck surface water bodies and TraC water bodies and therefore these have been screened out as outlined in **Appendix 12.2 Water Environment Regulations Compliance Assessment** of this PEIR.

4.3.5 All WER Surface Water Bodies within the study area eventually flow into Suffolk Coastal Water Body.

4.3.6 There is one surface water abstraction within 500m of the Draft Order Limits.

4.4 Groundwater

4.4.1 Within 500m of the Draft Order Limits, there are five licensed groundwater abstractions and one licensed surface water abstractions, all used for general agricultural purposes such as spray irrigation. In addition, there are six private groundwater abstractions for domestic residential use and eight deregulated abstraction licence points. This indicates a moderate to high level of local dependency on groundwater resources. Further details are in **Annex A** of **Appendix 12.3 Hydrogeological Impact Assessment**.

4.4.2 The Draft Order Limits fall within the Waveney and East Suffolk Chalk and Crag Groundwater Body. According to the British Geological Survey (BGS), the Draft Order Limits' bedrock is Crag Group, covered by peat, alluvium, tidal flat deposits, head, the Lowestoft Formation (diamicton), clays, silts, sands, and gravels. The Environment Agency aquifer designation mapping indicates aquifer classifications in **Table 4.1**.

Table 4.1: Aquifer classifications

Geology	Formation/member	Aquifer classification
Superficial	Peat	Secondary (undifferentiated)
	Alluvium	Secondary A
	Tidal Flat Deposits	Unproductive
	Head	Secondary (undifferentiated)

Geology	Formation/member	Aquifer classification
	Lowestoft Formation (diamicton)	Secondary (undifferentiated)
	Lowestoft Formation (clay and silts)	Secondary B
	Lowestoft Formation (sand and gravels)	Secondary A
Bedrock	Crag Group	Principal

Aquifer classifications
Principal aquifers: provide significant quantities of drinking water and water for business needs. They may also support rivers, lakes and wetlands.

Secondary A aquifers: comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers.

Secondary B aquifers: mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.

Secondary (undifferentiated): aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value.

Unproductive strata: largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.

4.4.3 The Environment Agency Groundwater Vulnerability Mapping indicates groundwater vulnerability classifications shown in **Table 4.2**.

Table 4.2: Groundwater vulnerability

Geology	Formation/member	Groundwater vulnerability
Superficial	Peat	Low
	Alluvium	Medium - High
	Tidal Flat Deposits	Low
	Head	Medium - High
	Lowestoft Formation (diamicton)	Medium
	Lowestoft Formation (clay and silts)	Medium - High
	Lowestoft Formation (sand and gravels)	Medium - High
Bedrock	Crag Group	Medium – Low

Geology	Formation/member	Groundwater vulnerability

Classifications of groundwater vulnerability:
High: areas that can easily transmit pollution to groundwater. They are characterised by high-leaching soils and the absence of low-permeability superficial deposits. These are high priority groundwater resources that have very limited natural protection. This results in a high overall pollution risk to groundwater from surface activities. Operations or activities in these areas are likely to require additional measures over and above good practice pollution prevention requirements to ensure that groundwater isn't impacted.

Medium - High: These are high priority groundwater resources that have limited natural protection. This results in a medium-high overall pollution risk to groundwater from surface activities. Activities in these areas may require additional measures over and above good practice to ensure they do not cause groundwater pollution.

Medium: areas that offer some groundwater protection. Intermediate between high and low vulnerability. These are medium priority groundwater resources that have some natural protection resulting in a moderate overall groundwater risk. Activities in these areas should as a minimum follow good practice to ensure they do not cause groundwater pollution.

Medium - Low: These are lower priority groundwater resources that have some natural protection resulting in a moderate to low overall groundwater pollution risk. Activities in these areas should follow good practice to ensure they do not cause groundwater pollution.

Low: areas that provide the greatest protection to groundwater from pollution. They are likely to be characterised by low-leaching soils and/or the presence of low-permeability superficial deposits. These are low priority groundwater resources that have a high degree of natural protection. This reduces their overall risk of pollution from surface activities. However, activities in these areas may be a risk to surface water due to increased run-off from lower permeability soils and near-surface deposits. Activities in these areas should be adequately managed to ensure they do not cause either surface or groundwater pollution.

Unproductive: areas comprised of rocks that have negligible significance for water supply or baseflow to rivers, lakes and wetlands. They consist of bedrock or superficial deposits with a low permeability that naturally offer protection to any aquifers that may be present beneath.

4.4.4 Kiln Lane Substation, the proposed Converter Station Site and the proposed Underground HVDC Cable Corridor are within Source Protection Zone[6] (SPZ) 3, linked to public water supplies. SPZ 1 and 2 outside the study area. The SPZs are illustrated on **Figure 12.2**.

4.4.5 SPZ1 (inner zone) is the most vulnerable area, either within 50 metres of the abstraction point or where groundwater takes up to 50 days to reach it, whichever is larger. SPZ2 (outer zone) extends up to 250 or 500 metres depending on the abstraction volume, or where water takes up to 400 days to travel to the point. SPZ3 (total catchment) includes all areas from which

[6] Source Protection Zones are defined around large and public potable groundwater abstraction sites. The purpose of SPZs is to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water.

groundwater flows to the abstraction point. Some zones are extended to account for risks from deep activities beneath protective geology like clay.

Summary

4.4.6 The Draft Order Limits are located within the Waveney and East Suffolk Chalk and Crag Groundwater Body, which is underlain by various superficial and bedrock geological formations that have different aquifer classifications and groundwater vulnerability levels. These include the Crag Group, Alluvium, and Lowestoft formation with medium to high vulnerability zones, and proximity to SPZs and active abstractions. Groundwater levels may be locally altered during excavation or piling, and there is potential for creating new flow pathways. Protection measures beyond standard practice, especially during trenching and Horizontal Directional Drilling (HDD) activities.

4.4.7 Given the area's high hydrogeological sensitivity, risk assessment and pollution prevention protocols are necessary. Construction activities should include controls to manage dewatering discharges and prevent contaminant release. Although operational demand is low, safeguarding local groundwater quality remains essential.

4.5 Existing water supply

4.5.1 Existing water supply sources for the Proposed Onshore Scheme are provided in **Table 4.3**.

Table 4.3: Existing water supply sources for the Proposed Onshore Scheme

Water Resource Zone	Source type	Source and location details	Water treatment works
Blyth WRZ	Potable – Groundwater	100% groundwater from Chalk and Crag boreholes. Supplies rural areas from Aldeburgh to Walberswick, west to Earl Soham, including Saxmundham, Leiston, Framlingham, Peasenhall and southern side of Halesworth.	Minor, associated with boreholes
Hartismere WRZ	Potable – Groundwater	100% groundwater from Chalk and Crag boreholes. Area includes Eye and nearby villages. Syleham WTW is located here but receives raw water import from the Northern Central WRZ	Syleha WTW (fed by Northern Central WRZ)
Northern Central WRZ	Mixed – surface and groundwater	~70% from surface water (Rivers Waveney, Bure, Ormesby Broad, Lound Ponds, Fritton Lake) and ~30% from groundwater (Chalk: Halesworth,	Barsham WTW, Ormesby WTW, Lound WTW

Water Resource Zone	Source type	Source and location details	Water treatment works
		Holton, Beccles; Crag/Gravel: Southwold, Broome)	

4.6 Water consumption and supply data

Historical and recent actuals

4.6.1 There is no existing water consumption or supply data available for the Proposed Onshore Scheme. Therefore, the water demand profile for the Proposed Onshore Scheme was determined entirely from the development parameters and typical unit demand rates.

4.7 Surface water drainage and sewerage

Surface water drainage and flood risk

4.7.1 The Proposed Onshore Scheme intersects several areas with varying degrees of surface water flood risk.

4.7.2 According to the Environment Agency's Flood Map for Planning and the Risk of Flooding from Surface Water (RoFSW) dataset (**Appendix 12.1 Flood Risk Assessment**), most of the proposed Underground Cable Corridor is situated within areas of low or negligible surface water flood risk. However, certain localised sections (Sections A, B, and C) are crossed by overland flow paths and shallow depressions, where surface water flooding could occur during intense rainfall events.

4.7.3 In Section A, the proposed Converter Station and proposed Underground HVAC Cable Corridor are located in areas that drain toward the River Fromus. Some locations exhibit a flood risk under 1 in 30 and 1 in 100-year events (considering climate change), while Kiln Lane Substation is within an area of lower risk (1 in 1,000-year event with climate change). Runoff from these sites, especially those draining toward sensitive receptors in Friston, would require careful management.

4.7.4 In Sections B and C, the proposed Underground HVDC Cable Corridor crosses multiple overland flow paths and watercourses not captured in fluvial flood maps. Localised risks exist in the 1 in 30 and 1 in 100-year events in areas such as Fordley Road and Westleton, necessitating runoff control and mitigation to prevent adverse downstream effects.

4.7.5 In Section D, including the proposed Landfall Site, the surface water flood risk is generally negligible. Minor ponding occurs in isolated landscape depressions near two construction compounds. However, considering the proposed Landfall Site's proximity to sensitive locations, including the Walberswick conservation

area, surface runoff from construction activities would need to be managed adequately.

4.7.6 While the overall risk of flooding from surface water is viewed as low to moderate, without appropriate mitigation measures, the development could result in:

a. changes to the quantity and quality of surface water runoff during construction and operation, particularly near sensitive drainage pathways and low-lying areas; and
b. increased risk of flooding or pollution to downstream receptors and communities if runoff is not effectively controlled.

4.7.7 To address these risks an FRA and Surface Water Drainage Strategy have been developed for the Proposed Onshore Scheme. These strategies include:

a. application of SuDS where feasible;
a. adherence to best practice guidance on runoff treatment and flow control;
b. mitigation of construction impacts via **Appendix 2.1 Outline Onshore Code of Construction Practice** ensuring that runoff and pollution risks are minimised during site works; and
c. specific runoff attenuation and pollution controls near sensitive receptors such as Friston, Fordley Road, and Westleton.

4.7.8 Through the implementation of these measures, the Proposed Onshore Scheme will ensure that surface water runoff is effectively managed and that there will be no increased flood risk to the surrounding environment or communities because of the development.

Existing surface water and foul water drainage infrastructure

4.7.9 Anglian Water is the wastewater service provider for the region. Review of site surveys and drainage assessments confirms that there are no public surface water or foul sewers within the proposed Converter Station, Kiln Lane Substation, or the proposed Landfall Site. These areas are greenfield or undeveloped and currently rely on private drainage or landowner installed field drains that discharge to adjacent ditches. No diversions of existing public drainage infrastructure are required for the Proposed Onshore Scheme.

4.8 Rainwater harvesting

4.8.1 There is currently no known operational rainwater harvesting scheme in the Draft Order Limits. However, rainwater harvesting will be incorporated into the Proposed Onshore Scheme, in line with Suffolk guidance to minimise impact on water supply and groundwater resources.

4.9 Water reuse/recycling

4.9.1 There is currently no known operational greywater reuse or water recycling in the Draft Order Limits. Essex and Suffolk Water's WRMP24 outlines long-term

options such as the planned Lowestoft Water Reuse Scheme which will be operational by 2031/32.

4.9.2 However, water reuse and recycling are expected to play a significant role in the management of water demand, particularly during the construction period, but also during the operation period, as appropriate.

5 Water use in the construction and operational phases of the Proposed Onshore Scheme

5.1 Proposed supply

Public water supply source

5.1.1 The Suffolk region is presently served by Essex and Suffolk Water, which operates three WRZs; Blyth, Hartismere, and Northern Central. The Environment Agency has designated the region as seriously water-stressed, indicating a high proportion of abstraction relative to effective rainfall and growing supply pressures.

5.1.2 The Proposed Onshore Scheme, including the proposed Landfall Site, proposed Underground HVDC Cable Corridor, and the proposed Converter Station, predominantly lies within the Blyth WRZ, a rural area that relies entirely on groundwater sources. These sources are extracted from the Chalk and Crag aquifers through a network of boreholes distributed across the zone.

5.1.3 The Draft Order Limits extend into the Hartismere WRZ at Kiln Lane Substation, which is supplied by groundwater abstractions from Chalk and Crag aquifers. The Syleham Treatment Works, located within Hartismere WRZ, receives imported raw water from boreholes in the Northern Central WRZ, highlighting operational interdependence between these zones.

5.1.4 Additionally, part of the proposed Underground HVDC Cable Corridor is within the Northern Central WRZ, which has a mixed supply with 70% sourced from surface water (River Waveney, River Bure, Ormesby Broad, and Lound Ponds/Fritton Lake) and 30% sourced from groundwater sources.

5.1.5 In line with the WFD No Deterioration requirements and Environment Agency guidance, abstraction license reductions are planned across the region.

a. Blyth WRZ will see a confirmed reduction of 4.18 Ml/d by 2026, with a total reduction of 6.32 Ml/d by 2030.
b. b. Northern Central WRZ will undergo a substantial reduction of 19.32 Ml/d by 2030, with no early reductions planned prior to 2030.
c. No reductions are currently planned for the Hartismere WRZ, though it remains dependent on transfers from Northern Central.

5.1.6 These reductions, along with projected population growth and climate pressures, demand strategic management and adaptive water supply planning. Although there are currently no operational water reuse or desalination schemes in the area, Essex and Suffolk Water's WRMP24 outlines long-term options such as

inter-zone transfers, the planned Lowestoft Water Reuse Scheme, and the proposed North Suffolk winter storage reservoir.

5.1.7 For now, it is expected that water available to ESW during the construction and operational phases of the Proposed Onshore Scheme will be sourced from existing groundwater infrastructure in the Blyth and Hartismere WRZs, with strategic support from Northern Central WRZ supported by the region's integrated transfer capabilities and metering strategies.

On-site supply

5.1.8 Since the Draft Order Limits are on a greenfield site, new connections to the mains water system, where feasible, will be required to meet both construction and operation phase needs. Other sources are likely to be required, given the limited availability of potable water supplies in ESW's Blyth, Hartismere and Northern Central WRZs. Water recycling, reuse and non-potable water supplies should all be under consideration.

5.1.9 Supply requirements may include temporary construction supply lines for dust suppression, welfare, and equipment cooling as well as permanent service connections for domestic water use and system cooling. The final specification and sizing of the water connections will be determined following detailed design and discussions with the local water undertaker.

5.1.10 It is also anticipated that there will be varying water pressure and reliability needs for different parts of the Proposed Onshore Scheme such as technical buildings or fire suppression systems, as well as the risk of backflow and contamination of the public mains, for which it may be necessary to have break tanks and booster sets.

5.1.11 The Proposed Onshore Scheme will incorporate both demand-side and supply-side measures to reduce water use and support regional water efficiency objectives, aligning with WRMP24 and the Suffolk FRM strategies to build resilience. This will include rainwater harvesting and greywater reuse where practical (toilet flushing, landscape irrigation, equipment washdown) reducing reliance on mains supply, and will be designed in accordance with SuDS palette/guidance, BRE365.

5.2 Construction phase water use

Construction water demand estimates

5.2.1 Construction of the Proposed Onshore Scheme will take place over multiple work packages, each component with separate timelines, resources, activities and water demands. See **Chapter 2 Description of the Proposed Scheme** for detail on construction periods.

5.2.2 Construction water demand estimates are highly dependent on construction requirements, as well as buildability considerations, proximity to existing

buildings, site constraints and proposed construction methods. Typically, construction water demand is determined by the appointed Contractor who is best placed to provide these estimates. Given limited information for detailed calculations, it is not feasible to provide precise or wholly reliable construction water demand estimates at this stage.

5.2.3 However, the Applicant's intention is to not increase water demand as a result of the Proposed Onshore Scheme, as its location is designated as a water stressed area and there are regulations and policies in place for abstraction reduction and potable water use reduction. Alternative, non-potable water resources will be explored, as it they may required as part of the construction phase water strategy. Further detail will be set out as part of the subsequent ES.

5.2.4 There may be significant water consumption for wheel washing calculated for the vehicles exiting sites, welfare water demand (which includes water required for the site staff involved in other construction activities) and water required for dust suppression in both primary and secondary compounds.

5.2.5 **Table 5.1** shows how the water demand calculations have been developed, and assumptions made for the Proposed Onshore Scheme.

Table 5.1: General assumptions made for the Proposed Onshore Scheme

Issue	Assumptions
Source of Information	Lion Link Construction Programme and Traffic Estimates (Ref 33) provided by the Applicant dated 13th December 2024
Construction periods	28/04/2028 – 22/11/2032 (1,192 days)
Period of operation	7:00am to 19:00pm (12 hr)/and 24 hr for certain activities such HDD
Months	Each month is assumed to be 30 days long
Construction shift patterns	Assumed to consist of one 12-hour shift over the 24-hour period for most of the activities except for HDD which would demand 24 hrs on-site operation, requiring two 12-hour shifts. In this period, it is assumed that each worker will use the toilet facilities up to 5 times per shift and have 1 shower at the end of each shift.
Wheel Washing Demand	Wheel washing is required to wash the chassis and undercarriage of vehicles, therefore a more substantial wheel washing facility is required. A traditional wheel wash would use approximately 20 litres per wheel (Ref 32) and is required when vehicles exit the site to control mud tracking.
Dust Suppression	During the construction period, dust suppression activities are carried out predominantly during the 12 hours of traffic movements during the daytime. It is

Issue	Assumptions
	assumed a tractor and bowser will be spraying water across the site throughout this time period, with one bowser being filled every hour. Assuming one bowser is used, a total of 12 bowsers will be filled during the 12-hour period of carrying out dust suppression on site. If additives are used, there would be a 50% water reduction. This is beneficial given the site has no existing mains water supply, there is a high and prolonged dust suppression demand and a long construction timeline. It would reduce reliance on non-potable abstracted sources, minimise the need for frequent bowser refills and help compliance with environmental permits or Environment Agency abstraction limits applied to the Suffolk WRZs.
Welfare requirements	These are based on assumptions derived from the Health, Safety and Environment guidance for the provision of welfare facilities during construction work, and the British Water codes of Practice relating to daily consumption. Assumptions made: • 90 litres per person per day; applies to all resources on site (primary compound) • 45 litres per person per day if secondary compound. • The number of personnels on site per day from the 2-way vehicle movements is calculated by the assumptions that half the 2-way trips represent unique visits, and each vehicle carries 1.5 people on average.

5.2.6 During the construction phase, water is required for surface maintenance and welfare facilities for the workforce and vehicle washdowns on site. The breakdown of water demand for each component of the Proposed Onshore Scheme is presented below, with a summary of the peak water demands during the construction and operational periods.

Surface activities

5.2.7 The peak volumes anticipated per day for the surface activities including wheel washing, dust suppression, and welfare provision are presented in **Table 5.2**. The information presented will need to be reviewed, verified and updated as the design progresses.

Table 5.2: Summary of indicative water demand requirements for the proposed Converter Station

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand (l/s)
Converter Station: The peak site occupancy of 227 includes all personnel, including visiting delivery drivers and haulage staff.			
WHEEL WASHING			
	Wheel wash water demand was based on the assumption of 20 litres per wheel, and each Heavy Goods Vehicle (HGV) has 8 wheels, equating to 160 litres per vehicle.	**0.111**	**0.318**
	For Cars/Vans ~80 litres per vehicle.	**0.311**	**0.400**
Reduced Water Demand Option **Assumption:** Given the sticky and cohesive soil conditions at the site, a completely waterless wheel wash system may be inadequate for effective debris removal. However, considering the water-stressed nature of the location, a traditional high-water-use system (approximately 20 l per wheel) is also likely to be unsuitable. Therefore, a hybrid solution is recommended: installing rumble strips (Eco-ramps) to dislodge most debris mechanically, complemented by a closed-loop wheel wash system with recycled water used only for periodic washdowns. This approach balances environmental constraints with functional effectiveness, potentially reducing water demand to under 5–10 l per wheel.			
	Wheel wash water demand was based on the assumption of 5 litres per wheel, and each HGV has 8 wheels, equating to 40 litres per vehicle.	**0.013**	**0.080**
	For Cars/Vans ~20 litres per vehicle.	**0.077**	**0.100**
WELFARE WATER DEMAND			
	Water demand when there is peak and average number of personnel on site per working day, consuming 45 l per person per day (with shift change)	**0.308**	**0.473**
DUST SUPPRESSION			
Assumptions: One 10,000 litre bowser used for site-wide suppression, operating 12 hours/day, with 1 refill per hour. The site is active for 995 days based on 'Compound in use' period for proposed Converter Station. **Justification:** The proposed Converter Station spans a large area, accommodates high daily vehicle movements and supports activities such as heavy earthworks, cut and fill, trenching, structural steel erection with daily working hours of 7:00- 19:00 (Monday-Friday) with extended			

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand (l/s)
working for certain activities. Dust suppression is required throughout the day, especially along haul roads and laydown areas.			
	Without additives	**2.778**	**5.556**
	If additives are used	**1.389**	**2.778**

Table 5.3: Summary of indicative water demand requirements for Kiln Lane Substation (Full Build Out Scenario)

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand(l/s)
Kiln Lane Substation: The peak site occupancy includes personnel visiting delivery drivers only as other resource details and compound details are unavailable **Assumption:** For the calculation purposes, the Full Build Out of Kiln Lane Substation Scenario is considered (see **Chapter 2 Description of the Proposed Scheme**).			
WHEEL WASHING			
	Wheel wash water demand was based on the assumption of 20 litres per wheel, and each HGV has 8 wheels, equating to 160 litres per vehicle.	**0.129**	**0.319**
	For Cars/Vans ~80 litres per vehicle.	**0.240**	**0.433**
Reduced Water Demand Option **Assumption:** Given the sticky and cohesive soil conditions at the site, a completely waterless wheel wash system may be inadequate for effective debris removal. However, considering the water-stressed nature of the location, a traditional high-water-use system (approximately 20 l per wheel) is also unsuitable. Therefore, a hybrid solution is recommended: installing rumble strips (Eco-ramps) to dislodge most debris mechanically, complemented by a closed-loop wheel wash system with recycled water used only for periodic washdowns. This approach balances environmental constraints with functional effectiveness, potentially reducing water demand to under 5–10Litres per wheel.			
	Wheel wash water demand was based on the assumption of 5 litres per wheel, and each HGV has 8 wheels, equating to 40 litres per vehicle.	**0.032**	**0.079**
	For Cars/Vans ~20 litres per vehicle.	**0.060**	**0.108**
WELFARE WATER DEMAND **Assumption**: the proposed Underground HVAC Cable Corridor has both primary and secondary compounds (multiple numbers). For calculation purpose, only one primary compound has been considered as it has more personnels at a given point of time on site. Assume 90 l per person per day as it is a primary compound (with no shift change) and half of the total daily vehicle movements being on site at once with each vehicle assumed to bring an average of 1.5 people. During 12-hour construction activities, one 12-hour shift is employed.			

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand(l/s)
	Water demand when there is peak and average number of personnel on site/working day consuming 90 l per person per day (with shift change)	**0.258**	**0.500**

Table 5.4: Summary of indicative water demand requirements for the proposed Underground HVDC Cable Corridor

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand(l/s)
Proposed Underground HVDC Cables: The peak site occupancy includes all personnel, including visiting delivery drivers and haulage staff. **Assumption:** For the calculation purpose, only one sub-programme was considered which has more resources on site on a specified day. Approximately 23% of the construction duration at the proposed Underground HVDC Cable Corridor, activities will operate on a 24-hour basis, involving shift changes and is expected to increase welfare water demand due to the presence of multiple shifts and higher on-site personnel turnover.			
WHEEL WASHING			
	Wheel wash water demand was based on the assumption of 20 litres per wheel, and each HGV has 8 wheels, equating to 160 litres per vehicle.	**0.027**	**0.204**
	For Cars/Vans ~80 litres per vehicle.	**0.042**	**0.090**
Reduced Water Demand Option **Assumption:** Given the sticky and cohesive soil conditions at the site, a completely waterless wheel wash system may be inadequate for effective debris removal. However, considering the water-stressed nature of the location, a traditional high-water-use system (approximately 20 l per wheel) is also unsuitable. Therefore, a hybrid solution is recommended: installing rumble strips (Eco-ramps) to dislodge most debris mechanically, complemented by a closed-loop wheel wash system with recycled water used only for periodic washdowns. This approach balances environmental constraints with functional effectiveness, potentially reducing water demand to under 5–10 l per wheel.			
	Wheel wash water demand was based on the assumption of 5 litres per wheel, and each HGV has 8 wheels, equating to 40 litres per vehicle.	**0.006**	**0.005**
	For Cars/Vans ~20 litres per vehicle.	**0.105**	**0.022**
WELFARE WATER DEMAND **Assumption**: the proposed Underground HVDC Cable Corridor has both primary and secondary compounds (multiple numbers). For calculation purpose, only the primary compound of the is considered. Assume 90 litres per person per day as it is a construction site with 73% of work involves non-trenchless work and primary compound is needed (with shift change) and half of the			

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand(l/s)
total daily vehicle movements being on site at once with each vehicle assumed to bring an average of 1.5 people. During 24-hour construction activities like trenchless at this site, two 12-hour shifts are employed. During shift changeover, both incoming and outgoing personnel are assumed to be briefly on site. Simultaneously, other activities occur on a single 12-hour shift.			
	Water demand when there is peak and average number of personnel on site/working day consuming 90litre per person per day (with shift change)	**0.081**	**0.167**
DUST SUPPRESSION			
Assumptions: One 2,000 litre bowser used for site-wide suppression, operating 12 hours/day during non-trenchless days and 24-hours during trenchless days, with 1 refill per hour. The site is active for 382 days. **Justification:** The proposed primary compound for the construction site has a footprint of 200m x 80m, supports activities such as vegetation clearance, trenching, trenchless operations, proposed Underground Cable installation, and reinstatement. With high daily vehicle movements and working hours of 07:00–19:00 (Monday–Friday), including 24-hour trenchless work during 23% of the construction period and standard daytime work during the remaining 77%, dust suppression is essential throughout, especially along haul roads and laydown areas.			
	Without additives	**0.556**	**1.111**
	If additives are used (50% reduction)	**0.278**	**0.556**

Table 5.5: Summary of indicative water demand requirements for proposed Underground HVAC Cable Corridor

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand(l/s)
Proposed Underground HVAC Cables: The peak site occupancy includes all personnel, including visiting delivery drivers and haulage staff. **Assumption:** For calculation purposes, only the proposed primary construction compound was considered which has more resources on site on a specified day.			
WHEEL WASHING			
	Wheel wash water demand was based on the assumption of 20 litres per wheel, and each HGV has 8 wheels, equating to 160 litres per vehicle.	**0.025**	**0.200**
	For Cars/Vans ~80 litres per vehicle.	**0.035**	**0.067**
Reduced Water Demand Option **Assumption:** Given the sticky and cohesive soil conditions at the site, a completely waterless wheel wash system may be inadequate for effective debris removal. However, considering the water-stressed nature of the location, a traditional high-water-use system (approximately 20 litres			

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand(l/s)
per wheel) is also unsuitable. Therefore, a hybrid solution is recommended: installing rumble strips (Eco-ramps) to dislodge most debris mechanically, complemented by a closed-loop wheel wash system with recycled water used only for periodic washdowns. This approach balances environmental constraints with functional effectiveness, potentially reducing water demand to under 5–10 litres per wheel.			
	Wheel wash water demand was based on the assumption of 5 litres per wheel, and each HGV has 8 wheels, equating to 40 litres per vehicle.	**0.006**	**0.050**
	For Cars/Vans ~20 litres per vehicle.	**0.008**	**0.016**
WELFARE WATER DEMAND **Assumption**: the proposed Underground HVAC Cable Corridor will have both primary and secondary compounds (multiple numbers). For calculation purpose, only one primary compound has been considered as it has more personnel on site at a given point of time. Assume 90 l per person per day as it is a primary compound (with no shift change) and half of the total daily vehicle movements being on site at once with each vehicle assumed to bring an average of 1.5 people. During 12-hour construction activities, one 12-hour shift is employed.			
	Water demand when there is peak and average number of personnel on site/working day consuming 90 l per person per day (with shift change)	**0.068**	**0.158**
DUST SUPPRESSION			
Assumptions: One 4000 litres bowser used for site-wide suppression, operating 12 hours/day, with 1 refill per hour. The site is active for 369 days based. **Justification:** The proposed Underground HVAC Cable Corridor's primary compound has a footprint of 180m x 80m, supports activities such as vegetation clearance, trenching, Hauling, proposed Underground Cable installation, and reinstatement. With high daily vehicle movements and working hours of 07:00–19:00 (Monday–Friday), dust suppression is essential throughout, especially along haul roads and laydown areas.		
	Without additives	**1.111**	**2.222**
	If additives are used (50% reduction)	**0.556**	**1.111**

Table 5.6: Summary of indicative water demand requirements for proposed Landfall

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand(l/s)
Proposed Landfall: The peak site occupancy includes all personnel, including visiting delivery drivers and haulage staff. **Assumption:** Approximately 73% of the construction duration, activities will operate on a 24-hour basis, involving shift changes and is expected to increase welfare water demand due to the presence of multiple shifts and higher on-site personnel turnover.			

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand(l/s)
WHEEL WASHING			
	Wheel wash water demand was based on the assumption of 20 litres per wheel, and each HGV has 8 wheels, equating to 160 litres per vehicle.	**0.000**	**0.004**
	For Cars/Vans ~80 litres per vehicle.	**0.007**	**0.025**
Reduced Water Demand Option **Assumption:** Given the sticky and cohesive soil conditions at the site, a completely waterless wheel wash system may be inadequate for effective debris removal. However, considering the water-stressed nature of the location, a traditional high-water-use system (approximately 20 l per wheel) is also unsuitable. Therefore, a hybrid solution is recommended: installing rumble strips (Eco-ramps) to dislodge most debris mechanically, complemented by a closed-loop wheel wash system with recycled water used only for periodic washdowns. This approach balances environmental constraints with functional effectiveness, potentially reducing water demand to under 5–10 litres per wheel.			
	Wheel wash water demand was based on the assumption of 5 litres per wheel, and each HGV has 8 wheels, equating to 40 litres per vehicle.	**0.000**	**0.001**
	For Cars/Vans ~20 litres per vehicle.	**0.001**	**0.006**
WELFARE WATER DEMAND **Assumption**: The proposed Landfall has a secondary compound. Assume 45 litres per person per day as it is a secondary compound (with shift change) and half of the total daily vehicle movements being on site at once with each vehicle assumed to bring an average of 1.5 people. During 24-hour construction activities like HDD at the proposed Landfall Site, two 12-hour shifts are employed. During shift changeover, both incoming and outgoing personnel are assumed to be briefly on site. Simultaneously, other activities occur on a single 12-hour shift.			
	Water demand when there is peak and average number of personnel on site/working day consuming 45 litres per person per day (with shift change)	**0.006**	**0.021**
DUST SUPPRESSION			
Assumptions: One 1,000 litre bowser used for site-wide suppression, operating 12 hours/day during non-trenchless days and 24-hours during trenchless days, with 1 refill per hour. The site is active for 329 days. **Justification:** Construction at the proposed Landfall Site, with a footprint of 110m x 75m, will involve activities such as vegetation clearance, trenching, trenchless operations, proposed Underground Cable installation, and reinstatement. With high daily vehicle movements and working hours of 07:00–19:00 (Monday–Friday), including 24-hour trenchless work during 50% of the construction period and standard daytime work during the remaining 35%, dust suppression is essential throughout, especially along haul roads and laydown areas.			

Component/activity	Calculations and assumptions	Average water demand (l/s)	Peak water demand(l/s)
	Without additives	**0.278**	**0.556**
	If additives are used	**0.138**	**0.278**

Construction water demand management

5.2.8 Construction is expected to begin in 2028. Since the Suffolk region is already designated as water stressed, with planned strategies and supply-side constraints extending into the 2030s, the Proposed Onshore Scheme will adopt construction phase demand management strategies. All potable and non-potable water use will emphasise on recycling, wheel wash efficiency, and reducing dependence on mains supplies aligning with abstraction reduction targets.

Reducing potable water demand

5.2.9 The potable water demand will be minimised on all site compounds by implementing reduction strategies primarily for site cabins, welfare facilities, and washing needs.

5.2.10 Reduction strategies (Ref 31) will include:

a. water efficient fittings – low flush toilets, self-closing taps, waterless urinals, low flow showers, sensor activated flush and tap systems;
b. eco-cabins and water-efficient welfare units – rainwater harvesting for flushing, composting toilets;
c. install water meters on welfare blocks, monitor for leaks or misuse, and use meter adaptors on site cabins to improve data capture;
d. behavioural training – toolbox talks, staff awareness posters and induction, flow controllers on hoses and wash stations; and
e. integrate pre-design water efficiency standards into schemes like BREEAM and BREEAM Infrastructure (formerly CEEQUAL).

5.2.11 The Works Information specifies that each contractor must minimise water consumption and measure their performance using construction key performance indicators (KPIs).

Non-potable water supply during construction

5.2.12 Given the designation of the region as a seriously water-stressed area and in alignment with local policies and strategies, the Proposed Onshore Scheme is committed to reducing dependence on potable water during construction. Non-potable water sources will be prioritised for construction activities in line with Policy SCLP9.7 Holistic Water Management (developments to integrate water efficiency and reuse measures), Policy WLP8.28 Sustainable Construction, and the Suffolk FRM strategy, which promotes water reuse, early SuDS integration and use of local drainage where feasible.

5.2.13 The following construction activities may use non-potable water.

a. dust suppression;
b. wheel washing;
c. concrete batching (subject to quality standards);
d. plant and equipment cleaning;
e. toilet flushing in welfare cabins;
f. landscape irrigation; and
g. fire safety.

Potential non-potable water sources

Rainwater harvesting

5.2.14 Permanent components of the Proposed Onshore Scheme will be assessed for integration of roof-based collection systems, above or below ground storage, and provides connections to non-potable water systems. Although Temporary Construction Compound (TCC) may limit large-scale capture and storage, rainwater harvesting will be considered for activities such as toilet flushing, dust suppression, and wheel washing, where water quality requirements can be met.

Construction water recycling

5.2.15 Where feasible, water from wheel wash systems, concrete washouts, and tool cleaning will be captured and reused through closed-loop or mobile filtration systems. This approach aligns with Policy WLP8.28 by reducing discharge volumes and conserving overall water usage.

Greywater reuse

5.2.16 In line with Policy SCLP9.7, greywater recycling will be considered for construction phase. Modular systems can be installed in temporary welfare units, where greywater from sinks and showers can be reused for toilet flushing.

Local land drainage

5.2.17 There are likely to be limited opportunities for abstracting untreated groundwater or surface water on the various construction sites and during operation at Kiln Lane Substation and the proposed Converter Station. However, opportunities to use local land drainage water for dust suppression or cleaning (washdowns of work areas, plant and equipment cleaning, and wheel washing), which do not involve cleaning for hygienic or potable purposes, will be explored, following guidance in Suffolk FRM Protocol (Appendix C).

Tankered supply

5.2.18 Water may also be delivered from licensed sustainable sources and stored on-site. This option will be carefully reviewed for traffic, carbon, and cost implications.

5.2.19 These measures comply with local policies and contribute to WRMP24 goals for reducing potable water demand and drought resilience.

5.3 Operational phase water use

Water demand for the operation and maintenance

5.3.1 Operational and maintenance water demand has been assessed for the various Proposed Onshore Scheme components, excluding demand-saving measures (see **Table 5.7**). During this period the only continuous water requirement is that needed for welfare activities.

Table 5.7: Operational phase water use

Component	Assumption/Comment	Average water demand (l/s)	Peak water demand (l/s)
Kiln Lane Substation	Monitored remotely Site visit once a week by one or two staff Scheduled minor maintenance every 6 months for 2 days, 2 staff Major maintenance every 2 years for 4 days by 20 staff	Negligible	0.5000
Proposed Converter Station	Operational throughout the year. Staffed operational activities 40 hrs per week 12 staff on site per day and 20 per week. 50 staff during outage major maintenance	0.01583	1.2500
Proposed Underground Cables	Monthly inspection by 2 staff	Negligible	0.0500
Proposed Landfall	Monthly inspection by 2 staff	Negligible	0.0500

Fire water demand

5.3.2 Fire water demand has been considered as part of the future operation of the site. The supply for fire suppression systems is expected to be provided by the retained and proposed mains connections and that short-term on-site supplies are adequate for this.

6 Proposed measures for reducing potable water use

6.1.1 In recognition of Suffolk's status as a serious water stressed area, the Proposed Onshore Scheme would reduce reliance on potable water, in accordance with regional and local policy expectations. The ESW WRMP24 sets out a target to reduce PCC in its supply area to 110 litres/person/day, supported by both supply and demand side interventions. Local policies including SCLP9.7 Holistic Water Management and WLP8.28 Sustainable Construction require developments to demonstrate the availability of water resources and encourage the integration of water efficiency measures, including the use of alternative water sources such as greywater and rainwater. The Sustainable Construction SPD strongly supports this approach by promoting measures such as efficient water fittings and appliances, SuDS, and non-potable water reuse.

6.1.2 In addition, policies SCLP9.2 and WMP8.28 require non-residential developments exceeding 1,000 sqm to meet the BREEAM 'Very Good' standard, which includes assessment of water use performance. Consistent with these requirements, the Proposed Onshore Scheme will incorporate water efficiency, rainwater harvesting, greywater recycling, and where feasible, the use of land drainage and site runoff across both the temporary construction compounds and permanent facilities.

6.2 Water efficiency

6.2.1 The Proposed Onshore Scheme, comprising the proposed Converter Station and Kiln Lane Substation, the proposed Underground Cables and temporary construction compounds lie within a water-stressed area. Water efficiency is central to the Proposed Onshore Scheme's sustainability strategy, and is thus aligned with ESW's WRMP24, which targets significant reductions in PCC and promotes non-potable supply options.

6.2.2 The Proposed Onshore Scheme would commit to exceeding baseline requirements through measures consistent with BREEAM Wat 01: Water Consumption (Ref 45), targeting up to 5 credits by reducing potable water use. Specific measures include:

a. low-flush hand wash taps (3 l/min);
b. effective toilet flush volumes capped at 3litres; urinals either waterless or limited to 2 flushes/hour, calculated per bowl;
c. showers restricted to 3.5 l/min, with timed access to reduce actual hourly use (example 8 l/min over 8min/hour – 1.07 l/min equivalent);
d. greywater recycling in welfare units for flushing, with potential expansion to permanent facilities, in line with SCLP9.7;

e. rainwater harvesting, including from permanent structures to meet flushing, dust suppression, and wheel wash needs, supporting WLP8.28 and Suffolk's SuDS protocol;
f. metering of recycled water (example rainwater, greywater, process water) where usage exceeds 10% of site demand, per BREEAM guidance;
g. leak detection systems applied to all water supplies, including those feeding toilets and urinals via rainwater harvesting tanks to prevent waste and non-compliance; and
h. when safe, use of process water, for non-potable applications like tool cleaning or batching (BREEAM compliant offsetting of potable use).

6.2.3 Given the high number of Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs) expected across the construction compounds, wheel washing is essential for controlling dust, reducing off-site tracking, and complying with environmental management protocols. The Proposed Onshore Scheme is committed to deploying a low water-high efficiency approach consistent with Policy WLP8.28, SCLP9.7 and SuDS protocol.

6.2.4 Using the known frequency of vehicle movements, total water demand for wheel washing is calculated based on an industry standard estimate of 20 l/wheel, providing a more accurate assessment of non-potable water needs and will inform compound level water supply design.

a. waterless wheel washers will be prioritised at low-traffic or space-constrained sites;
b. at sites with high exit traffic or heavy mud risk, portable wheel wash systems with closed loop recycling and filtration units will be deployed, which will reuse 90% of water; and
c. rainwater harvesting and greywater reuse will be explored to supply these systems.

6.2.5 For welfare facilities such as drinking, toilets, handwashing, kitchen use, and showers, a water demand of 90lpd has been assumed, aligning with industry norms for construction sites.

6.3 Greywater reuse

6.3.1 Greywater recycling will be adopted across key construction compounds to reduce reliance on potable mains water and align with Policy SCLP9.7 on holistic water management and WLP8.28 Sustainable Construction.

6.3.2 For example, at the proposed Converter Station, which will operate for over four years, peak welfare demand is estimated at 20.43 m3/day. Of this, approximately 40% (8 m3/day) is considered greywater generated from sinks and showers (sources suitable for treatment and reuse).

6.3.3 By recycling this greywater for toilet flushing, up to 30-50% of daily potable demand during high usage periods such as shift changes for trenchless operations (24-hr activity which will have two shifts) can be offset. This directly supports the water efficiency targets under BREEAM WAT 01, contributing

towards achieving 4 to5 credits, depending on overall site level water reduction and monitoring.

6.3.4 Modular greywater systems will be prioritised at the proposed Converter Station, Kiln Lane Substation, and the proposed Underground HVAC Cable Corridor primary compounds, where extended timelines justify investment in on-site treatment. Secondary compounds, including at the proposed Landfall and proposed Underground HVDC Cable Corridor, may integrate compact eco-cabin units with built-in greywater recovery for welfare pods at locations operating extended hours.

6.3.5 In addition, treated greywater could be utilised for wheel washing operations. At the proposed Converter Station, total peak daily wheel wash demand is estimated at 31 m^3/day based on two-way vehicle movements and 20 l/wheel. Filtered greywater could be utilised for pre-wash or general plant washdowns.

6.3.6 Similarly, dust suppression requires approximately 120 m^3/day, assuming one 10,000 litres bowser is filled 12 times daily across the 12-hour working day. Over the full construction period of 995 days, this total 119,400m^3. Assuming 60-70% of the 8 m^3/day greywater can be safely recovered and reused, it could supply the equivalent of one bowser refill every two days, supplementing rainwater during dry weather when roof runoff is limited.

6.3.7 The same approach applies in varying proportions across other components of the Proposed Onshore Scheme such as Kiln Lane Substation, the proposed Underground HVAC Cable Corridor, the proposed Underground HVDC Cable Corridor, and the proposed Landfall site, based on its water demand profiles and greywater recovery potential.

6.4 Rainwater harvesting

6.4.1 Rainwater harvesting will be integrated across permanent infrastructure components of the Proposed Onshore Scheme to reduce reliance on potable mains water, aligning with policies SCLP9.7 and WLP8.28 and WRMP24 supply-side and drought resilience strategies. Opportunities exist during both the construction and operational phases, supported by the long duration and scale of site activities.

6.4.2 At the proposed Converter Station, the primary construction compound spans 200m x 200m (40,000 m^2), which will be constructed within 20 days and remain in use for 995 days. This compound includes several roofed structures, such as the reception/visitor centre, office, and multiple storage units with a combined roof area of 4,075 m^2, providing early-stage rainwater harvesting opportunities. Assuming an annual rainfall of 600 mm and 80% harvesting efficiency, the system could yield 1,956 m^3/year or average 5.35 m^3/day, which could supplement non-potable construction uses such as dust suppression, plant washdowns or as a pre-wash stage for wheel washing systems.

6.4.3 From the calculations previously done, it was noted that toilet flushing in the proposed Converter Station compound alone required 6-8 m^3/day of welfare demand of 20.43 m^3/day. With an estimated 5.35 m^3/day of rainwater available, up to 75-85% of toilet flushing demand can be met during peak welfare periods.

6.4.4 This targeted reuse of non-potable water significantly reduces mains water use for sanitary fittings and aligns with BREEAM Wat 01 benchmarks, potentially contributing to 4-5 credits where potable water savings exceed 50% in assessed categories.

6.4.5 For the operational phase, the proposed Converter Station will occupy ~81,000 m^2 permanent footprint. Assuming 50% of roof area is connected to rainwater harvesting systems (40,500 m^2), the system could yield 19,440 m^3/year or ~53.2 m^3/day. This harvested water can meet a range of operational water uses, including toilet flushing, landscape irrigation, and fire suppression reserve tanks, reducing pressure on groundwater sources from the WRZs, which are already under significant stress and subject to Environment Agency abstraction reductions.

6.4.6 Similarly, systems, scaled proportionally, may be replicated at Kiln Lane Substation, the proposed Underground Cable Corridor compounds, and the proposed Landfall Site, subject to feasibility.

6.5 Management and monitoring

6.5.1 Management and monitoring will be central to delivering the Proposed Onshore Scheme in a region designated as seriously water stressed by the Environment Agency. The Proposed Onshore Scheme's water strategy for both construction and operational phases aligns with SCLP9.7, WLP8.28, and the WRMP24 that promotes metering, water reuse, and leakage reduction. The following measures will be adopted to support these and to align with BREEAM Wat 01-03.

a. BREEAM Wat 02 - water monitoring:
   i. All primary and secondary construction compounds of the Proposed Onshore Scheme (five components) will be equipped with mains water meters and sub-metering for high-demand uses such as welfare cabins and vehicle washdown areas.
   ii. Meters will be capable of pulsed output for integration into portable monitoring systems during construction and a permanent Building Management System (BMS) during operation for the monitoring of water consumption.
   iii. This enables alignment with the smart metering objectives of ESW's WRMP24, which seeks full metering in Suffolk by 2030.
b. BREEAM Wat 03 – leak detection:
   i. Leak detection will be installed in both permanent buildings and high demand temporary compounds, helping detect and mitigate losses during construction and transition into operational phases.

ii. Flow-based alarms and programmable control systems will be used to detect unusual consumption patterns, minimise false alarms, and reduce wastage.
iii. Welfare areas will be equipped with presence detectors, timers, or volume-controlled flush systems to limit overuse and prevent minor leaks.

Integration with construction water strategy

6.5.2 These monitoring measures support the construction water strategies set out in **Section 5.2**.

Operational BMS and long-term monitoring

6.5.3 For permanent infrastructure like the proposed Converter Station, a centralised BMS will provide long term insights into water use, enabling adaptive management reflecting and contributing to ESW's WRMP24 leakage reduction and smart meter integration expectations for non-domestic use. The BMS may also facilitate real-time tracking of rainwater harvesting, greywater recycling, and other SuDS.

6.6 Overall impact

6.6.1 The total water demand for the construction phase of the Proposed Onshore Scheme has been estimated based on detailed activity-based (welfare water demand, dust suppression, wheel washing) calculations across all major components, including the proposed Converter Station, Kiln Lane Substation, the proposed Underground Cable Corridors, and the proposed Landfall site. As shown in **Table 6.1**, the combined average daily water demand across the Proposed Onshore Scheme is estimated at ~291,665 litres per day (0.29 Ml/d), while peak daily demand may rise to up to, ~567,110 litres/day (0.57 Ml/d) during periods of intensive activity such as HDD, peak welfare usage, or high vehicle movement for wheel washing and dust suppression.

6.6.2 The forecasted demand is calculated based on assumptions from industry standards and the Proposed Onshore Scheme construction traffic programme (see **Table 6.1**).

6.6.3 From a water resource planning perspective, this level of demand is considered significant, especially in the context of the East Suffolk region's designation as 'seriously water stressed' by the Environment Agency. The area is already facing abstraction reductions which indicates the importance of reducing reliance on potable water sources.

Table 6.1: Total impact of the Proposed Onshore Scheme on potable water demand

	Converter Station	Kiln Lane Substation	Proposed HVAC Cables	Proposed HVDC Cables	Landfall Site	Total Demand
Wheel Washing						
Avg lpd	18,240	16,000	2,640	3,680	560	41,120
Peak lpd	31,040	32,480	11,520	15,680	2,240	92,960
Avg (l/s)	0.422	0.370	0.061	0.069	0.007	0.929
Peak (l/s)	0.719	0.752	0.267	0.295	0.029	2.062
Welfare Demand						
Avg lpd	13,320	11,160	2,970	4,320	495	32,265
Peak lpd	20,430	21,600	6,840	8,820	1,620	59,310
Avg (l/s)	0.308	0.258	0.068	0.081	0.006	0.721
Peak (l/s)	0.472	0.500	0.158	0.167	0.021	1.318
Dust Suppression						
Avg lpd	120,000	No data available	48,000	29,520	20,760	218,180
Peak lpd	240,000		96,000	40,560	38,280	414,840
Avg (l/s)	2.778		1.111	0.556	0.278	4.723
Peak (l/s)	5.556		2.222	1.111	0.556	9.445

6.6.4 In response, the Proposed Onshore Scheme includes a set of demand side and supply side measures to reduce potable water consumption for water resilience and supporting local strategies SCLP9.7, WLP8.28, ESW's WRMP24. These include rainwater harvesting systems, greywater recycling units, water efficient fittings and smart metering, use of non-potable sources such as recycled wheel wash water, and closed loop systems as discussed earlier in the previous chapters for various activities.

6.6.5 For example, at the proposed Converter Station, greywater recycling from welfare facilities (estimated 8 m^3/day) and rainwater harvesting from roofed

structures (yielding 5.35 m^3/day) could together offset up to 13 m^3/day of potable demand for toilet flushing, wheel washing and limited dust suppression needs. In addition, reduced water uses strategies have been identified for dust suppression and wheel washing using additives (50% reduction) and by deploying hybrid solutions (5 litres/wheel instead of 20 litres/wheel).

6.6.6 These measures while currently quantified only for the proposed Converter Station, present potential opportunities across other components.

7 Surface water drainage and sewerage

7.1 Surface water drainage

Existing drainage infrastructure and proposed diversions

7.1.1 The baseline and proposed overarching surface water and drainage assessments are provided in **Chapter 12 Hydrology, Hydrogeology and Drainage.** Refer to this document for full understanding of the existing drainage infrastructure and proposals, including potentially likely significant effects of the Proposed Onshore Scheme (in terms of Hydrology, Hydrogeology and Drainage) on the respective baseline conditions in the study area which is defined in **Chapter 12 Hydrology, Hydrogeology and Drainage of the PEIR**.

7.1.2 The WCS has focused on aspects most relevant to the study, outlined below for the five key components of the Proposed Onshore Scheme.

Proposed Converter Station

7.1.3 The proposed Converter Station site is currently a greenfield area with existing landowner-installed drainage directing surface water runoff to a ditch located directly east of the site, which flows in a south-easterly direction for approximately 300m before continuing in a south-westerly direction. This ditch receives surface water runoff from the upstream field. Infiltration is not viable due to poor soakaway performance, as confirmed by BRE365 tests carried out during ground investigations.

7.1.4 No existing public surface water or foul sewers have been identified on site, and so no diversions are noted. It is intended to liaise with the Environment Agency and/or the LLFA to approve the design and construction works around the existing drainage ditch. Further information will be presented in as part of the subsequent Environmental Statement.

Kiln Lane Substation

7.1.5 There are two assessment scenarios set out in **Chapter 2 Description of the Proposed Scheme**:

a. Amendments to Kiln Lane Substation Scenario: Temporary drainage will be provided during the extension works, and parts of the existing private drainage network may need to be replaced or upsized to suit the new platform and levels.
b. Full Build out of Kiln Lane Substation Scenario: The Proposed Onshore Scheme would design and construct the full temporary and permanent drainage system, including foul and surface water pipes, manholes, and discharge headwalls/pipes. One or more attenuation ponds, similar to those proposed by SPR, will be required; their location and capacity will be confirmed during detailed engineering.

Proposed Underground HVAC and HVDC Cable Corridors

7.1.6 There is no detail on existing field drains or public sewer along the proposed Underground Cable Corridor and no indication of required sewer diversions. Temporary water management during construction may involve localised flow controls. Further information will be obtained from the statutory undertaker and presented as part of the subsequent Environmental Statement.

Proposed Landfall Site

7.1.7 No utilities, including drainage infrastructure, are identified at the Proposed Landfall Site. There is no requirement for permanent drainage. A temporary construction drainage strategy is proposed, including swales and a detention basin to manage surface runoff. Flows will be attenuated and discharged at a controlled rate.

7.1.8 No diversions of foul or surface sewers are necessary, although potential connections to a sewer and water main in Stock Lane may be explored for temporary use.

Existing and proposed constraints

7.1.9 There are several site-specific constraints where a restriction in runoff can be provided and where attenuation features can be located.

7.1.10 These include the following:

a. spatial constraints – large permanent footprint of the components (particularly the proposed Converter Station and Kiln Lane Substation) implies how much greenfield area is lost;
b. existing utilities and structures;
c. protected trees and hedgerows;
d. unexploded ordnance (UXO) and heritage – Zetica pre-desk study assessment flags low UXO risk around the proposed Landfall Site. However, its occurrence cannot be discounted totally;
e. topography and flood risk – The proposed Landfall Site is low-lying and includes areas of surface water flood risk; the inland proposed Converter Station Site lies in Flood Zone 1 but slopes eastwards towards surface water depressions. This influences potential SuDS placement;
f. ground conditions – BRE365 infiltration tests <10mm/hr, indicating poor soakage rates or shallow groundwater tables in key areas;
g. policy and adoption; and
h. high-pressure services.

Surface water drainage hierarchy

7.1.11 The proposed surface water drainage system will be designed to convey surface water only, with foul water discharged separately. The design will be in accordance with BS EN 752 – Drain and Sewer Systems Outside Buildings, BS

EN 12056 – Gravity Drainage Systems Inside Buildings, and Approved Document H of Building Regulations (Ref 28).

7.1.12 In line with the NPPF, Defra's Non-Statutory Technical Standards for SuDS (Ref 24), the CIRIA SuDS Manual C753 (Ref 26), and SCC Local Guidance (Ref 25), the surface water drainage strategy for the Proposed Onshore Scheme adheres to the following sequential surface water drainage hierarchy.

Infiltration to ground

7.1.13 As the most sustainable option, infiltration is prioritised where site conditions permit. This requires:

a. sufficient clearance (≥1.2m) between soakaway base and groundwater levels;
b. infiltration rates >10 mm/hr, confirmed via BRE365 testing and groundwater monitoring; and
c. avoidance of deep soakaways (>2m), unless other options are demonstrably unfeasible.

Discharge to a watercourse

7.1.14 Where infiltration is not viable, surface water may be discharged to an adjacent watercourse, subject to:

a. restriction to greenfield runoff rates (QBar[7] or 2 l/s/ha) for events up to the 1% AEP + climate change allowance;
b. appropriate pollution control and volume attenuation measures; and
c. confirmation that the receiving watercourse is continuous and not an isolated ditch (as per SCC guidance).

Discharge to a surface water sewer or highway drain

7.1.15 If discharge to a natural watercourse is not feasible, connection to a sewer or highway drain may be considered, also with discharge restricted to QBar or 2 l/s/ha. Approval from Anglian Water or other relevant authority is required.

Discharge to a combined sewer

7.1.16 Discharge to a combined sewer is the least sustainable option and is only acceptable where all other disposal methods are proven unviable. Approval from Anglian Water is required.

7.1.17 **Table 7.1** shows the hierarchy of surface water disposal in decreasing order of preference.

[7] QBar is mean annual flood flow; the average annual peak flow from a greenfield site, used for drainage design.

Table 7.1: Surface water drainage hierarchy

Disposal Method	Applicability to Proposed Onshore Scheme	Justification
Infiltration to ground	Viability depends on depth to groundwater and infiltration potential which will vary across site.	Infiltration tests (BRE365) indicate poor infiltration in some areas
Discharge to watercourse	Potentially feasible along the proposed Underground Cable Corridors and proposed Landfall.	Proximity to minor rivers. Subject to continuity and hydraulic capacity confirmation.
Discharge to surface water sewer or highway drain	Possibly feasible at proposed Converter Station and Kiln Lane Substation.	Requires confirmation of existing infrastructure and third-party approval.
Discharge to combined sewer	To be avoided unless others are unfeasible.	Least sustainable. Contradicts local and national guidance unless justified.

Sustainable Drainage Systems

7.1.18 SuDS are the most sustainable way to manage surface water runoff, taking into account site-specific constraints. They mimic natural drainage, reduce flood risk, improve water quality, and offer biodiversity and amenity benefits. Various SuDS options can attenuate surface water runoff. **Table 7.2** assesses the feasibility of different SuDS features for the Proposed Onshore Scheme, explaining why some are suitable and others are not.

Table 7.2: SuDS features feasible for the Proposed Onshore Scheme

Device	Description	Constraints/comments	Feasible
Green/brown roofs (source control)	Provide soft landscaping at roof level which reduces surface water runoff	Feasible in permanent facilities (proposed Converter Station, Kiln Lane Substation); blue roofs optional for flat surfaces.	Y
Infiltration devices and Soakaways (source control)	Store runoff and allow water to percolate into the ground via natural infiltration.	Not suitable in areas with shallow depth to groundwater and limited space for infiltration buffers.	TBC in the subsequent ES.
Permeable surfaces (source control)	Allow storm water to infiltrate or slowly release to sewers through a storage layer.	Feasible in compounds and laydown areas where load-bearing specifications allow sub-base storage.	Y
Rainwater harvesting (source control)	Reduce runoff by reusing water for non-potable uses (e.g. toilet flushing, washdown).	Widely applicable in construction compounds and rooftops to reduce potable demand.	Y

Device	Description	Constraints/comments	Feasible
Swales (permeable conveyance)	Broad shallow channels that convey and infiltrate runoff (if ground permits).	Feasible and proposed along the northwest boundaries of both the temporary compound (1,252 m) and permanent site (667 m). Designed to intercept upstream flows and support surface water management.	Y
Filter drains and perforated pipes (permeable conveyance)	Trenches with granular materials to convey/store runoff and provide some treatment.	Feasible in selective locations, particularly near haul roads and LGV access points.	Y
Filter Strips (permeable conveyance)	Sloping grass/vegetation areas to remove pollutants from runoff.	Not considered feasible due to spatial limitations and constructability issues.	N
Bioretention Systems/Rain Garden (end of pipe treatment)	Shallow landscaped depressions that filter runoff through vegetation and soil.	Proposed near temporary compounds and parking areas for runoff filtration and attenuation.	Y
Infiltration basins (end of pipe treatment)	Surface depressions to store and infiltrate runoff.	Not feasible across most sites due to space and minimum offset constraints (5m).	N
Detention Basin/Pond (end of pipe treatment)	Surface depressions storing runoff without infiltration, often with permanent pools.	Feasible and proposed as controls peak flow, helps avoid retrofitting.	Y
Attenuation underground (end of pipe treatment)	Below-ground geocellular tanks or sectional tanks to store water.	Preferred solution in areas where green roofs are not possible or for surface level runoff management.	Y

Catchment area and existing runoff rates

7.1.19 The Proposed Onshore Scheme spans multiple sites across East Suffolk, with each component sitting within a distinct topographic and hydrological context, with surface gradients generally sloping eastwards towards coastal catchments such as Dunwich River, Hundred River and River Fromus.

7.1.20 The largest is the proposed Converter Station among the five key components, with a mix of temporary and semi-permanent impervious surfaces including welfare units, offices, laydown areas and haul roads. Other components are smaller in size but cumulatively contribute to the catchment loading during construction.

Proposed Converter Station

7.1.21 The proposed Converter Station Site covers a total drainage area of 10.41ha, comprising the permanent compound (8.10ha), a detention basin (1.34ha), and earthworks (0.97ha). A temporary construction compound (5.05ha) will coexist during construction, which includes a 10-meter-wide corridor around the compound to account for earthworks.

7.1.22 Greenfield runoff rates were calculated using the HR Wallingford Greenfield Runoff Estimation Tool, with Base flow Index (BFI) = 0.858 and Standard Annual Average Rainfall (SAAR) of 588 mm, resulting in a greenfield runoff rate, QBar of 4.5 l/s. This has been set as the allowable discharge rate for the 1-in-100-year event with 45% climate change allowance, in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015) (Ref 22).

7.1.23 Catchment areas draining to the detention basin total 7.301 ha (permanent) and 3.178 ha (temporary), based on surface type runoff coefficients (e.g. gravel: 0.6, earthworks: 0.3). As infiltration is not viable (per BRE365 tests), runoff will discharge to the adjacent drainage ditch via gravity (basin bed: 15.0m; ditch invert: 14.67m).

7.1.24 A detention basin of 20,839m³ volume with a 300mm freeboard manages runoff during both construction and operation. Swales (1,252m and 667m) intercept upstream flows and may be diverted to the basin post-construction to enhance attenuation. The design ensures controlled discharge within greenfield rates and compliance with SuDS standards and LLFA requirements.

Kiln Lane Substation

7.1.25 Kiln Lane Substation will include a Gas-Insulated Switchgear (GIS) compound with a total footprint of approximately 1.7ha under the Amendments to Kiln Lane Substation Scenario and up to 2.0ha under the Full Build Out of Kiln Lane Substation Scenario. Drainage requirements vary accordingly. In the Amendments to Kiln Lane Substation Scenario, temporary drainage will be provided during extension works, and sections of the existing private drainage network may require replacement or upsizing to suit the new platform and levels. In the Full Build Out of Kiln Lane Substation Scenario, the Proposed Onshore Scheme will design and construct the full drainage infrastructure, including foul and surface water pipers, manholes, and discharge headwalls. Attenuation ponds, similar to those proposed by SPR, will be required, with location and capacity to be determined through detailed engineering. Across both Kiln Lane Substation Scenarios, drainage design will follow SuDS principles to avoid increasing flood risk. During construction, temporary measures will be implemented to manage stormwater runoff, control sediment, and minimise standing water, with discharges subject to agreement with the local water authority (Ref 46).

Proposed Landfall Site

7.1.26 The proposed Landfall Site covers a drainage area of 2.968ha, including a proposed platform (0.825 ha), haulage road, cut earthworks, swale, detention basin (0.081ha), and runoff from a 1.63ha upstream catchment. Using Micro Drainage Source Control software with SAAR of 600mm and soil index of 0.15, the greenfield runoff rate (QBar) is 1.0 l/s. Due to blockage risk from small orifice size, runoff is set at 2.3 l/s per SuDS Manual (C753), Sewers for Adoption 7th Edition, and Sussex Flood Risk Management Strategy. Surface runoff coefficients (0.6 for platform, 0.3 for permeable ground) yield a total factored area of 1.214 ha. The drainage strategy includes a detention basin and swale in line with SuDS principles.

7.1.27 The same level of detail is unavailable for other components at this stage.

Water quality

7.1.28 Given the Proposed Onshore Scheme's proximity to surface water features such as the Fromus River, Hundred River, and Dunwich River, as well as Principal and Secondary A aquifers within the Crag Group and the Waveney and East Suffolk Chalk and Crag Groundwater Body, pollution prevention is a critical consideration.

7.1.29 The construction and operation of the Proposed Onshore Scheme will generate surface runoff from a range of temporary and permanent features, including haul roads, welfare and site compounds, plant storage, and wheel washing areas. The Proposed Onshore Scheme will incorporate appropriate treatment within the drainage system to ensure that the quality of water discharged is acceptable, in accordance with CIRIA SuDS Manual (C753) (Ref 26), Simple Index Tools FRA and Drainage Strategy (Ref 26), and the Suffolk SuDS guidance (Ref 27).

7.1.30 The pollution hazard levels have been identified for the typical land uses present across the Proposed Onshore Scheme. The hazard indices are summarised in **Table 7.3**, indicating the risk of Total Suspended Solids (TSS), metals, and hydrocarbons being mobilised in surface runoff due to the activities such as HGV movement and vehicle washdown operations.

Table 7.3: Pollution hazard indices for land uses

Land use	Justification for Pollution Hazard Index (PHI)	Pollution hazard level	TSS	Metals	Hydrocarbons
Haul roads	Frequent HGV traffic, dust, grit	Medium	0.7	0.6	0.6
Wheel washing areas	Likely to carry mud, oil from HGV wheels	High	0.8	0.8	0.8
Welfare/Temporary Compounds	LGV access, low pollution potential from storage and use	Low	0.4	0.4	0.4
Plant and material storage	Fuel and chemical storage risk, vehicle refuelling	Medium	0.6	0.5	0.5
Construction laydown areas	Machinery parking, minor leakage	Medium	0.6	0.5	0.5

7.1.31 To mitigate these risks, SuDS features would be selected to achieve an appropriate level of treatment across all pollutant types, complying with pollution mitigation targets under the Simple Index Approach. **Table 7.4** provides recommended SuDS features applicable linking back to the pollution context.

Table 7.4: Recommended SuDS features

SuDS Feature	Justification	TSS	Metals	Hydrocarbons
Silt trap + bioretention system	Targeted solids control and high-performance treatment required for wheel wash (high pollution) and haul roads (HGV movement)	0.8	0.8	0.8
Filter drain	Suitable for welfare/temporary compounds with	0.4	0.4	0.4

SuDS Feature	Justification	TSS	Metals	Hydrocarbons
	moderate TSS and metals (Low risk LGV access areas)			
Permeable pavement and detention basin	Areas with fuel storage and refuelling need dual treatment	0.6	0.6	0.5
Swale and detention basin	Moderate pollutant control (machinery parking resulting in minor hydrocarbon leakage)	0.6	0.5	0.5
Swales	Suitable for haul roads and open areas with limited space; moderate treatment for TSS/hydrocarbons.	0.5	0.6	0.6

7.1.32 Specific attention will be given to wheel washing areas, which present the highest potential pollution risk. At these locations, closed-loop wheel wash systems with water recycling and filtration will be prioritised, and any overflow or discharge will be treated using the SuDS features discussed in the above table appropriately.

7.1.33 In line with the Suffolk Flood Risk Management Strategy and WFD 'No Deterioration' obligations, these treatment trains will be designed to support no deterioration in the quality of downstream surface water bodies earlier mentioned in this section. Where the drainage connects to groundwater or SPZs, additional measures (for example, spill control) will be integrated to avoid infiltration of contaminants.

Exceedance routes

7.1.34 The Proposed Onshore Scheme crosses several areas with varying degrees of surface water flood risk. According to Environment Agency's Risk of Flooding from Surface Water dataset, certain sections in the vicinity of the proposed Converter Station (Section A), the proposed Underground HVDC Cable Corridor (Sections B and C), and locations near Friston and Fordley Road may experience localised ponding or overland flow during extreme rainfall events.

7.1.35 Should storm events exceed the capacity of the designed surface water drainage systems, such as a 1 in 100-year event plus 45% climate change allowance, surface water may surcharge and flow along pre-existing overland flow paths or landscape depressions. To address this, the drainage strategy for the Proposed Onshore Scheme will include exceedance routing principles, ensuring water is directed away from critical infrastructure and towards designated attenuation areas or low-risk zones.

7.1.36 These exceedance routes will be further developed during detailed design, in conjunction with the FRA and SuDS strategy, to ensure that no increase in downstream flood risk occurs because of the Proposed Onshore Scheme.

7.2 Foul water sewerage

7.2.1 Foul water generation across the proposed Converter Station, Kiln Lane Substation, and proposed Landfall Site will be limited to temporary welfare facilities during the construction phase. No permanent foul drainage connections are currently proposed for these locations. Based on estimated workforce numbers and standard usage rates (90 litres/person/day), foul water flows are expected to remain low and manageable across all sites (typically 95% of welfare water use). Each site will implement appropriate on-site foul water treatment or containment solutions such as small, packaged treatment plants (PTPs), septic systems with drainage fields, or cesspools.

7.2.2 All foul drainage infrastructure will be designed in accordance with BS EN 752 – Drain and Sewer Systems Outside Buildings, BS EN 12056 – Gravity Drainage Systems Inside Buildings and Approved Document H of Building Regulations (Ref 28). The final selection and sizing of systems will be determined during detailed design, in consultation with specialist providers in accordance with Building Regulations Part H (Ref 28) and the Environment Agency's General Binding Rules for non-mains drainage systems (Ref 29), and in agreement with Anglian Water, the wastewater service provider for the region. Where required, pre-development enquiries and trade effluent consent applications will be submitted to confirm capacity and regulatory compliance.

7.2.3 In addition to foul drainage, all sites will implement temporary surface water drainage systems as part of enabling and early construction works. As included in sub-programme schedules, temporary drainage is a standard activity designed to prevent waterlogging, protect haul roads and control runoff. These systems are expected to include sump pumps, sediment control measures and will be aligned with SuDS principles to avoid flood risks.

7.2.4 Discharge of uncontaminated stormwater during construction will require approval from Anglian Water or the Suffolk County Council (LLFA) and contractors will be responsible for implementing adequate temporary drainage systems.

7.2.5 Permanent foul and surface water systems will be established during later project stages as required by operational facilities.

8 Summary and conclusions

8.1.1 A Water Cycle Study has been prepared for the Proposed Onshore Scheme to assess its implications on water demand, supply resilience, drainage, and flood risk. The study considers the designation of the site location as 'seriously water stressed', intersecting three WRZs – Blyth, Hartismere, and Northern Central. It aligns with key regulatory and planning documents including NPPF, East Suffolk Local Plans, ESW WRMP24, Anglian Water's DWMP and SPDs.

8.1.2 Water demand for the construction phase is projected to average 6.37 l/s, (~291,665 litres per day, 0.29 Ml/d), peaking at 12.82 l/s (~567,110 litres/day, 0.57 Ml/d) during periods of intensive activity such as HDD, peak welfare usage, or high vehicle movement for wheel washing and dust suppression.

8.1.3 The proposed Converter Station is the highest water-consuming component, followed by Kiln Lane Substation (though major compound details are unavailable), proposed Underground Cable Corridor, and the proposed Landfall.

8.1.4 In response to regional water scarcity and regulatory expectations, the Proposed Onshore Scheme integrates water efficiency strategies including:

a. Rainwater harvesting systems on roofed structures for flushing, wheel washing, and irrigation; at the proposed Converter Station, this system is expected to yield ~5.35 m^3/day, which could offset up to 75-85% of daily toilet flushing demand during peak welfare activity.
b. Greywater reuse from showers and sinks in welfare facilities for non-potable applications, with recovery potential of up to 8 m3/day at the proposed Converter Station, offsetting up to 40% of potable water demand.
c. Low-flow water fittings, sensor taps, and self-closing valves across temporary and permanent infrastructure.
d. Hybrid wheel wash systems (for example rumble strips and closed-loop wash units) reducing water use from 20 litres/wheel to 5 litres/wheel, translating to over a 70% reduction in high traffic areas.
e. Smart metering and leak detection systems aligned with BREEAM Wat01-03 and WRMP24 targets.
f. Use of water additives for dust suppression, which can reduce water use by up to 50%, lowering daily demand from 120 m^3/day to 60 m^3/day in the case of the proposed Converter Station.

8.1.5 These measures are anticipated to reduce reliance on potable water and support the WRMP/DWMP long term goals for PCC reduction and leakage control.

8.1.6 On the other hand, the surface water drainage strategy adheres to the national established drainage hierarchy as outlined in the NPPF (Ref 1), Defra's Non-Statutory Technical Standards for SuDS (Ref 24), the CIRIA SuDS Manual C753, and SCC Local Guidance (Ref 25). Given the site's potential limited infiltration capacity as confirmed by BRE365 testing, infiltration methods are not viable in all

locations (which will be assessed in further detail as the drainage design develops) and presented at ES. Instead, the Proposed Onshore Scheme applies:

a. swales, filter drains, and bioretention area for conveyance and treatment;
b. detention basins sized for greenfield discharge rates at the proposed Converter Station;
c. permeable surfaces in compounds to manage runoff volume and quality; and
d. rain gardens in appropriate locations, where compact SuDS interventions are feasible.

8.1.7 Pollution risks from HGV movement, wheel washing, and equipment storage are addressed using the Simple Index Approach, with treatment trains designed to control suspended solids, metals, and hydrocarbons.

8.1.8 Exceedance flow routes are integrated to prevent surface ponding or uncontrolled runoff in flood-prone sections such as Friston and Fordley Roads. Permanent foul and surface water systems will be established during later project stages as required by operational facilities.

8.1.9 The Proposed Onshore Scheme does not depend on large-scale abstraction, and demand will be managed through combined methods of reuse, efficiency measures, and responsible resourcing from licensed suppliers or stored rainwater.

8.1.10 This WCS is based on available design and construction data and will be updated at detailed design stages as new information becomes available. The study serves as an evidence base to indicate that the Proposed Onshore Scheme can be delivered without much impact on the local water environment. By integrating non-potable water reuse, SuDS-led drainage, and best practice construction water management, the development aligns with local policies and regional water resilience plans.

Topic Glossary

Acronym/Phrase/Abbreviation	Definition
AW	Anglian Water
BAU+	Business as Usual Plus
BGS	British Geological Survey
BRAVA	Baseline Risk and Vulnerability Assessment
BRE Digest 365	Building Research Establishment Digest 365
BREEAM	Building Research Establishment Environmental Assessment Method
CaBA	Catchment-Based Approach
CCMA	Coastal Change Management Areas
CEVA	Coastal Erosion Vulnerability Assessment
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
DCO	Development Consent Order
DEFRA	Department for Environment, Food and Rural Affairs
DI	Distribution Input
DO	Deployable Output
DWF	Dry Weather Flow
DWMP	Drainage and Wastewater Management Plan
DYAA	Dry Year Annual Average
EA	Environment Agency
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESC	East Suffolk Council
ESW	Essex and Suffolk Water
FRA	Flood Risk Assessment
FRM	Flood Risk Management
FWMA	Flood and Water Management Act
GI	Ground Investigation
GIS	Gas Insulated Switchgear
GYBC	Great Yarmouth Borough Council
HDD	Horizontal Directional Drilling

Acronym/Phrase/Abbreviation	Definition
HGV	Heavy Goods Vehicle
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IDB	Internal Drainage Board
ICZM	Integrated Coastal Zone Management
KPIs	Key Performance Indicators
LGV	Light Goods Vehicle
LPA	Local Planning Authority
LLFA	Lead Local Flood Authority
Ml/d	Megalitres per day
mAOD	Metres Above Ordnance Datum
NAV	New Appointment and Variations
NETS	National Electricity Transmission System
NGET	National Grid Electricity Transmission
NGLLL	National Grid LionLink Limited
NNDC	North Norfolk District Council
NPPF	National Planning Policy Framework
NWL	Northumbrian Water Limited
OPI	Overriding Public Interest
PCC	Per Capita Consumption
PCF	Per Capita Flow
PEIR	Preliminary Environmental Information Report
PHI	Pollution Hazard Index
PPG	Planning Practice Guidance
PR24	Price Review 2024
QBar	Mean Annual Flood Flow
RAA	Recent Actual Average
RBCS	Risk Based Catchment Screening
RBMP	River Basin Management Plan
RoFSW	Risk of Flooding from Surface Water
RoSPA	Royal Society for the Prevention of Accidents
RZ	Resource Zone
SAC	Special Area of Conservation

Acronym/Phrase/Abbreviation	Definition
SCC	Suffolk County Council
SCLP	Suffolk Coastal Local Plan
SDS	Strategic Direction Statement
SEA	Strategic Environmental Assessment
SMP	Shoreline Management Plan
SPD	Supplementary Planning Document
SPR	Scottish Power Renewables
SPZ	Source Protection Zone
SSD	Small Sewage Discharges
SuDS	Sustainable Drainage Systems
TCC	Temporary Construction Compound
THR	Target Headroom
TJB	Transition Joint Bay
TraC	Transitional and Coastal
TSS	Total Suspended Solids
UK EEZ	United Kingdom Exclusive Economic Zone
UXO	Unexploded Ordnance
WAFU	Water Available For Use
WCS	Water Cycle Study
WFD	Water Framework Directive
WINEP	Water Industry National Environment Programme
WRC	Water Recycling Centre
WRMP	Water Resources Management Plan
WTW	Water Treatment Works

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