Outer Dowsing Offshore Wind

Preliminary Environmental Information Report

Volume 1, Chapter 24: Onshore Hydrology, Hydrogeology and Flood Risk

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OUTER DOWSING OFFSHORE WIND

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Abbreviations

Acronym	Expanded name
AEP	Annual Exceedance Probability
AOD	above Ordnance Datum
CIRIA	Construction Industry Research and Information Association
CEA	Cumulative Effects Assessment
CMS	Construction Method Statement
CoCP	Code of Construction Practice
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
ES	Environmental Statement
ETG	Expert Topic Group
FRA	Flood Risk Assessment
GT R4 Ltd	The Applicant. The special project vehicle created in partnership between Corio Generation (a wholly owned Green Investment Group portfolio company), Gulf Energy Development and TotalEnergies
HDD	Horizontal Directional Drilling
IDB	Internal Drainage Board
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
ODOW	Outer Dowsing Offshore Windfarm
PEIR	Preliminary Environmental Information Report
rBWD	Revised Bathing Waters Directive
SFRA	Strategic Flood Risk Assessment
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SPZ	Source Protection Zone
TCC	Temporary Construction Compound
TJB	Transition Joint Bay
WFD	Water Framework Directive

Definitions

Term	Definition
Baseline	The status if the environment at the time of the assessment without the development in place.
Cumulative effects	The combined effect of the project acting cumulatively with the effects of a number of different projects, on the same single receptor/resource.

Term	Definition
Cumulative impacts	Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with Project.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP) from the Secretary of State (SoS) for Business, Energy and Industrial Strategy (BEIS), now the Department of Energy Security and Net Zero (DESNZ).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of an impact with the sensitivity of a receptor, in accordance with defined significance criteria.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the Environmental Impact Assessment (EIA) Regulations, including the publication of an Environmental Statement (ES)
Environmental Statement (ES)	The suite of documents that detail the processes and results of the Environmental Impact Assessment (EIA).
Haul Road	The track within the onshore ECC which the construction traffic would use to facilitate construction.
Impact	An impact to the receiving environment is defined as any change to it baseline condition, either adverse or beneficial.
Joint Bays	A joint bay provides a secure environment for the assembly of cable joints as well as bonding and earthing leads. A joint bay is installed between each length of cable.
Landfall	The location at the land-sea interface where the offshore export cable will come ashore.
Link boxes	Underground chambers or above ground cabinets next the cable trench housing electrical earthing links.
Maximum Design Scenario	The maximum design parameters of the combined project assets that result in the greatest potential for change in relation to each impact assessed.
Mitigation	Mitigation measures, or commitments, are commitments made by the Project to reduce and/or eliminate the potential for significant effects to arise as a result of the Project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects.
National Policy Statement (NPS)	A document setting out national policy against which proposals for Nationally Significant Infrastructure Projects (NSIPs) will be assessed and decided upon.
Outer Dowsing Offshore Wind (ODOW)	The Project.
Onshore Export	The Onshore Export Cable Corridor (Onshore ECC) is the area within

Term	Definition
Cable Corridor (ECC)	the PEIR boundary within which the export cable running from the array to landfall with be situated.
Onshore Substation (OnSS)	The Project's onshore substation, containing electrical equipment to enable connection to the National Grid.
Onshore Infrastructure	The combined name for all onshore infrastructure associated with the Project from landfall to grid connection
Preliminary Environmental Information Report (PEIR)	The PEIR is written in the style of a draft Environmental Statement (ES) and provides information to support and inform the statutory consultation process in the pre-application phase. Following that consultation, the PEIR documentation will be updated to produce the Project's ES that will accompany the application for the Development Consent Order (DCO).
PEIR Boundary	The PEIR Boundary is outlined in Figure 3.1 of Volume 1, Chapter 3: Project Description and comprises the extent of the land and/or seabed for which the PEIR assessments are based upon.
Project design envelope	A description of the range of possible elements that make up the Project's design options under consideration, as set out in detail in the project description. This envelope is used to define the Project for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach.
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
Statutory consultee	Organisations that are required to be consulted by the Applicant, the Local Planning Authorities and/or The Inspectorate during the pre-application and/or examination phases, and who also have a statutory responsibility in some form that may be relevant to the Project and the DCO application. This includes those bodies and interests prescribed under Section 42 of the Planning Act 2008.
Study area	Area(s) within which environmental impact may occur – to be defined on a receptor-by-receptor basis by the relevant technical specialist.
The Applicant	GT R4 Ltd. The Applicant making the application for a DCO. The Applicant is GT R4 Limited (a joint venture between Corio Generation, TotalEnergies and Gulf Energy Development (GULF)), trading as Outer Dowsing Offshore Wind. The project is being developed by Corio Generation (a wholly owned Green Investment Group portfolio company), TotalEnergies and GULF.
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
The Project	Outer Dowsing Offshore Wind including proposed onshore and offshore infrastructure
Transition Joint Bay	The offshore and onshore cable circuits are jointed on the landward

Term	Definition
(TJB)	side of the sea defences/beach in Transition Joint Bay (TJB). The TJB is an underground chamber constructed of reinforced concrete which provides a secure and stable environment for the cable.
Trenchless technique	Trenchless technology is an underground construction method of installing, repairing and renewing underground pipes, ducts and cables using techniques which minimize or eliminate the need for excavation. Trenchless technologies involve methods of new pipe installation with minimum surface and environmental disruptions. These techniques may include Horizontal Directional Drilling (HDD), thrust boring, auger boring, and pipe ramming, which allow ducts to be installed under an obstruction without breaking open the ground and digging a trench.

24 Onshore Hydrology, Hydrogeology and Flood Risk

24.1 Introduction

24.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the results to date of the Environmental Impact Assessment (EIA) for the potential impacts of Outer Dowsing Offshore Wind (ODOW) on Onshore Hydrology, Hydrogeology and Flood Risk. Specifically, this chapter considers the potential impact of the Project from the Landfall, along the Onshore Export Cable Corridor (ECC), and the Onshore substation (OnSS) during the construction, operation and maintenance, and decommissioning phases. The Project is a Nationally Significant Infrastructure Project (NSIP). An EIA will be provided as part of a Development Consent Order (DCO) application under the Planning Act 2008.

24.1.2 GT R4 Limited (trading as Outer Dowsing Offshore Wind) hereafter referred to as the 'Applicant', is proposing to develop the Project. The Project will be located approximately 54km from the Lincolnshire coastline in the southern North Sea. The Project will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and connection to the electricity transmission network (see Volume 1, Chapter 3: Project Description for full details).

24.1.3 The Flood Risk Assessment for the project will be undertaken following the selection of the grid connection point and associated onshore ECC, the OnSS location and indicative design, and this will be included with the DCO application.

24.1.4 This chapter should be read alongside the following chapters and appendices:

- Volume 1, Chapter 8: Marine Water Quality;
- Volume 1, Chapter 3: Project Description;
- Volume 1, Chapter 21: Onshore Ecology;
- Volume 1, Chapter 22: Onshore Ornithology;
- Volume 1, Chapter 23: Geology and Ground Conditions;
- Volume 1, Appendix 8.1: Water Framework Directive (WFD) Compliance Assessment;
- Document Reference 8.1.4: Outline Pollution Prevention and Emergency Incident Response Plan; and
- Document Reference 8.1: Draft Code of Construction Practice.

24.1.5 This hydrology, hydrogeology, and flood risk chapter:

- Describes the existing baseline established from desk studies, dedicated surveys and consultation;
- Outlines the potential environmental effects on hydrology, hydrogeology and flood risk arising from the onshore elements of the Project, based on the information gathered and the analysis and assessments undertaken to date and assesses whether they are significant (in EIA terms);

- Identifies any assumptions and limitations encountered in compiling the environmental information; and
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce, or offset the possible environmental effects identified at the relevant stage in the EIA process.

24.2 Statutory and Policy Context

24.2.1 Regard will be given to legislation, policy, technical guidance and other codes of best practice during the design phase of the development, in order to limit;

- The potential for contamination of surface waters or groundwater;
- The potential for flooding to be caused to the existing water environment and surrounding sensitive users; and
- Other potential impacts on water users or water dependant environment.

24.2.2 The hydrology and hydrogeology impact assessment and the flood risk assessments have been undertaken in accordance with the following legislation and policy:

European Legislation

24.2.3 The Water Framework Directive (2000/60/EC) (the WFD) provides the foundation for the protection of the UK's water environment. The WFD seeks to protect all elements of the water cycle and to enhance the quality of groundwater, surface waters, estuaries, and coastal waters. The Directive is transposed and implemented within England through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Volume 2, Appendix 8.1: Water Framework Directive Compliance Assessment also makes reference to the WFD in assessment of the offshore water environment.

24.2.4 The Groundwater Directive (2006/118/EC, including amendments to Annex II detailed under Directive 2014/80/EU) (the GWD) is designed to combat groundwater pollution and sets out procedures for assessing quality of groundwater. Aspects of the GWD are transposed and implemented through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and the Environmental Permitting (England and Wales) Regulations 2016.

24.2.5 The Floods Directive (2007/60/EC) requires assessment of all watercourses and coastlines to determine risk of flooding and action to take adequate and coordinated measures to reduce this flood risk. The Flood Risk Regulations 2009 transpose the EU Floods Directive into law in England and Wales.

24.2.6 The revised Bathing Water Directive (rBWD) (2006/7/EC) came into force in March 2006. The rBWD has been implemented in England and Wales via the Bathing Water Regulations 2013 (as amended), with Bathing Waters classified against the standards set by the rBWD since 2015. The rBWD provides more stringent standards than the previous Directive and places an emphasis on providing information to the public.

National Legislation

24.2.7 The objectives of the directives discussed above that are relevant to this assessment are met through the following UK legislation, relevant to the protection of the water environment:

- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 transposes the Water Framework Directive (WFD) and aspects of the GWD into UK legislation;
- The Environmental Permitting (England and Wales) Regulations 2016 consolidate and replace the Environmental Permitting (England and Wales) Regulations 2010, which have been amended 15 times to date. The 2016 Regulations are still in force and are the main implementing regulations for the environmental permitting regime.
- The Groundwater (England and Wales) Regulations 2009 which implemented Article 6 of the GWD were repealed by the Environmental Permitting (England and Wales) Regulations 2010, and then consolidated by the Environmental Permitting (England and Wales) Regulations 2016, which detail measures to prevent or limit inputs of pollutants into groundwater;
- The Flood Risk Regulations 2009 transposes the EU Floods Directive into UK legislation and sets out requirements of the Environment Agency (EA) and local authorities in preparing assessments and mapping of flood risk for each river basin district in England and Wales;
- Flood and Water Management Act 2010 includes provision for the management of risk in connection with flooding and sets out requirements for Lead Local Flood Authorities (LLFA) in preparing strategies for local flood risk management;
- The Water Resources Act 1991 regulates water resources, water quality and flood defence. The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009, made changes to the powers for carrying out anti-pollution works and serving notices, which are set out in sections 161 to 161AB of the Water Resources Act 1991;
- The Land Drainage Act 1991 and The Land Drainage Act 1994 sets out requirements for maintenance of watercourses by riparian owners;
- Environment Act, 1995 sets out roles and responsibilities for the Environment Agency;
- The Private Water Supplies (England) (Amendment) Regulations 2018 amend the Private Water Supplies (England) Regulations 2016. The Regulations transpose requirements of European Law on the quality of water intended for human consumption from private abstractions; and
- Town and Country Planning (Environmental Impact Assessment (EIA)) Regulations 2017 set out the key stages in the assessment process, including review and monitoring.

National and Local Planning Policy

24.2.8 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to hydrology, hydrogeology and flood risk, is contained in the National Policy Statements (NPSs) for Overarching Energy (EN-1, DECC 2011a), Renewable Energy Infrastructure (EN-3, DECC 2011b) and Electricity Networks Infrastructure (EN-5, DECC 2011c). The principal guidance for the proposals is that provided by the NPSs, together with National Planning Policy Framework (NPPF) and local development plan policies, which provide additional relevant context.

24.2.9 The NPSs identify a number of issues relevant to this chapter. The policies of particular relevance to hydrology, hydrogeology and flood risk from NPS EN-1 and NPS EN-3 are summarised in Table 24.1 below.

24.2.10 Guidance in relation to renewable energy projects is provided within NPS EN-3. For offshore wind farms, this document focuses primarily on the offshore elements of the Project. In relation to flood risk, NPS EN3 refers to NPS EN-1, Section 4.8.

24.2.11 Guidance in relation to the scope of assessment required is provided within NPS EN-3. Assessment should be undertaken for all stages of the lifespan of the proposed wind farm (paragraph 2.6.190).

24.2.12 Guidance specifically relating to onshore grid connections and climate change adaption is provided in NPS EN-5. In relation to flood risk, NPS EN 5 refers to NPS EN-1, Section 4.8.

24.2.13 In addition to the current NPS, draft NPSs were consulted upon between September and November 2021. The draft NPSs have been reviewed to determine the emerging expectations and changes from previous iterations of the NPSs. This includes the Draft Overarching NPS EN-1 (DECC, 2021), Draft EN- 3 (DECC, 2021) and Draft EN- 5 (DECC, 2021).No significant changes with regard to the assessment of onshore hydrology, hydrogeology or flood risk are noted in the emerging draft NPS.

National Planning Policy Framework

24.2.14 The National Planning Policy Framework (NPPF), prepared by the Department for Communities and Local Government was published in March 2012 and revised in July 2021. Chapter 14 of the NPPF, Meeting the challenge of climate change, flooding and coastal change, along with the National Planning Practice Guidance (PPG) which expands on policies contained in the NPPF, recommends a proactive strategy to mitigate and adapt to climate change and requires that flood risk, sustainability and water quality are considered. In addition, the NPPF requires that account is taken of the potential for pollution arising from previous use of the land when determining suitability for a proposed use. NPPF informs Section 5.7 Flood Risk of the Overarching National Planning Policy Statement for Energy (EN-1).

24.2.15 Chapter 15 of the NPPF, Conserving and enhancing the natural environment, along with guidance contained within PPG requires that account is taken of the potential for impact on water quality (in relation to water supply and the natural environment) and local hydrological regimes. NPPF informs section 5.15 Water Quality and Resources of the Overarching National Planning Policy Statement for Energy (EN-1).

24.2.16 The relevant legislation and national planning policy for offshore renewable energy NSIPs, specifically in relation to hydrology, hydrogeology and flood risk, is outlined in Table 24.1below:

Table 24.1: Legislation and policy context

Legislation/policy	Key provisions	Section where comment addressed
National Policy Statement for Overarching Energy (NPS EN-1) (2011)	Paragraph 4.8.6 of NPS EN-1 requires that applicants for new energy infrastructure must take into account the potential impacts of climate change using the latest UK Climate Projections available at the time, in order to ensure that appropriate mitigation or adaptation measures have been identified for the estimated lifetime of the new infrastructure.	The characterisation of the flood risk baseline and future baseline has been established using the Environment Agency Flood Map for Planning, the local authority Strategic Flood Risk Assessments and data from recent hydraulic models, which take into account climate change effects. This information is contained in this chapter and will be in the Flood Risk Assessment reporting to be included in the ES at DCO application. Flood risk has been considered for the life of the development in Section 24.7
NPS EN-1	Paragraph 5.7.4 of NPS EN-1 requires that applications for energy projects of 1ha or greater in Flood Zone 1 and all energy projects located in Flood Zones 2 and 3 should be accompanied by a FRA. An FRA may also be required where there may be flooding issues other than from rivers and the sea (for example from surface water), or where the EA, Drainage Board or other body have indicated that there may be drainage problems. The FRA should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account. The minimum requirements for what should be included in an FRA are also outlined at paragraph 5.7.5 of NPS EN-1.	Flood Risk Assessment reporting will be undertaken in consultation with the EA and Local Authorities, compliant to NPS EN-1, paragraph 5.7.5: to be provided in the Flood Risk Assessment at the ES at the DCO application stage.
NPS EN-1	Paragraphs 5.7.7 - 5.7.8 of NPS EN-1 require applicants to hold pre-application discussions with the Environment Agency and any other relevant bodies where a	Consultation with the Environment Agency has been undertaken as part of the Project Evidence Plan

Legislation/policy	Key provisions	Section where comment addressed
	project has the potential to affect flood risk. Any concerns in regard to flood risk should be discussed all reasonable steps to agree ways in which the proposal might be amended, or additional information provided, which would alleviate concerns.	(Hydrology and Flood Risk Expert Topic Group (ETG)) process, as set out in Section 24.3.
NPS EN-1	Paragraph 5.7.9 of NPS EN-1 lists the matters which the Secretary of State (SoS) should be satisfied by when determining an application for development consent, including where relevant: an FRA; application of the sequential test as part of the site selection; sequential approach at the site level to minimise risk; the proposal is in line with relevant local flood risk management strategies; priority has been given to the use of sustainable drainage systems (SuDS); and in flood risk areas the proposals are appropriately flood resilient and resistant to flooding. Paragraph 5.7.13 of NPS EN-1 defines the process to be followed if the requirements of the sequential test are to be met. Paragraph 5.7.14 of NPS EN-1 notes that if, following application of the sequential test, it is not possible, consistent with wider sustainability objectives, for the project to be located in zones of lower probability of flooding, then the exception test can be applied. The exception test requires that three elements must all be passed: it must be demonstrated that the project provides wider sustainability benefits to the community that outweigh flood risk; the project should be on developable, previously developed land or, if it is not on previously developed land, that there are no reasonable alternative sites on developable previously developed land; and a FRA must demonstrate that the project will be safe, without increasing flood risk elsewhere. Paragraph 5.7.18 onwards of NPS EN-1 sets out mitigation measures that require consideration in order to manage surface	Flood Risk Assessment reporting will be undertaken in consultation with the EA and Local Authorities which includes consideration of the sequential test and the exception test at the DCO application stage. The OnSS design will include a surface water drainage scheme, based on the SuDS principles, which would manage rainfall runoff from the proposed substation and will not increase flood risk locally or in the wider area.

Legislation/policy	Key provisions	Section where comment addressed
	water and the impact of natural water cycle on people and property. These measures include the use of SuDS, surface water drainage design, the sequential approach to infrastructure layout, flood resilience and flood warning.	
NPS EN-1	Paragraph 5.15.2 of NPS EN-1 requires applicants to undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment where it is considered that a project is likely to have effects on the water environment. Paragraphs 5.15.5 to 5.15.7 ask the SoS to ensure that proposals have regard for River Basin Management Plans (RBMP) and meets the requirements of the WFD.	The baseline environment (Section 24.4) is described for the hydrology, hydrogeology and flood risk study area. An assessment of the impacts on water quality, resources and physical characteristics is provided in Section 24.7. The assessment of sensitivity for environmental receptors takes into consideration RBMPs and WFD status (Section 24.5 and Table 24.23).
Revised Draft National Policy Statement for Overarching Energy (NPS EN-1) (2023)	Paragraphs 4.9.10 - 4.9.11 of the Revised Draft NPS EN-1 require that applicants should assess the impacts on and from their proposed energy project across a range of climate change scenarios, in line with appropriate expert advice and guidance available at the time. Applicants should be able to demonstrate that proposals have a high level of climate resilience built-in from the outset. They and should also be able to demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario. These results should be considered alongside relevant research which is based on the climate change projections.	The characterisation of the flood risk baseline and future baseline has been established using the Environment Agency Flood Map for Planning, the local authority Strategic Flood Risk Assessments and data from recent hydraulic models, which take into account climate change effects. This information is contained in this chapter and will also be presented in the Flood Risk Assessment reporting to be included in the ES and DCO application. Flood risk has been considered for the life of the development in Section 24.7.
	Paragraphs 5.8.13 – 5.8.15 of the Revised Draft NPS EN-1 require that applications for energy projects of 1ha or greater in Flood Zone 1 and all energy projects located in Flood Zones 2 and 3 should be accompanied by a site-specific FRA. Assessment may also be required where	Flood Risk Assessment reporting will be undertaken in consultation with the EA and Local Authorities, compliant to NPS EN-1, paragraph 5.7.5, to be included in the ES and DCO application.

Legislation/policy	Key provisions	Section where comment addressed
	flooding issues other than from rivers and the sea (for example from surface water), or where the EA, Drainage Board or other body have indicated that there may be drainage problems. The FRA should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account. The minimum requirements for what should be included in an FRA are also outlined at paragraph 5.8.15 of Draft NPS EN-1.	
	Paragraphs 5.8.18 - 5.8.23 of the Revised Draft NPS EN-1 require applicants to hold pre-application discussions before the official pre-application stage of the NSIP process with the Environment Agency and any other relevant bodies. Any concerns in regard to flood risk should be discussed all reasonable steps to agree ways in which the proposal might be amended, or additional information provided, which would alleviate concerns.	Consultation with the Environment Agency has been undertaken as part of the Project Evidence Plan (Hydrology and Flood Risk Expert Topic Group (ETG)) process, as set out in Section 24.3 and Table 24.1.
	Paragraph 5.8.36 of the Revised Draft NPS EN-1 lists the matters which the SoS should be satisfied by when determining an application for development consent, including where relevant: an FRA; application and satisfaction of the sequential test as part of the site selection; sequential approach at the site level to minimise risk; the proposal is in line with relevant national and local flood risk management strategies; SuDS have been used unless there is clear evidence that their use would be inappropriate; in flood risk areas the proposal development remains safe and operational during its lifetime without increasing flood risk elsewhere; that safe access/escape routes are included where required as part of an emergency plan; any residual risk can be safely managed over the lifetime of the development and land needed for future	Flood Risk Assessment reporting will be undertaken for the ECC and OnSS, in consultation with the Environment Agency and Local Authorities which includes consideration of the sequential approach and will be included in the ES and DCO application. The OnSS design will consider the use of a SuDS based surface water drainage scheme which would manage rainfall runoff from the proposed substation and will not increase flood risk locally or in the wider area.

Legislation/policy	Key provisions	Section where comment addressed
	flood risk management is safeguarded.	
	Paragraph 5.16.3 of the Revised Draft NPS EN-1 requires applicants to undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment where it is considered that a project is likely to have effects on the water environment, and how this might change due to the impact of climate change on rainfall patterns and consequently water availability across the water environment. Paragraphs 5.16.12 to 5.16.15 ask the SoS to ensure that proposals have regard for River Basin Management Plans (RBMP) and meets the requirements of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The SoS must also consider duties under other legislation including duties under the Environment Act 2021 in relation to environmental targets and have regard to the policies set out in the Government's Environmental Improvement Plan.	The baseline environment (Section 24.4) is described for the hydrology, hydrogeology and flood risk study area. An assessment of the impacts on water quality, resources and physical characteristics is provided in Section 24.7 of sensitivity for environmental receptors takes into consideration RBMPs and WFD status (Section 24.4 and Table 24.23).
National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2011)	Paragraph 2.6.43 of NPS EN-3 notes that where precise details of proposed developments are not known, the maximum potential adverse effects of the project should be considered.	Where options exist, the maximum height or footprint (referred to as the Maximum Design Scenario) has been considered within this assessment as described in Section 24.5.
NPS EN-3	Paragraph 2.6.190 of NPS EN-3 states that assessment should be undertaken for all stages of the lifespan of the proposed wind farm.	Environmental assessment has been undertaken for all stages of the lifespan of the proposed wind farm at Section 24.7 for the construction, operation and decommissioning stages respectively.

Legislation/policy	Key provisions	Section where comment addressed
Revised Draft National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)	Paragraph 3.2.6 of Revised Draft NPS EN-3 notes that where precise details of proposed developments are not known, the maximum potential adverse effects of the project should be considered.	Where options exist, the maximum height or footprint (referred to as the Maximum Design Scenario) has been considered within this assessment as described in Section 24.5
Revised Draft NPS EN-3	Paragraph 3.8.115 of Revised Draft NPS EN-3 states that applicants must undertake a detailed assessment for all phases of the lifespan of that development.	Environmental assessment has been undertaken for all stages of the lifespan of the proposed wind farm at Section 24.7 for the construction, operation and decommissioning stages respectively.
National Planning Policy Framework (NPPF) (2021)	Paragraph 161 of NPPF requires that all plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. This requirement is supported by NPPF planning practice guidance for flood risk and coastal change which states "other forms of flooding need to be treated consistently with river and tidal flooding in mapping probability and assessing vulnerability, so that the sequential approach can be applied across all areas of flood risk."	Flood Risk Assessment reporting will be prepared at the application stage that will include consideration of the sequential approach.
NPPF	Paragraph 167 of NPPF states that local planning authorities should ensure that flood risk is not increased elsewhere and where appropriate, applications should be supported by a site-specific flood-risk assessment.	Flood Risk Assessment reporting will be prepared at the application stage that will include consideration of the sequential approach.
NPPF	Paragraph 169 of NPPF requires that major developments incorporate sustainable drainage systems, in line with Local Authority guidance; have appropriate proposed minimum operational standards; have maintenance arrangements in place to ensure an acceptable standard of	The potential for the proposed onshore infrastructure associated with the Project to cause additional run-off will be assessed within the FRA for the onshore ECC to be provided in the ES at DCO application

Legislation/policy	Key provisions	Section where comment addressed
	operation for the lifetime of the development; and where possible, provide multifunctional benefits.	stage. The assessment of the drainage design will be provided with the ES at DCO application stage, when further details are available.

Local Planning Policy

24.2.17 Planning policies of relevance in terms of hydrology, hydrogeology and flood risk are listed below:

- East Lindsey District Council Local Plan Core Strategy (adopted July 2018)
  - Strategic Policy 16 (SP16): Inland Flood Risk
  - Strategic Policy 17 (SP17): Coastal East Lindsey
- South East Lincolnshire Local Plan (adopted March 2019)
  - Policy 4: Approach to Flood Risk

Shoreline Management Plans

24.2.18 Shoreline Management Plans (SMP) outline strategy for managing flood and erosion risk along the coastline, over short, medium and long-term periods. SMP3 has been prepared by the Humber Estuary Coastal Authorities Group and covers the east coast of England from Flamborough Head to Gibraltar Point. SMP4 has been prepared by the East Anglia Coastal Group and covers the coastline from Gibraltar Point to Old Hunstanton.

Other Relevant Guidance

24.2.19 Relevant UK guidance on good practice for construction projects that will be referenced during assessment is detailed in the following documents:

- Control of Water Pollution from Construction Sites (C532), Construction Industry Research and Information Association, (CIRIA) 2001;
- Environmental Good Practice on Site (C741), CIRIA 2015;
- Control of water pollution from linear construction projects (C648), CIRIA 2006;
- The Environment Agency's approach to groundwater protection, version 1.2, February 2018; and
- The SuDS Manual (C753), CIRIA 2015.

24.2.20 The CIRIA guidance provides help on environmental good practice for the control of water pollution arising from construction activities. It focuses on the potential sources of water pollution from within construction sites and the effective methods of preventing its occurrence.

24.2.21 The Environment Agency guidance is part of a wider suite of documents and guidance relating to groundwater protection which sets out principles for assessing risk, protecting groundwater, and permitting of abstractions and discharges from groundwater. The full suite of documents relating to groundwater can be found on the GOV.UK website.

24.2.22 The SuDS Manual incorporates the latest research, industry practice, and guidance for design, delivery, and maintenance of Sustainable Drainage Systems (SuDS).

24.3 Consultation

24.3.1 Consultation is a key part of the Development Consent Order (DCO) application process. Consultation regarding hydrology, hydrogeology and flood risk has been conducted through the Evidence Plan Process (EPP) Expert Technical Group (ETG) meetings and the EIA scoping process (ODOW, 2022). An overview of the Project consultation process is presented within Volume 1, Chapter 6: Consultation.

24.3.2 A Scoping Opinion for the Project was sought from the SoS. The Scoping Opinion, which includes responses from the EA, Local Authorities and Drainage Boards, identifies areas of the assessment methodology for further consideration. A summary of the key issues raised during consultation to date, specific to hydrology, hydrogeology and flood risk, is outlined in Table 24.1 below, together with how these issues have been considered in the production of this PEIR.

Table 24.1: Summary of consultation relating to Hydrology, Hydrogeology and Flood Risk

Date and consultation phase/type	Comments	Section where comment addressed
Scoping Opinion (the Inspectorate, 9 September 2022) Comment ID: 3.17.1 Table 8.5.4	Accidental spillages and leakages of polluting substances – Construction, O&M and Decommissioning The Scoping Report proposes to scope out accidental pollution resulting from construction, operation and decommissioning of the Proposed Development. The Inspectorate agrees that such effects are capable of mitigation through standard management practices and can be scoped out of the assessment. The ES should provide details of the proposed mitigation measures to be included in the Environment Management Plan. The ES should also explain how such measures will be secured.	This comment has been addressed in Section 24.5.2. A Draft CoCP outlining these measures has also been provided as part of the PEIR (Document Reference 8.1: Draft Code of Construction Practice).
Scoping Opinion (the Inspectorate, 9 September 2022) Comment ID: 3.17.2 Table 8.5.4	Impact on Water Framework Directive (WFD) status for surface water or groundwater bodies – O&M The Inspectorate agrees that once installed, the underground cabling elements of the proposed onshore development are unlikely to have significant effects on WFD waterbodies during the operational phase and this matter can be scoped out of the assessment.	This comment has been addressed in Section 24.5.2.
Scoping Opinion (the Inspectorate, 9 September 2022) Comment ID: 3.17.3 Table 8.5.4	Potential for damage to flood defence or surface water drainage infrastructure – Decommissioning The Scoping Report seeks to scope this matter out on the basis that onshore cables would be left in situ and therefore no effects would result from decommissioning. However, the Scoping Report currently contains limited information with regard to decommissioning activities. The ES should consider the potential for damage to flood defences as a result of required decommissioning activities, such as the removal of any above ground infrastructure, and also whether any elements left in situ would impact the future maintenance or improvement works to flood defences.	This comment has been addressed in Table 24.24 and Section 24.7.118.
Scoping Opinion (the Inspectorate, 9 September 2022) Comment ID: 3.17.4 Table 8.5.4	Pollution or disruption of flow to groundwater through ground excavations or piling – Decommissioning. The Scoping Report seeks to scope out this matter on the basis that any piling or deep excavation works would be left in situ and therefore no effects would result from decommissioning. The Scoping Report contains very limited reference to piling or deep excavations, or the likely	This comment has been addressed in Section 24.5.2.

Date and consultation phase/type	Comments	Section where comment addressed
	decommissioning activities. However, the Planning Inspectorate agrees that where the Proposed Development is to be left in situ and there would be no pollution or disruption of flow to ground water arising from decommissioning activities, this matter can be scoped out of the assessment.	
Scoping Opinion (the Inspectorate, 9 September 2022) Comment ID: 3.17.5 Table 8.5.4	Changes to surface water drainage at the OnSS location – Cumulative The Scoping Report states that the proposed surface water management scheme will reduce the potential for significant impacts from the Proposed Development in this regard and there would be no potential for cumulative impacts during the operational phase. The Scoping Report contains limited information on the proposed surface water management, or likely projects or plans that may act cumulatively; therefore, the Planning Inspectorate cannot agree that this matter can be scoped out of the assessment at this stage. The ES should include an assessment of cumulative changes to surface water drainage at the OnSS location, where likely significant effects could occur.	This comment has been addressed in Section 24.8.
Scoping Opinion (the Inspectorate, 9 September 2022) Comment ID: 3.17.6 Paragraph 8.5.42	Transboundary hydrology, hydrogeology and flood risk effects Onshore transboundary effects are scoped out of the assessment as the Applicant considers that hydrology, hydrogeology and flood risk transboundary effects will be highly unlikely to occur. The Planning Inspectorate agrees that as effects are likely to be localised, this matter can be scoped out of the assessment.	This comment has been addressed in Section 24.10.1.
Scoping Opinion (the Inspectorate, 9 September 2022) Comment ID: 3.17.7 Paragraph 8.5.4	Study area The Scoping Report describes a study area of up to 2km from the AoS as appropriate for areas where there is potential for hydraulic connectivity but does not give reasons for the choice of study area nor the approach that will be used to refine the study area for the ES. The ES should explain the rationale behind the choice of study area and, where possible, the approach should be discussed with the relevant consultation bodies.	This comment has been addressed in Section 24.6.3.
Scoping Opinion (the Inspectorate, 9 September 2022) Comment ID: 3.17.8	WFD assessment The Planning Inspectorate recommends the sources of data and guidance listed in Table 7.2.1 (Marine Water Quality) of the Scoping Report also be considered for the WFD assessment identified for the	A WFD Compliance Assessment is included at Volume 1, Appendix 8.1.

Date and consultation phase/type	Comments	Section where comment addressed
Paragraph 8.5.46	onshore aspect chapter, where applicable. It is unclear if one WFD assessment is to be provided for the Proposed Development with the ES and DCO application. The Planning Inspectorate recommends that one WFD assessment be provided, with the information used to inform both the Offshore: Marine Water Quality and Onshore: Hydrology, Hydrogeology and Flood Risk aspect assessments.	
Scoping Opinion (the Inspectorate, 9 September 2022) Comment ID: 3.17.9	Future proposals for watercourses within the study area The Planning Inspectorate points the Applicant to the response from South Holland IDB for consideration in the future baseline for hydrology, drainage and flood risk. The ES should identify any future plans that could involve potential widening of watercourses and the implications for the Proposed Development during construction, operation and decommissioning. The Applicant is encouraged to discuss future plans for waterbodies with the relevant consultation bodies, including the IDBs and the EA.	This comment has been addressed in Section 24.6.4.

24.3.3 As identified in Volume 1, Chapter 4: Site Selection and Consideration of Alternatives and Volume 1, Chapter 3: Project Description, the Project design envelope has been refined and will be refined further prior to DCO submission. This process is reliant on stakeholder consultation feedback.

24.4 Baseline Environment

24.4.1 The onshore ECC options have been broken down into a number of indicative segments, shown in Figure 24.1, Figure 24.2, and Figure 24.3, which describe the onshore ECC in relation to significant local features. Hydrological, hydrogeological and flood risk receptors have been detailed below in relation to each segment. The onshore ECC segments are listed below:

ECC to Lincolnshire Node

- LN1 - Landfall to A52 – Mumby; and
- LN2 - A52 – Mumby to Lincolnshire Node.

ECC to Weston Marsh

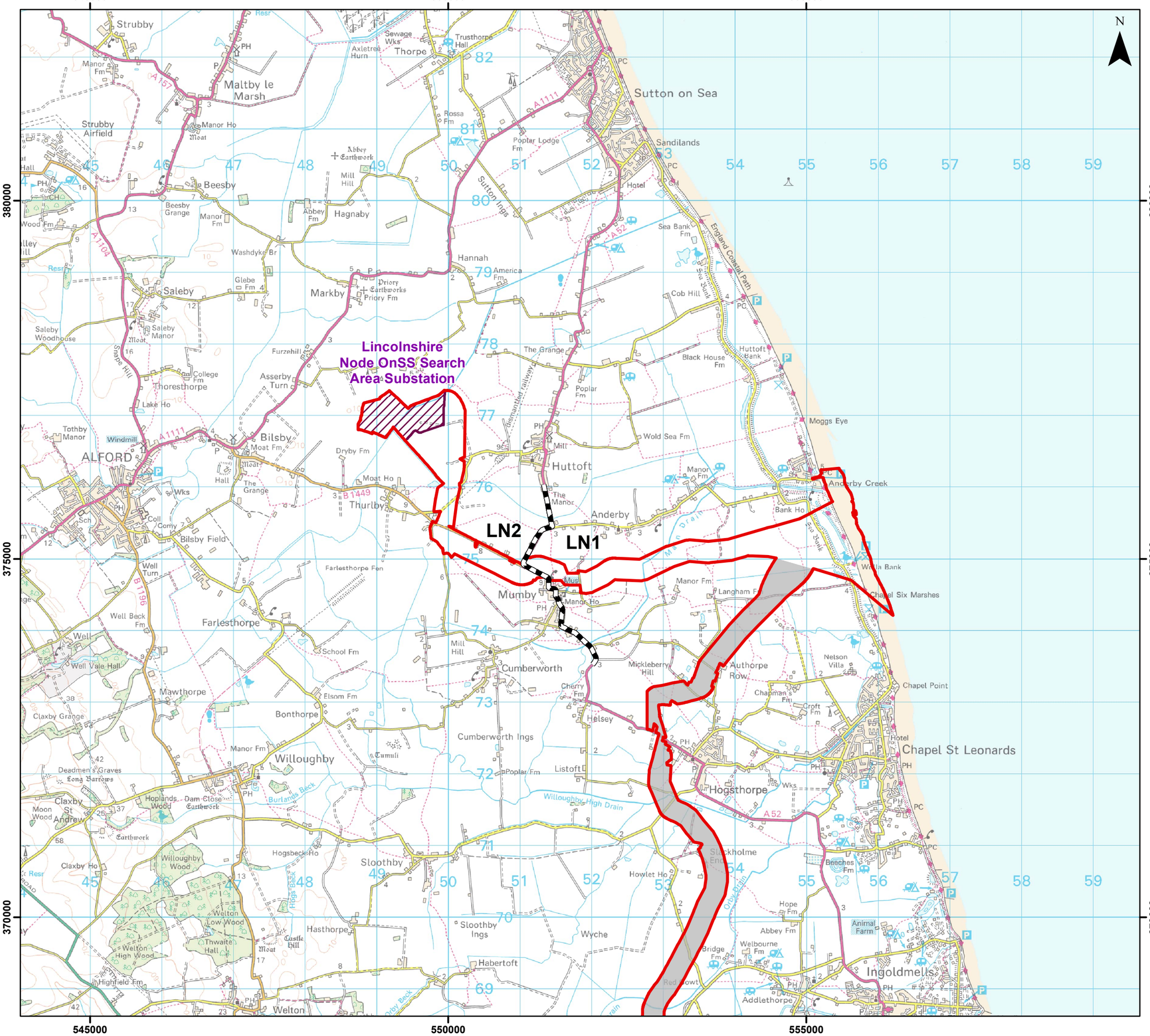
- WM1 - Landfall to A52 – Hogsthorpe;
- WM2 - A52 – Hogsthorpe to Marsh Lane;
- WM3 - Marsh Lane to A158 – Skegness Road;
- WM4 - A158 – Skegness Road to Low Road;
- WM5 - Low Road to Steeping River;
- WM6 - Steeping River to Ivy House Farm / Marsh Yard;
- WM7 - Ivy House Farm / Marsh Yard to Staples Farm;
- WM8 - Staples Farm to Crowhall Lane;
- WM9 - Crowhall Lane to Church End Lane;
- WM10 - Church End Lane to The Haven;
- WM11 - The Haven to Marsh Road;
- WM12 - Marsh Road to Fosdyke Bridge;
- WM13 - Fosdyke Bridge to Weston Marsh Substation North; and
- WM14 - Fosdyke Bridge to Weston Marsh Substation South.

ECC to Weston Marsh (Alternative)

- A1 - Low Road to Steeping River;
- A2 – Steeping River to Fodder Dike Bank/Fen Bank;
- A3 - Fodder Dike Bank/Fen Bank to Broadgate;
- A4 - Broadgate to Ings Drove; and

- A5 - Ings Drove to Church End Lane.

24.4.2 The onshore ECC falls within several WFD Surface Water Operational Catchments and IDB districts. Figures showing these have been provided as Figure 24.4 and Figure 24.5.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Lincolnshire Node OnSS Search Area

Sources:

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

Preliminary Environmental Information Report

Landfall to Lincolnshire Node
ECC Route Segments

Figure 24.1

OUTER DOWSING OFFSHORE WIND

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520000 530000 540000 550000 560000 570000

380000 370000 360000 350000 340000 330000

N

WM1 WM2 WM3 WM4 WM5 WM6 WM7 WM8 WM9 WM10 WM11 WM12 WM13 WM14

Weston Marsh North OnSS Search Area Substation

Weston Marsh South OnSS Search Area Substation

THE WASH

BOSTON DEEPS

LYNN DEEPS

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Weston Marsh North OnSS Search Area
- Weston Marsh South OnSS Search Area

Sources:

Coordinate System: British National Grid

0 5 10 km

Scale: 1:200,000

Preliminary Environmental Information Report

Landfall to Weston Marsh
ECC Route Segments

Figure 24.2

OUTER DOWSING OFFSHORE WIND

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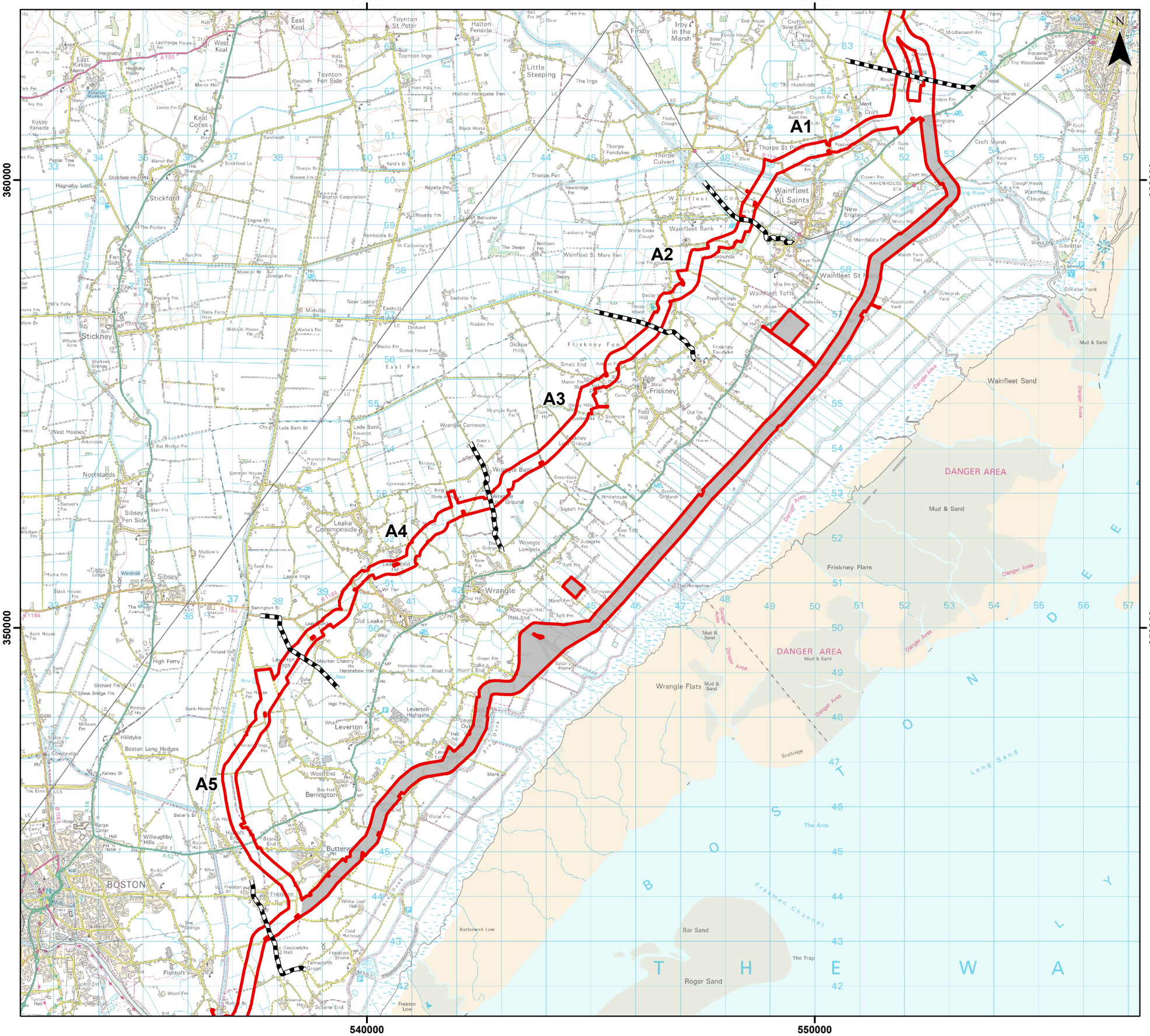

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Sources:

Coordinate System: British National Grid

0 2 4 km

Scale: 1:80,000

Preliminary Environmental Information Report

Landfall to Weston Marsh
Alternative ECC Route Segments

Figure 24.3

OUTER DOWSING OFFSHORE WIND

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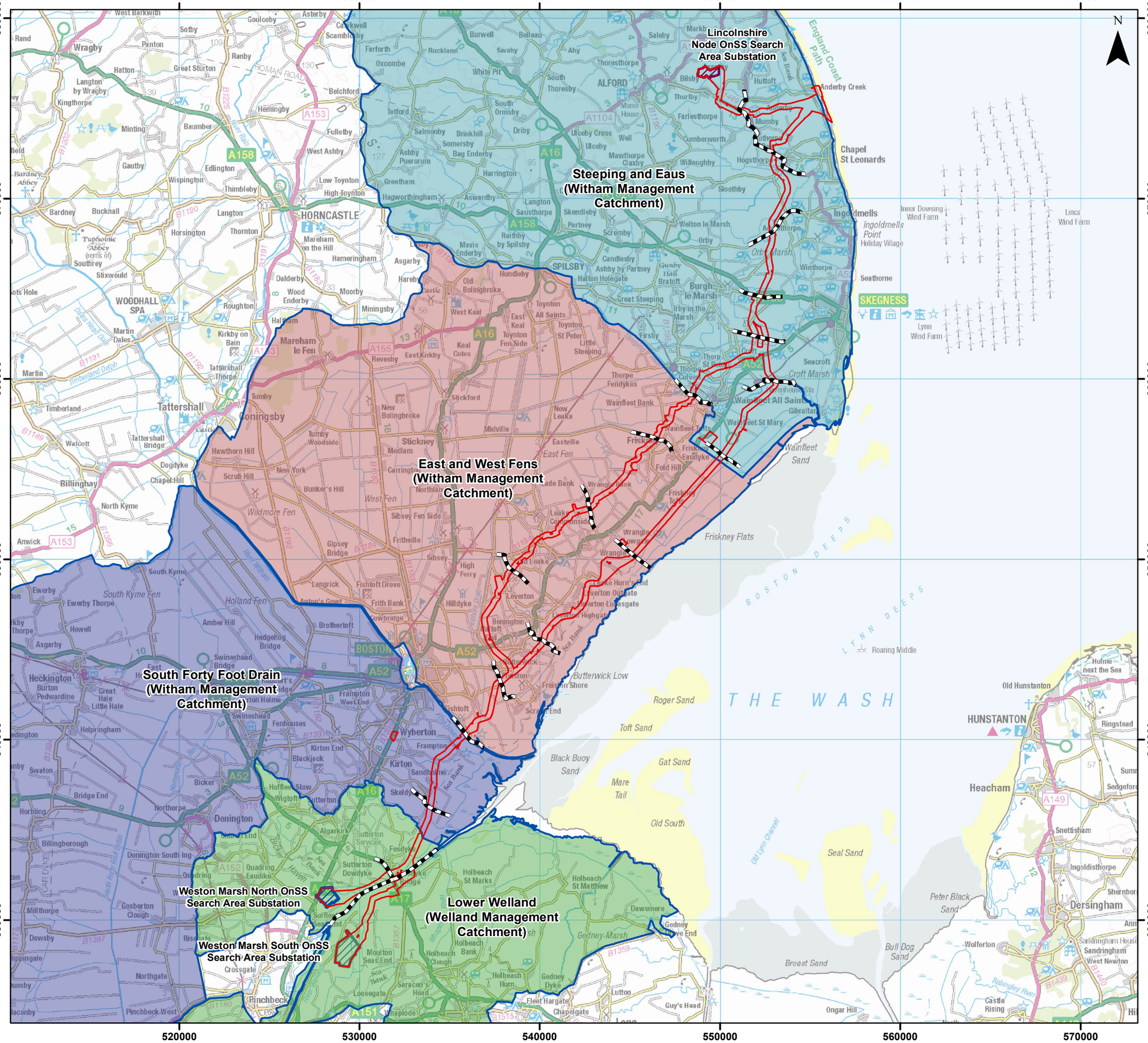

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Lincolnshire Node OnSS Search
- Weston Marsh North OnSS Search
- Weston Marsh South OnSS Search

Surface Water Operational Catchments

- East and West Fens
- Lower Welland
- South Forty Foot Drain
- Steeping and Eaus

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0 5 10 km

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Surface Water Operational Catchments

Figure 24.4

OUTER DOWSING OFFSHORE WIND

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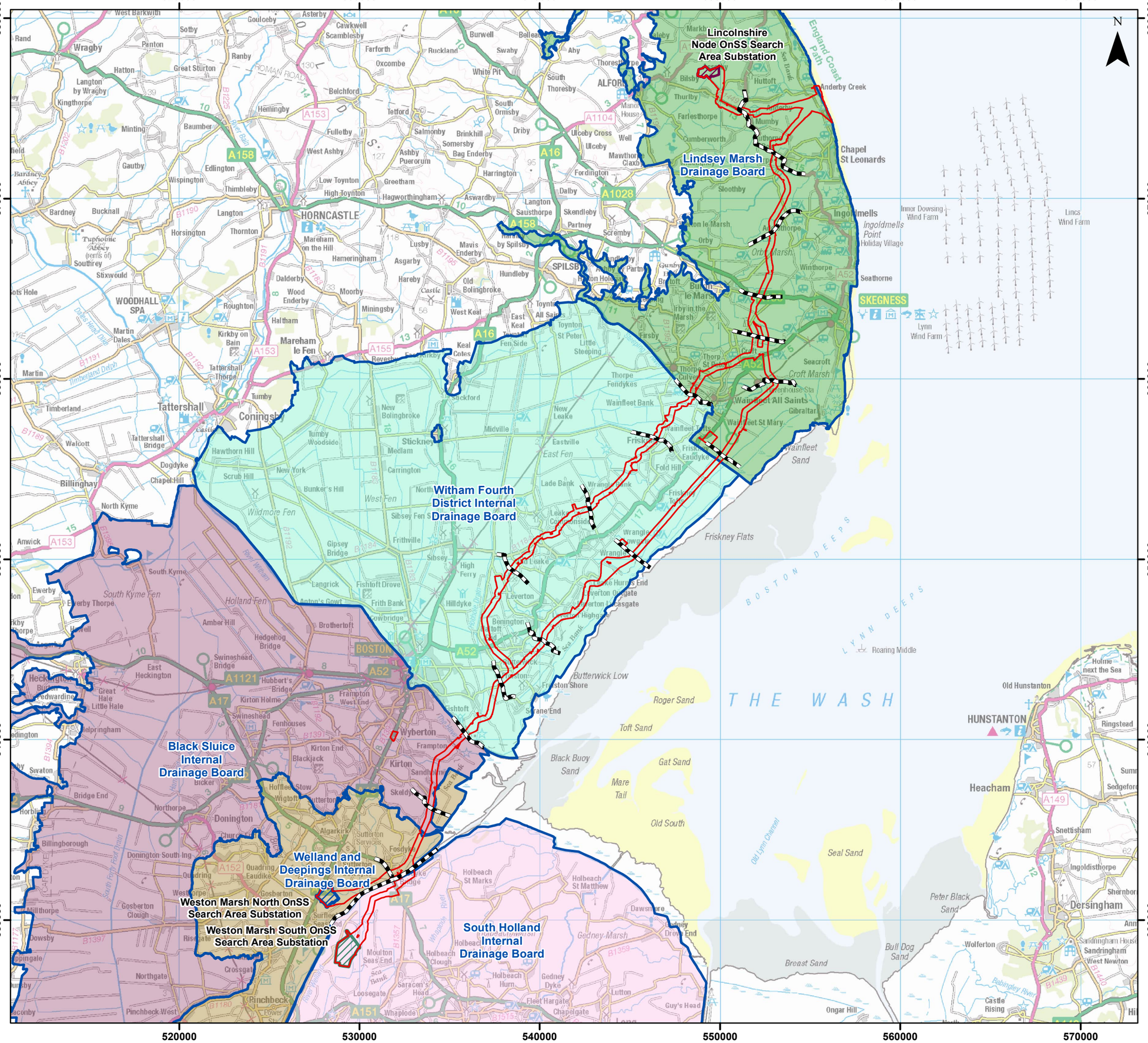

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Lincolnshire Node OnSS Search Area
- Weston Marsh North OnSS Search Area
- Weston Marsh South OnSS Search Area

Internal Drainage Board Administrative Boundary

- Black Sluice Internal Drainage Board
- Lindsey Marsh Drainage Board
- South Holland Internal Drainage Board
- Welland and Deepings Internal Drainage Board
- Witham Fourth District Internal Drainage Board

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Coordinate System: British National Grid

0 5 10 km

Scale: 1:200,000

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Internal Drainage Board Districts

Figure 24.5

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Hydrological Setting

24.4.3 The landfall site is located at Wolla Bank Beach, on the coastline between Anderby Creek and Chapel St Leonards. The North Sea extends eastwards from the coast.

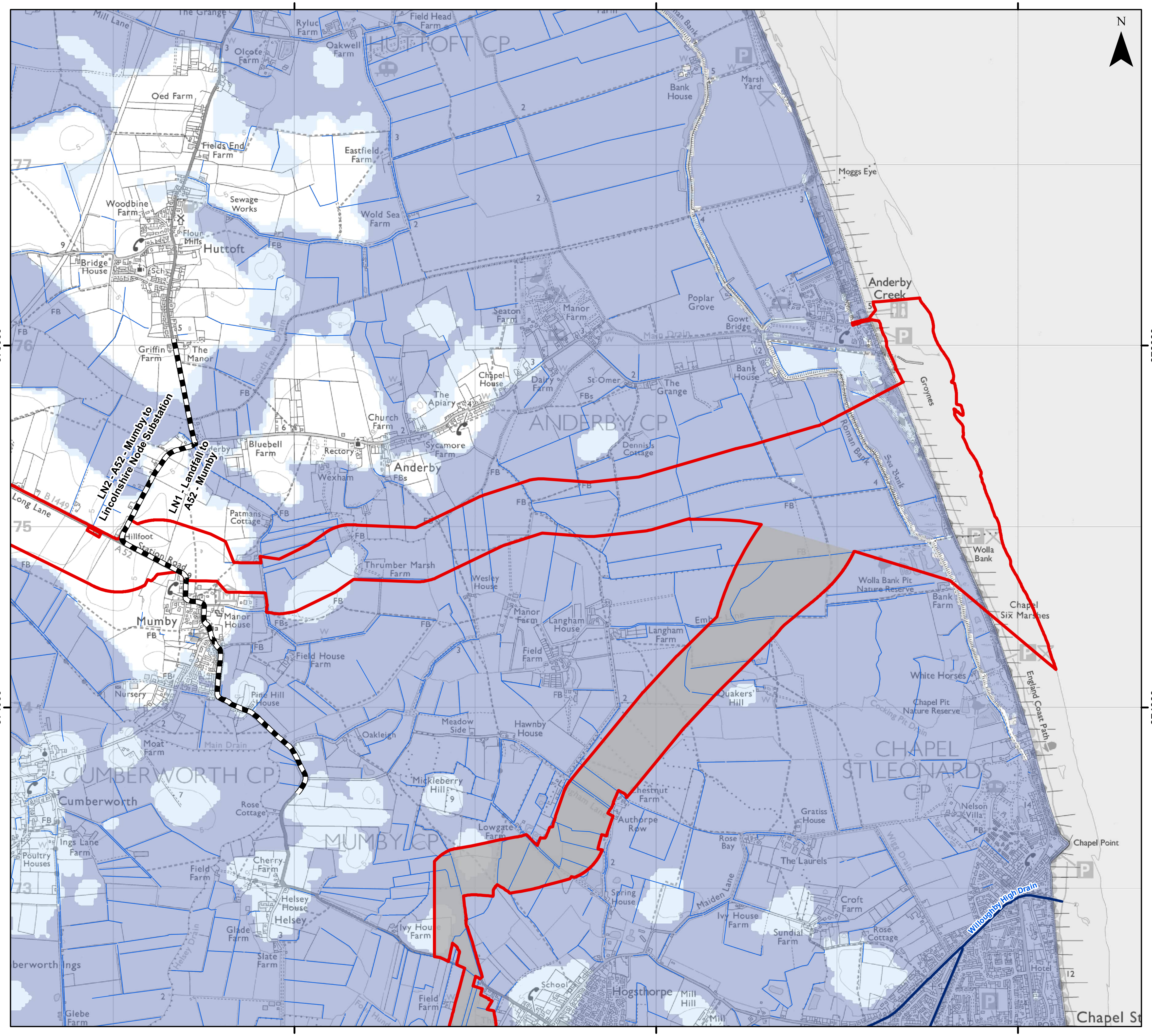
24.4.4 The Landfall to A52 – Mumby segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, the segment is drained by Anderby Main Drain (ordinary watercourse), which has an entire catchment area of 35.3 km^2.

24.4.5 The drainage board within this segment is Lindsey Marsh IDB (LMIDB), who are responsible for the management and maintenance of drainage within their area. There are several LMDB maintained watercourses within this segment. Anderby pumping station is located approximately 550m to the north of the onshore ECC in this segment.

24.4.6 The significant watercourses within this segment are shown in Figure 24.6.

Watercourse sensitivity

24.4.7 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:20,000

Preliminary Environmental Information Report

LN1 - Watercourses and Flood Zones

Figure 24.6

OUTER DOWSING OFFSHORE WIND

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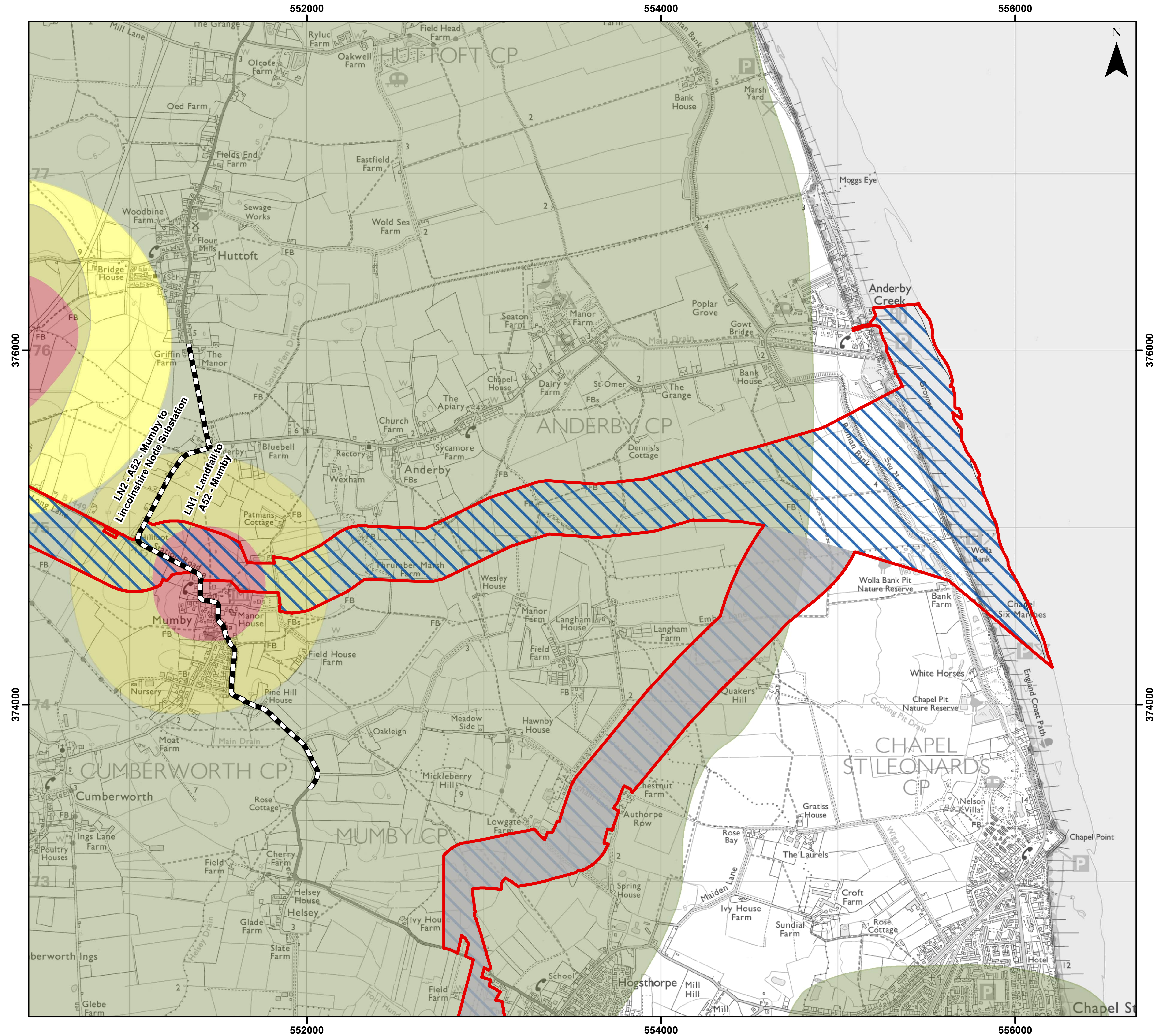

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Principal Aquifer

Source Protection Zone

- 1
- 1c
- 2
- 2c
- 3

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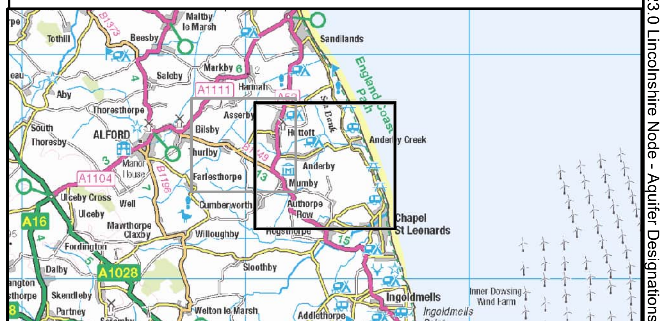
Bedrock Aquifer Designation data sourced from Environment Agency and British Geological Survey



Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:20,000

Preliminary Environmental Information Report

LN1 - Aquifer Designations and Source Protection Zones

Figure 24.7

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.8 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.9 Groundwater beneath the segment is present within the Principal bedrock aquifers of the Burnham Chalk Formation and Welton Chalk Formation. Inland superficial deposits underlying the segment comprise mainly of Tidal Flat Deposits, with some areas of Till and Glaciofluvial Deposits. These deposits are classified as an Unproductive aquifer.

24.4.10 The majority of the segment lies within an area designated as a Zone 3 of groundwater Source Protection Zone (SPZ), with the far western part of the segment lying within Zone 1 and Zone 2. The landfall site does not lie within a SPZ.

24.4.11 The aquifer designations and SPZs for this segment are shown within Figure 24.7.

Groundwater Sensitivity

24.4.12 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.13 Fluvial and tidal flood risk mapping shows the majority of the segment lies within Flood Zone 3. A small area to the west of this segment, between Thrumber Marsh Lane and Station Road (A52) lies within Flood Zone 1. Flood defences are located along the coastline at Wolla Bank Beach in the form of dunes, with an effective crest level of 8.32m Above Ordnance Datum (AOD). The design standard of protection of these defences are considered to be 1 in 200-year.

24.4.14 Surface water flood risk mapping produced by the EA[1] indicates areas in the segment at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical low points which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.15 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.16 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.17 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.18 Under the Water Framework Directive (WFD), monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.19 The water body catchment in this segment is:

- Anderby Main Drain – moderate ecological status and fail chemical status.

Coastal/ Transitional Water Quality

24.4.20 The coastal waters are monitored as the Lincolnshire coastal waterbody which has moderate ecological status and fail for chemical status.

Bathing Water Quality

24.4.21 The Environment Agency is responsible for monitoring bathing waters in England. Monitoring locations in close proximity to the study area include:

- Moggs Eye (north of Anderby Creek),
- Anderby (at Anderby Creek), and
- Chapel St Leonards (south of Anderby Creek)

24.4.22 The classification of the identified Bathing Waters, for each year, reported between 2017 and 2021 (no classification for 2020 due to lack of data sampling), are Excellent.

Groundwater Quality

24.4.23 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.24 There is a single groundwater catchment assessed as part of the RBMP which is within this segment of the ECC. This is the Steeping Long Eau Little Eau Chalk Unit water body associated with bedrock geology beneath the study area. The water body has poor overall status with good quantitative status and poor chemical status.

Pollution Events

24.4.25 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment are minor and are listed below:

- A 'minor' incident recorded on 3rd October 1996 in Manby District where oil pollutants entered the North Sea; and
- A 'minor' incident recorded on 27th July 1997 in Manby District where mechanical failure of a pumping station led to sewage entering an unnamed ditch.

Discharge Consents

24.4.26 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.2 below.

Table 24.2 LN1 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Mr B & Mrs A Brenchley	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr & Mrs G Jennings (Fieldway)	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Anderby Main Drain
Mr E & Mrs V Matthews	Not Supplied	Unknown	Land
Mr I Harwood	Not Supplied	Unknown	Land
Mr I Harwood	Not Supplied	Unknown	Land
Mr I Harwood	Not Supplied	Unknown	Land
Mr.H. & Mrs. M.S. Owen	Not Supplied	Unknown	Land
Anglian Water Services Limited	Not Given	Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company	Unknown Tributary
Mr & Mrs B Payne	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
A Dales & Sons	Not Supplied	Unknown	Land
Anglian Water Services Limited	Not Supplied	Storm /emergency overflow	Unnamed Drain Anderby Main Drain
George Alan Chapman	Not Supplied	Unknown	Not Supplied
P. E. Lucas Esq.,	Not Supplied	Unknown	Land
R J Martin (Builder)	Not Supplied	Unknown	Land
R J Martin (Builder)	Not Supplied	Unknown	Land
R. J. Martin Esq.,	Not Supplied	Unknown	Land
C W Malbon	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr B & Mrs A Brenchley	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr.J. Martin	Not Supplied	Unknown	Land
Anglian Water Services Limited	Not Given	Sewage Discharges - Pumping Station - Water Company	Cocking Pit Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
R H Mowbray Ltd	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Longham House Farm	Not Supplied	Agricultural effluents	Langham Broad Drain
Mr G & Mrs G M Willoughby	Not Supplied	Unknown	Land
Mr I Harwood	Not Supplied	Unknown	Land
R. J. Martin Esq.,	Not Supplied	Unknown	Land
Anglian Water Services Limited	Not Supplied	Storm /emergency overflow	Cocking Pit Drain to Willoughby
R. J. Martin Esq.,	Not Supplied	Unknown	Land
Mr Graham A Dixon	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Stream
Mr Paul Oxford	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Drain Within Linsday Marsh IDB
Anglian Water Services Limited	Not Supplied	Storm /emergency overflow	Unnamed Dyke Anderby Main Drain
Mrs Jill Hardy	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Fen Drain
R. J. Martin Esq.,	Not Supplied	Unknown	Land
Mr G Howard	Not Supplied	Unknown	Land
Mrs Nicola Houltby	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Groundwater via Soakaway
Mr.M.Sharp	Not Supplied	Unknown	Land
Anglian Water Services Limited	Not Supplied	Sewage Discharges - Pumping Station - Water Company	Unnamed Tributary Anderby Main
Mr R & Mrs D A Burge	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unamed Fen Drain
Mr Stan Filipiak	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Drain Within Lindsey Marsh IDB
Mr G.C.Roberts	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Stream
Anglian Water Services Limited	Not Supplied	Sewage Discharges - Pumping Station - Water Company	Unnamed Tributary Anderby Main
Anglian Water Services Limited	Boy Grift Drain (Alford)	Sewage Discharges - Final/Treated Effluent	Anderby Main Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
		- Water Company	
The Occupier	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary
The Occupier	Not Supplied	Unknown	Land
Messrs J Hill & Sons	Not Supplied	Agricultural effluents	Unknown Tributary
Mr R & Mrs D A Burge	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Not Supplied
R J Martin (Builder)	Not Supplied	Unknown	Land
Anglian Water Services Limited	Anderby Main/Willoughby	Sewage Discharges - Pumping Station - Water Company	Cocking Pit Drain
Anglian Water Services Limited	Boy Grift Drain (Alford)	Sewage Discharges - Final/Treated Effluent - Water Company	Anderby Main Drain
Anglian Water Services Limited	Boy Grift Drain (Alford)	Sewage Discharges - Pumping Station - Water Company	Unnamed Tributary Anderby Main
Mr Derek Brown	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Ground Water Via Infiltration
Anglian Water Services Limited	Boy Grift Drain (Alford)	Sewage Discharges - Final/Treated Effluent - Water Company	Anderby Main Drain
Mr & Mrs Payne	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
R H Mowbray Ltd	Not Supplied	Trade Effluent	Tributary River Till
Mrs Nicola Houltby	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Groundwater via Soakaway
Mr I Harwood	Not Supplied	Unknown	Land
Mr B Ayris	Not Supplied	Unknown	Land
Mr Richard W.B Houltby	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Groundwater Via Soakaway
Anglian Water Services Limited	Anderby Main/Willoughby	Sewage Discharges - Pumping Station - Water Company	Unnamed Tributary Anderby Main
Mrs C J Jenkins	Not Supplied	Unknown	Into Land
Mr I Harwood	Not Supplied	Unknown	Land
Mr & Mrs W H Harris	Boy Grift Drain (Alford)	Sewage Discharges - Final/Treated Effluent - Not Water Company	South Fen Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
Mr G C Roberts	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Anderby Main Drain
Mr Richard W.B Houltby	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Groundwater Via Soakaway
C W Malbon	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land

Abstractions

24.4.27 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.28 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.29 There are several declared ecological designations located within 2km of the segment. These consist of the following statutory designations:

- Greater Wash – Special Protection Area (SPA)
- Sea Bank Clay Pits – Sites of Special Scientific Interest (SSSI)
- Chapel Point to Wolla Bank – SSSI
- Anderby Marsh – Local Wildlife Site
- Wolla Bank Reedbed – Local Wildlife Site
- Wolla Bank Pit – Local Wildlife Site
- Anderby Creek Sand Dunes – Local Wildlife Site
- Wolla Bank South – Local Wildlife Site
- Chapel Six Marshes – Local Wildlife Site
- Chapel Point Dunes North – Local Wildlife Site

LN2 – A52 – Mumby to Lincolnshire Node

Hydrological Setting

24.4.30 A52 – Mumby to Lincolnshire Node segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, the majority of the segment is drained by Anderby Main Drain (ordinary watercourse), which has an entire catchment area of 35.3 km^2. The far north-western area at Lincolnshire Node Substation Search Area is drained by Boygrift Drain (ordinary watercourse), which has an entire catchment area of 23.8 km^2.

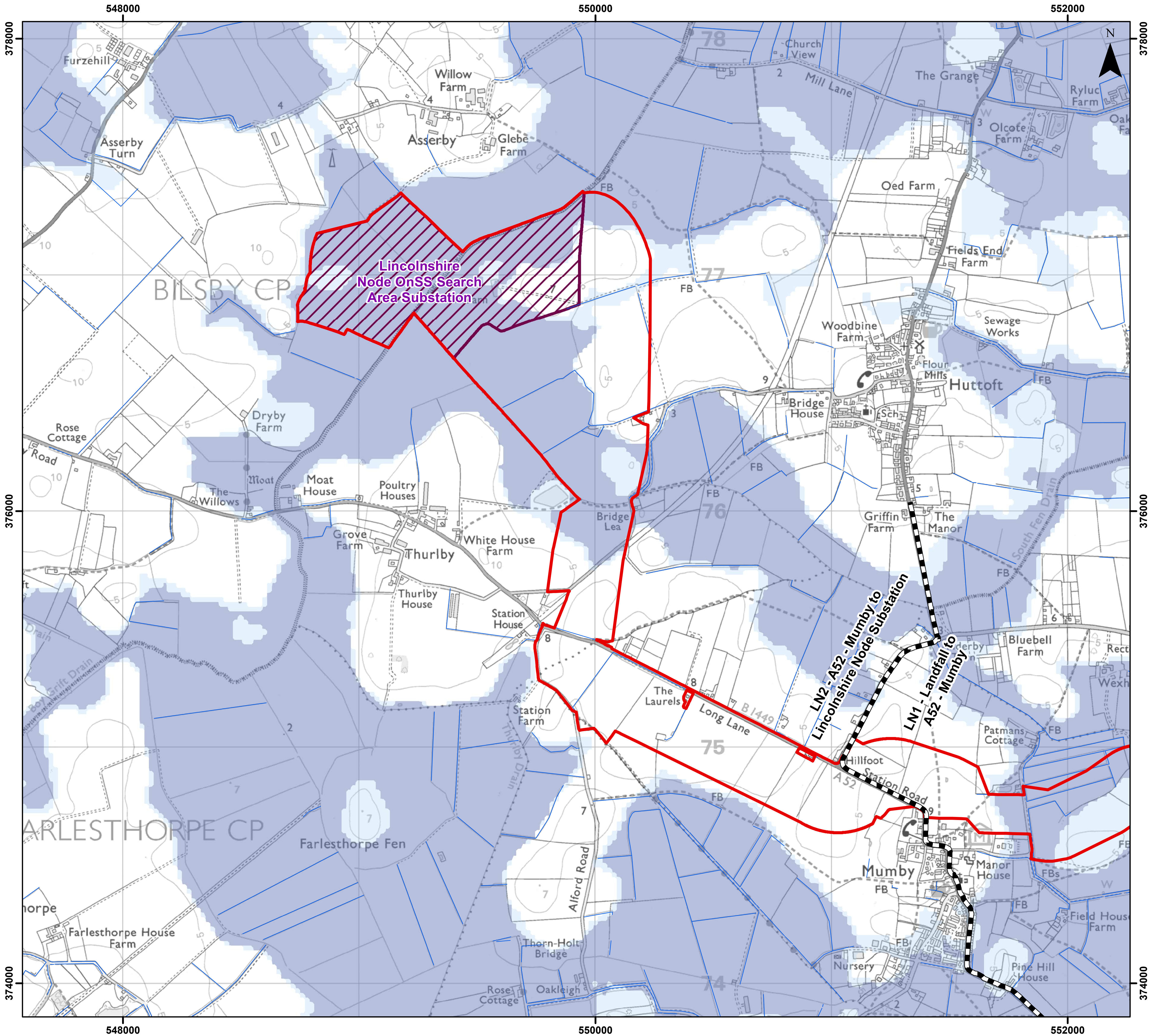
24.4.31 Other watercourses within this area include South Fen Drain, which drains towards Anderby Main Drain.

24.4.32 The drainage board within this segment is LMDB, who are responsible for the management and maintenance of drainage within their area. There are several LMDB maintained watercourses within this segment.

24.4.33 The significant watercourses within this segment are shown in Figure 24.8.

Watercourse sensitivity

24.4.34 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



548000
550000
552000
378000
376000
374000
Lincolnshire Node OnSS Search Area Substation
BILSBY CP
ARLESTHORPE CP
Furzehill
Willow Farm
Asserby
Asserby Turn
Glebe Farm
Church View
Mill Lane
The Grange
Ryluc Farm
Olcote Farm
Oed Farm
Fields End Farm
Woodbine Farm
Sewage Works
Flour Mills
Huttoft
Bridge House
Dryby Farm
Rose Cottage
Road
Moat House
Poultry Houses
The Willows
Moat
Grove Farm
Thurlby
White House Farm
Thurlby House
Station House
Bridge Lea
Griffin Farm
The Manor
South Fen Drain
Bluebell Farm
The Laurels
Long Lane
B 1449
LN2 - A52 - Mumby to Lincolnshire Node Substation
LN1 - Landfall to A52 - Mumby
Hillfoot
Station Road
A52
Patmans Cottage
Station Farm
Thurlby Drain
Farlesthorpe Fen
Alford Road
Mumby
Manor House
Field House Farm
Farlesthorpe House Farm
Thorn-Holt Bridge
Rose Cottage
Oakleigh
Nursery
Pine Hill House
FB

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Lincolnshire Node OnSS Search
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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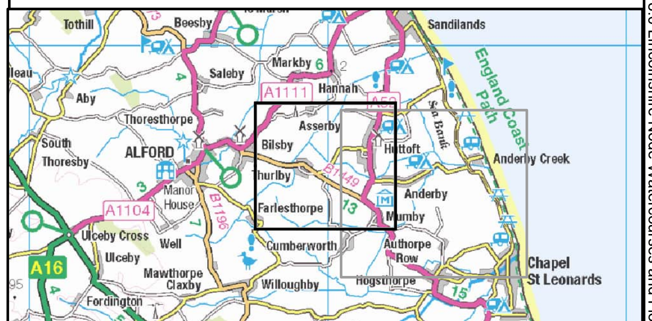

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

LN2 - Watercourses and Flood Zones

Figure 24.8

OUTER DOWSING OFFSHORE WIND

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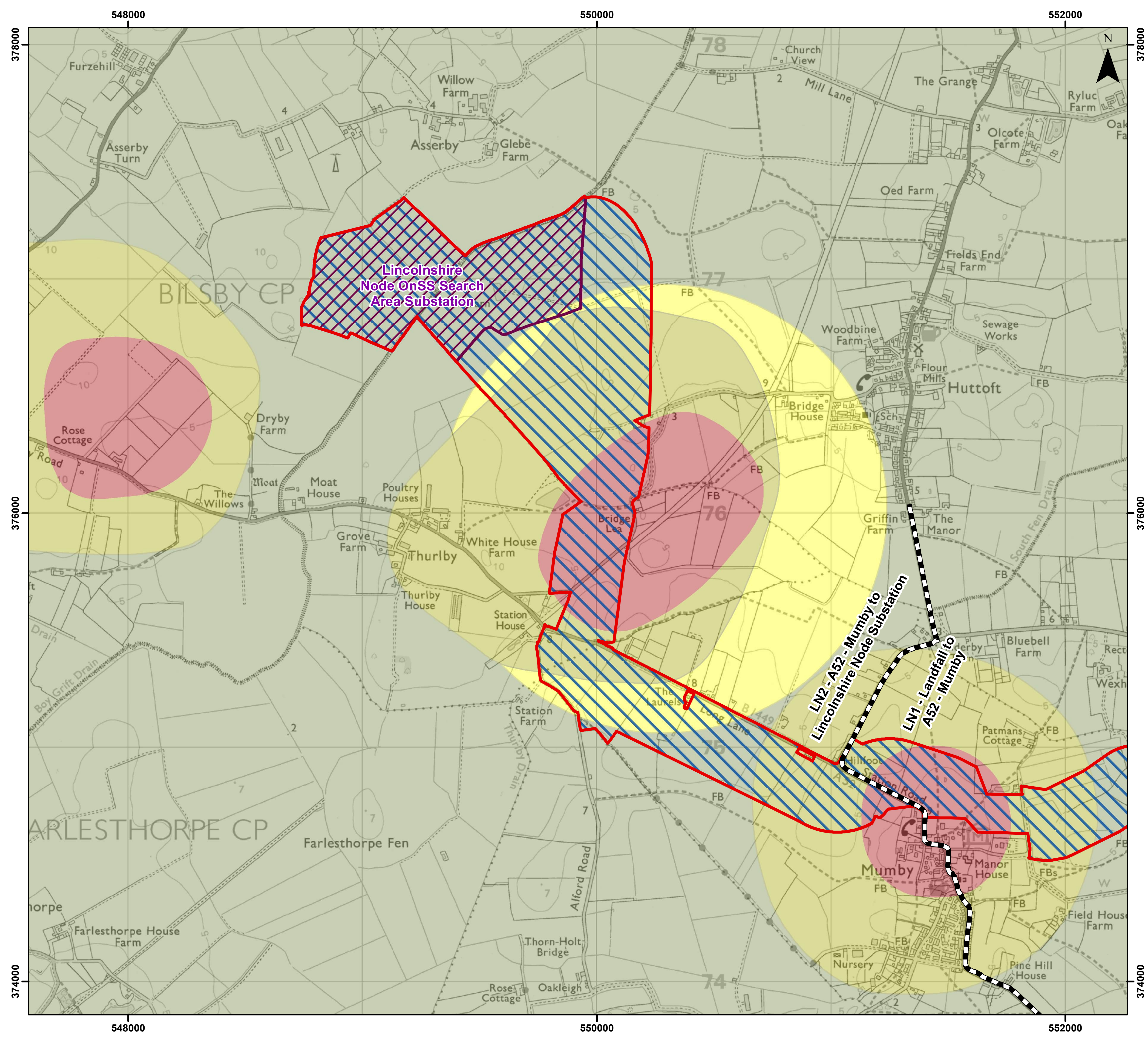

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Lincolnshire Node OnSS Search Area

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Principal Aquifer

Source Protection Zone

- 1
- 1c
- 2
- 2c
- 3

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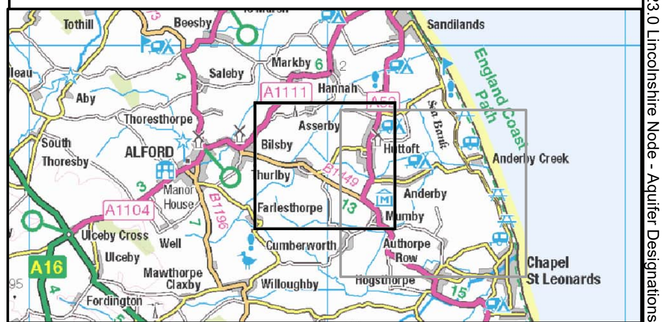
Bedrock Aquifer Designation data sourced from Environment Agency and British Geological Survey



Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

LN2 - Aquifer Designations and Source Protection Zones

Figure 24.9

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.35 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.36 Groundwater beneath the segment is present within the Principal bedrock aquifer of the Welton Chalk Formation. Inland superficial deposits underlying the segment comprises of Tidal Flat Deposits, Till and Glaciofluvial Deposits. These deposits are classified as Secondary A and Secondary B aquifers, with some areas of Unproductive aquifers at the Lincolnshire Node Substation Search Area.

24.4.37 The segment lies within areas designated as Zone 1, Zone 2 and Zone 3 of groundwater Source Protection Zones.

24.4.38 The aquifer designations and SPZs for this segment are shown within Figure 24.9.

Groundwater Sensitivity

24.4.39 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.40 Fluvial and tidal flood risk mapping shows the area between Station Road (A52) to Huttoft Road lies within Flood Zone 1. The majority of the area from Huttoft Road to the Lincolnshire Node Substation Search Area lies within Flood Zone 3, with some limited areas of Flood Zone 1 to the east of the segment. There are no formal flood defences within this segment.

24.4.41 Surface water flood risk mapping produced by the EA[1] indicates areas in the segment at potential risk of inundation from extreme rainfall. The majority of these areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes. A potential overland flow path route is present within the northwestern part of the Lincolnshire Node Substation Search Area, linked to low ground to the north of Boy Grift Drain.

24.4.42 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.43 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.44 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.45 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.46 The water body catchments in this segment are:

- Anderby Main Drain – moderate ecological status and fail chemical status
- Boygrift Drain – moderate ecological status and fail chemical status

Groundwater Quality

24.4.47 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.48 There is a single groundwater catchment assessed as part of the RBMP which is within this section of the ECC. This is the Steeping Long Eau Little Eau Chalk Unit water body associated with bedrock geology beneath the study area. The water body has poor overall status with good quantitative status and poor chemical status.

Pollution events

24.4.49 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment are minor and are listed below:

- A 'minor' incident recorded on 15th July 1994 in Manby District where a wrong connection led to sewage entering an unnamed IDB drain;
- A 'minor' incident recorded on 13th April 1994 in Manby District where ineffective pumping led to sewage entering an unnamed ditch; and
- A 'minor' incident recorded on 19th February 1996 in Manby District where inadequate construction led to septic tank effluent entering an unnamed stream.

Discharge Consents

24.4.50 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.3 below.

Table 24.3: LN2 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Mr & Mrs Morris	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into Land
Mr A C Barns	Not Supplied	Unknown	Into Land
Mr K Sawford	Not Supplied	Unknown	Land
Mr. J.S. Millson	Not Supplied	Unknown	Land
East Lindsay D.C.	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Drain
George Alan Chapman	Not Supplied	Unknown	Not Supplied
Mr P Hunt	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Willoughby High Drain
P. E. Lucas Esq.,	Not Supplied	Unknown	Land
R J Martin (Builder)	Not Supplied	Unknown	Land
R J Martin (Builder)	Not Supplied	Unknown	Land
R. J. Martin Esq.,	Not Supplied	Unknown	Land
Royale Homes	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mrs Jane Douglas	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Groundwater
Christopher Barlow	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Willoughby High Drain
Ms J L Miller	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr Roland Gibb & Mrs Karen Gibb	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Ground Water via Infiltration
Anglian Water Services Limited	Not Given	Storm /emergency overflow	Unnamed Dyke Boygrift Drain
R. J. Martin Esq.,	Not Supplied	Unknown	Land
Mr. C.F. Snell	Not Supplied	Unknown	Land
R. J. Martin Esq.,	Not Supplied	Unknown	Land
G S Dennett (Holdings) Ltd	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
R Hutson	Not Supplied	Unknown	Into Land
Mr P Hunt	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Willoughby High Drain
Orchard Leaze Holiday Park Ltd	Not Supplied	Sewage Discharges - Final/Treated Effluent -	Unnamed Watercourse

Permit Holder	Catchment	Discharge Type	Receiving Water
		Not Water Company	
Mr Christpher Young	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Gw
Mr & Mrs A J Peach	Waithe Beck / Louth Canal	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr John Maplethorpe	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Wold Grift Drain
Mr & Mrs A J Peach	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
R. J. Martin Esq.,	Not Supplied	Unknown	Land
Mr E Cooper	Not Supplied	Unknown	Land
Mr R Wilson	Not Supplied	Unknown	Into Land
P. Windley Esq.,	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
L J Fairburn & Son Ltd	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Ancroft Fen Drain
Ms J L Miller	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Peter Callaghan	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Wold Grift Drain
Anglian Water Services Limited	Boy Grift Drain (Alford)	Sewage Discharges - Pumping Station - Water Company	Unknown Tributary
Mr & Mrs Morris	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into Land
Mr Graham Marsh	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Groundwater
L J Fairburn & Son Ltd	Not Supplied	Unknown	Land
Mr & Mrs R S J Saunders	Not Supplied	Unknown	Land
R J Martin (Builder)	Not Supplied	Unknown	Land
Mrs Pamela Beckham	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Groundwater
The Occupier	Not Supplied	Agricultural effluents	Not Supplied
Mr & Mrs W H Harris	Boy Grift Drain (Alford)	Sewage Discharges - Final/Treated Effluent - Not Water Company	South Fen Drain

Abstractions

24.4.51 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.52 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.53 There is one ecological designation located within 2km of the segment. This consists of the following statutory designation:

- Spendluffe Meadows – Local Wildlife Site

M1 – Landfall to A52 – Hogsthorpe

Hydrological Setting

24.4.54 The landfall site is located at Wolla Bank Beach, on the coastline between Anderby Creek and Chapel St Leonards. The North Sea extends eastwards from the coast.

24.4.55 The Landfall to A52 – Hogsthorpe segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, the majority of the segment is drained by Willoughby High Drain (Main River) which has an entire catchment area of 65.2 km^2. The landfall area is drained by Anderby Main Drain (ordinary watercourse), which has an entire catchment area of 35.3 km^2.

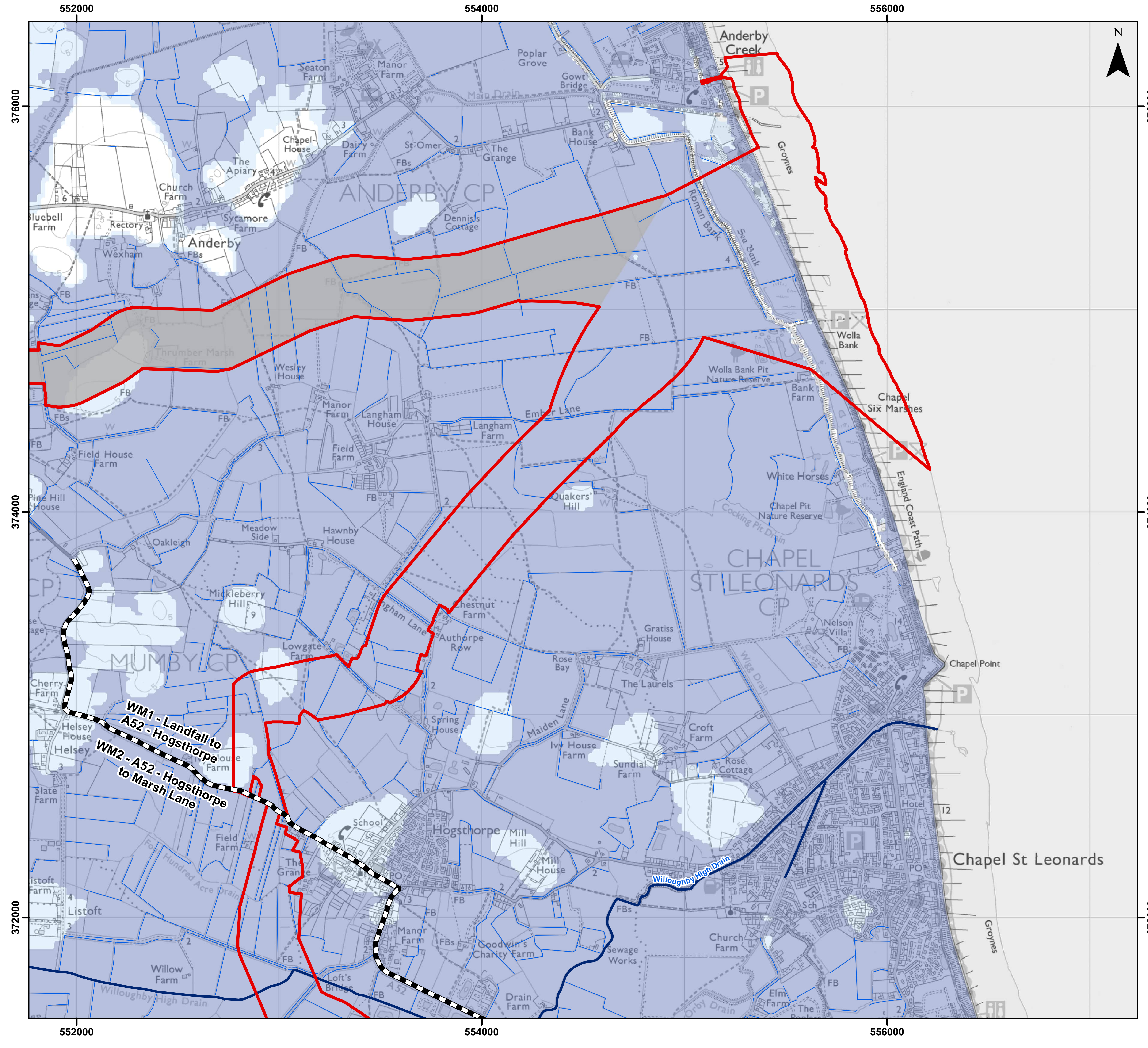
24.4.56 Other ordinary watercourses in this segment include Wigg Drain and Four Hundred Acre Drain which drain into the Willoughby High Drain.

24.4.57 The drainage board within this segment is LMDB, who are responsible for the management and maintenance of drainage within their area, including Wigg Drain. There are several LMDB maintained watercourses within this segment. Anderby pumping station is located approximately 500m to the north of the onshore ECC in this segment.

24.4.58 The significant watercourses within this segment are shown in Figure 24.10.

Watercourse sensitivity

24.4.59 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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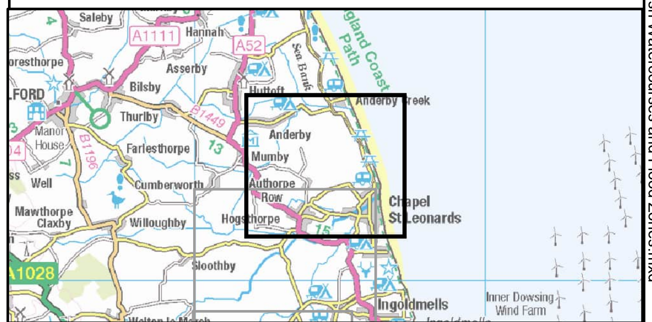

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:17,500

Preliminary Environmental Information Report

WM1 - Watercourses and Flood Zones

Figure 24.10

OUTER DOWSING OFFSHORE WIND

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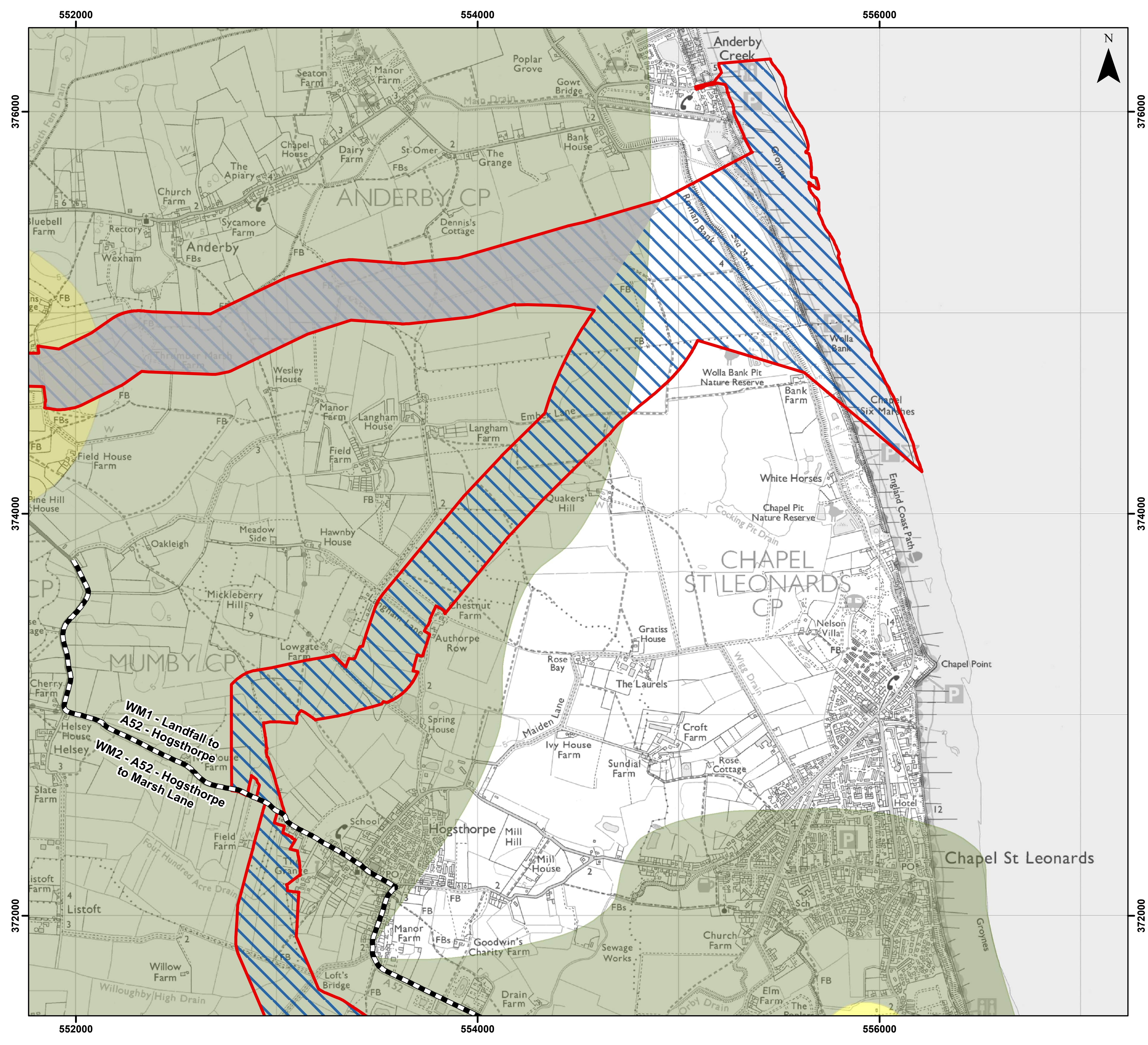

552000
554000
556000
376000
374000
372000
N
Anderby Creek
Seaton Farm
Manor Farm
Poplar Grove
Gowt Bridge
Main Drain
Chapel House
Dairy Farm
St Omer
The Grange
Bank House
The Apiary
Church Farm
ANDERBY CP
Dennis's Cottage
Bluebell Farm
Rectory
Sycamore Farm
Anderby
Wexham
Groynes
Roman Bank
Sea Bank
Wolla Bank
Wolla Bank Pit Nature Reserve
Bank Farm
Chapel Six Marshes
Thrumber Marsh Farm
Wesley House
Manor Farm
Langham House
Langham Farm
Ember Lane
Field Farm
Field House Farm
Pine Hill House
White Horses
Chapel Pit Nature Reserve
Cocking Pit Drain
England Coast Path
Quakers' Hill
Meadow Side
Hawnby House
Oakleigh
CHAPEL ST LEONARDS CP
Mickleberry Hill
Chestnut Farm
Authorpe Row
Gratiss House
Nelson Villa
Lowgate Farm
MUMBY CP
Rose Bay
The Laurels
Wigg Drain
Chapel Point
Cherry Farm
Spring House
Maiden Lane
Croft Farm
WM1 - Landfall to A52 - Hogsthorpe
WM2 - A52 - Hogsthorpe to Marsh Lane
Helsey House
Helsey
Ivy House Farm
Sundial Farm
Rose Cottage
Slate Farm
Hotel
School
Hogsthorpe
Mill Hill
Field Farm
Four Hundred Acre Drain
The Grange
Mill House
Chapel St Leonards
Listoft Farm
Listoft
Manor Farm
Goodwin's Charity Farm
Sewage Works
Church Farm
Willow Farm
Loft's Bridge
Willoughby High Drain
Drain Farm
Elm Farm
Orby Drain
Groynes

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Principal Aquifer

Source Protection Zone

- 1
- 2
- 2c
- 3

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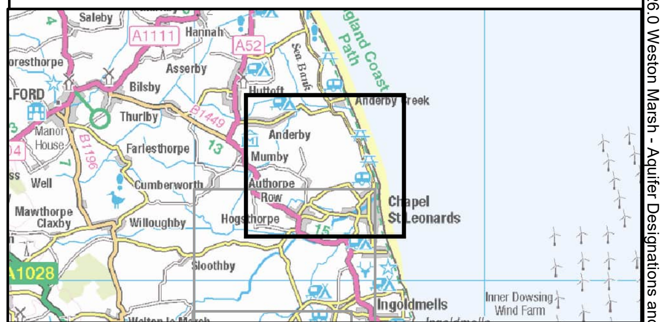

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:17,500

Preliminary Environmental Information Report

WM1 - Aquifer Designations and Source Protection Zones

Figure 24.11

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.60 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.61 Groundwater beneath the segment is present within the Principal bedrock aquifers of the Burnham Chalk Formation and Welton Chalk Formation. Inland superficial deposits underlying the segment comprise mainly of Tidal Flat Deposits and Till. The majority of these deposits in the segment are classified as an Unproductive aquifer, with some small areas of Secondary (Undifferentiated) aquifer.

24.4.62 The majority of the segment lies within an area designated as a Zone 3 of groundwater Source Protection Zone (SPZ). The landfall site and a small area of the segment to the east does not lie within a SPZ.

24.4.63 The aquifer designations and SPZs for this segment are shown within Figure 24.11

Groundwater Sensitivity

24.4.64 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.65 Fluvial and tidal flood risk mapping shows the majority of the segment lies within Flood Zone 3. Some small, isolated areas of slightly higher ground along the segment lie within Flood Zone 2. Flood defences are located along the coastline at Wolla Bank Beach in the form of dunes, with an effective crest level of 8.32m AOD. The design standard of protection of these defences are considered to be 1 in 200-year.

24.4.66 Surface water flood risk mapping produced by the Environment Agency[1] indicates areas in the segment at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.67 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the topographic slope into open drainage ditches/ streams or the main watercourse network.

24.4.68 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.69 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.70 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.71 The water body catchments in this segment are:

- Anderby Main Drain – moderate ecological status and fail chemical status
- Willoughby High Drain – moderate ecological status and fail chemical status

24.4.72 The bathing water quality at Anderby Creek has been classified as excellent in 2021 under the European Bathing Water Directive.

Coastal/ Transitional Water Quality

24.4.73 The coastal waters are monitored as part of the Lincolnshire Coastal Waterbody which has moderate ecological status and failing chemical status.

Bathing Water Quality

24.4.74 The Environment Agency is responsible for monitoring bathing waters in England. Monitoring locations in close proximity to the study area include:

- Moggs Eye (north of Anderby Creek),
- Anderby (at Anderby Creek), and
- Chapel St Leonards (south of Anderby Creek)

24.4.75 The classification of the identified Bathing Waters, for each year, reported between 2017 and 2021 (no classification for 2020 due to lack of data sampling), are Excellent.

Groundwater Quality

24.4.76 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.77 There is a single groundwater catchment assessed as part of the RBMP which is within this segment of the ECC. This is the Steeping Long Eau Little Eau Chalk Unit water body associated with bedrock geology beneath the study area. The water body has poor overall status with good quantitative status and poor chemical status.

Pollution events

24.4.78 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment are minor and are listed below:

- A 'minor' incident recorded on 11th July 1993 in Manby District where an unknown cause led to an unknown pollutant entering a surface water sewer;
- A 'minor' incident recorded on 8th December 1993 in Manby District where an unknown cause led to oils entering Willoughby High Drain;
- A 'significant' incident recorded on 8th October 1992 in Manby District where an unknown cause led to an unknown pollutant entering Willoughby High Drain;
- A 'minor' incident recorded on 19th April 1995 in Manby District where an unknown cause led to organic wastes entering Willoughby High Drain;
- A 'minor' incident on 19th APRIL 1994 in Manby District where an unknown cause led to oils entering Orby Drain;
- A 'minor' incident on 8th August 1992 in Manby District where an unknown cause led to unknown pollutants entering Willoughby High Drain;
- A 'minor' incident on 2nd January 1996 in Manby District where an unknown cause led to oils entering the North Sea;
- A 'minor' incident on 23rd February 1997 in Hogsthorpe where an accidental spillage led to oils entering an unknown receiving water;
- A 'minor' incident on 7th July 1998 in Manby District where a wrong connection led to sewage entering a freshwater stream;
- A 'minor' incident on 4th January 1997 in Chapel St Leonards where an accidental spillage led to oils entering Willoughby High Drain;
- A 'minor' incident on 27th July 1997 in Manby District where a mechanical failure led to sewage entering an unnamed ditch;
- A 'minor' incident on 4th January 1997 in Manby District where an accidental spillage led to oils entering Willoughby High Drain; and
- A 'significant' incident on 26th November 1993 in Manby District where poor/inadequate maintenance led to oils entering Orby Drain.

Discharge Consents

Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.4 below.

Table 24.4: WM1 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Anglian Water Services Limited	Not Given	Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company	Willoughby High Drain
Anglian Water Services Limited	Not Supplied	Sewage Discharges - Pumping Station - Water Company	Willoughby High Drain
Golden Sands Estates Limited	Not Supplied	Unknown	Land
Anglian Water Services Limited	Anderby Main/Willoughby	Sewage Discharges - Pumping Station - Water Company	Willoughby High Drain
Anglian Water Services Limited	Not Supplied	Public Sewage: Storm Sewage Overflow	Willoughby High Drain
Anglian Water Services Limited	Not Given	Sewage Discharges - Pumping Station - Water Company	Cocking Pit Drain
Alford Drainage Board	Not Supplied	Discharge Of Other Matter-Surface Water	Orby Drain
Longham House Farm	Not Supplied	Agricultural effluents	Langham Broad Drain
Mr Chris Clarke	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Wiggs Drain
Anglian Water Services Limited	Not Supplied	Storm /emergency overflow	Cocking Pit Drain to Willoughby
S. Jackson & Sons	Not Supplied	Discharge Of Other Matter-Surface Water	The Orby Drain
Mr & Mrs Thorp	Not Supplied	Unknown	Land
Mr G R Fish	Not Supplied	Unknown	Land
Anglian Water Services Limited	Not Supplied	Storm /emergency overflow	Willoughby High Drain
Mr.M.Sharp	Not Supplied	Unknown	Land
S. Jackson & Sons	Not Supplied	Discharge Of Other Matter-Surface Water	The Willoughby High Drain
Anglian Water Services Limited	Not Given	Public Sewage: Storm Sewage Overflow	Willoughby High Drain
D J Pridgeon	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Messrs J Hill & Sons	Not Supplied	Agricultural effluents	Unknown Tributary
A Miller Esq.	Not Supplied	Unknown	Land
Anglian Water Services Limited	Anderby Main/Willoughby	Sewage Discharges - Pumping Station - Water Company	Cocking Pit Drain
D J Pridgeon	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
D J Pridgeon	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr & Mrs P H Jackson	Not Supplied	Unknown	Into Land
Mr B Ayris	Not Supplied	Unknown	Land
J H Traves and Son	Not Supplied	Agricultural effluents	Wigg Lane Drain

Abstractions

24.4.79 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.80 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology, Volume 1, Chapter 22: Onshore Ornithology and Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.81 There are several ecological designations located within 2km of the segment. These consist of the following statutory designations:

- Greater Wash – SPA
- Sea Bank Clay Pits –SSSI
- Chapel Point to Wolla Bank – SSSI
- Anderby Marsh – Local Wildlife Site
- Wolla Bank Reedbed – Local Wildlife Site
- Wolla Bank Pit – Local Wildlife Site
- Anderby Creek Sand Dunes – Local Wildlife Site
- Wolla Bank South – Local Wildlife Site
- Chapel Six Marshes – Local Wildlife Site
- Chapel Point Dunes North – Local Wildlife Site
- Chapel Point Dunes South – Local Wildlife Site

WM2 – A52 – Hogsthorpe to Marsh Lane

Hydrological Setting

24.4.82 A52 – Hogsthorpe to Marsh Lane segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, the northern part of this segment is drained by Willoughby High Drain (Main River), which has an entire catchment area of 65.2 km^2. The southern part of this segment is largely served by the Orby Drain catchment.

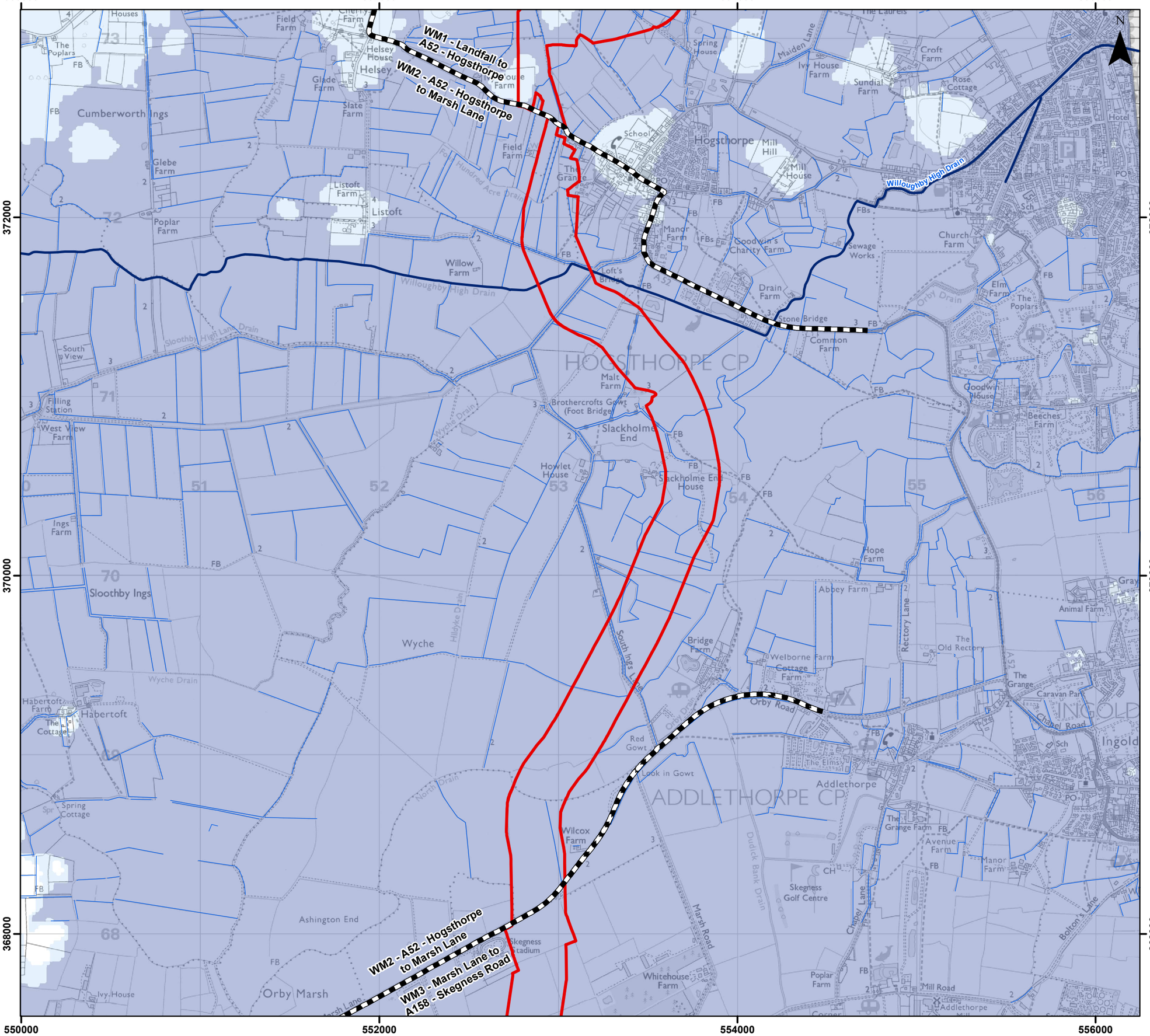
24.4.83 Other watercourses within this segment include Four Hundred Acre Drain, Hildyke Drain, Orby Drain and Wyche Drain.

24.4.84 The drainage board within this segment is LMDB, who are responsible for the management and maintenance of drainage within their area. There are several LMDB maintained watercourses within this segment including Wyche Drain, Orby North Drain and Orby South drain.

24.4.85 The significant watercourses within this segment are shown Figure 24.12.

Watercourse sensitivity

24.4.86 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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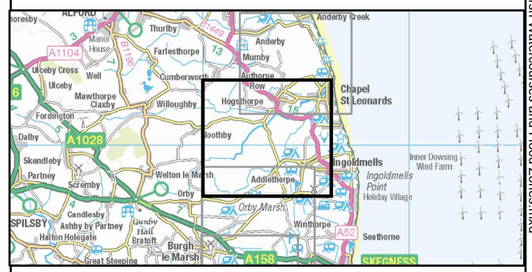

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:20,000

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WM2 - Watercourses and Flood Zones

Figure 24.12

OUTER DOWSING OFFSHORE WIND

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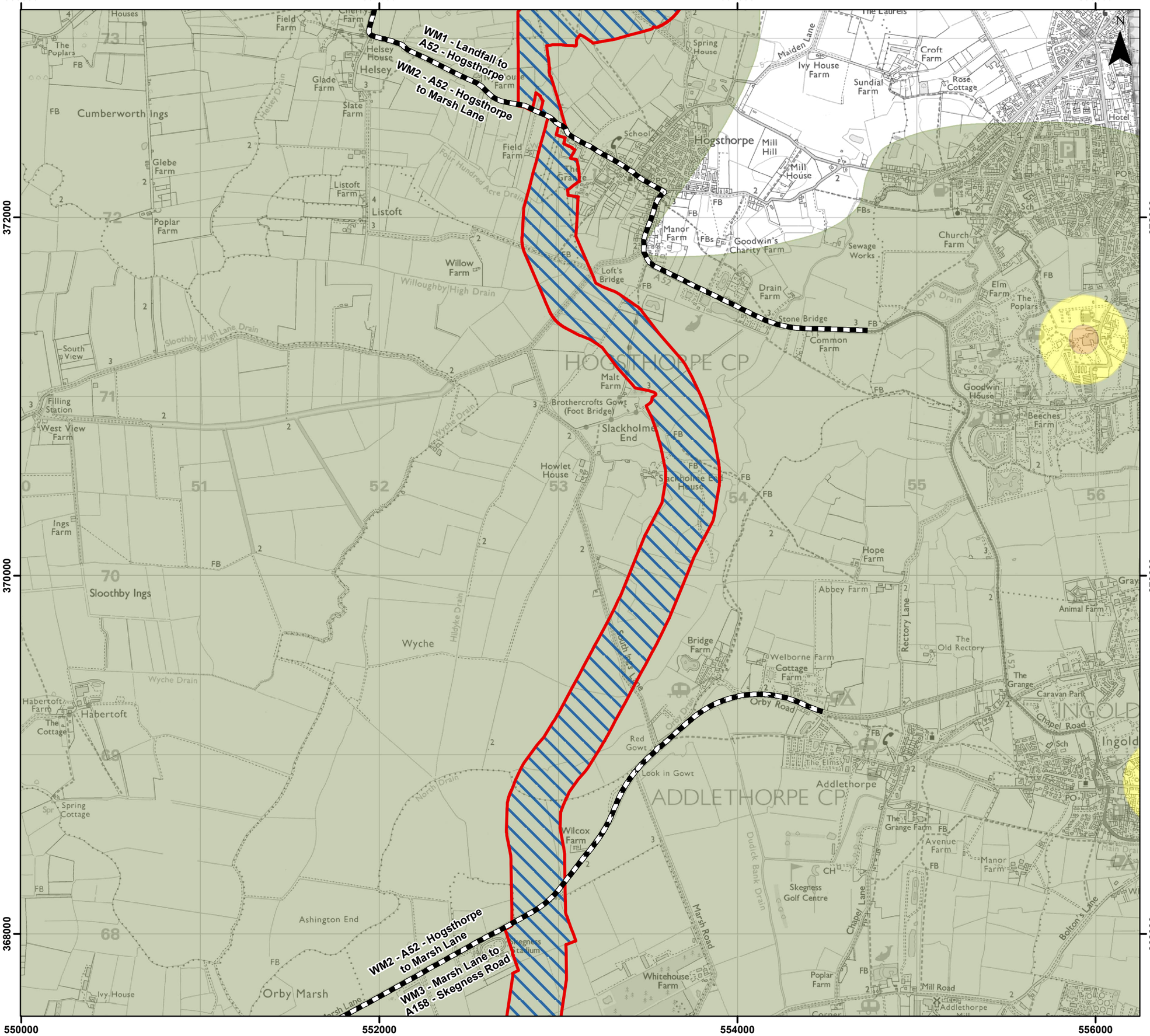

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Principal Aquifer

Source Protection Zone

- 1c
- 2c
- 3

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WM2 - Aquifer Designations and Source Protection Zones

Figure 24.13

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.87 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.88 Groundwater beneath the segment is present within the Principal bedrock aquifers of the Burnham Chalk Formation and Welton Chalk Formation. Inland superficial deposits underlying the segment comprises mainly of Tidal Flat Deposits with some isolated areas of Till. These deposits are classified as Unproductive aquifers, with a small area of Secondary (Undifferentiated aquifer).

24.4.89 The segment lies within an area designated as Zone 3 of a groundwater Source Protection Zone.

24.4.90 The aquifer designations and SPZs for this segment are shown within Figure 24.13.

Groundwater Sensitivity

24.4.91 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.92 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Flood defences are located along Willoughby High Drain in the form of natural high ground, with an effective crest level of 3.71m AOD. The design standard of protection of these defences are considered to be 1 in 25-years.

24.4.93 Surface water flood risk mapping produced by the EA[1] indicates areas in the segment at potential risk of inundation from extreme rainfall. The majority of these areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.94 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradient into open drainage ditches/ streams or the main watercourse network.

24.4.95 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.96 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.97 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.98 The water body catchment in this segment is:

- Willoughby High Drain – moderate ecological status and fail chemical status

Groundwater Quality

24.4.99 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.100 There is a single groundwater catchment assessed as part of the RBMP which is within this segment of the ECC. This is the Steeping Long Eau Little Eau Chalk Unit water body associated with bedrock geology beneath the study area. The water body has poor overall status with good quantitative status and poor chemical status.

Pollution events

24.4.101 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment range from minor to significant and are listed below:

- A 'minor' incident recorded on 31st January 1996 in Manby District where an unknown cause led to oils entering an unknown receiving water.
- A 'minor' incident recorded on 10th September 1992 in Manby District where an unknown cause led to an unknown pollutant entering an unnamed drain.
- A 'significant' incident recorded on 23rd July 1993 in Manby District where an unknown cause led to an unknown pollutant entering Mill Road Fishing Lakes.
- A 'minor' incident recorded on 20th March 1999 in Manby District where inadequate design/capacity led to sewage entering a Tributary of Orby Drain.
- A 'minor' incident on 24th May 1994 in Manby District where an unknown cause led to sewage entering an unnamed dyke.
- A 'significant' incident on 16th February 1994 in Manby District where an unknown cause led to a sewage entering an unnamed stream.

Discharge Consents

24.4.102 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.5 below.

Table 24.5: WM2 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
R Tointon T/A Tointon & Son	Not Given	Trade Effluent	Unknown Tributary
Dorothy May Balderston	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr I J Barker	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Vicarage Drain
Mr J T E Beniston	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Fen Drain
Mr & Mrs Mather	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
Dorothy May Balderston	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr C Collier	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Willoughby High Drain
Mr K And Mrs J V Johnson	Not Supplied	Unknown	Land
Mr & Mrs I Harrison	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Willoughby High Drain
Mr & Mrs Seaton	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Tributary Willoughby H
Mr G A Simpson	Not Supplied	Agricultural effluents	Unknown Tributary
E. W. Johnson Esq.,	Not Supplied	Unknown	Land
Mr Dennis Kime	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr J Simpson	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr J T E Beniston	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Drain
D & P Froggatt	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into Land
Mr. R. & Mrs. J. Baker	Not Supplied	Unknown	Land

Permit Holder	Catchment	Discharge Type	Receiving Water
Mr D. Paul	Not Supplied	Unknown	Land
Mr J Simpson	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr C Collier	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Willoughby High Drain
G H Paul	Not Supplied	Unknown	Not Supplied
Mr Mark Caudwell	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Lindsey Marsh Idb
Mrs R Giblin	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Willoughby High N
F B & G Coxhead	Not Supplied	Discharge Of Other Matter-Surface Water	Unknown Tributary
Mr S Howseman	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Willoughby High Drain
Mr Dennis Kime	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr C Collier	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Willoughby High Drain
D & P Froggatt	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into Land
Anglian Water Services Limited	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Vicarage Drain
Mrs T E Ainsworth	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Drain

Abstractions

24.4.103 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.104 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.105 There is one ecological designation located within 2km of the segment. This consists of the following statutory designation:

- Sloothby Low Lane – Local Wildlife Site

WM3 – Marsh Lane to A158 – Skegness Road

Hydrological Setting

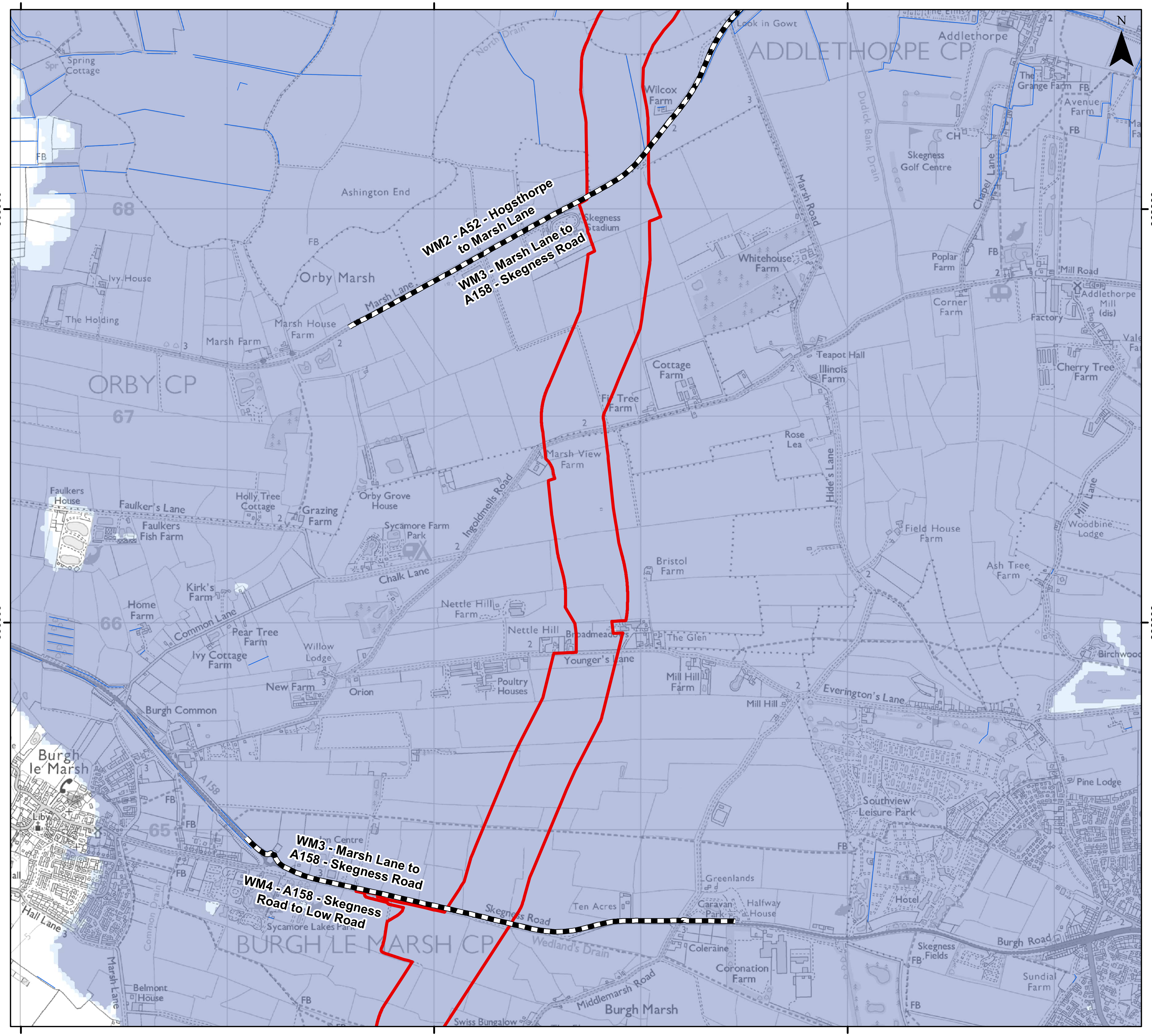
24.4.106 The Marsh Lane to A158 – Skegness Road segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, the segment is drained by Ingoldmells Main Drain (ordinary watercourse), which has an entire catchment area of 29.3 km^2.

24.4.107 The drainage board within this segment is LMDB, who are responsible for the management and maintenance of drainage within their area. There are several LMDB maintained watercourses within this segment including Orby South Drain, Ingoldmells Main Drain, Black House Farm Drain, Mill Hill Drain and Burgh Marsh Drain. Burgh le Marsh pumping station is located approximately 1.3km southwest of the onshore ECC at this segment.

24.4.108 The significant watercourses within this segment are shown in Figure 24.14

Watercourse sensitivity

24.4.109 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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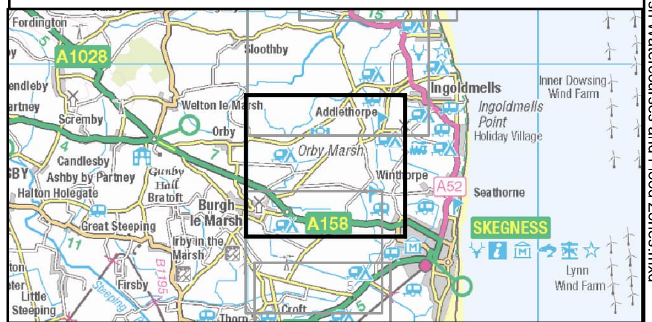

Coordinate System: British National Grid

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Scale: 1:17,500

Preliminary Environmental Information Report

WM3 - Watercourses and Flood Zones

Figure 24.14

OUTER DOWSING OFFSHORE WIND

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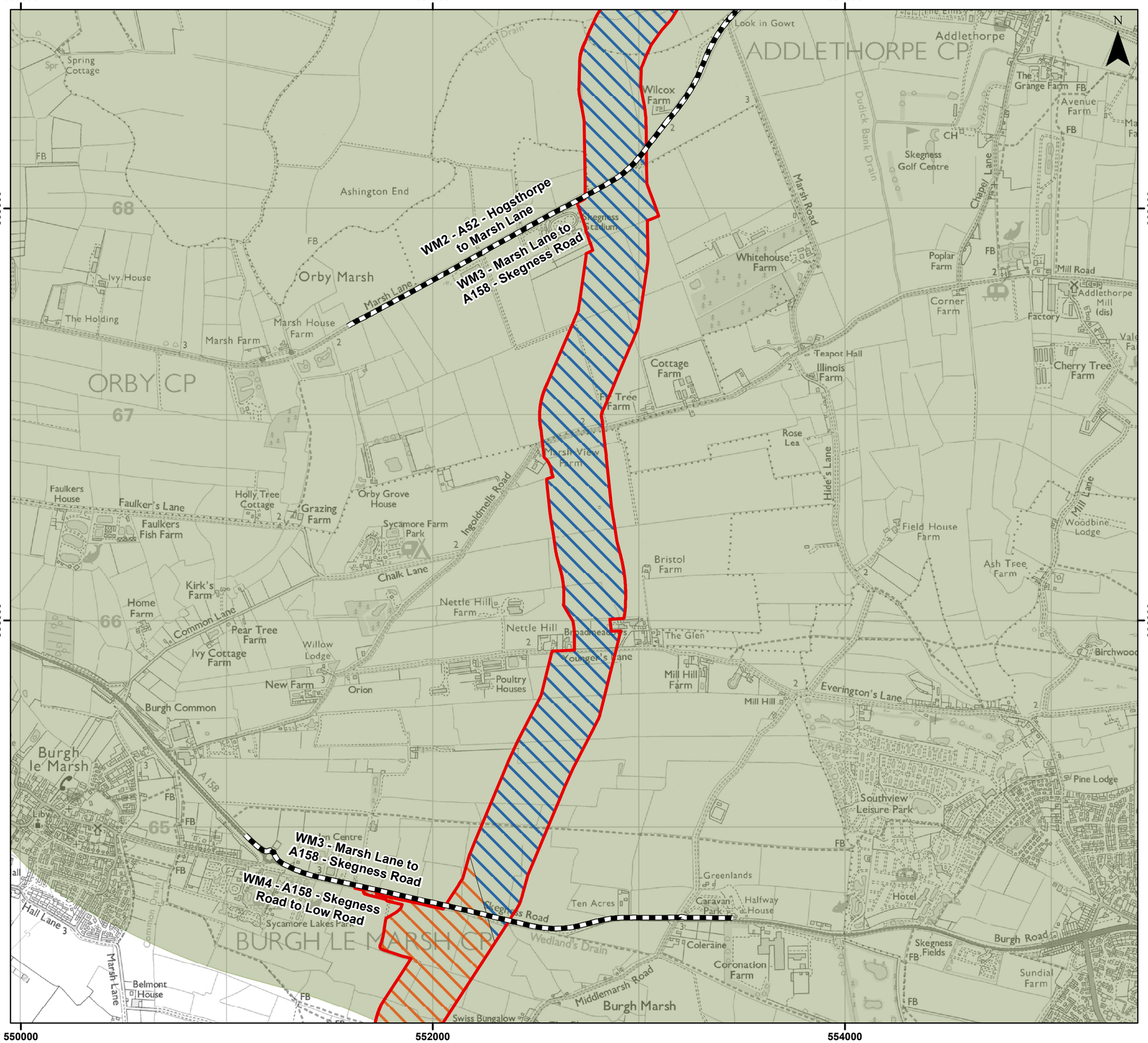

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Principal Aquifer
- Secondary Aquifer - B

Source Protection Zone

- 3

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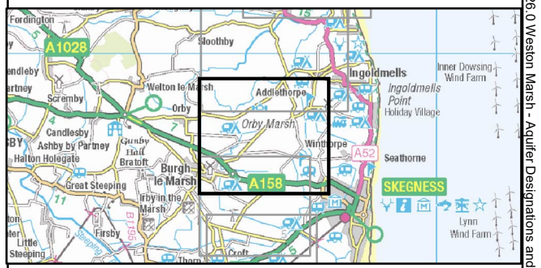

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:17,500

Preliminary Environmental Information Report

WM3 - Aquifer Designations and Source Protection Zones

Figure 24.15

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.110 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.111 Groundwater beneath the segment is present within the Principal bedrock aquifers of the Claxby Ironstone Formation, Tealby Formation and Roach Formation. Inland superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.112 The segment lies within an area designated as Zone 3 of groundwater SPZ.

24.4.113 The aquifer designations and SPZs for this segment are shown within Figure 24.15.

Groundwater Sensitivity

24.4.114 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in.

Flood Risk

24.4.115 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. There are no formal defences within this segment.

24.4.116 Surface water flood risk mapping produced by the EA[1] indicates areas in the segment at risk at potential risk of inundation from extreme rainfall. The majority of these areas are limited to very small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.117 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.118 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.119 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.120 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

24.4.121 The water body catchment in this segment is:

- Ingoldmells Main Drain – moderate ecological status and fail chemical status

Groundwater Quality

24.4.122 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.123 There is a single groundwater catchment assessed as part of the RBMP which is within this segment of the ECC. This is the Steeping Long Eau Little Eau Chalk Unit water body associated with bedrock geology beneath the study area. The water body has poor overall status with good quantitative status and poor chemical status.

Pollution events

24.4.124 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment range from minor to significant and are listed below:

- A 'significant' incident recorded on 27th March 1998 in Manby District where a leaking field heap led to organic wastes entering a tributary of Cow Bank Drain;
- A 'minor' incident recorded on 26th March 1992 in Manby District where an unknown cause led to unknown pollutants entering an unnamed watercourse;
- A 'significant' incident recorded on 24th February 1993 in Manby District where an unknown cause led to an unknown pollutant entering an unnamed dyke;
- A 'minor' incident recorded on 11th April 1996 in Manby District where an inadequate design/capacity led to sewage entering an unknown receiving water;
- A 'minor' incident on 2nd November 1998 in Manby District where poor operational practice led to sewage entering an unnamed ditch;
- A 'minor' incident on 2nd February 1996 in Manby District where poor operational practice led to sewage entering an unnamed ditch; and
- A 'minor' incident on 26th March 1992 in Manby District where an unknown caused led to an unknown pollutant entering Square Lake and Mill Road Fishing Pond.

Discharge Consents

Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.6 below.

Table 24.6: WM3 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Mr D B Purdy	Not Supplied	Unknown	Into Land
Mr M Bailey	Not Supplied	Unknown	Land
Mr V Rose	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Layfords Contract Packers	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Tributary Common Drain
A R Knowles Esq	Not Supplied	Unknown	Into Land
F Simpson & Son	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
F Simpson & Son	Not Supplied	Unknown	Not Supplied
Union Grain Storage (Lincs) Ltd	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
W F Caudwell	Not Supplied	Unknown	Not Supplied
Coastfields Leisure	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	The North Drain
Union Grain Storage (Lincs) Ltd	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr Peter Smith	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Ditch
Mr Tooby	Not Supplied	Unknown	Into Land
P & P Lawton	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
William Henry Jaques	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Not Supplied
P & P Lawton	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Jeffrey Craig Middleton	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Not Supplied
Mr & Mrs R Froggatt	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	An Unnamed Watercourse
G.S. Schofield	Not Supplied	Unknown	Land

Permit Holder	Catchment	Discharge Type	Receiving Water
R J Langstaff Esq.	Not Supplied	Unknown	Land
Mr & Mrs J Buckland	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of North Drain
Addlethorpe Golf & Ctry Club Ltd	Anderby Main/Willoughby	Sewage And Trade Combined - Unspecified	Ingoldmells Main Drain
Mr C Goodere	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of the North Drain

Abstractions

24.4.125 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.126 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.127 There are no ecological designations located within 2km of the segment.

24.4.128

WM4 – A158 – Skegness Road to Low Road

Hydrological Setting

24.4.129 The A158 – Skegness Road to Low Road segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, the segment is drained by three watercourses:

- Wedlands and North Drains (ordinary watercourse), which has an entire catchment area of 15.2 km^2;
- Lymn/Steeping (Main River), which has an entire catchment area of 170.3 km^2; and
- Cow Bank Drain (ordinary watercourse), which has an entire catchment area of 13.8 km^2.

24.4.130 Other watercourses in this segment include Catchwater Drain.

24.4.131 The drainage board within this segment is Lindsey Marsh IDB (LMDB), who are responsible for the management and maintenance of drainage within their area. There are several LMDB maintained watercourses and pumping stations within or serving this segment, including College Drain, Catchwater Drain, Rookery Drain, Croft Drain, Pinchbeck Drain, Caudwells Drain and Searbys Glasshouse Drain. The pumping stations include:

- Burgh le Marsh pumping station located approximately 1.3km northwest of the onshore ECC;

- Gotts pumping station located approximately 1.3km east of the onshore ECC; and
- Crown Farm pumping station located approximately 1.8km southwest of the onshore ECC.

24.4.132 The significant watercourses within this segment are shown in Figure 24.16.

Watercourse sensitivity

24.4.133 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.

550000 552000 554000

364000

362000

WM3 - Marsh Lane to A158 - Skegness Road

WM4 - A158 - Skegness Road to Low Road

WM4 - A158 - Skegness Road to Low Road

WM5 - Low Road to Steeping River

N

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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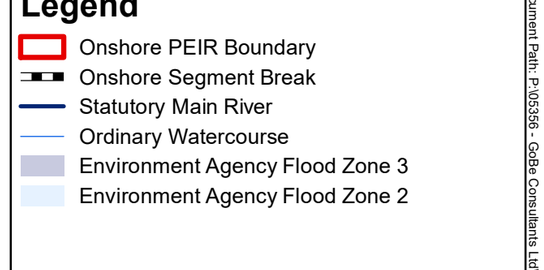

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

WM4 - Watercourses and Flood Zones

Figure 24.16

OUTER DOWSING OFFSHORE WIND

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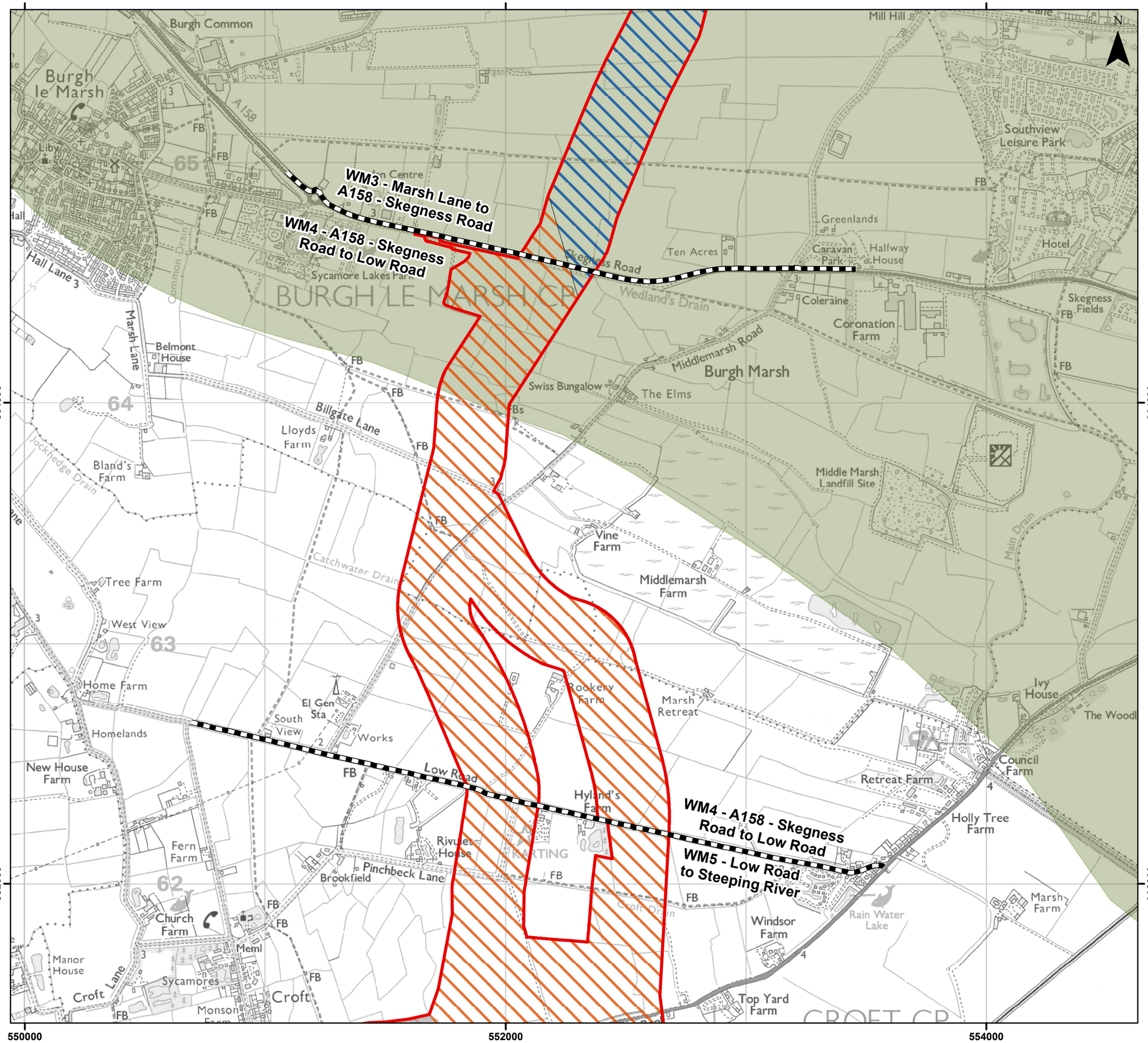

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Principal Aquifer
- Secondary Aquifer - B

Source Protection Zone

- 3

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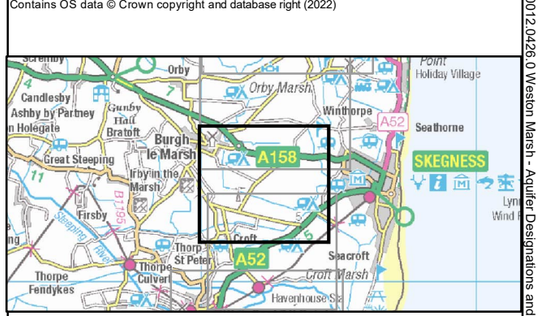

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

WM4 - Aquifer Designations and Source Protection Zones

Figure 24.17

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.134 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.135 Groundwater beneath the segment is present within the Secondary B bedrock aquifers of the Claxby Ironstone Formation, Tealby Formation and Roach Formation. Inland superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.136 The majority of the segment is not designated as a SPZ. A small area to the north of the segment lies within an area designated as Zone 3 of groundwater SPZ.

24.4.137 The aquifer designations and SPZs for this segment are shown within Figure 24.17.

Groundwater Sensitivity

24.4.138 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.139 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. There are no formal flood defences within this segment.

24.4.140 Surface water flood risk mapping produced by the EA[1] indicates areas in the segment at risk at potential risk of inundation from extreme rainfall. The majority of these areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.141 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.142 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.143 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.144 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

24.4.145 The water body catchments in this segment is:

- Wedlands and North Drains – moderate ecological status and fail chemical status;
- Lymn/Steeping – moderate ecological status and fail chemical status; and
- Cow Bank Drain – moderate ecological status and fail chemical status.

Groundwater Quality

24.4.146 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.147 There is a single groundwater catchment assessed as part of the RBMP which is within this segment of the ECC. This is the South Lincolnshire Chalk Unit water body associated with bedrock geology beneath the study area. The water body has poor overall status with good quantitative status and poor chemical status.

Pollution events

24.4.148 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment ranges from minor to significant and are listed below:

- A 'minor' incident on 21st January 1995 in Manby District where an accidental spillage led to oils entering a Fish Pond;
- A 'minor' incident on 2nd June 1995 in Manby District where poor/inadequate maintenance led to organic wastes entering an unknown receiving water;
- A 'minor' incident on 3rd April 1992 in Manby District where an unknown cause led to an unknown pollutant entering an unnamed IDB drain;
- A 'minor' incident on 11th June 1992 in Manby District where an unknown cause led to an unknown pollutant entering Catchwater Drain;
- A 'minor' incident on 16th June 1992 in Manby District where an unknown cause led to an unknown pollutant entering Burgh Le Marsh Main Drain;
- A 'minor' incident on 6th February 1995 in Manby District where an unknown cause led to an unknown pollutant entering an unnamed watercourse;
- A 'minor' incident on 2nd June 1995 in Manby District where a wrong connection led to sewage entering an unnamed watercourse;
- A 'minor' incident on 25th July 1995 in Manby District where an unknown cause led to an unknown pollutant entering Catchwater Drain;
- A 'minor' incident on 2nd February 1996 in Manby District where poor operational practice led to sewage entering an unnamed ditch; and
- A 'minor' incident on 1st May 1992 in Manby District where an unknown cause led to an unknown pollutant entering an unnamed stream.

Discharge Consents

24.4.149 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.7 below.

Table 24.7: WM4 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
David & Karen Cumberlidge	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary
Mr & Mrs S J Dennis	Lymn/steeping River (Spilsby)	Trade Discharge - Process Water	Land
Waste Savers International	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Common Drain
Anglian Water Services Limited	Not Supplied	Storm /emergency overflow	Catchwater Drain
R Hooper	Not Supplied	Unknown	Not Supplied
Mr J Giraldez	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Wedlands Drain
Mr J Giraldez	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Wedlands Drain
A E Searby Farms	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Skegness Grain Ltd	Anderby Main/Willoughby	Sewage And Trade Combined - Unspecified	Unnamed Tributary Cowbank Drain
Anglian Water Services Limited	Not Supplied	Storm /emergency overflow	Unnamed Drain Steeping River
Anglian Water Services Limited	Not Supplied	Public Sewage: Storm Sewage Overflow	Catchwater Drain
Anglian Water Services Limited	Not Given	Public Sewage: Storm Sewage Overflow	Catchwater Drain
James Leonard Dodsworth	Not Supplied	Agricultural effluents	Unknown Tributary
Sid Dennis & Sons Ltd	Lymn/steeping River (Spilsby)	Trade Discharge - Process Water	Tributary Catchwater Drain
Anglian Water Services Limited	Not Supplied	Public Sewage: Storm Sewage Overflow	Catchwater Drain
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Sewage Discharges - Pumping Station - Water Company	Unnamed Tributary Steeping River
C. B. Sanderson Esq.,	Not Supplied	Unknown	Land
Anglian Water Services Limited	Not Supplied	Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company	The Catchwater Drain
Sid Dennis	Lymn/steeping	Trade Discharge -	Tributary Catchwater Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
	River (Spilsby)	Process Water	
Anglian Water Services Limited	Not Supplied	Sewage Discharges - Pumping Station - Water Company	Unnamed Tributary Steeping River
Anglian Water Services Limited	Not Supplied	Public Sewage: Storm Sewage Overflow	Croft Drain
Anglian Water Services Limited	Not Supplied	Sewage Discharges - Pumping Station - Water Company	Catchwater Drain

Abstractions

24.4.150 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.151 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.152 There is one ecological designation located within 2km of the segment. This consists of the following statutory designation:

- Middlemarsh Farm – Local Wildlife Site

WM5 – Low Road to Steeping River

Hydrological Setting

24.4.153 The A158 – Low Road to Steeping River segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, the segment is drained by three watercourses:

- Wedlands and North Drains (ordinary watercourse), which has an entire catchment area of 15.2 km^2;
- Lymn/Steeping (Main River), which has an entire catchment area of 170.3 km^2; and
- Cow Bank Drain (ordinary watercourse), which has an entire catchment area of 13.8 km^2.

24.4.154 Other watercourses in this segment include Catchwater Drain and Steeping River along the southern boundary of the segment.

24.4.155 The drainage board within this segment is Lindsey Marsh IDB (LMDB), who are responsible for the management and maintenance of drainage within their area. There are several LMDB maintained watercourses and pumping stations within or serving this segment, including College Drain, Catchwater Drain, Rookery Drain, Croft Drain, Pinchbeck Drain, Caudwells Drain and Searbys Glasshouse Drain. The pumping stations include:

- Burgh le Marsh pumping station located approximately 1.3km northwest of the onshore ECC;

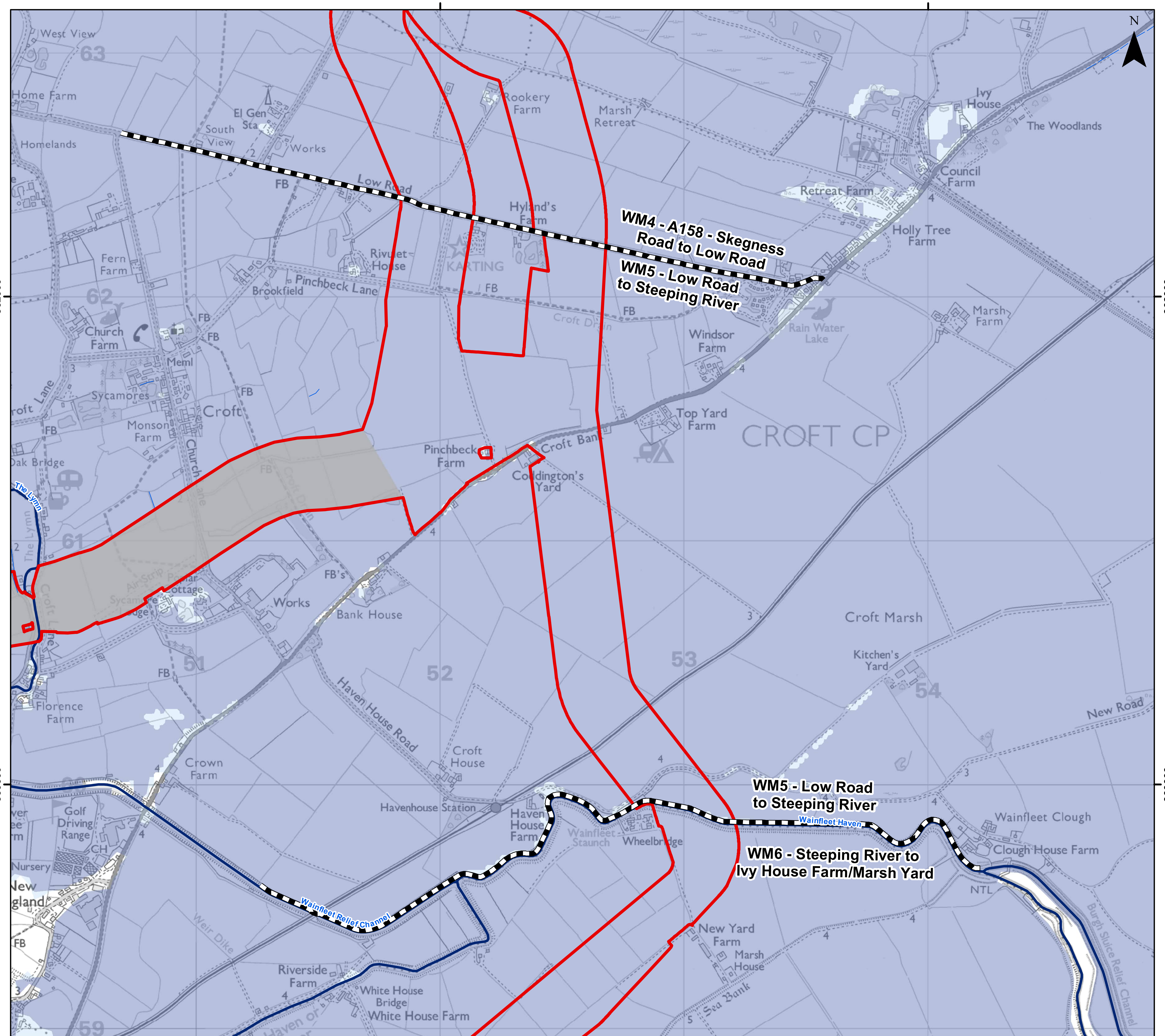
- Gotts pumping station located approximately 1.3km east of the onshore ECC; and
- Crown Farm pumping station located approximately 1.8km southwest of the onshore ECC.

24.4.156 The significant watercourses within this segment are shown in Figure 24.18.

Watercourse sensitivity

24.4.157 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.

24.4.158



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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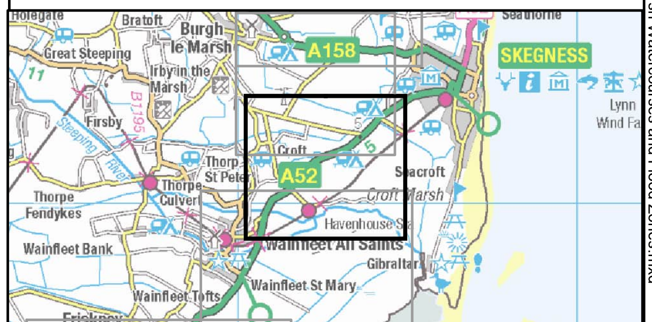

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Scale: 1:15,000

Preliminary Environmental Information Report

WM5 - Watercourses and Flood Zones

Figure 24.18

OUTER DOWSING OFFSHORE WIND

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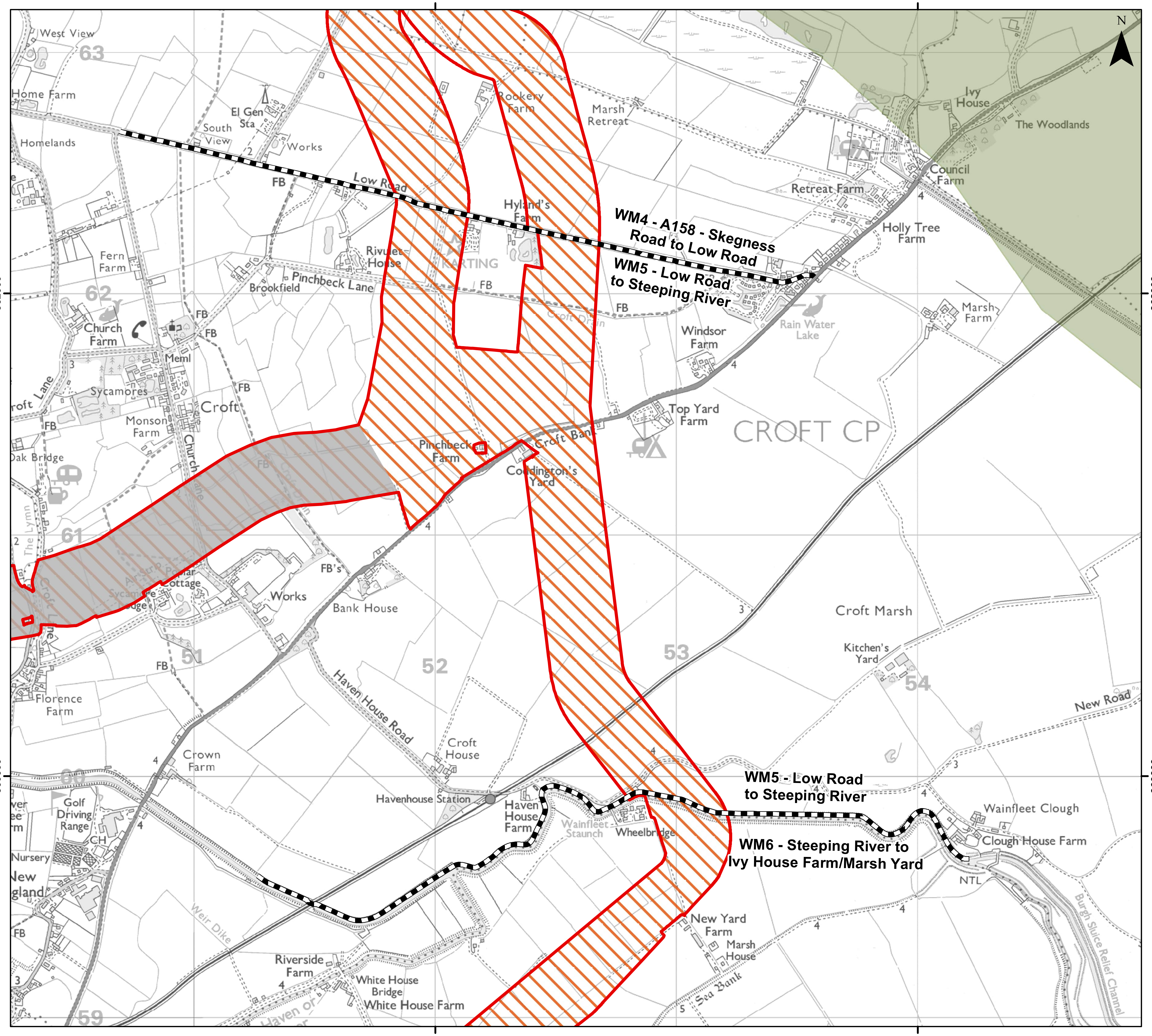
552000
554000
362000
360000
WM4 - A158 - Skegness Road to Low Road
WM5 - Low Road to Steeping River
WM6 - Steeping River to Ivy House Farm/Marsh Yard
CROFT CP
Croft
Croft Marsh
Low Road
Pinchbeck Lane
Croft Bank
Haven House Road
New Road
Sea Bank
Burgh Sluice Relief Channel
Havenhouse Station
Wainfleet Clough
Clough House Farm
Wheelbridge
Ivy House
The Woodlands
Council Farm
Retreat Farm
Holly Tree Farm
Marsh Farm
Rain Water Lake
Windsor Farm
Top Yard Farm
Kitchen's Yard
Croft House
Haven House Farm
New Yard Farm
Marsh House
Riverside Farm
White House Bridge
White House Farm
Crown Farm
Florence Farm
Bank House
Works
Pinchbeck Farm
Coddington's Yard
Hyland's Farm
Rookery Farm
Marsh Retreat
Rivulet House
El Gen Sta
South View
Homelands
Home Farm
West View
Fern Farm
Brookfield
Church Farm
Sycamores
Monson Farm
Oak Bridge
Golf Driving Range
Nursery
N
SKEGNESS
A158
A52

Legend

Onshore PEIR Boundary
Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

Secondary Aquifer - B

Source Protection Zone

3

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Preliminary Environmental Information Report

WM5 - Aquifer Designations and Source Protection Zones

Figure 24.19

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.159 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.160 Groundwater beneath the segment is present within the Secondary B bedrock aquifers of the Claxby Ironstone Formation, Tealby Formation and Roach Formation. Inland superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.161 The majority of the segment is not designated as a SPZ.

24.4.162 The aquifer designations and SPZs for this segment are shown within Figure 24.19.

Groundwater Sensitivity

24.4.163 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.164 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Flood defences are located along Steeping River along the southern boundary of the segment in the form of embankments, with an effective crest level of between 4.07m AOD to 4.82m AOD. The design standard of protection of these defences are considered to be 1 in 200-years.

24.4.165 Surface water flood risk mapping produced by the EA[1] indicates areas in the segment at risk at potential risk of inundation from extreme rainfall. The majority of these areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.166 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.167 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.168 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.169 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.170 The water body catchments in this segment are:

- Wedlands and North Drains – moderate ecological status and fail chemical status;
- Lymn/Steeping – moderate ecological status and fail chemical status; and
- Cow Bank Drain – moderate ecological status and fail chemical status.

Groundwater Quality

24.4.171 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.172 There is a single groundwater catchment assessed as part of the RBMP which is within this segment of the ECC. This is the South Lincolnshire Chalk Unit water body associated with bedrock geology beneath the study area. The water body has poor overall status with good quantitative status and poor chemical status.

Pollution events

24.4.173 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment are minor and are listed below:

- A 'minor' incident on 1st August in Manby District where an unknown cause led to an unknown pollutant entering an unnamed ditch.

Discharge Consents

Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.8.

Table 24.8: WM5 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
David & Karen Cumberlidge	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary
Mr & Mrs S J Dennis	Lymn/steeping River (Spilsby)	Trade Discharge - Process Water	Land
Waste Savers International	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Common Drain
Anglian Water Services Limited	Not Supplied	Storm /emergency overflow	Catchwater Drain
R Hooper	Not Supplied	Unknown	Not Supplied
Mr J Giraldez	Anderby Main/Willoughby	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Wedlands Drain
Mr J Giraldez	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Wedlands Drain
A E Searby Farms	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Skegness Grain Ltd	Anderby Main/Willoughby	Sewage And Trade Combined - Unspecified	Unnamed Tributary of Cowbank Drain
Anglian Water Services Limited	Not Supplied	Storm /emergency overflow	Unnamed Drain Steeping River
Anglian Water Services Limited	Not Supplied	Public Sewage: Storm Sewage Overflow	Catchwater Drain
Anglian Water Services Limited	Not Given	Public Sewage: Storm Sewage Overflow	Catchwater Drain
James Leonard Dodsworth	Not Supplied	Agricultural effluents	Unknown Tributary
Sid Dennis & Sons Ltd	Lymn/steeping River (Spilsby)	Trade Discharge - Process Water	Tributary of Catchwater Drain
Anglian Water Services Limited	Not Supplied	Public Sewage: Storm Sewage Overflow	Catchwater Drain
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Sewage Discharges - Pumping Station - Water Company	Unnamed Tributary of Steeping River
C. B. Sanderson Esq.,	Not Supplied	Unknown	Land
Anglian Water Services Limited	Not Supplied	Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company	Catchwater Drain
Sid Dennis	Lymn/steeping River (Spilsby)	Trade Discharge - Process Water	Tributary of Catchwater Drain
Anglian Water Services Limited	Not Supplied	Sewage Discharges - Pumping Station - Water Company	Unnamed Tributary of Steeping River
Anglian Water Services Limited	Not Supplied	Public Sewage: Storm Sewage Overflow	Croft Drain
Anglian Water Services Limited	Not Supplied	Sewage Discharges - Pumping Station - Water Company	Catchwater Drain

Abstractions

24.4.174 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.175 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.176 There is one ecological designation located within 2km of the segment. This consists of the following statutory designation:

- Middlemarsh Farm – Local Wildlife Site

WM6 – Steeping River to Ivy House Farm/Marsh Yard

Hydrological Setting

24.4.177 The Steeping River to Ivy House Farm/ Marsh Yard segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, the north of the segment is drained by Lymn/ Steeping (Main River), which has an entire catchment area of 170.3km^2 while the central and southern part of the segment generally drains to Old Delph drainage channel (Sea Lane and Gibraltar Point).

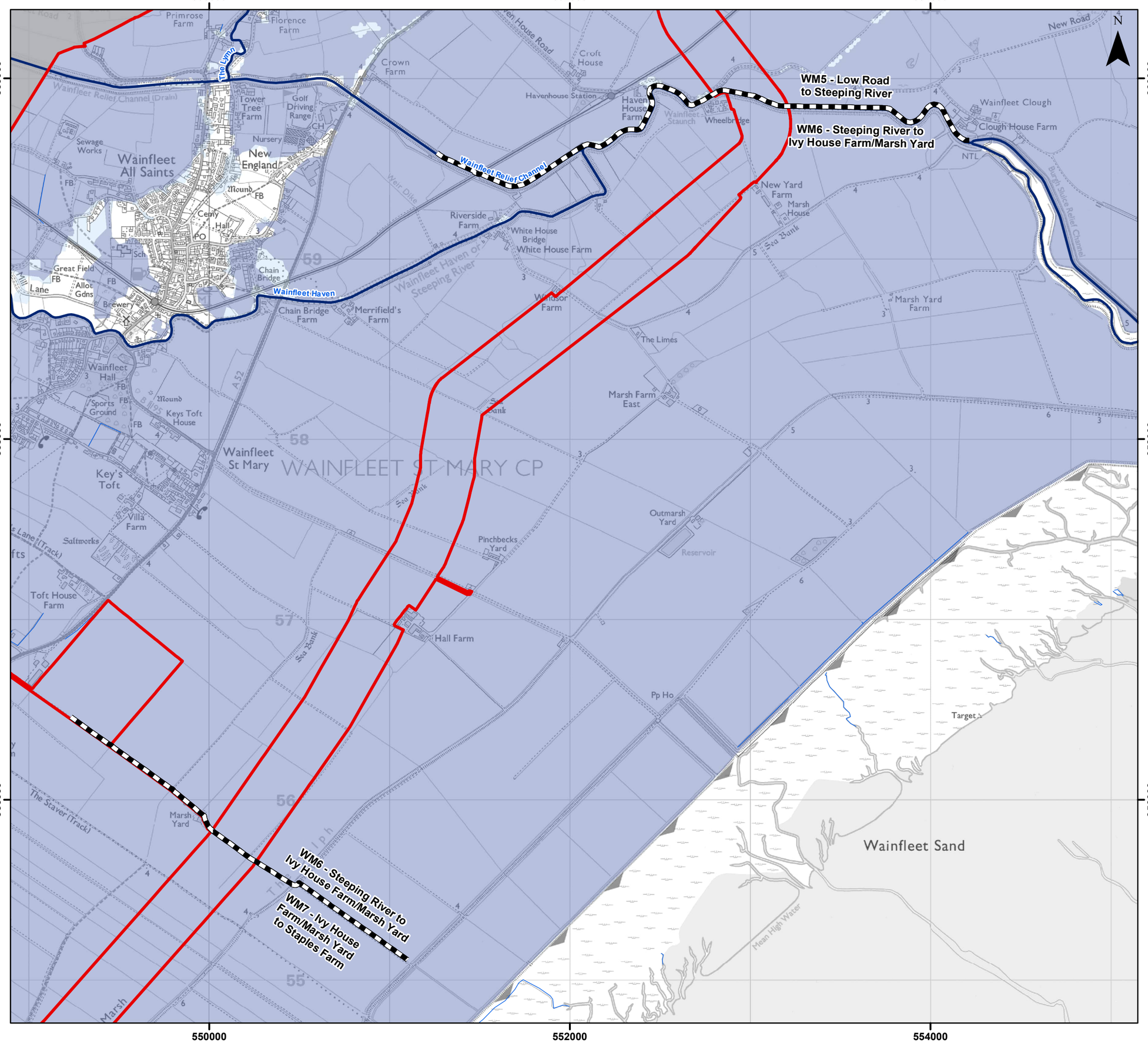
24.4.178 The drainage board within this segment is LMDB, who are responsible for the management and maintenance of drainage within their area. There are several LMDB maintained watercourses and pumping stations within or serving this segment, including White House Farm Drain, Worths Main Drain, Allens Sewer, Sea Lane Drain, Hall Farm Drain and Cold Harbour Drain. The pumping stations include:

- Crown Farm pumping station located approximately 1.8km northwest of the onshore ECC;
- Wainfleet Sea Lane pumping station located approximately 1.5km east of the onshore ECC; and
- Gibraltar Point pumping station located approximately 2.5km east of the onshore ECC (serves Old Delph drainage channel).

24.4.179 The significant watercourses within this segment are shown in Figure 24.20.

Watercourse sensitivity

24.4.180 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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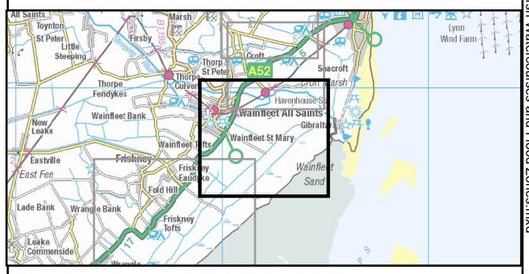

Coordinate System: British National Grid

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Scale: 1:20,000

Preliminary Environmental Information Report

WM6 - Watercourses and Flood Zones

Figure 24.20

OUTER DOWSING OFFSHORE WIND

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WM5 - Low Road to Steeping River
WM6 - Steeping River to Ivy House Farm/Marsh Yard
WM7 - Ivy House Farm/Marsh Yard to Staples Farm

WAINFLEET ST MARY CP

Wainfleet Sand

N

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Principal Aquifer
- Secondary Aquifer - B
- Unproductive Strata

Source Protection Zone

- 3

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WM6 - Aquifer Designations and Source Protection Zones

Figure 24.21

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.181 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.182 Groundwater beneath the segment is present within the Secondary B bedrock aquifers of the Claxby Ironstone Formation, Tealby Formation and Roach Formation, and the Principal aquifers of the Spilsby Sandstone Formation. Inland superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.183 The northern part of the segment is not designated as a SPZ. To the south of the segment, the area between Sea Lane and Ivy House Farm/ Marsh Yard is designated as Zone 3 of groundwater SPZ.

24.4.184 The aquifer designations and SPZs for this segment are shown within Figure 24.21.

Groundwater Sensitivity

24.4.185 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.186 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Flood defences are located along Steeping River along the northern boundary of the segment in the form of embankments, with an effective crest level of between 4.07m AOD to 4.82m AOD. The design standard of protection of these defences are considered to be 1 in 200-years. Approximately 500m to the east of the segment, flood defences are present along The Old Delph drainage channel in the form of embankments, with an effective crest level of between 5.40m AOD to 5.92m AOD. The design standard of protection of these defences are considered to be one in five-years.

24.4.187 Surface water flood risk mapping produced by the EA[1] indicates there are limited areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.188 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.189 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.190 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.191 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.192 The water body catchment in this segment is:

- Lymn/ Steeping – moderate ecological status and fail chemical status

Groundwater Quality

24.4.193 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.194 There is a groundwater catchment assessed as part of the RBMP which is within the northern part of this segment of the ECC. This is the Steeping Long Eau Little Eau Chalk Unit water body associated with bedrock geology beneath the study area. The water body has poor overall status with good quantitative status and poor chemical status. The southern edge of this segment is within the Spilsby Sandstone Unit water body which has poor overall status with poor quantitative status and good chemical status.

Pollution events

24.4.195 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment are minor and are listed below:

- A 'minor' incident on 1st August in Manby District where an unknown cause led to an unknown pollutant entering an unnamed ditch.

Discharge Consents

Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in below.

Table 24.9: WM6 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Lincolnshire Cc	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary River Steeping
Mr R E Farmer	Not Supplied	Unknown	Land
Mrs M P Simpson	Not Supplied	Unknown	Into Land
Mr James C Barry	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Stream
Julian Francis	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Little River Lymn
G J Wild & T A Hill	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Little River Lymn
Mr A Marshall	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Culverted Tributary Wainfleet
G Coupland Ltd	Not Supplied	Unknown	Into Land
T W Taylor	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Drain
T A Smith & Co (Farm Produce) Ltd	Not Supplied	Unknown	Not Supplied
T A Smith & Co (Farm Produce) Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Miss Nicola Oakley	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
Mr Robert Cabon	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
Mr Phillip Wallace	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
Mr David Briggs And Miss Zoe Stokes	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
Mr Mark Caudwell	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Cow Bank Drain
Mr Mark Caudwell	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Lindsey Marsh IDB
S J Johnson	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Little River Lymn
Anglian Water Services	Lymn/steeping	Sewage Discharges -	Unnamed Tributary of

Permit Holder	Catchment	Discharge Type	Receiving Water
Limited	River (Spilsby)	Final/Treated Effluent - Water Company	Steeping River
Mr Colin Wilkinson	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
W J Webster	Not Supplied	Unknown	Land
Mr Mark Caudwell	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Lindsey Marsh IDB
Eptons Farms Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Water Company	Unnamed Tributary of Steeping River
Mr A Cawley	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Croft Drain
Miss Amanda Bligh	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
The Occupier	Not Supplied	Unknown	Not Supplied
Neil Huskisson & Jane Huskisson	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
T W Taylor	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Fen Drain
Mr James C Barry	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Stream
Mr J R Dodsworth	Not Supplied	Unknown	Not Supplied
Lincolnshire C.C.	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Watercourse
Mr Martin Wrate	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Croft Drain
Mr R D Carnelly	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	The Lymn
Epjon Builders	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Stream
Mr Richard Dennis	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
Mr Paul Briggs & Mrs Keri Briggs	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
H Hamson	Not Supplied	Unknown	Not Supplied
Mr Carl Drury	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	The Lymn
Mrs B Mckenna	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Tributary of River Steeping
Mr Michael Till & Mrs Deborah Till	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
Mr R D Carnelly	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	The Lymn
Mrs M P Simpson	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into Land
Colin S Scott	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Not Supplied
Mr Simon Barker	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
Aj Roe & D E Sukeforth	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	River Lymn
Mr Thomas Noble	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Chapel Drain
G Coupland Ltd	Not Supplied	Unknown	Into Land
Mr Ivan Podbury	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Drain to Steeping River
Epjon Builders	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	The Chapel Drain

Abstractions

24.4.196 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.197 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.198 There are several ecological designations located within 2km of the segment. These consists of the following statutory designations:

- The Wash – SPA, Ramsar, SSSI, Special Area of Conservation (SAC);

- Wainfleet Range – Local Wildlife Site; and
- Steeping Marsh – Local Wildlife Site.

WM7 – Ivy House Farm/Marsh Yard to Staples Farm

Hydrological Setting

24.4.199 The majority of the Ivy House Farm/ Marsh Yard to Staples Farm segment lies within the wider Fens East and West Operational Catchment. On a small scale, the majority of the segment is drained by East and West Fen Drains (ordinary watercourse), which has an entire catchment area of 371.8 km^2.

24.4.200 The northernmost part of the Ivy House Farm/ Marsh Yard to Staples Farm segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, this part of segment is drained by Lymn/ Steeping (main river), which has an entire catchment area of 170.3 km^2.

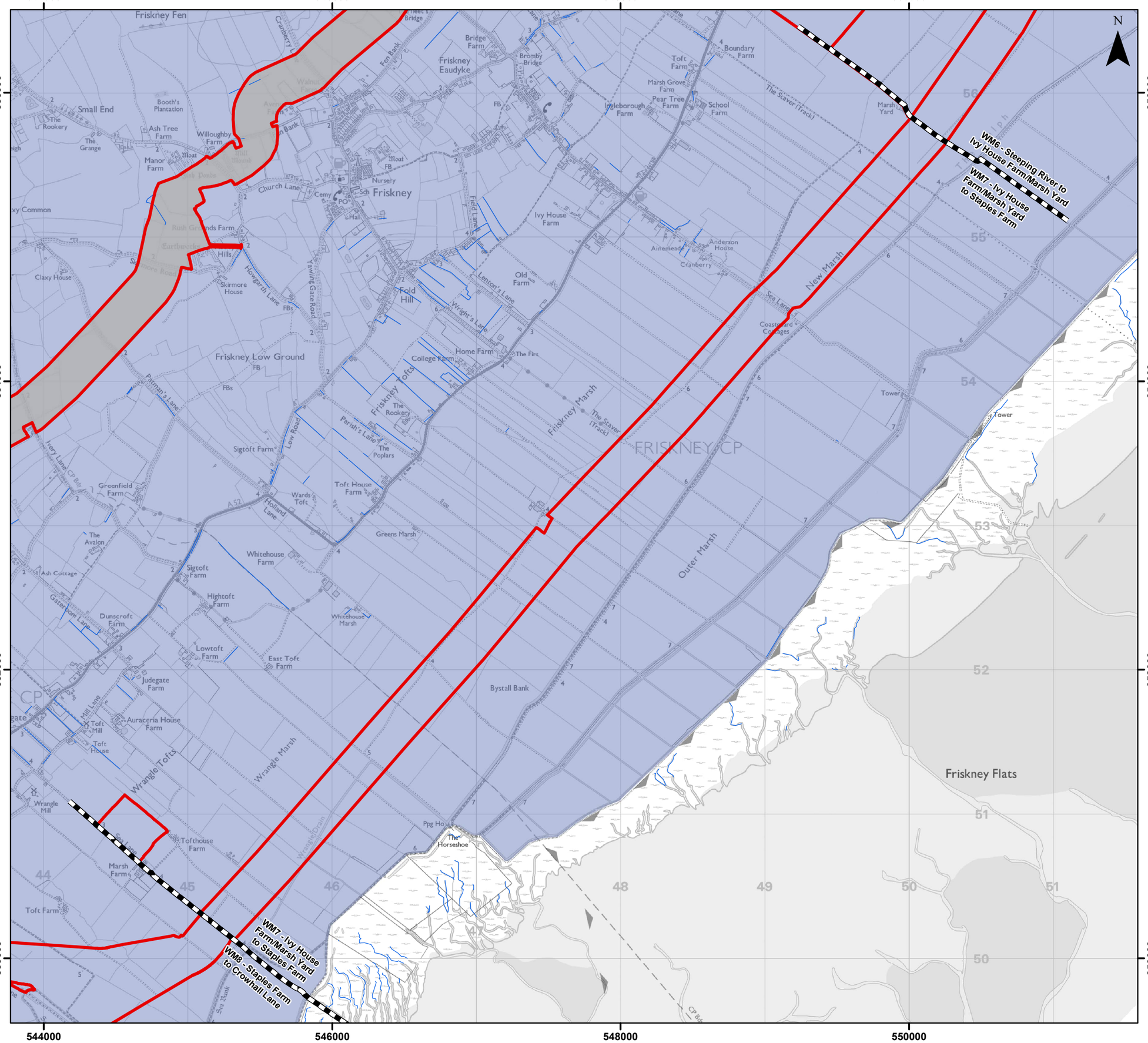
24.4.201 Other watercourses in this segment include Wrangle Drain and The Delph.

24.4.202 The drainage board with responsibility for land within the majority of this segment is Witham Fourth IDB (W4IDB), with the northernmost part of the segment lying within land managed by LMDB. There are several W4IDB maintained watercourses within this segment including Atkinsons Friskney, Spethens Friskney North, Barley Mow Friskney North & South, Roughtons Friskney, Caudwells Friskney, Tuplins Friskney Middle, Tuplins Friskney South and Wrangle Drain. Wrangle pumping station located approximately 575m southeast of the onshore ECC.

24.4.203 The significant watercourses within this segment are shown in Figure 24.22.

Watercourse sensitivity

24.4.204 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

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WM7 - Watercourses and Flood Zones

Figure 24.22

OUTER DOWSING OFFSHORE WIND

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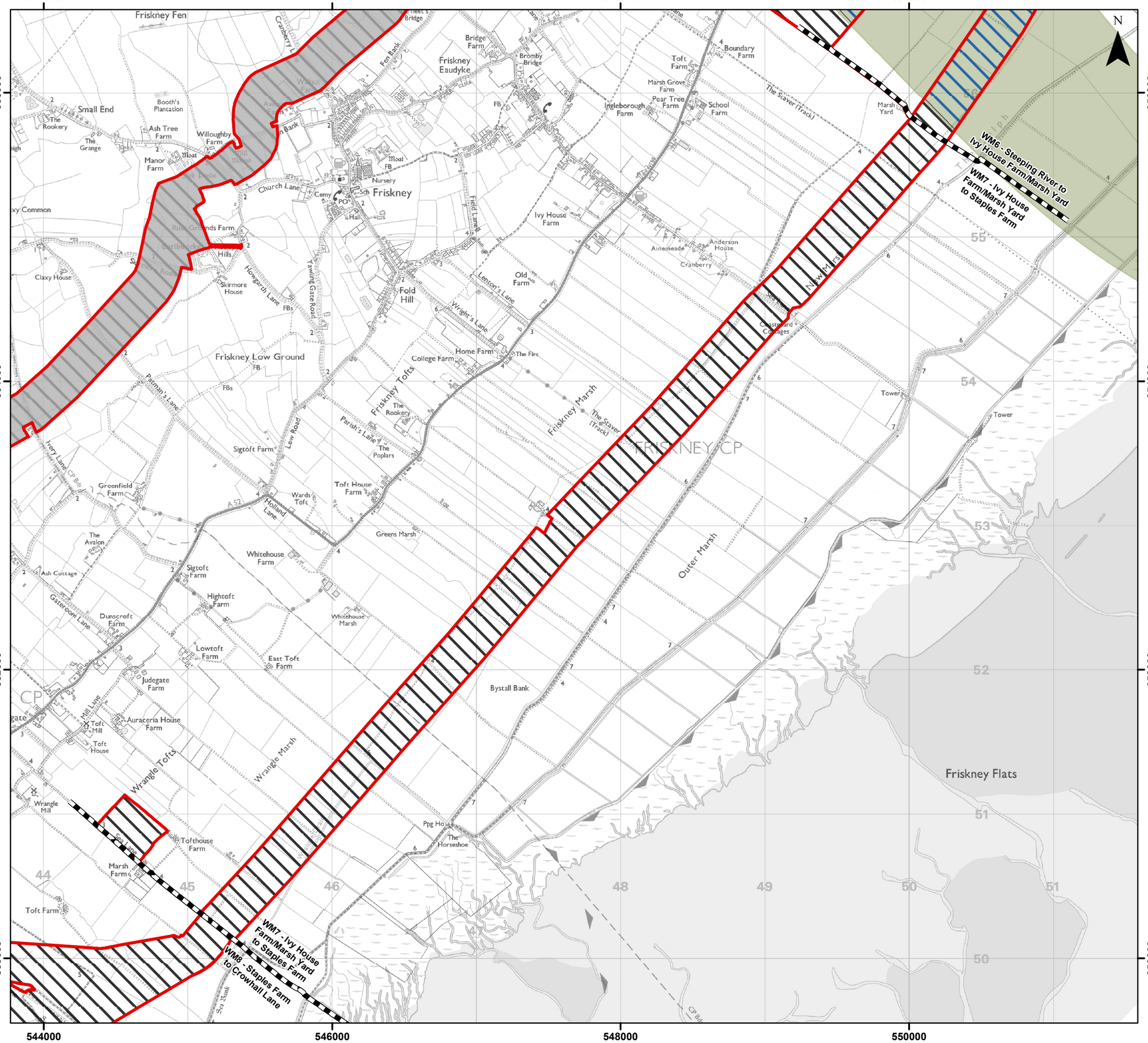

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Principal Aquifer
- Unproductive Strata

Source Protection Zone

- 3

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WM7 - Aquifer Designations and Source Protection Zones

Figure 24.23

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.205 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.206 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Kimmeridge Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.207 The segment is not designated as a SPZ.

24.4.208 The aquifer designations and SPZs for this segment are shown within Figure 24.23.

Groundwater Sensitivity

24.4.209 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.210 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Immediately to the east of the segment, flood defences are present along The Delph (Friskney Drain) in the form of embankments, with an effective crest level of between 5.28m AOD to 6.92m AOD. The design standard of protection of these defences are considered to be one in five-years. Various flood defences are also located along the coast in the form of embankments, at Wrangle Marsh and Jubilee Bank, with design standards of protection varying from one in five-years to 1 in 150-years.

24.4.211 Surface water flood risk mapping produced by the EA[1] indicates there are limited areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.212 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.213 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.214 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

[1] Environment Agency Long Term Flood Risk Mapping, https://check-long-term-flood-risk.service.gov.uk/postcode

Water Quality

River Water Quality

24.4.215 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.216 The water body catchments in this segment are:

- East and West Fen Drains – bad ecological status and fail chemical status
- Lymn/ Steeping – moderate ecological status and fail chemical status

Groundwater Quality

24.4.217 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution events

24.4.218 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. There are no identified pollution incidents within this segment.

Discharge Consents

24.4.219 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.10 below.

Table 24.10: WM7 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
M.J. Worth Ltd	Not Supplied	Agricultural effluents	Unknown Tributary
Mr J Atkinson	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into Land
Anglian Water Services Limited	Not Given	Public Sewage: Storm Sewage Overflow	Unnamed Drain of Steeping Haven
Atkinsons Farms Ltd	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
C W Parker (Wainfleet) Ltd	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Public Sewage: Storm Sewage Overflow	Unnamed Drain of Steeping Haven
R J Epton	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land

Permit Holder	Catchment	Discharge Type	Receiving Water
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Public Sewage: Storm Sewage Overflow	Unnamed Drain of Steeping Haven
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Sewage Discharges - Pumping Station - Water Company	Unnamed Drain of Steeping Haven
M J Worth Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Lincolnshire Cc	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Whitehouse Farm Drain
Lindsey Marsh Drainage Board	Not Supplied	Trade Effluent Discharge-Site Drainage	Wainfleet Channel/ River Steeping
R Harrison & Sons Ltd	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
R J Epton	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Lincolnshire Cc	Lymn/steeping River (Spilsby)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Worth's Main Drain
Mr J Atkinson	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into Land
M J Worth Ltd	Lymn/steeping River (Spilsby)	Trade Discharge - Process Water	Roadside Ditch
The Royal British Legion Housing	Not Supplied	Discharge Of Other Matter-Surface Water	Steeping River
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Public Sewage: Storm Sewage Overflow	River Steeping

Abstractions

24.4.220 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.221 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology. There are several ecological designations located within 2km of the segment. These consists of the following statutory designations:

- The Wash – SPA, Ramsar, SSSI, SAC;

- Wainfleet Range – Local Wildlife Site; and
- Wrangle Brick Pits – Local Wildlife Site.

WM8 – Staples Farm to Crowhall Lane

Hydrological Setting

24.4.222 The Staples Farm to Crowhall Lane segment lies within the wider Fens East and West Operational Catchment. On a small scale, the segment is drained by East and West Fen Drains (ordinary watercourse), which has an entire catchment area of 371.8km^2.

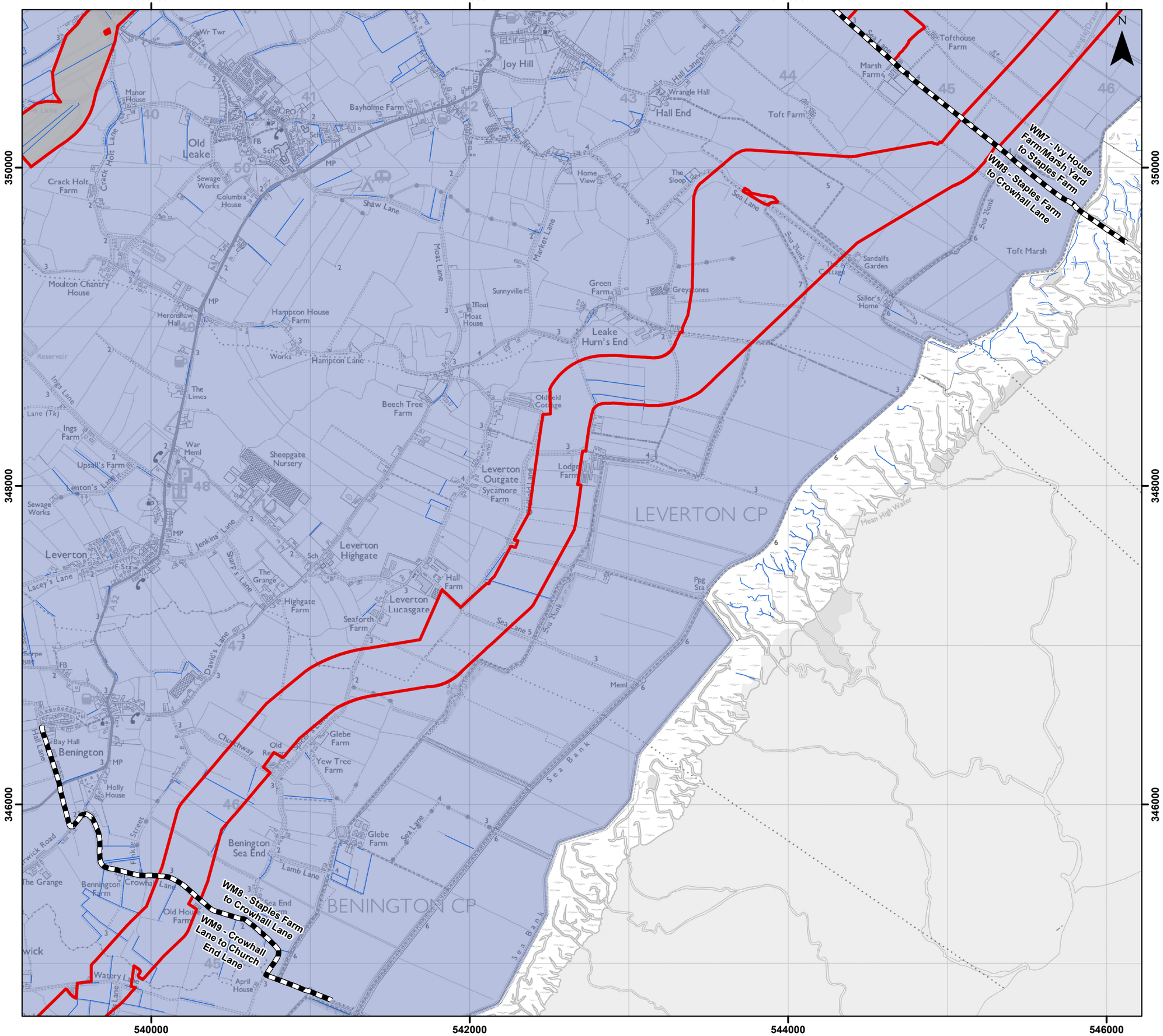
24.4.223 The drainage board within this segment is W4IDB who are responsible for the management and maintenance of drainage within their area. There are several W4IDB maintained watercourses and pumping stations within or serving the segment, including the following drainage channels: Staples Wrangle Marsh and Sailors Home, Cemetery to Roman Bank, Leverton to Leake Hurns End, Leverton Lodge, Ings to Sea Bank, Benington Marsh, Church Yard to Benington Gull and Benington Drain. The pumping stations include:

- Leverton pumping station is located approximately 900m east of the onshore ECC, serving Leverton Drain and Benington Marsh drainage channel; and
- Benington pumping station is located approximately 1.6km southeast of the onshore ECC serving Benington Drain

24.4.224 The significant watercourses within this segment are shown in Figure 24.24.

Watercourse sensitivity

24.4.225 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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WM8 - Watercourses and Flood Zones

Figure 24.24

OUTER DOWSING OFFSHORE WIND

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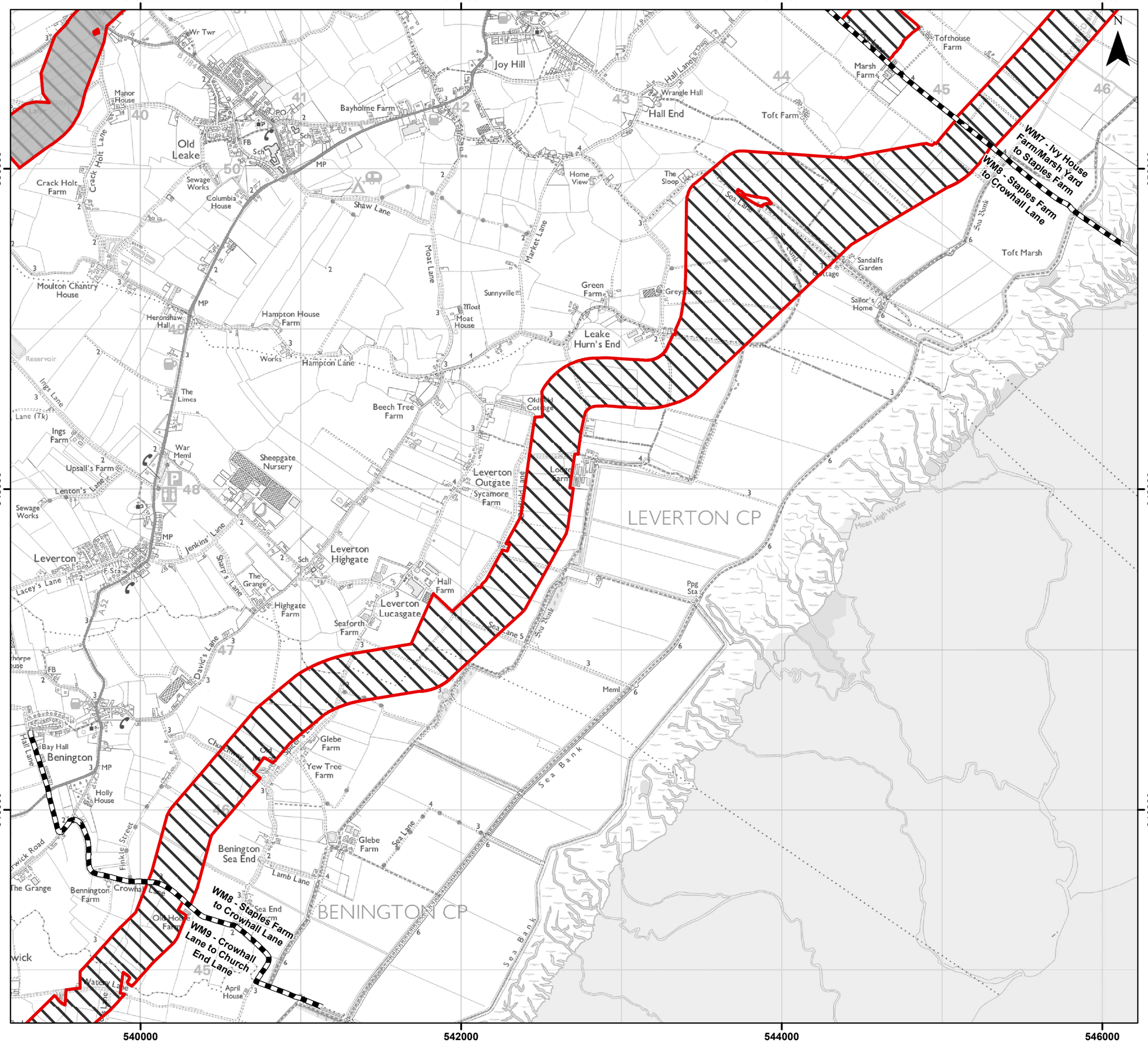

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Unproductive Strata

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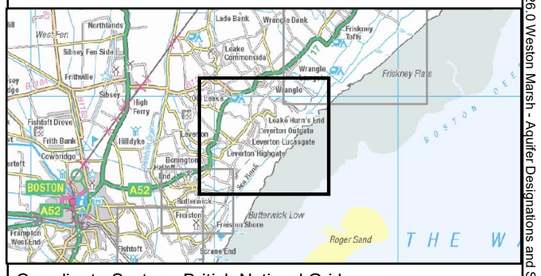

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:22,500

Preliminary Environmental Information Report

WM8 - Aquifer Designations and Source Protection Zones

Figure 24.25

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.226 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.227 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Kimmeridge Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.228 The segment is not designated as a SPZ.

24.4.229 The aquifer designations and SPZs for this segment are shown within Figure 24.25.

Groundwater Sensitivity

24.4.230 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.231 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. A flood defence is present in the form of an embankment within the cable corridor at Sea Lane, with an effective crest level of 4.96m AOD, and a design standard of protection of one in five-years. Immediately to the southeast of the segment, flood defences are present along in the form of embankments, with an effective crest level of between 4.65m AOD to 5.26m AOD. The design standard of protection of these defences are considered to be one in five-years.

24.4.232 Surface water flood risk mapping produced by the EA[1] indicates there are limited areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.233 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.234 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.235 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.236 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.237 The water body catchment in this segment is:

- East and West Fen Drains – bad ecological status and fail chemical status

Groundwater Quality

24.4.238 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution events

24.4.239 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment are minor and are listed below:

- A 'minor' incident on 17th May 1993 in Lincoln District where an unknown cause led to an unknown pollutant entering a tributary of Fodder Dyke;
- A 'minor' incident on 9th March 1992 in Lincoln District where an unknown cause led to an unknown pollutant entering Soak Dyke behind Sea Bank;
- A 'minor' incident on 9th April 1996 in Lincoln District where poor operational practice led to organic wastes entering a freshwater stream;
- A 'minor' incident on 8th January 1998 in Lincoln District where an unknown cause led to sewage sludge entering an unnamed dyke; and
- A 'minor' incident on 5th June 1995 in Lincoln District where poor operational practice led to oils entering a tributary of Fodder Dyke.

Discharge Consents

24.4.240 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.11 below.

Table 24.11: WM8 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
J P Grala Esq	Not Supplied	Unknown	Into Lane
Mr Denis Bennett	Not Supplied	Unknown	Land
B. Nettleship Esq.,	Not Supplied	Unknown	Land
East Lindsay D.C.	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary

Permit Holder	Catchment	Discharge Type	Receiving Water
Roughton Farms Ltd	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Miss N Robinson	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Wrangle Drain
Mr L Harrison	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Fodder Dike
Mr Peter & Mrs Yvonne Shaw	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	The Delph
Waterloo Housing Group Ltd	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Fodder Dike
Mr & Mrs N Goodhew	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
East Lindsay D.C.	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	A Stream
W M Cooper + Sons Ltd	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Mr. A. Willis	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Fodder Dyke
Mr R Hampson	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
Mrs Wendy Smith	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
Mr D A Patrick	Not Supplied	Unknown	Land
Mr R J Bullard	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of the Hobhole Drain
East Lindsay D.C.	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into A Stream
Mr Barry Winsley	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	River The Delph
Mr & Mrs N Goodhew	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
E G Holmes & Co	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Tuplin & Son Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Boston Mayflower	West Fen/East Fen	Sewage Discharges -	Tributary of Hobhole Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
Housing Company	Catchwater	Final/Treated Effluent - Not Water Company	
Mr J Bray	Not Supplied	Unknown	Into Land
Mrs A Faulkner & Mr C Stothard	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of the Fodder Dike
Mrs Wendy Smith	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke

Abstractions

24.4.241 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.242 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology. The only ecological designation located within 2km of this segment is The Wash – SPA, Ramsar, SSSI, and SAC.

WM9 – Crowhall Lane to Church End Lane

Hydrological Setting

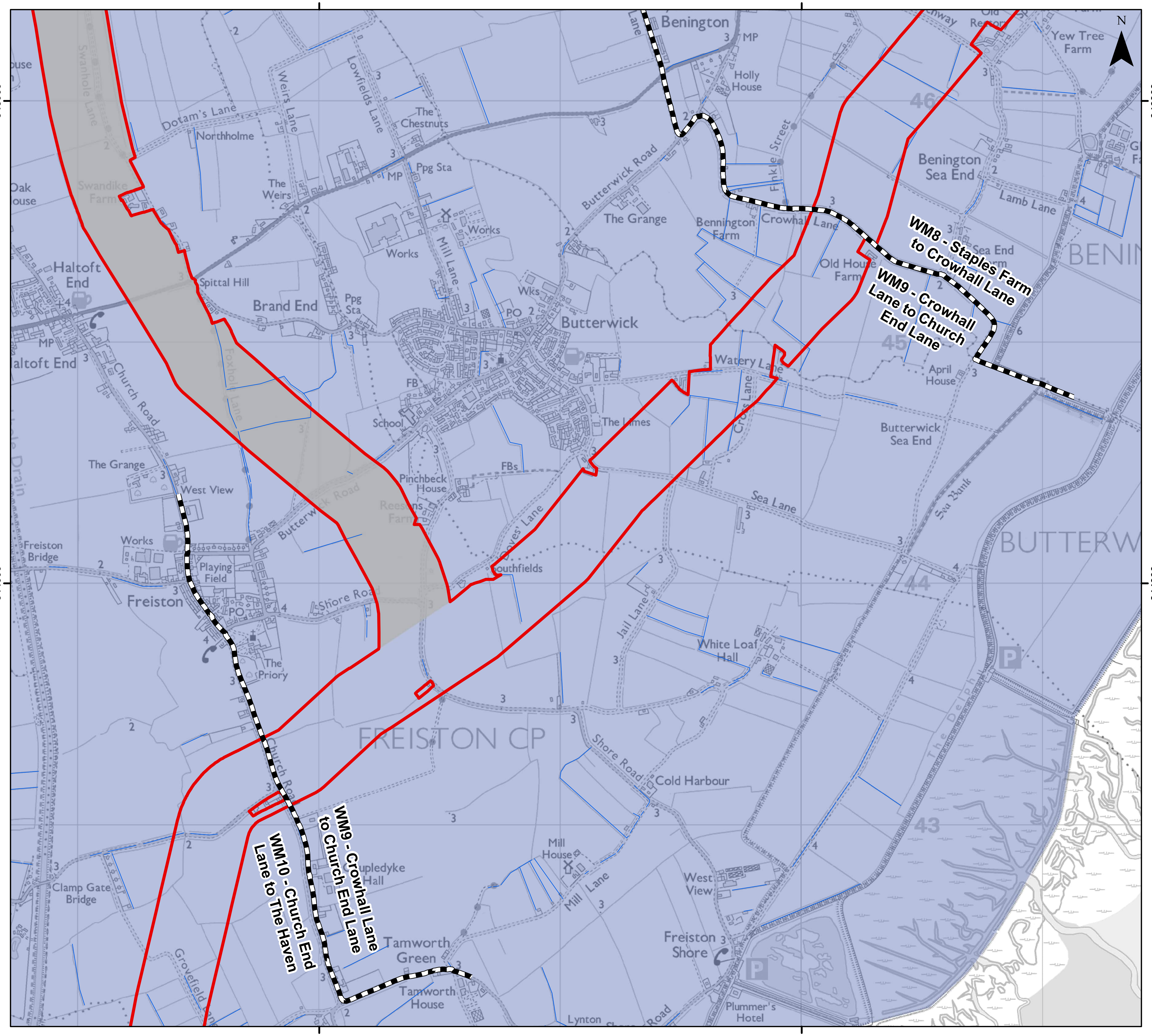
24.4.243 The Crowhall Lane to Church End Lane segment lies within the wider Fens East and West Operational Catchment. On a small scale, the segment is drained by East and West Fen Drains (ordinary watercourse), which has an entire catchment area of 371.8km^2.

24.4.244 The drainage board within this segment is W4IDB who are responsible for the management and maintenance of drainage within their area. There are several W4IDB maintained watercourses and pumping stations within or serving this segment, including the following drainage channels: Crowhall, Watery Lane, Butterwick Main, The Firs, Doves Lane, Caythorpe House to Sea Bank and Poynton Hill. Benington pumping station located approximately 1.8km northeast of the onshore ECC, serving Benington Drain and Butterwick Main drainage channel.

24.4.245 The significant watercourses within this segment are shown in Figure 24.26

Watercourse sensitivity

24.4.246 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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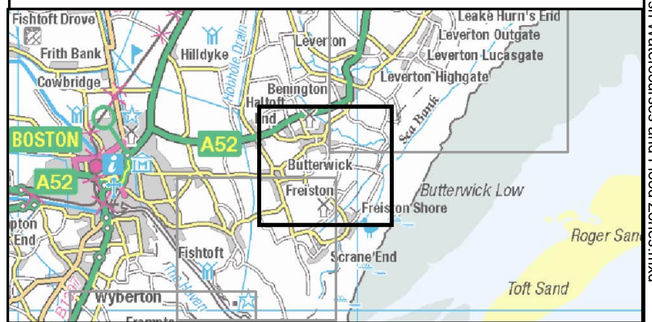

Coordinate System: British National Grid

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Scale: 1:15,000

Preliminary Environmental Information Report

WM9 - Watercourses and Flood Zones

Figure 24.26

OUTER DOWSING OFFSHORE WIND

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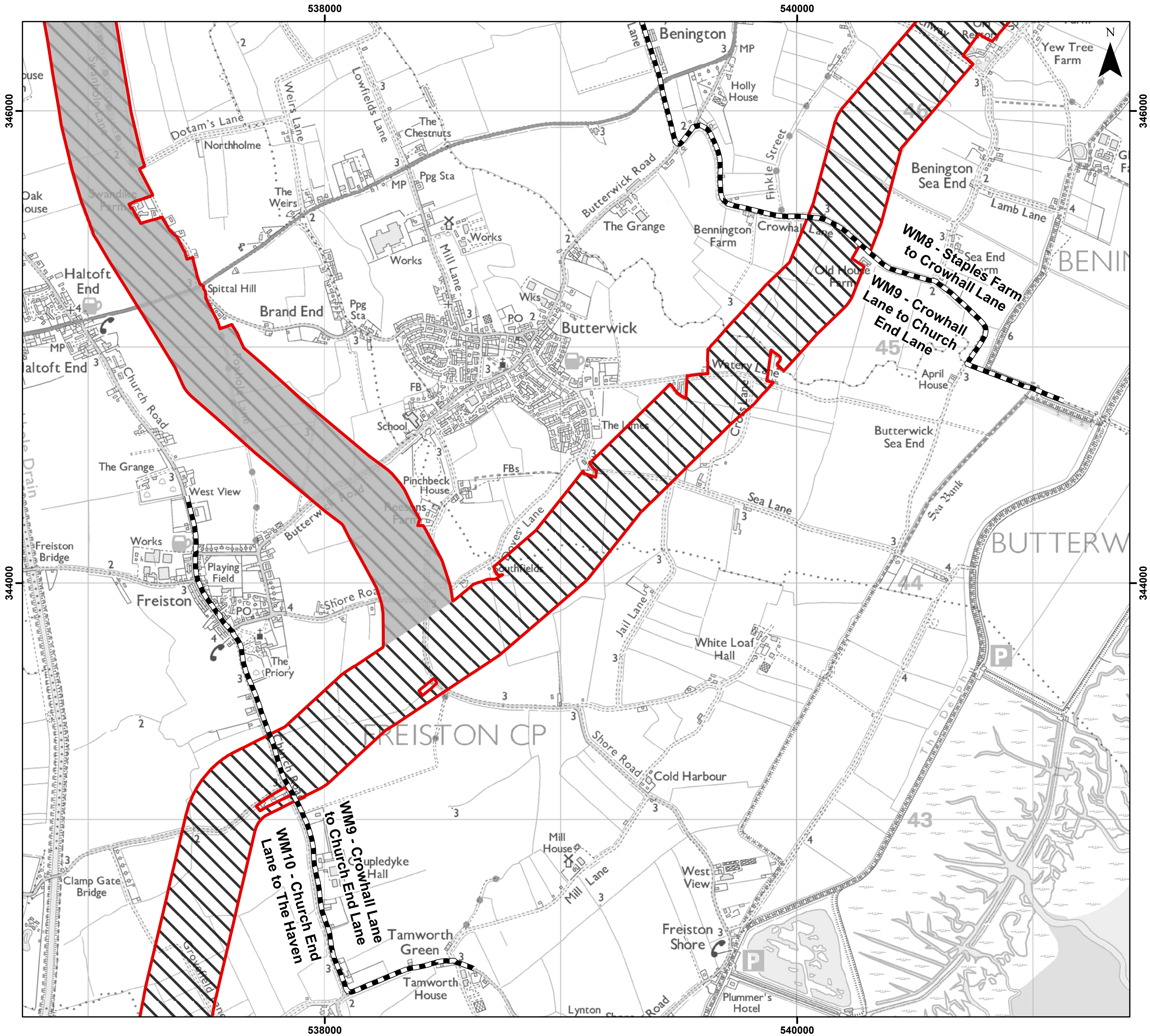
538000
540000
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344000
Benington
Holly House
Yew Tree Farm
Dotam's Lane
Northolme
The Chestnuts
Weirs Lane
Lowfields Lane
Ppg Sta
The Weirs
Works
Mill Lane
Butterwick Road
The Grange
Bennington Farm
Crowhall Lane
Finkle Street
Benington Sea End
Lamb Lane
Sea End Farm
Old House Farm
BENIN
Halftoft End
Spittal Hill
Brand End
Butterwick
WM8 - Staples Farm to Crowhall Lane
WM9 - Crowhall Lane to Church End Lane
Watery Lane
April House
Church Road
School
The Limes
Butterwick Sea End
The Grange
West View
Pinchbeck House
Sea Lane
Sea Bank
Freiston Bridge
Playing Field
Freiston
Shore Road
BUTTERW
Jail Lane
White Loaf Hall
The Priory
FREISTON CP
Shore Road
Cold Harbour
WM10 - Church End Lane to The Haven
WM9 - Crowhall Lane to Church End Lane
Cupledyke Hall
Clamp Gate Bridge
Mill House
Mill Lane
West View
Tamworth Green
Tamworth House
Freiston Shore
Plummer's Hotel
The Delph
Lynton

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Unproductive Strata

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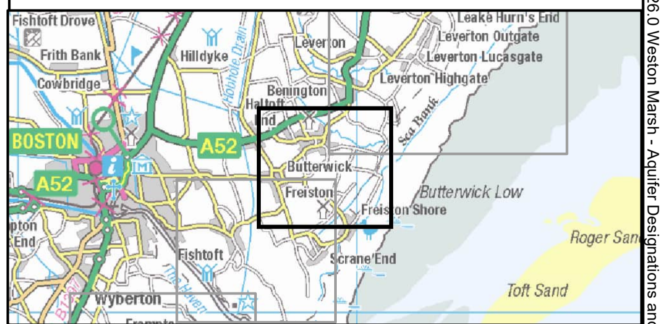

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

WM9 - Aquifer Designations and Source Protection Zones

Figure 24.27

OUTER DOWSING OFFSHORE WIND

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Revision: 0.1

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Geological and Hydrogeological Setting

24.4.247 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.248 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Ampthill Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.249 The segment is not designated as a SPZ.

24.4.250 The aquifer designations and SPZs for this segment are shown within Figure 24.27.

Groundwater Sensitivity

24.4.251 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.252 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Various flood defences are also located along the coast in the form of embankments, at Wrangle Marsh and Jubilee Bank, with design standards of protection varying from one in five-years to 1 in 150-years.

24.4.253 Surface water flood risk mapping produced by the EA[1] indicates there are limited areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.254 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.255 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.256 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.257 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

24.4.258 The water body catchment in this segment is:

- East and West Fen Drains – bad ecological status and fail chemical status

Groundwater Quality

24.4.259 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution events

24.4.260 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment range from significant to minor and are listed below:

- A 'significant' incident on 28th February 1996 in Lincoln District where an unknown cause led to oils entering an unnamed stream.
- A 'minor' incident 11th April 1996 in Lincoln District where a wrong connection led to an unknown pollutant entering a tributary of New Marsh Drain.
- A 'minor' incident on 3rd February 1992 in Lincoln District where an unknown cause led to an unknown pollutant entering Wrangle Marsh.
- A 'minor' incident on 14th March 1995 in Lincoln District where an unknown cause led to oils entering a tributary of Hobhole Drain.
- A 'minor' incident on 3rd February 1992 in Lincoln District where an unknown cause led to an unknown pollutant entering salt marshes.

Discharge Consents

24.4.261 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.12 below.

Table 24.12: WM9 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
J Hardwick	Not Supplied	Unknown	Land
M & D Crawford-Thomson	Not Supplied	Unknown	Land
M J Crawford	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr P English	West Fen/East Fen Catchwater	Unknown	Land
Boston Mayflower	River Rhee / River Mel / River Shep	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Tributary of Hob Hole Drain
Boston Mayflower	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Lade Bank Drain
Boston Borough Council	Not Supplied	Unknown	Land

Permit Holder	Catchment	Discharge Type	Receiving Water
Boston Borough Council	Not Supplied	Unknown	Land
Boston Borough Council	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary
G. Paul Esq.,	Not Supplied	Unknown	Land
J D Yates Esq.	Not Supplied	Unknown	Land
Leverton Pigs Ltd	Not Supplied	Trade Effluent	Unknown Tributary
Staples Brothers Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Wrangle Drain
N K Walden	Not Supplied	Unknown	Not Supplied
Richard Grant & Son (Leverton) Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
T H Clements & Son Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
George Bateman & Son Ltd	West Fen/East Fen Catchwater	Sewage And Trade Combined - Unspecified	Tributary of Sea Lane Dyke
Mr N A Watson	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Drain
Mr D & Mrs J Purdy	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
Mr Brian Allen	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Watercourse
Boston Mayflower	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
B Henton	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Watercourse
J.G. Roff Esq.	Not Supplied	Unknown	Land
Mr And Mrs S Foster	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of River Witham
T H Clements & Son Ltd	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
J F & J Edwards & Son	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Mr P Marsh & Miss J Oakley	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
John Saul Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mr A M Swain	Not Given	Sewage Discharges - Final/Treated Effluent -	Unknown Tributary

Permit Holder	Catchment	Discharge Type	Receiving Water
		Not Water Company	
Mrs Redford	Not Supplied	Unknown	Land
E W Bowser & Son Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Boston Borough Council	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into Dyke
Boston Mayflower	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
Mr M A Franklin	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Drain 4/78 (Pinder's Bridge T)
Mr & Mrs P Docherty	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Hobhole Drain
J. Baxter	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary River Witham
J R Spikings Esq.	Not Supplied	Unknown	Land
Mrs C West	Not Supplied	Agricultural effluents	Not Supplied
Boston Borough Council	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
Mr A J Flynn	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of the North Sea
Boston Mayflower Housing Company	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	A Tributary of Hobhole Drain
Mr J D Platts	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
D R Tranter	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary
Mr W T Lefley	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Boston Borough Council	Not Supplied	Unknown	Land
Boston Borough Council	Not Supplied	Unknown	Land
Lincolnshire Police	Not Supplied	Unknown	Land
Mr.B.T.Eastick	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Hobhole Drain
Mrs Rose Wise	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
Boston Borough Council	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary
Western Power Distribution (East Midlands) Plc	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
White Cat Caravan Park	Not Supplied	Unknown	Land
The Occupier	Not Supplied	Unknown	Land
Mr.B.T.Eastick	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
E H Wilkinson Esq.	Not Supplied	Unknown	Land
Mr Mumby	River Hiz (Hitchin)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Village Drain
Boston Borough Council	Not Supplied	Unknown	Land
Boston Mayflower	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
F Fowcett	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Me Kevin Lannen	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Lawyers Creek
Boston Mayflower	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Lade Bank Drain
East Midlands Electricity Plc	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr Thomas William Wright	Not Supplied	Agricultural effluents	Not Supplied
Boston Borough Council	Not Supplied	Unknown	Land
M J Crawford	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land

Abstractions

24.4.262 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.263 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.264 There are several ecological designations located within 2km of the segment. These consists of the following statutory designations:

- The Wash – SPA, Ramsar, SSSI, SAC
- Freiston Shore – RSPB Reserve

WM10 – Church End Lane to The Haven

Hydrological Setting

24.4.265 The Church End Lane to The Haven segment lies within the wider Fens East and West Operational Catchment. On a small scale, the segment is drained by East and West Fen Drains (ordinary watercourse), which has an entire catchment area of 371.8 km^2.

24.4.266 Other watercourses within or serving this segment include Hobhole Drain, The Haven and The Graft.

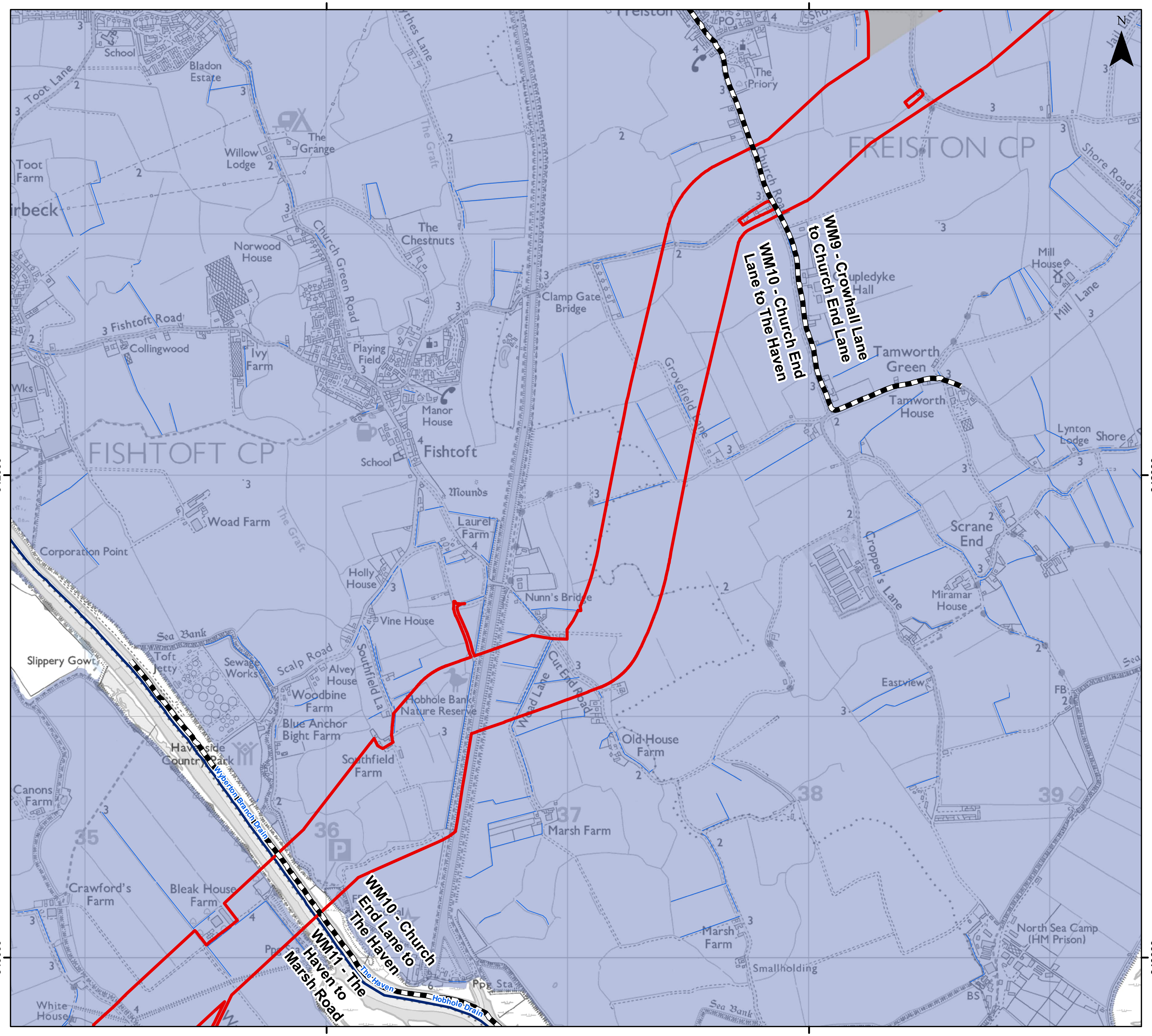
24.4.267 The drainage board within this segment is W4IDB who are responsible for the management and maintenance of drainage within their area. There are several W4IDB maintained watercourses and pumping stations within this segment, including the following drainage channels: Freiston Main, Clampgate (2) East Branch, New Tunnel to Tamworth, Grovefield Lane to Sea Bank, Fishtoft Marsh North, Woad Lane, Hobhole Drain, Southfields Lane and The Graft. The pumping stations include:

- Hobhole electric pumping station located approximately 500m southeast of the onshore ECC serving Hobhole Drain; and
- Hobhole pumping station located approximately 650m southeast of the onshore ECC serving Hobhole Drain.

24.4.268 The significant watercourses within this segment are shown in Figure 24.28.

Watercourse sensitivity

24.4.269 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



536000
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FISHTOFT CP
FREISTON CP
WM9 - Crowhall Lane to Church End Lane
WM10 - Church End Lane to The Haven
WM11 - The Haven to Marsh Road
Fishtoft
Tamworth Green
Tamworth House
Scrane End
Miramar House
Eastview
Old House Farm
Marsh Farm
North Sea Camp (HM Prison)
Smallholding
Haven side Country Park
Slippery Gowt
Corporation Point
Woad Farm
Laurel Farm
Holly House
Vine House
Nunn's Bridge
Clamp Gate Bridge
Cupledyke Hall
Mill House
Lynton Lodge
Shore
Woodbine Farm
Blue Anchor Bight Farm
Southfield Farm
Hobhole Bank Nature Reserve
Alvey House
Sewage Works
Toft Jetty
Canons Farm
Crawford's Farm
Bleak House Farm
White House
Manor House
Playing Field
Ivy Farm
Collingwood
Fishtoft Road
Norwood House
The Chestnuts
Willow Lodge
The Grange
Toot Farm
Toot Lane
Bladon Estate
School
The Priory
Church Road
Church Green Road
Scalp Road
Southfield La
Cut End Road
Woad Lane
Grovefield Lane
Cropper's Lane
Mill Lane
Shore Road
Sea Bank
Wyberton Branch Drain
The Haven
Hobhole Drain

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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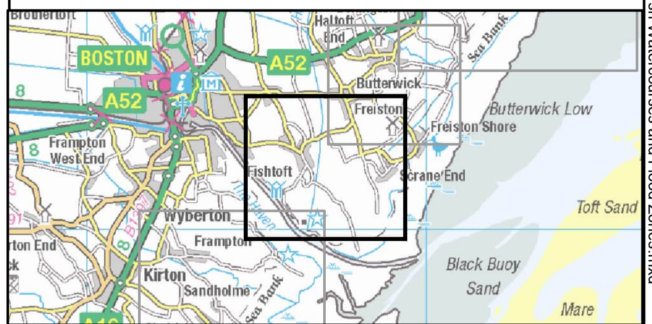

Coordinate System: British National Grid

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Scale: 1:15,000

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WM10 - Watercourses and Flood Zones

Figure 24.28

OUTER DOWSING OFFSHORE WIND

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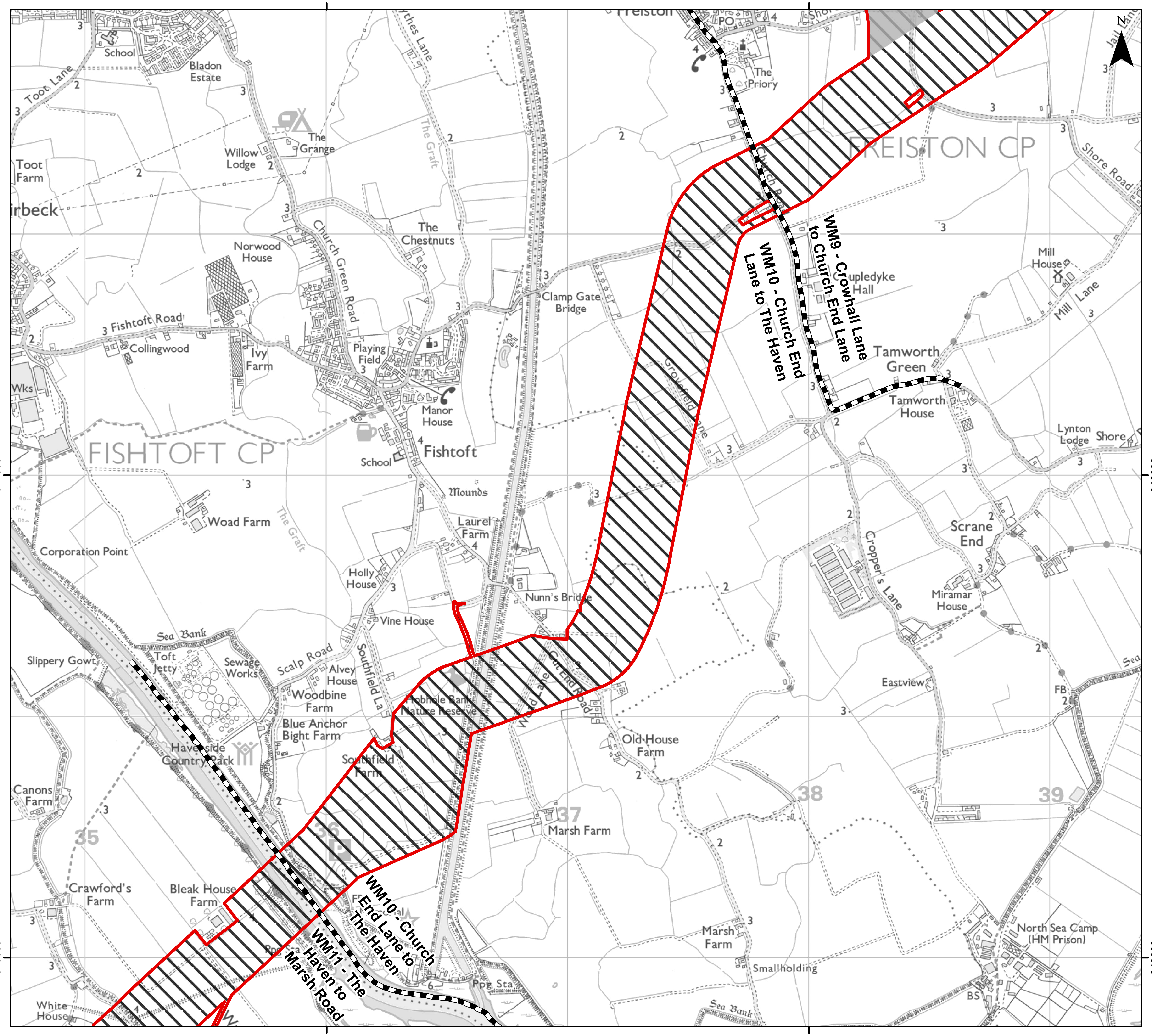

536000
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FISHTOFT CP
FREISTON CP
Fishtoft
Freiston
Toot Lane
Toot Farm
School
Bladon Estate
Willow Lodge
The Grange
The Graft
The Chestnuts
Norwood House
Church Green Road
Fishtoft Road
Collingwood
Ivy Farm
Playing Field
Manor House
Wks
Mounds
Woad Farm
Corporation Point
Laurel Farm
Clamp Gate Bridge
Holly House
Nunn's Bridge
Vine House
Sea Bank
Toft Jetty
Slippery Gowt
Sewage Works
Scalp Road
Alvey House
Southfield La
Woodbine Farm
Blue Anchor Bight Farm
Havenside Country Park
Hobhole Bank Nature Reserve
Southfield Farm
Canons Farm
Crawford's Farm
Bleak House Farm
White House
Marsh Farm
Old House Farm
Smallholding
Ppg Sta
Church End Road
Wood Lane
Grovefield Lane
The Priory
Coupledyke Hall
Tamworth Green
Tamworth House
Cropper's Lane
Scrane End
Miramar House
Eastview
Mill House
Mill Lane
Shore Road
Jail Lane
Lynton Lodge
Shore
North Sea Camp (HM Prison)
WM9 - Crowhall Lane to Church End Lane
WM10 - Church End Lane to The Haven
WM11 - The Haven to Marsh Road
35
36
37
38
39

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Unproductive Strata

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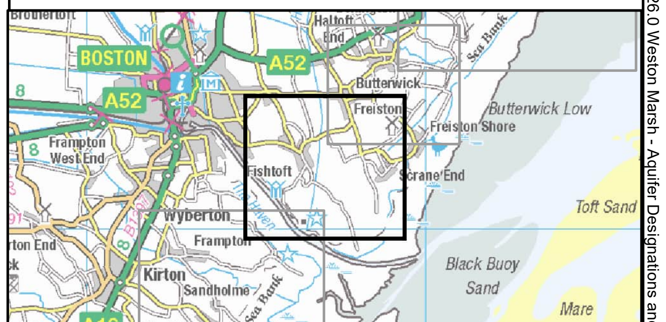

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

WM10 - Aquifer Designations and Source Protection Zones

Figure 24.29

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.270 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.271 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Ampthill Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.272 The segment is not designated as a SPZ.

24.4.273 The aquifer designations and SPZs for this segment are shown within Figure 24.29.

Groundwater Sensitivity

24.4.274 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.275 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Flood defences are located to the south of the segment along the north-eastern bank of The Haven in the form of embankments, with an effective crest level of 6.03m AOD, and a design standard of protection of 1 in 150-years.

24.4.276 Surface water flood risk mapping produced by the EA[1] indicates there are limited areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.277 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.278 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.279 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.280 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

24.4.281 The water body catchment in this segment is:

- East and West Fen Drains – bad ecological status and fail chemical status.

Coastal/ Transitional Water Quality

24.4.282 The estuarine transitional waters are monitored as the Witham transitional waterbody which has bad ecological status and fail for chemical status.

Groundwater Quality

24.4.283 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution events

24.4.284 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment are minor and are listed below:

- A 'minor' incident on 26th August 1996 in Lincoln District where an accidental spillage led to oils entering a tributary of Hobhole Drain.

Discharge Consents

24.4.285 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.13 below.

Table 24.13: WM10 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Boston Mayflower	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Hobhole Drain
Arable & Bulb Chemicals Limited	Not Supplied	Unknown	Land
Boston Borough Council	Not Supplied	Unknown	Land
F Buitelaar Limited	Not Supplied	Unknown	Land
Fred Grant (Company)	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
J A Bland	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mr R Birkin	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Hobhole Drain
Kevin Humphries	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary
Boston Borough Council	Not Supplied	Unknown	Land
Mr & Mrs R Tarling	Not Supplied	Unknown	Land
Mr S G Shoesmith	Not Supplied	Unknown	Land
Mr Andrew Smith	West Fen/East Fen	Sewage Discharges -	Tributary of River Haven

Permit Holder	Catchment	Discharge Type	Receiving Water
	Catchwater	Final/Treated Effluent - Not Water Company	
A. R. Teague Esq.,	Not Supplied	Unknown	Land
A & E Pearson & Sons	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Boston Borough Council	Not Supplied	Unknown	Land
Mrs N Cooper	Not Supplied	Unknown	Land
Boston Borough Council	Not Supplied	Unknown	Land
Marshall Bros (Potatoes) Ltd	West Fen/East Fen Catchwater	Trade Discharge - Process Water	A Stream
Kevin Humphries	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary

Abstractions

24.4.286 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.287 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.288 There are several ecological designations located within 2km of the segment. These consists of the following statutory designations:

- The Wash – SPA, Ramsar, SSSI, SAC;
- Freiston Shore – RSPB Reserve;
- Havenside – Local Nature Reserve (LNR), Local Wildlife Site;
- Hobhole Drain, Baker's Bridge South – Local Wildlife Site; and
- Hobhole Bank – Local Wildlife Site.

WM11 – The Haven to Marsh Road

Hydrological Setting

24.4.289 The Haven to Marsh Road segment lies within the wider South Forty Foot Drain Operational Catchment. On a small scale, the segment is drained by two watercourses:

- Black Sluice IDB draining to the South Forty Foot Drain (ordinary watercourse), which has an entire catchment area of 447.2 km^2; and
- Kirton Marsh Drain (ordinary watercourse), which has an entire catchment area of 15.7km^2.

24.4.290 Other watercourses in this segment include The Haven, Craile Eau, Boundary Drain and Wyberton Branch Drain.

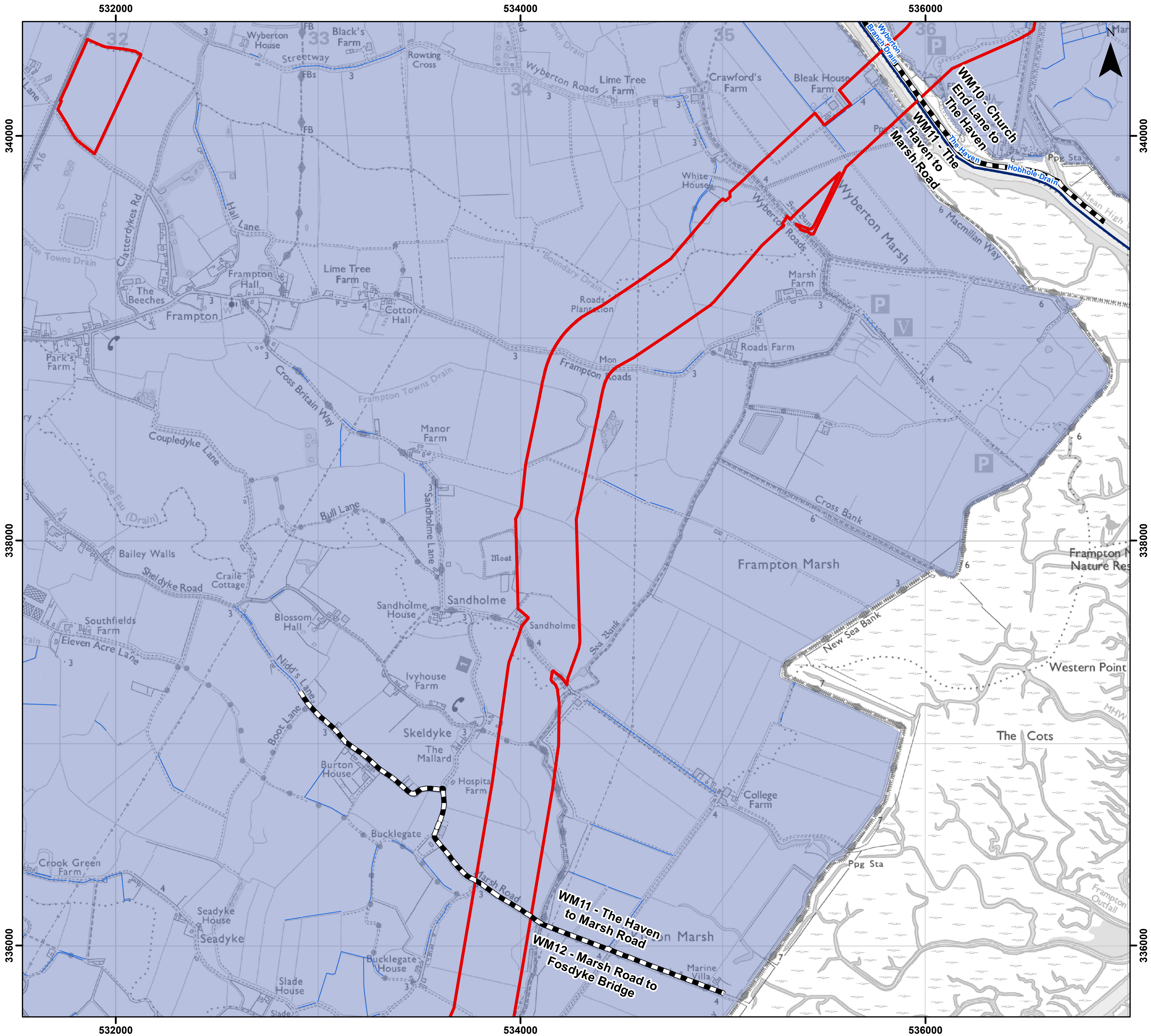
24.4.291 The drainage board within this segment is Black Sluice IDB (BSIDB) who are responsible for the management and maintenance of drainage within their area. There are several BSIDB maintained watercourses and pumping stations within and serving this segment including Wyberton Marsh Pump Drain, Wyberton Frampton Boundary Drain, Wyberton Branch Drain, Junction Drain, Frampton Towns Drain, Branch South, Craile Eau and Branch Northwest. The pumping stations include:

- Wyberton Marsh pumping station is located approximately 100m northeast of the onshore ECC, serving Wyberton Marsh Pump Drain; and
- Kirton Marsh pumping station located approximately 1,150m south of the segment, serving Craile Eau.

24.4.292 The significant watercourses within this segment are shown in Figure 24.30.

Watercourse sensitivity

24.4.293 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



532000
534000
536000
340000
338000
336000
Wyberton House
Black's Farm
Streetway
Rowting Cross
Wyberton Roads
Lime Tree Farm
Crawford's Farm
Bleak House Farm
WM10 - Church End Lane to The Haven
WM11 - The Haven to Marsh Road
Wyberton Branch Drain
The Haven
Hobhole Drain
Ppg Sta
Macmillan Way
White House
Wyberton Roads
Wyberton Marsh
Clatterdykes Rd
Hall Lane
Towns Drain
Frampton Hall
Lime Tree Farm
Boundary Drain
Marsh Farm
The Beeches
Frampton
Cotton Hall
Roads Plantation
Park's Farm
Cross Britain Way
Frampton Towns Drain
Mon
Frampton Roads
Roads Farm
Manor Farm
Coupledyke Lane
Craile Eau (Drain)
Bull Lane
Sandholme Lane
Moat
Cross Bank
Frampton Marsh
Bailey Walls
Sheldyke Road
Craile Cottage
Frampton Nature Res
Southfields Farm
Blossom Hall
Sandholme House
Sandholme
New Sea Bank
Eleven Acre Lane
Nidd's Lane
Sea Bank
Ivyhouse Farm
Western Point
Boot Lane
Skeldyke
The Mallard
The Cots
Burton House
Hospital Farm
College Farm
Bucklegate
Crook Green Farm
Marsh Road
Ppg Sta
Frampton Outfall
Seadyke House
Seadyke
WM11 - The Haven to Marsh Road
WM12 - Marsh Road to Fosdyke Bridge
Marine Villa
Bucklegate House
Slade House
N

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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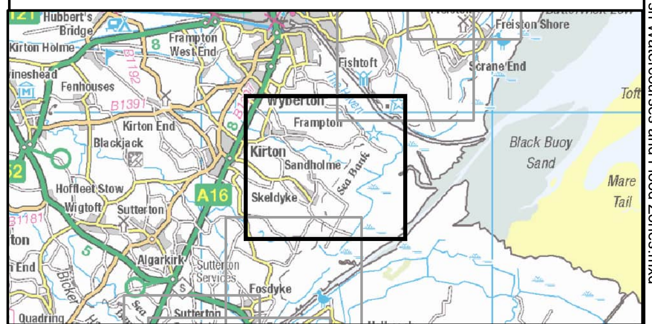

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:17,500

Preliminary Environmental Information Report

WM11 - Watercourses and Flood Zones

Figure 24.30

OUTER DOWSING OFFSHORE WIND

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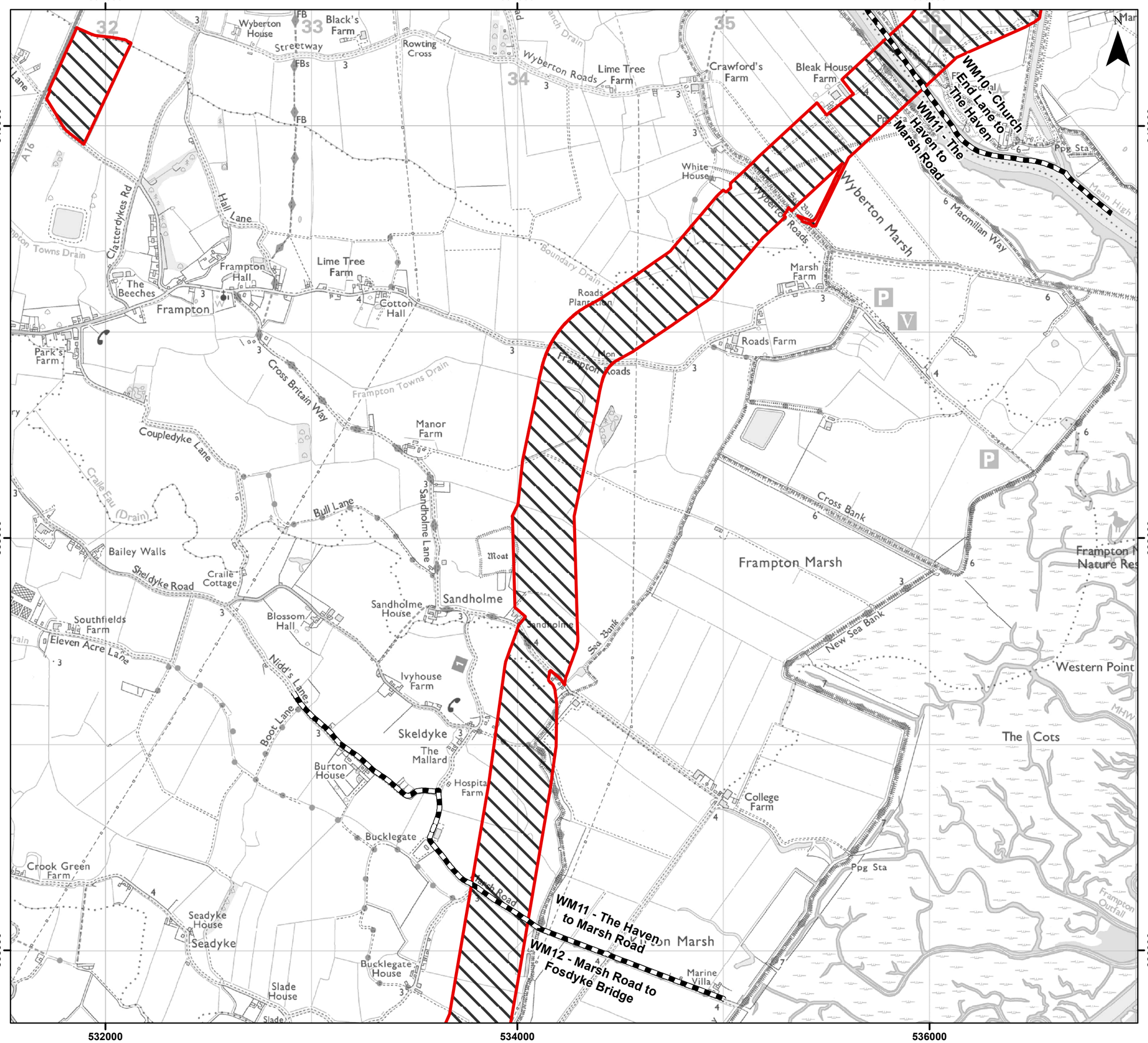

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Unproductive Strata

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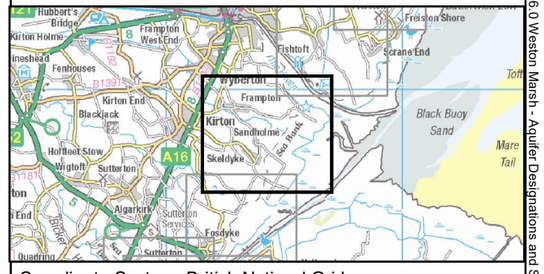

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:17,500

Preliminary Environmental Information Report

WM11 - Aquifer Designations and Source Protection Zones

Figure 24.31

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.294 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.295 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Ampthill Clay Formation and West Walton Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.296 The segment is not designated as a SPZ.

24.4.297 The aquifer designations and SPZs for this segment are shown within Figure 24.31.

Groundwater Sensitivity

24.4.298 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.299 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Flood defences are located to the north of the segment, crossing the onshore ECC, along the south-western bank of The Haven in the form of embankments, with an effective crest level of 6.54m AOD, and a design standard of protection of 1 in 150-years. Flood defences are also present along Wyberton Road, crossing the onshore ECC in the form of an embankment, with an effective crest level 5.52m AOD, and a design standard of protection of one in five-years. Another set of flood defences cross the onshore ECC south of Sandholme Lane, however the EA do not hold any information on these defences.

24.4.300 Surface water flood risk mapping produced by the EA[1] indicates there are some areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.301 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.302 The majority of the segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs. However, a small area to the north of the segment between Wyberton Road and Break House Farm lies within an area at risk of flooding from reservoirs, associated with Wyberton Marsh pumping station.

Floodplain sensitivity

24.4.303 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.304 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.305 The water body catchments in this segment are:

- Black Sluice IDB draining to the South Forty Foot Drain – moderate ecological status and fail chemical status
- Kirton Marsh Drain – good ecological status and fail chemical status

Groundwater Quality

24.4.306 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution events

24.4.307 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment ranges from significant to minor and are listed below:

- A 'minor' incident on 26th February 1998 in Manby District where an unknown cause led to an unknown pollutant entering Frampton Marsh Drain;
- A 'minor' incident on 4th September 1998 in Manby District where an unknown cause led to oils entering an unnamed stream;
- A 'minor' incident on 8th April 1992 in Lincoln District where an unknown cause led to an unknown pollutant entering Witham Drain;
- A 'minor' incident on 15th June 1992 in Lincoln District where an unknown cause led to an unknown pollutant entering Hobhole Drain;
- A 'significant' incident on 15th April 1993 in Lincoln District where an unknown cause led to an unknown pollutant entering a tributary of Hobhole Drain;
- A 'minor' incident on 6th June 1998 in Manby District where a leaking tank led to oils entering an unnamed stream; and
- A 'minor' incident on 17th January 1994 in Norwich District where an accidental spillage led to oils entering River Bure/Goose Beck.

Discharge Consents

24.4.308 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.14 below.

Table 24.14: WM11 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Alec Congy (Farms) Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	Witham Haven
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	Witham Haven
The Governor (Fao: Mr P James)	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of The Haven
Bernard Matthews Foods Ltd.	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Tributary of Hobhole Drain
Miss Samantha Rundlett	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	Witham Haven
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	Witham Haven
Malcolm Paterson	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Graft Drain
W Bradley & Sons (Freiston) Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mr R J Follows	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Hobhole Drain
Boston Borough Council	Not Supplied	Unknown	Land
Mr A W & K E Hardy	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Witham 4th IDB Drain
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	Witham Haven
Mr Malcolm Patterson	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	The Graft (Drain)
Estate Associates Limited	Not Supplied	Unknown	Land

Abstractions

24.4.309 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.310 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.311 There are several ecological designations located within 2km of the segment. These consists of the following statutory designations:

- The Wash – SPA, Ramsar, SSSI, SAC;
- The Wash – National Nature Reserve;
- Frampton Marsh – RSPB Reserve;
- Frampton Marsh – Local Wildlife Trust;
- Slippery Gowt Sea Bank – Local Wildlife Site; and
- Frampton Hall – Local Wildlife Site.

WM12 – Marsh Road to Fosdyke Bridge

Hydrological Setting

24.4.312 The northern part of the Marsh Road to Fosdyke Bridge segment lies within the wider South Forty Foot Drain Operational Catchment. On a smaller scale, the northern part of the segment is drained by Kirton Marsh Drain (ordinary watercourse), which has an entire catchment area of 15.7km^2. The southern part of the segment lies within the wider Welland Operational catchment. On a smaller scale, the southern part of the segment is drained by the Fosdyke Bridge Outfall (ordinary watercourse), which has an entire catchment area of 35.5km^2.

24.4.313 The drainage board within the northern part of this segment is BSIDB who are responsible for the management and maintenance of drainage within their area. There are several BSIDB maintained watercourses within the northern part of the segment including Kirton Drain, which is served by Kirton Marsh pumping station, located approximately 550m east of the onshore ECC. The drainage board with responsibility for land within the southern part of this segment is Welland and Deepings IDB (WDIDB). There are several WDIDB maintained watercourses within the southern part of this segment, including Main Drain and Roman Bank Drain.

24.4.314 The significant watercourses within this segment are shown in Figure 24.32

Watercourse sensitivity

24.4.315 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.

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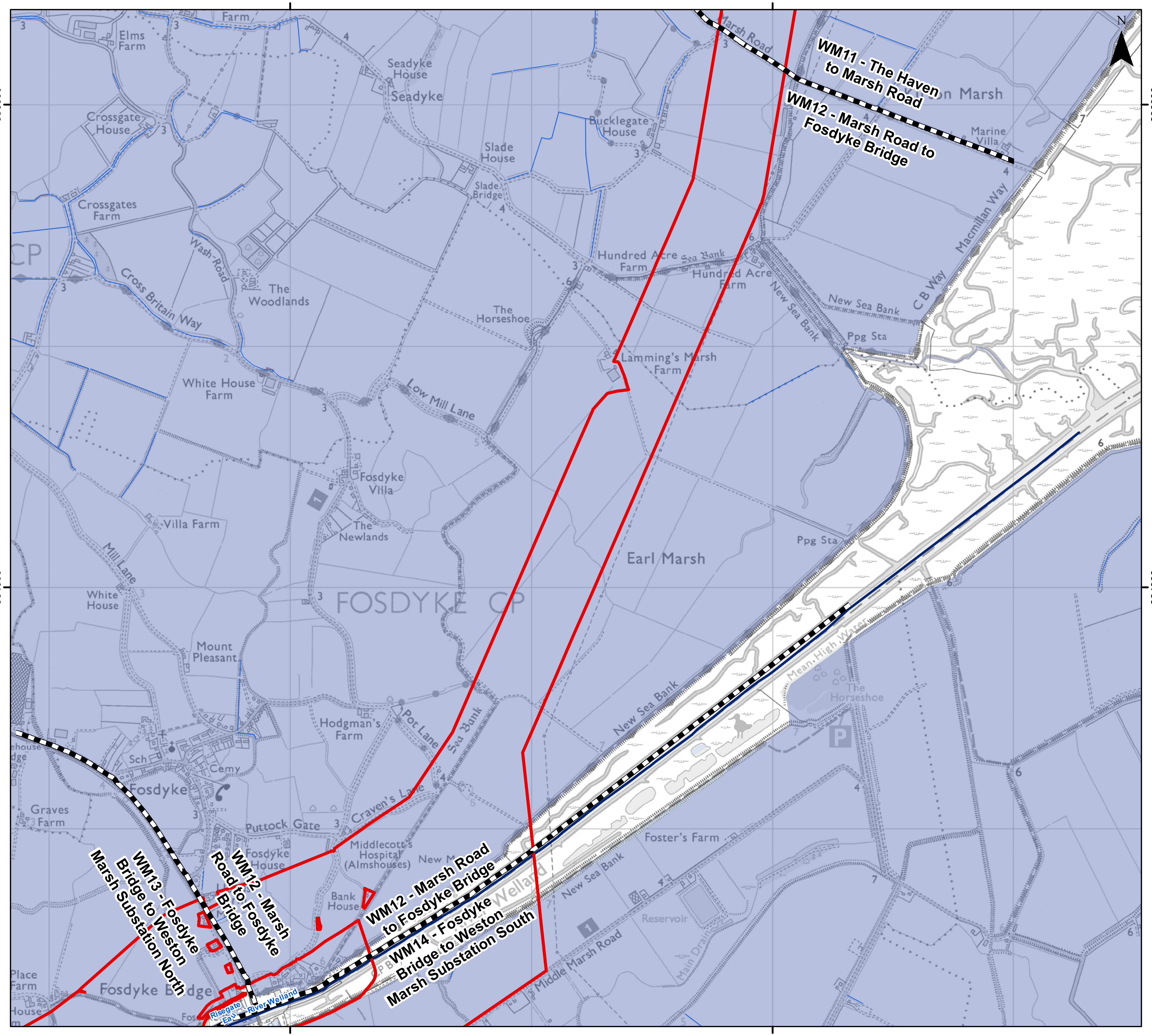

WM11 - The Haven to Marsh Road
WM12 - Marsh Road to Fosdyke Bridge
WM13 - Fosdyke Bridge to Weston Marsh Substation North
WM14 - Fosdyke Bridge to Weston Marsh Substation South
Elms Farm
Seadyke House
Seadyke
Crossgate House
Bucklegate House
Slade House
Slade Bridge
Crossgates Farm
Marine Villa
Macmillan Way
Hundred Acre Farm
Sea Bank
New Sea Bank
CB Way
Ppg Sta
Wash Road
Cross Britain Way
The Woodlands
The Horseshoe
Lamming's Marsh Farm
White House Farm
Low Mill Lane
Fosdyke Villa
The Newlands
Villa Farm
Earl Marsh
Mill Lane
White House
FOSDYKE CP
Mount Pleasant
Hodgman's Farm
Pot Lane
Mean High Water
Fosdyke
Graves Farm
Puttock Gate
Craven's Lane
Middlecott's Hospital (Almshouses)
Fosdyke House
Bank House
Foster's Farm
Reservoir
Middle Marsh Road
Main Drain
Fosdyke Bridge
Place Farm
Risegate Eau
River Welland

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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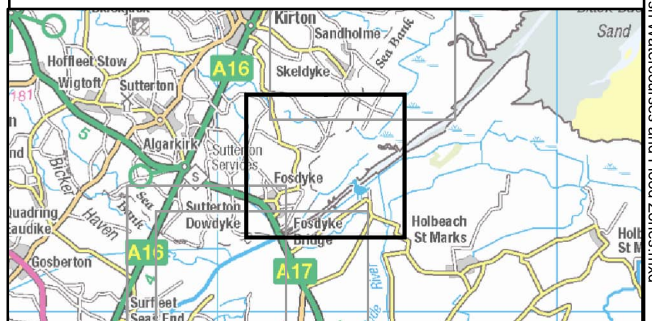

Coordinate System: British National Grid

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Scale: 1:15,000

Preliminary Environmental Information Report

WM12 - Watercourses and Flood Zones

Figure 24.32

OUTER DOWSING OFFSHORE WIND

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WM11 - The Haven to Marsh Road

WM12 - Marsh Road to Fosdyke Bridge

WM13 - Fosdyke Bridge to Weston Marsh Substation North

WM14 - Fosdyke Bridge to Weston Marsh Substation South

Elms Farm

Crossgate House

Crossgates Farm

Seadyke House

Seadyke

Bucklegate House

Slade House

Slade Bridge

Marine Villa

Macmillan Way

Hundred Acre Farm

New Sea Bank

C B Way

Ppg Sta

Wash Road

Cross Britain Way

The Woodlands

The Horseshoe

Lamming's Marsh Farm

White House Farm

Low Mill Lane

Fosdyke Villa

The Newlands

Villa Farm

Mill Lane

White House

Mount Pleasant

FOSDYKE CP

Earl Marsh

Hodgman's Farm

Port Lane

Sch

Cemy

Fosdyke

Graves Farm

Puttock Gate

Craven's Lane

Middlecott's Hospital (Almshouses)

Fosdyke House

Bank House

Foster's Farm

Reservoir

Middle Marsh Road

Main Drain

Mean High Water

The Horseshoe

Fosdyke Bridge

Place Farm

Legend

Onshore PEIR Boundary

Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

Unproductive Strata

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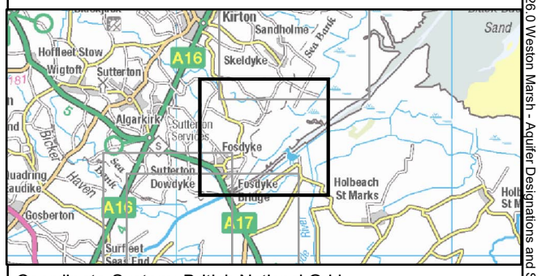

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

WM12 - Aquifer Designations and Source Protection Zones

Figure 24.33

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.316 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.317 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the West Walton Formation and Oxford Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.318 The segment is not designated as a SPZ.

24.4.319 The aquifer designations and SPZs for this segment are shown within Figure 24.33.

Groundwater Sensitivity

24.4.320 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.321 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Flood defences are located to the north of the segment, crossing the onshore ECC, along the southern bank of Kirton Drain in the form of embankments, however the Environment Agency do not hold any information on these defences. Flood defences are also located along the River Welland to the south of the segment, in the form of embankments, with varied effective crest levels and design standard of protections along the length of the river.

24.4.322 Surface water flood risk mapping produced by the EA[1] indicates there are some areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.323 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.324 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.325 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.326 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.327 The water body catchments in this segment are:

- Kirton Marsh Drain – good ecological status and fail chemical status
- Fosdyke Bridge Outfall – bad ecological status and fail chemical status

Coastal/ Transitional Water Quality

24.4.328 The estuarine transitional waters are monitored as the Welland transitional waterbody which has moderate ecological status and fail for chemical status.

Groundwater Quality

24.4.329 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution events

24.4.330 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment are minor and are listed below:

- A 'minor' incident on 24th April 1995 in Lincoln District where inadequate construction led to an unknown pollutant entering a tributary of Towns Drain;
- A 'minor' incident on 19th May 1997 in Wittering where a collision led to oils entering groundwater;
- A 'minor' incident on 19th July 1994 in Lincoln District where an unknown cause led to sewage entering Witham Haven;
- A 'minor' incident on 1st February 1993 in Lincoln District where an unknown cause led to an unknown pollutant entering Roadside Dyke;
- A 'minor' incident on 17th April 1998 in Manby District where poor operational practice led to sewage entering a tributary of the Haven;
- A 'minor' incident on 17th February 1998 in Manby District where an unknown cause led to an unknown pollutant entering a tributary of South Forty Foot Drain;
- A 'minor' incident on 14th May 1993 in Lincoln District where an unknown cause led to an unknown pollutant entering a tributary of Towns Drain; and
- A 'minor' incident on 10th March 1994 in Lincoln District where land runoff led to an unknown pollutant entering an unnamed dyke.

Discharge Consents

24.4.331 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.15 below.

Table 24.15: WM12 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Mrs M Cahill	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Black Sluice I D B	Not Supplied	Unknown	Land
N.F. Cooper Farms Ltd.	Not Supplied	Unknown	Land
Rev N. Russell	Not Supplied	Unknown	Not Supplied
T L Craven Ltd	Not Supplied	Unknown	Land
Mr D R Downs	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	The Haven
Boston Mayflower	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Kirton Marsh Pump Drain
N.F. Cooper Farms Ltd.	Not Supplied	Unknown	Land
Henry Tunnard Limited	Not Supplied	Unknown	Land
Mr & Mrs R B Goodson	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of the Haven
Boston Bc	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Kirton Marsh Pump Drain
Boston Mayflower	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Frampton Towns Drain
Boston Mayflower	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of the Craile Eau Drain
B W Brotherton & Sons	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mr Richard Singleton	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of the Haven

Abstractions

24.4.332 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.333 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.334There are several ecological designations located within 2km of the segment. These consists of the following statutory designations:

- The Wash – SPA, Ramsar, SSSI, SAC;
- The Wash – National Nature Reserve; and
- Moulton Marsh – Local Wildlife Site.

WM13 – Fosdyke Bridge to Weston Marsh Substation North

Hydrological Setting

24.4.335The segment lies within the wider Welland Operational catchment. On a smaller scale, the segment is drained by two watercourses:

- Fosdyke Bridge Outfall (ordinary watercourse), which has an entire catchment area of 35.5 km^2; and
- Risegate Eau (ordinary watercourse), which has an entire catchment area of 38.7km^2

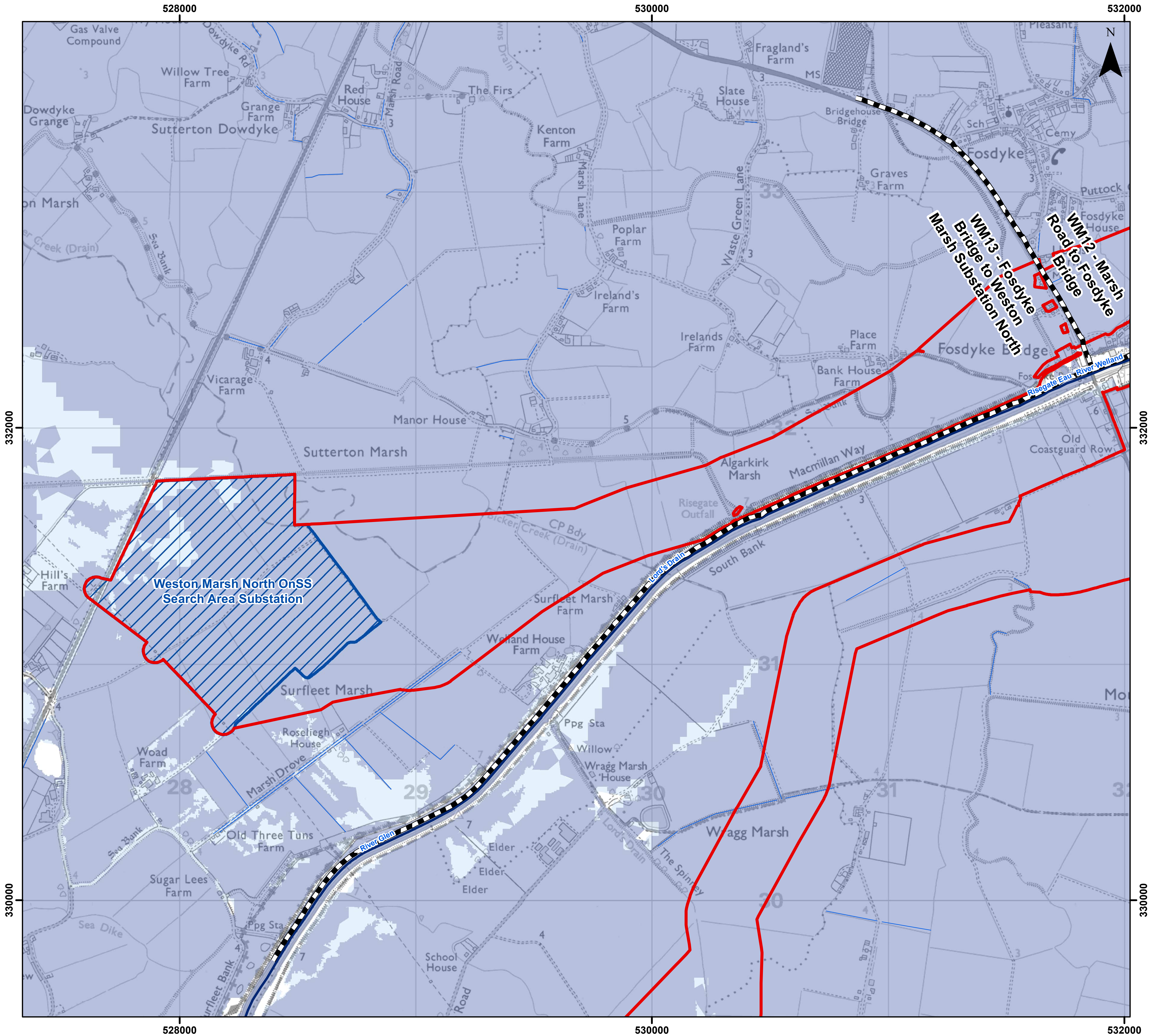
24.4.336Other watercourses within this segment include the River Welland, Vernatt's Drain and the River Glen.

24.4.337The drainage board within this segment is WDIDB who are responsible for the management and maintenance of drainage within their area. There are several WDIDB maintained watercourses within and serving this segment including Five Towns Drain, Risegate Eau and Surfleet Marsh Drain.

24.4.338The significant watercourses within this segment are shown in Figure 24.34

Watercourse sensitivity

24.4.339Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



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WM13 - Fosdyke Bridge to Weston Marsh Substation North
WM12 - Marsh Road to Fosdyke Bridge
Weston Marsh North OnSS Search Area Substation
River Welland
Risegate Eau
Lord's Drain
River Glen
Sutterton Dowdyke
Sutterton Marsh
Algarkirk Marsh
Macmillan Way
South Bank
Surfleet Marsh
Wragg Marsh
Fosdyke
Fosdyke Bridge
Old Coastguard Row
Welland House Farm
Surfleet Marsh Farm
Roseliegh House
Old Three Tuns Farm
Sugar Lees Farm
Wragg Marsh House
The Spinney
Marsh Drove
Vicarage Farm
Manor House
Ireland's Farm
Irelands Farm
Poplar Farm
Kenton Farm
The Firs
Red House
Grange Farm
Willow Tree Farm
Dowdyke Grange
Gas Valve Compound
Fragland's Farm
Slate House
Bridgehouse Bridge
Graves Farm
Place Farm
Bank House Farm
Fosdyke House
Waste Green Lane
Marsh Lane
Marsh Road
Sea Bank
Hill's Farm
Woad Farm
School House
Sea Dike
Risegate Outfall
CP Bdy
Elder
Willow
Ppg Sta

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Weston Marsh North OnSS Search Area
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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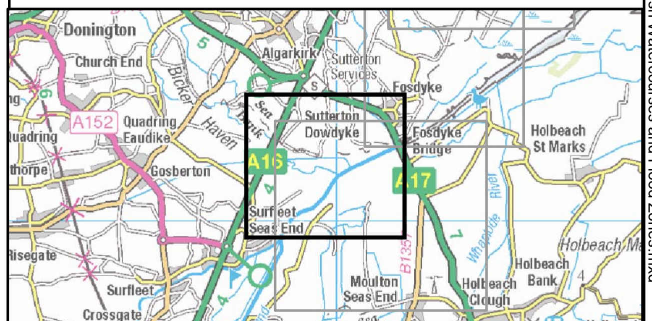

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

WM13 - Watercourses and Flood Zones

Figure 24.34

OUTER DOWSING OFFSHORE WIND

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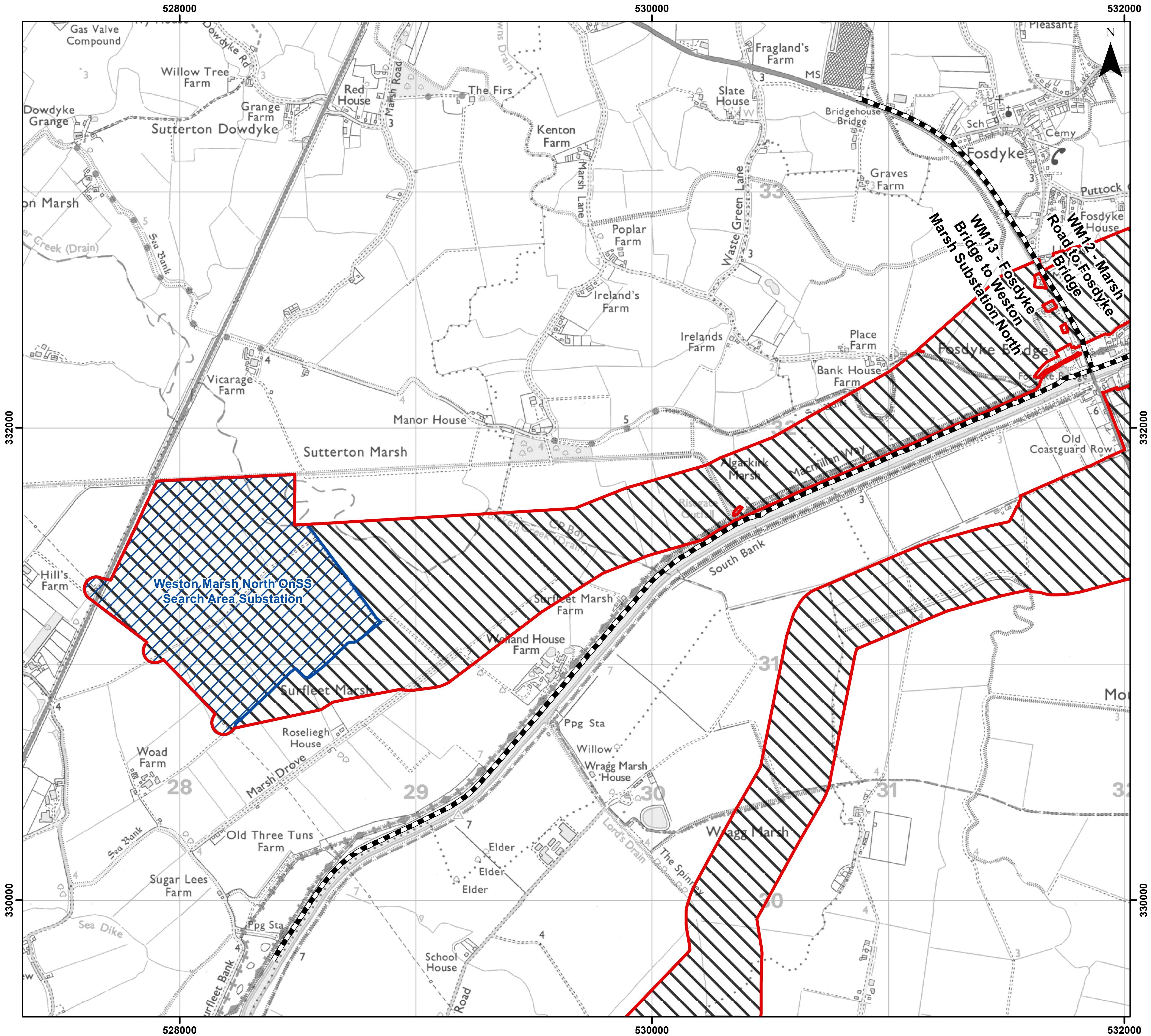

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Weston Marsh North OnSS Search Area

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Unproductive Strata

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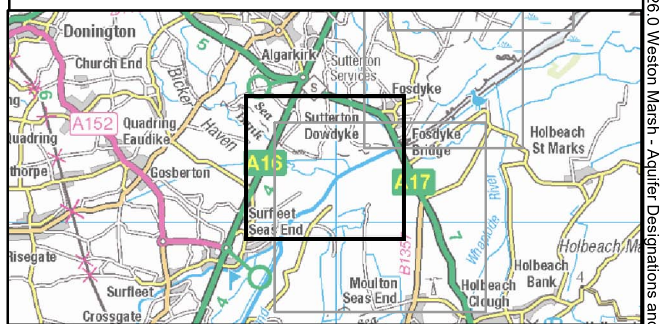

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

WM13 - Aquifer Designations and Source Protection Zones

Figure 24.35

OUTER DOWSING OFFSHORE WIND

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Revision: 0.1

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Geological and Hydrogeological Setting

24.4.340 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.341 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Oxford Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.342 The segment is not designated as a SPZ.

24.4.343 The aquifer designations and SPZs for this segment are shown within Figure 24.35.

Groundwater Sensitivity

24.4.344 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.345 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Flood defences are located along the River Welland to the south of the segment, in the form of embankments, with varied effective crest levels and design standard of protections along the length of the river.

24.4.346 Surface water flood risk mapping produced by the EA[1] indicates there are some areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.347 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.348 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.349 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.350 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

24.4.351 The water body catchments in this segment are:

- Fosdyke Bridge Outfall – bad ecological status and fail chemical status
- Risegate Eau – poor ecological status and fail chemical status

Coastal/ Transitional Water Quality

24.4.352 The estuarine transitional waters are monitored as the Welland transitional waterbody which has moderate ecological status and fail for chemical status.

Groundwater Quality

24.4.353 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution events

24.4.354 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment ranges from significant to minor and are listed below:

- A 'minor' incident on 28th May 1993 in Spalding District where an unknown cause led to an unknown pollutant entering an unnamed watercourse;
- A 'minor' incident on 4th November 1992 in Spalding District where an unknown cause led to an unknown pollutant entering Fen Drain;
- A 'minor' incident on 8th June 1993 in Spalding District where an unknown cause led to an uknown pollutant entering groundwater;
- A 'minor' incident on 21st July 1996 in Lincoln District where a fire led to an unknown pollutant entering an unnamed water body;
- A 'significant' incident on 25th March 1992 in Spalding District where an unknown cause led to an unknown pollutant entering Roadside Dyke; and
- A 'significant' incident on 17th February 1994 in Spalding District where an unknown cause led to an unknown pollutant entering French Drain.

Discharge Consents

Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.16.

Table 24.16: WM13 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Boston Mayflower Ltd	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
J Watterson	Not Supplied	Unknown	Land
P L Ely (Contractors) Ltd	Not Supplied	Unknown	Land
P L Ely (Contractors) Ltd	Not Supplied	Unknown	Land
P L Ely (Contractors) Ltd	Not Supplied	Unknown	Land
Mr T O'Donnell	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Kirton Drain
Anglian Water Services Limited	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Water Company	Whitehouse Farm Drain
Anglian Water Services Limited	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Water Company	Whitehouse Farm Drain
Anglian Water Services Limited	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Water Company	Whitehouse Farm Drain
Mr H Leader	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	Seadyke Drain
Robert Oldershaw	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
H C C Tinsley & Son Ltd	Not Supplied	Agricultural effluents	Not Supplied
Mr Andrew Richardson	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Un Ditch - Tributary of River Welland
Tinsley Foods Limited	Low River Welland (Spalding)	Trade Discharge - Process Water	Holbeach River
John William Ulyatt	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Tinsley Foods Limited	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Holbeach River
Nicholas Culy	Not Supplied	Unknown	Land
Tinsley Foods Limited	Low River Welland (Spalding)	Trade Effluent	Holbeach River
Tinsley Foods Limited	Low River Welland (Spalding)	Trade Discharge - Process Water	Holbeach River
H C C Tinsley & Son Ltd	Not Supplied	Agricultural effluents	Not Supplied
Mr. & Mrs. B. Smalley	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Lincolnshire County Council	Not Supplied	Unknown	Land
Tinsley Foods Limited	Low River Welland	Agricultural effluents	Tributary Moulton River

Permit Holder	Catchment	Discharge Type	Receiving Water
	(Spalding)		
Anglian Water Services Limited	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Water Company	River Welland Tributary
Tinsley Foods Limited	Low River Welland (Spalding)	Trade Discharge - Process Water	River Welland
Bakkavor Foods Ltd	Low River Welland (Spalding)	Trade Discharge - Process Water	Holbeach River
F Parker & Sons (Builders) Ltd	Not Supplied	Unknown	Land
Mr J Cebula	Not Supplied	Unknown	Land
R Geeson	Not Supplied	Unknown	Land
J H Burdall	Not Supplied	Unknown	Land
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	River Welland Tributary
Tinsley Foods Limited	Low River Welland (Spalding)	Trade Discharge - Process Water	Holbeach River
Mr James Wright	Low River Witham / South Forty Foot	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of Kirton Drain
P L Ely (Contractors) Ltd	Not Supplied	Unknown	Land
A E Cheer & Co	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
P L Ely (Contractors) Ltd	Not Supplied	Unknown	Land
Jack Buck (Farms) Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
The Trustees Of Fosdyke Charities	Not Supplied	Unknown	Land
Anglian Water Services Ltd.	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Water Company	River Welland Tributary
Tinsley Foods Limited	Low River Welland (Spalding)	Trade Discharge - Process Water	Holbeach River
F Parker & Sons (Builders) Ltd	Not Supplied	Unknown	Land
Tinsley Foods Limited	Low River Welland (Spalding)	Trade Discharge - Process Water	Holbeach River
Anglian Water Services Limited	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Water Company	Whitehouse Farm Drain
F Parker & Sons (Builders) Ltd	Not Supplied	Unknown	Land

Abstractions

24.4.355 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.356 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.357 There are several ecological designations located within 2km of the segment. These consists of the following statutory designations:

- South Bank Fosdyke – Local Wildlife Site;
- Surfleet Bank – Local Wildlife Site;
- Surfleet Seas End Saltmarsh – Local Wildlife Site;
- Blue Gowt Drain, North – Local Wildlife Site;
- River Glen Corridor – Local Wildlife Site;
- A16 Verges North of the River Glen – Local Wildlife Site; and
- Risegate Eau – Local Wildlife Site.

WM14 – Fosdyke Bridge to Weston Marsh Substation South

Hydrological Setting

24.4.358 The segment lies within the wider Welland Operational catchment. On a smaller scale, the segment is drained by two watercourses:

- Whaplode River (ordinary watercourse), which has an entire catchment area of 68.8km^2
- Moulton River (ordinary watercourse), which has an entire catchment area of 24.3km^2

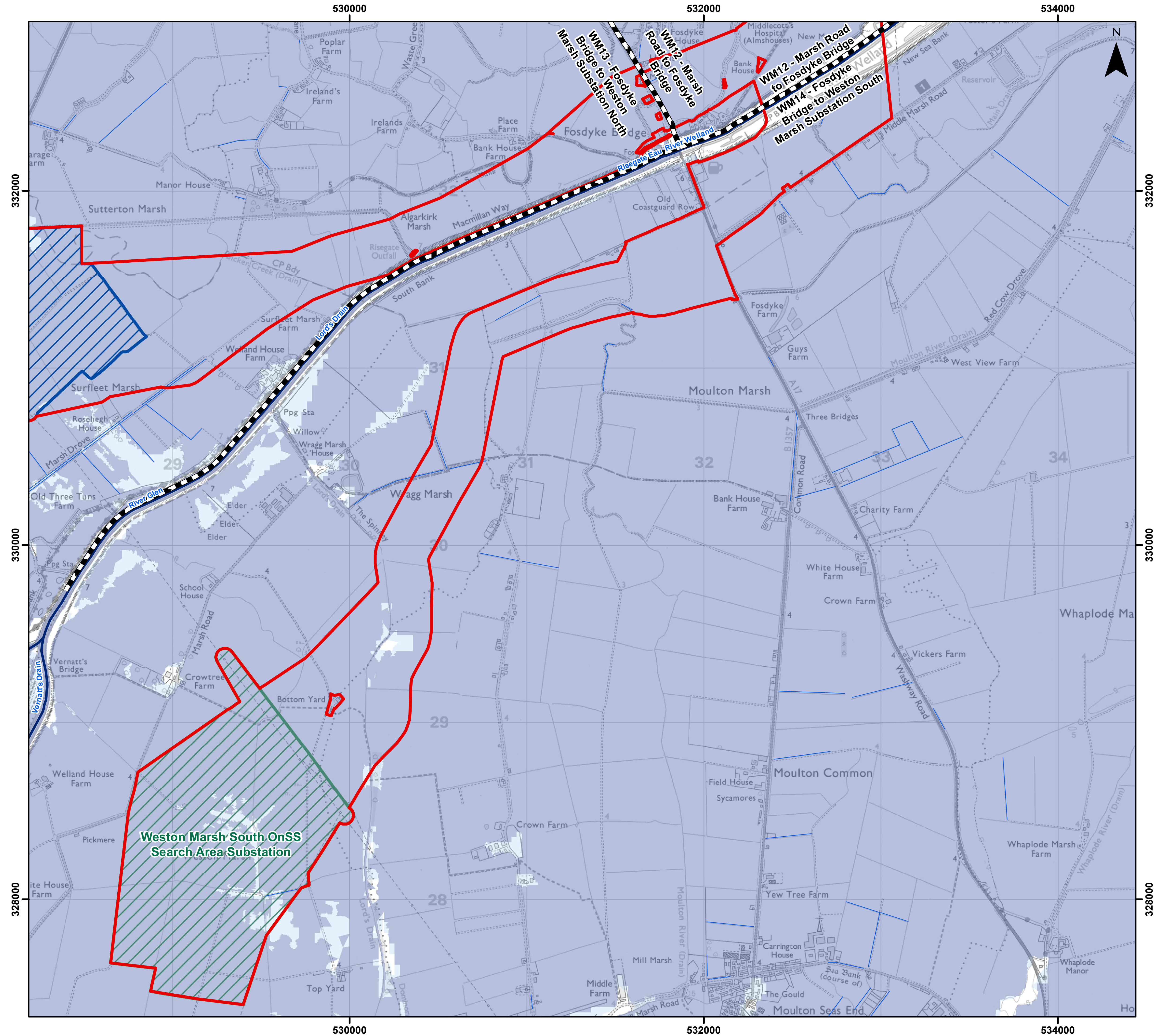
24.4.359 Other watercourses within or serving this segment include the River Welland, which the onshore ECC crosses to the Weston Marsh Substation Search Area (South), Lords Drain and Dominorum Drain.

24.4.360 The drainage board within the southern part of this segment is South Holland Internal Drainage Board (IDB) who are responsible for the management and maintenance of drainage within their area. There are several WDIDB maintained watercourses within the southern part of this segment.

24.4.361 The significant watercourses within this segment are shown in Figure 24.36.

Watercourse sensitivity

24.4.362 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.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WM13 - Fosdyke Bridge to Weston Marsh Substation North
WM12 - Marsh Road to Fosdyke Bridge
WM12 - Marsh Road to Fosdyke Bridge
WM14 - Fosdyke Bridge to Weston Marsh Substation South
Fosdyke Bridge
Risegate Eau
River Welland
Sutterton Marsh
Manor House
Algarkirk Marsh
Macmillan Way
Risegate Outfall
South Bank
Lord's Drain
Surfleet Marsh Farm
Welland House Farm
Surfleet Marsh
Rosclegh House
Marsh Drove
River Glen
Old Three Tuns Farm
Ppg Sta
Willow
Wragg Marsh House
Wragg Marsh
Elder
School House
Marsh Road
Vernatt's Bridge
Vernatt's Drain
Crowtree Farm
Bottom Yard
Welland House Farm
Pickmere
Weston Marsh South OnSS Search Area Substation
Top Yard
Mill Marsh
Middle Farm
Moulton Marsh
Bank House Farm
Old Coastguard Row
Fosdyke Farm
Guys Farm
Three Bridges
Common Road
Charity Farm
White House Farm
Crown Farm
Vickers Farm
Washway Road
Moulton Common
Field House
Sycamores
Crown Farm
Yew Tree Farm
Carrington House
Moulton Seas End
The Gould
Sea Bank (course of)
Moulton River (Drain)
Moulton River (Drain)
West View Farm
Red Cow Drove
Middle Marsh Road
New Sea Bank
Reservoir
Whaplode Marsh
Whaplode Marsh Farm
Whaplode River (Drain)
Whaplode Manor
Middlecott's Hospital (Almshouses)
Poplar Farm
Ireland's Farm
Irelands Farm
Place Farm
Bank House Farm
Waste Green
A17
B1357

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Weston Marsh North OnSS Search Area
- Weston Marsh South OnSS Search Area
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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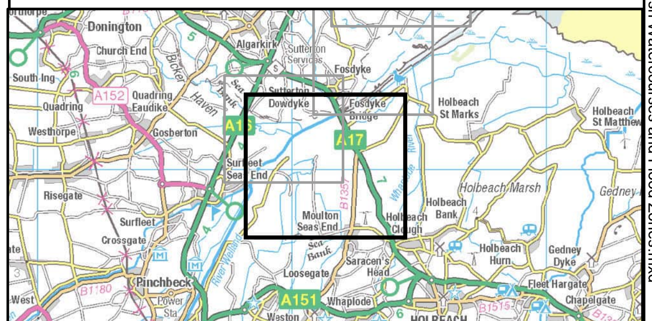

Coordinate System: British National Grid

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Preliminary Environmental Information Report

WM14 - Watercourses and Flood Zones

Figure 24.36

OUTER DOWSING OFFSHORE WIND

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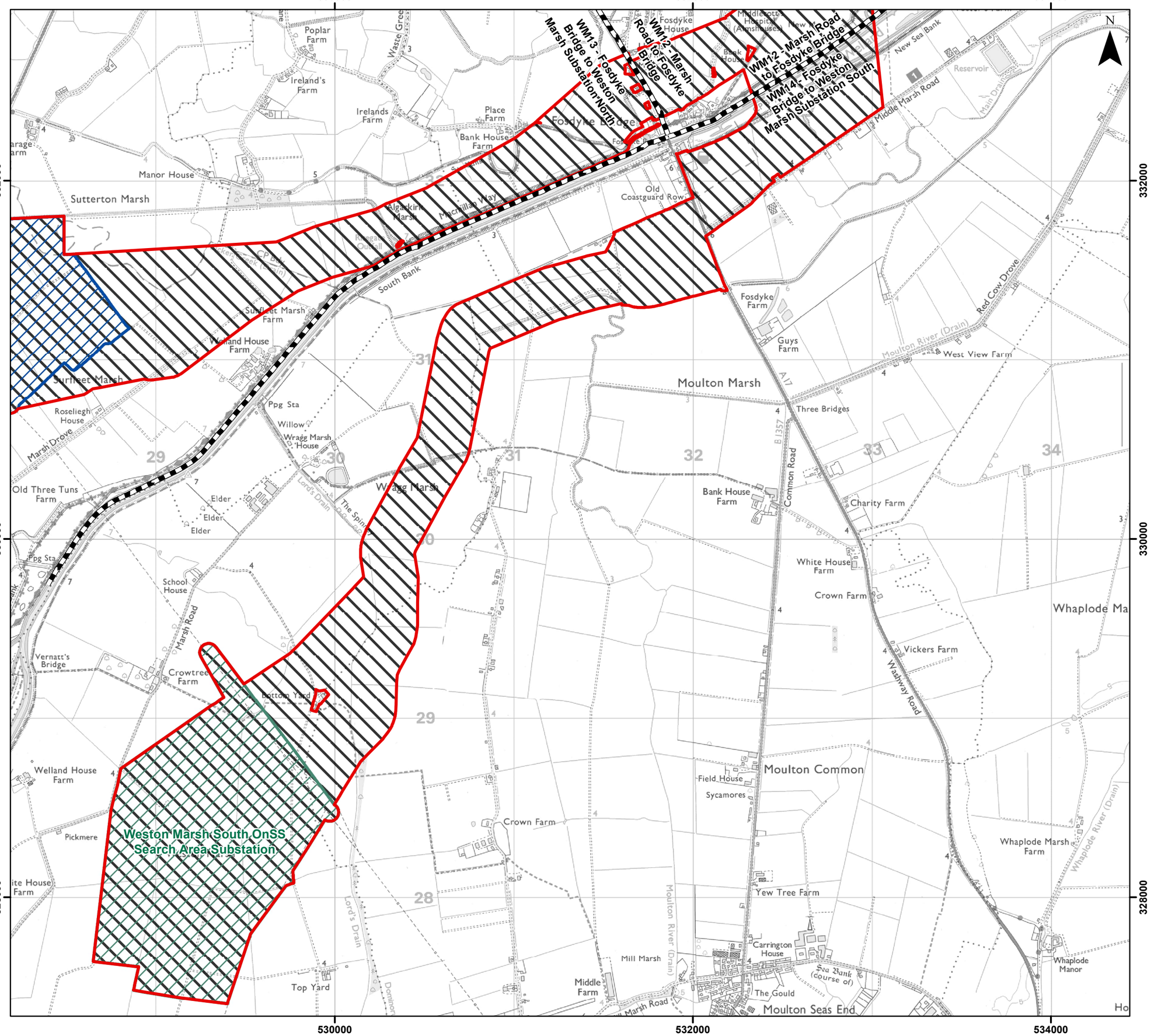

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Weston Marsh North OnSS Search Area
- Weston Marsh South OnSS Search Area

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Unproductive Strata

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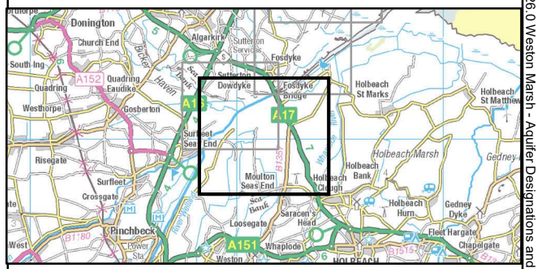

Coordinate System: British National Grid

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Scale: 1:20,000

Preliminary Environmental Information Report

WM14 - Aquifer Designations and Source Protection Zones

Figure 24.37

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.363 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.364 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Oxford Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.365 The segment is not designated as a SPZ.

24.4.366 The aquifer designations and SPZs for this segment are shown within Figure 24.37.

Groundwater Sensitivity

24.4.367 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.368 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. Flood defences are located along the River Welland to the north of the segment, in the form of embankments, with varied effective crest levels and design standard of protections along the length of the river.

24.4.369 Surface water flood risk mapping produced by the EA[1] indicates there are some areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.370 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.371 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.372 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Wayer Quality

24.4.373 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

24.4.374 The water body catchments in this segment are:

- Whaplode River – moderate ecological status and fail chemical status
- Moulton River – moderate ecological status and fail chemical status

Coastal/ Transitional Water Quality

24.4.375 The estuarine transitional waters are monitored as the Welland transitional waterbody which has moderate ecological status and fail for chemical status.

Groundwater Quality

24.4.376 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution events

24.4.377 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents' within this segment range from significant to minor and are listed below:

- A 'minor' incident on 7th July 1997 in Spalding District where an unknown cause led to an unknown pollutant entering an unnamed dyke.
- A 'minor' incident on 14th September 1998 in Manby District where a leaking underground pipe led to sewage entering Frampton Towns Drain.
- A 'minor' incident on 8th April 1998 in Spalding District where an unknown cause led to organic waste entering River Glen.
- A 'minor' incident on 4th January 1993 in Spalding District where an unknown cause led to an unknown pollutant entering an unnamed drain.
- A 'minor' incident on 25th February 1992 in Spalding District where an unknown cause led to an unknown pollutant entering River Glen.
- A 'significant' incident on 26th July 1992 in Spalding District where an unknown cause led to an unknown pollutant entering an unnamed water body.

Discharge Consents

24.4.378 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.17 below.

Table 24.17: WM14 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
K Bingham	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Lewis Gray Builder	Not Supplied	Unknown	Not Supplied
Little Chef Ltd	Not Supplied	Unknown	Land
F W Hoyles	Not Supplied	Agricultural effluents	Not Supplied
G W Sly	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mr T Swift	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	River Glen
Mr C Douglas	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	River Glen
Richard Hedger	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Drain To Three Towns Drain
Anglian Water Services Limited	Not Supplied	Public Sewage: Storm Sewage Overflow	Fen Drain
Mr Richard Bright	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Risegate Eau
J.T. Vickers Esq.	Not Supplied	Unknown	Land
Lincolnshire Cc	Low River Nene / South Holland Main	Sewage Discharges - Final/Treated Effluent - Not Water Company	Fen Drain
Mrs D Gover	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	River Glen
Ms L M Stokes & Mr J Stokes	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of River Glen
Mr J H Smith	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Not Supplied
Mr Alec Ginn	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Risegate Eau
Robert Frank Hoyles	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Robert Wheeler	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mr M Laker	Low River Welland	Sewage Discharges - Final/Treated Effluent -	River Glen

Permit Holder	Catchment	Discharge Type	Receiving Water
	(Spalding)	Not Water Company	
The Clerk	Not Supplied	Unknown	Land
Mr & Mrs C P Juliff	Not Supplied	Unknown	Land
Mr Phillip Harris and Mrs Jane Harris	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary Of River Glen
Mr D Collier	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Michael John Stanley	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mr. Raddlann Esq.	Not Supplied	Unknown	Land
M J & S M Congreve	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
M Parker and Sons Limited	Low River Welland (Spalding)	Sewage And Trade Combined - Unspecified	Tributary Of River Welland
D J & W Depear	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mrs J Johnson	Not Supplied	Unknown	Land
Finlay Flowers Uk Limited	Low River Welland (Spalding)	Trade Discharge - Process Water	Tributary Of Lords Drain
Anglian Water Services Limited	Not Supplied	Public Sewage: Storm Sewage Overflow	Fen Drain
K W Naylor & Son	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
P Thorold	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Mr C Hawes & Mrs S Hawes	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	River Welland by Two Towns Drain
Rhoda Mary Dack	Not Supplied	Unknown	Land
Mr J H Smith	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
E Moore & Sons	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mrs P A Littlewood & Mr T Littlewood	Low River Welland (Spalding)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of River Glen
Robert Maruc Scrimshaw	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mrs. M. Brown	Not Supplied	Unknown	Land

Abstractions

24.4.379 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.380 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology. There are several ecological designations located within 2km of the segment. These consists of the following statutory designations:

- The Wash – SPA, Ramsar, SSSI, SAC;
- Moulton Marsh – Local Wildlife Site;
- Moulton River – Local Wildlife Site;
- Pinchbeck Marsh – Local Wildlife Site;
- Surfleet Seas End Saltmarsh – Local Wildlife Site;
- Surfleet Bank – Local Wildlife Site; and
- South Bank Fosdyke – Local Wildlife Site.

A1 – Low Road to Steeping River

Hydrological Setting

24.4.381 The Low Road to Steeping River segment lies within the wider Steeping and Eaus Operational Catchment. On a smaller scale, the segment is drained by the Lymn/Steeping (Main River), which has an entire catchment area of 170.3 km^2.

24.4.382 Other watercourses in this segment include the Wainfleet Relief Channel.

24.4.383 The drainage board within this segment is Lindsey Marsh IDB (LMDB), who are responsible for the management and maintenance of drainage within their area. There are several LMDB maintained watercourses and pumping stations within or serving this segment, including College Drain, Catchwater Drain, Rookery Drain, Croft Drain, Pinchbeck Drain, Caudwells Drain and Searbys Glasshouse Drain. The pumping stations include:

- Crown Farm pumping station located approximately 1.4km east of the onshore ECC; and
- Thorpe Culvert pumping station located approximately 1.8km northwest of the onshore ECC.

24.4.384 The significant watercourses within this segment are shown in Figure 24.38

Watercourse sensitivity

24.4.385 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.

548000 550000 552000

362000 360000

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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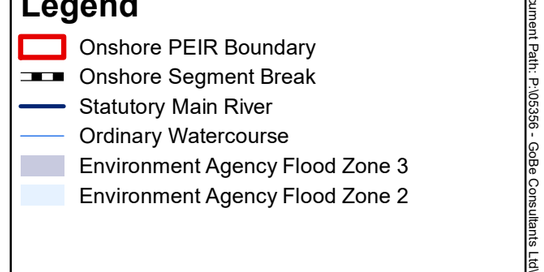

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:20,000

Preliminary Environmental Information Report

A1 - Watercourses and Flood Zones

Figure 24.38

OUTER DOWSING OFFSHORE WIND

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548000 550000 552000

362000 360000

A1 - Low Road to Steeping River

A2 - Steeping River to Fodder Dike Bank/Fen Bank

A1 - Low Road to Steeping River

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Principal Aquifer
- Secondary Aquifer - B
- Unproductive Strata

Source Protection Zone

- 3

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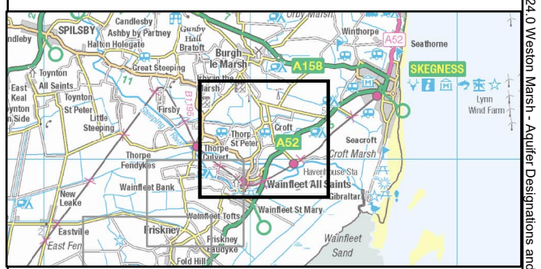
Bedrock Aquifer Designation data sourced from Environment Agency and British Geological Survey



Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:20,000

Preliminary Environmental Information Report

A1 - Aquifer Designations and Source Protection Zones

Figure 24.39

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.386 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.387 Groundwater beneath the segment is present within the Secondary B bedrock aquifers of the Claxby Ironstone Formation, Tealby Formation and Roach Formation and the Principal aquifer of the Spilsby Sandstone Formation. Inland superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.388 The majority of the segment is not designated as a SPZ. An area to the south of the segment, associated with the Principal Aquifer, is designated as Zone 3 of groundwater SPZ.

24.4.389 The aquifer designations and SPZs for this segment are shown within Figure 24.39.

Groundwater Sensitivity

24.4.390 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.391 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3.

24.4.392 Surface water flood risk mapping produced by the EA[1] indicates areas in the segment at risk at potential risk of inundation from extreme rainfall. The majority of these areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.393 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.394 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.395 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.396 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of 'high'; 'good'; 'moderate'; 'poor'; or 'bad') and chemical criteria (possible categories of 'good'; or 'fail').

24.4.397 The water body catchment in this segment is:

- Lymn/Steeping – moderate ecological status and fail chemical status

Groundwater Quality

24.4.398 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.399 There are two groundwater catchments assessed as part of the RBMP which is within this segment of the ECC. These are:

- South Lincolnshire Chalk Unit water body – associated with bedrock geology beneath the study area. The water body has poor overall status with good quantitative status and poor chemical status.
- Spilsby Sandstone Unit water body – associated with bedrock geology beneath the study area. The water body has poor overall status with a poor quantitative status and poor chemical status.

Pollution events

24.4.400 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment ranges from significant to minor and are listed below:

- A 'minor' incident on 29th January 1998 in Manby District where a leaking tank led to chemicals entering an unnamed ditch;
- A 'minor' incident on 6th January 1998 in Manby District where a blocked sewer led to crude sewage entering an unnamed water body;
- A 'minor' incident on 16th May 1996 in Manby District where an accidental spillage led to oils entering a private water supply;
- A 'significant' incident on 6th September 1994 in Manby District where vandalism led to oils entering Steeping River; and
- A 'minor' incident on 15th March 1999 where benthic algae led to pollutants entering Little River Lymn.

Discharge Consents

24.4.401 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.18 below.

Table 24.18: A1 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
Mrs M P Simpson	Lymn/steeping River (Spilsby)	Freshwater Stream/River	Tributary River Steeping
Mr James C Barry	Not Supplied	Onto Land	Land
Julian Francis	Not Supplied	Land/Soakaway	Into Land
G J Wild & T A Hill	Lymn/steeping River (Spilsby)	Freshwater Stream/River	Unnamed Stream
Mr A Marshall	Not Given	Freshwater Stream/River	Little River Lymn
G Coupland Ltd	Not Given	Freshwater Stream/River	Little River Lymn
T W Taylor	Not Given	Freshwater Stream/River	Culverted Tributary Wainfleet
T A Smith & Co (Farm Produce) Ltd	Not Supplied	Land/Soakaway	Into Land
R J Epton	Not Supplied	Drain	Unnamed Drain
Miss Nicola Oakley	Not Supplied	Not Supplied	Not Supplied
Mr Robert Cabon	Not Supplied	Land/Soakaway	Land
Mr Phillip Wallace	Not Supplied	Freshwater Stream/River	Chapel Drain
Mr David Briggs and Miss Zoe Stokes	Not Supplied	Freshwater Stream/River	Chapel Drain
S J Johnson	Not Supplied	Freshwater Stream/River	Chapel Drain
Anglian Water Services Limited	Not Supplied	Freshwater Stream/River	Chapel Drain
Mr Colin Wilkinson	Lymn/steeping River (Spilsby)	Freshwater Stream/River	Little River Lymn
W J Webster	Lymn/steeping River (Spilsby)	Freshwater Stream/River	Unnamed Tributary Steeping River
Anglian Water Services Limited	Not Supplied	Freshwater Stream/River	Chapel Drain
Miss Amanda Bligh	Not Supplied	Onto Land	Land
The Occupier	Lymn/steeping River (Spilsby)	Freshwater Stream/River	Unnamed Tributary of Steeping River
R J Epton	Not Supplied	Freshwater Stream/River	Chapel Drain
Neil Huskisson & Jane Huskisson	Not Supplied	Not Supplied	Not Supplied
T W Taylor	Not Supplied	Land/Soakaway	Land
Mr James C Barry	Not Supplied	Freshwater	Chapel Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
		Stream/River	
Mr J R Dodsworth	Not Given	Freshwater Stream/River	Fen Drain
Mr Martin Wrate	Not Supplied	Freshwater Stream/River	Unnamed Stream
Mr R D Carnelly	Not Supplied	Not Supplied	Not Supplied
Epjon Builders	Lymn/steeping River (Spilsby)	Freshwater Stream/River	Tributary of Croft Drain
Mr Richard Dennis	Not Supplied	Into and/or Watercourse	The Lymn
Mr Paul Briggs & Mrs Keri Briggs	Not Given	Freshwater Stream/River	Unnamed Stream
H Hamson	Not Supplied	Freshwater Stream/River	Chapel Drain
Mr Carl Drury	Not Supplied	Freshwater Stream/River	Chapel Drain
Mrs B Mckenna	Not Supplied	Not Supplied	Not Supplied
Mr Michael Till & Mrs Deborah Till	Not Given	Freshwater Stream/River	The Lymn
Mr R D Carnelly	Lymn/steeping River (Spilsby)	Freshwater Stream/River	Unnamed Tributary River Steeping
Mrs M P Simpson	Not Supplied	Freshwater Stream/River	Chapel Drain
Colin S Scott	Lymn/steeping River (Spilsby)	Land/Soakaway	The Lymn
Mr Simon Barker	Lymn/steeping River (Spilsby)	Land/Soakaway	Into Land
Mr Thomas Noble	Not Supplied	Land/Soakaway	Not Supplied
G Coupland Ltd	Not Supplied	Freshwater Stream/River	Chapel Drain
Mr Ivan Podbury	Lymn/steeping River (Spilsby)	Freshwater Stream/River	River Lymn
Epjon Builders	Not Supplied	Freshwater Stream/River	Chapel Drain

Abstractions

24.4.402 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.403 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.404 There are no ecological designations located within 2km of the segment.

A2 – Steeping River to Fodder Dike Bank/Fen Bank

Hydrological Setting

24.4.405 The Steeping River to Fodder Dike Bank/Fen Bank segment lies within the wider Fens East and West Operational Catchment. There are no Main Rivers within this segment.

24.4.406 The drainage board within this segment is W4IDB, who are responsible for the management and maintenance of drainage within their area. There are several W4IDB maintained watercourses within this segment, including Quakers, Chambers and Branch, Dodds and Pile Bank to Low Road and Decoy and Extension. There are no pumping stations within this segment.

24.4.407 The significant watercourses within this segment are shown in Figure 24.40.

Watercourse sensitivity

24.4.408 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.

546000
548000
358000
356000

A2 - Steeping River to Fodder Dike Bank/Fen Bank

A3 - Fodder Dike Bank/Fen Bank to Broadgate

A1 - Low Road to Steeping River

A2 - Steeping River to Fodder Dike Bank/Fen Bank

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Statutory Main River
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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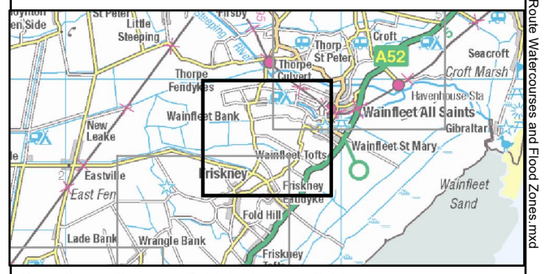

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

A2 - Watercourses and Flood Zones

Figure 24.40

OUTER DOWSING OFFSHORE WIND

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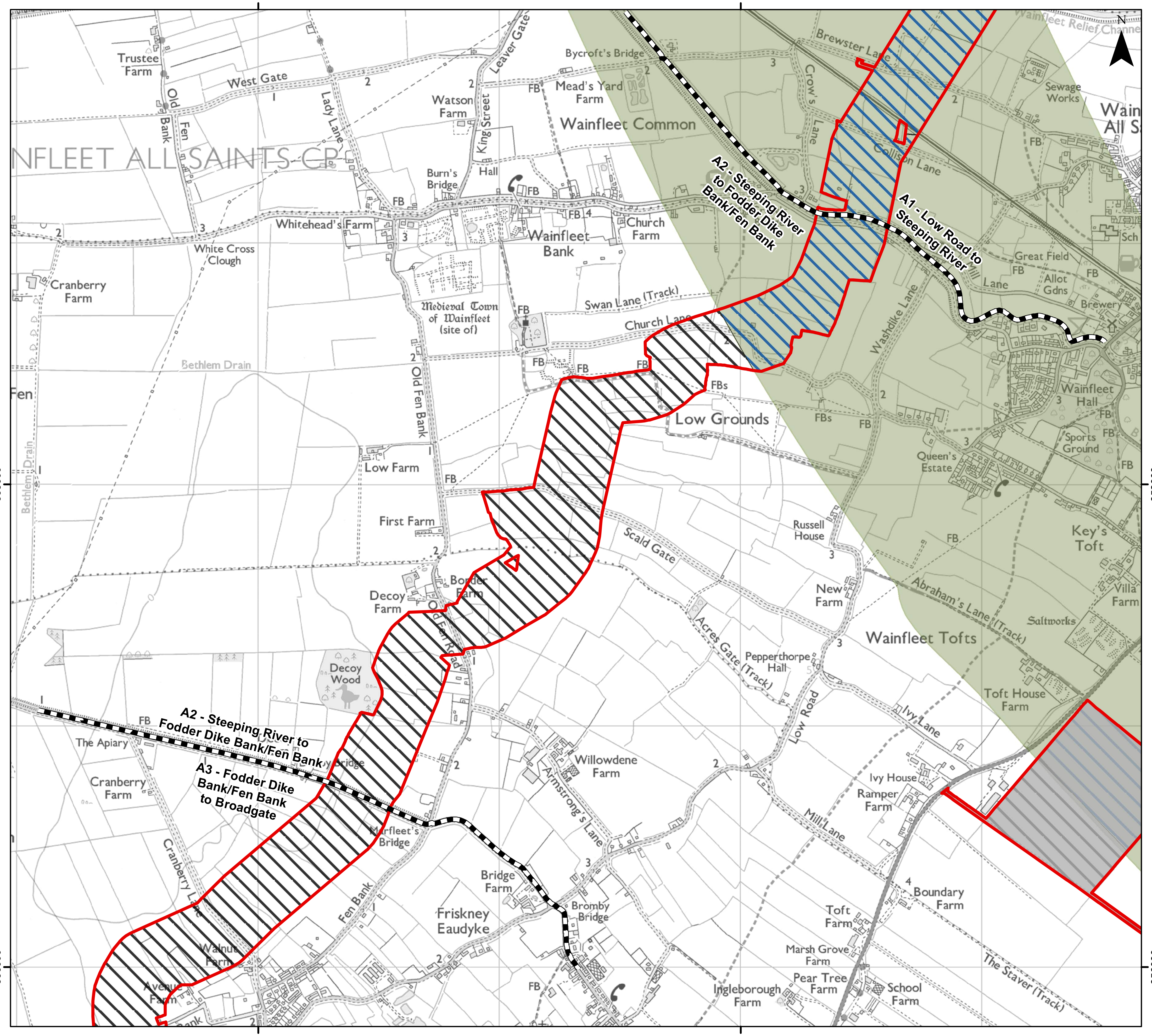

546000
548000
358000
356000
A2 - Steeping River to Fodder Dike Bank/Fen Bank
A1 - Low Road to Steeping River
A3 - Fodder Dike Bank/Fen Bank to Broadgate
Wainfleet Common
Wainfleet Bank
Wainfleet Tofts
Low Grounds
Trustee Farm
West Gate
Watson Farm
Mead's Yard Farm
Bycroft's Bridge
Brewster Lane
Crow's Lane
Collison Lane
Sewage Works
Burn's Bridge
Whitehead's Farm
Church Farm
White Cross Clough
Cranberry Farm
Swan Lane (Track)
Church Lane
Bethlem Drain
Old Fen Bank
Low Farm
First Farm
Scald Gate
Russell House
Decoy Farm
Border Farm
New Farm
Decoy Wood
Acres Gate (Track)
Pepperthorpe Hall
Washdike Lane
Great Field
Wainfleet Hall
Sports Ground
Queen's Estate
Key's Toft
Villa Farm
Saltworks
Abraham's Lane (Track)
Toft House Farm
Ivy Lane
Low Road
Ivy House
Ramper Farm
Willowdene Farm
Armstrong's Lane
Mill Lane
The Apiary
Marfleet's Bridge
Bridge Farm
Bromby Bridge
Friskney Eaudyke
Fen Bank
Walnut Farm
Avenue Farm
Toft Farm
Boundary Farm
Marsh Grove Farm
Pear Tree Farm
Ingleborough Farm
School Farm
The Staver (Track)

Legend

Onshore PEIR Boundary

Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

Principal Aquifer

Unproductive Strata

Source Protection Zone

3

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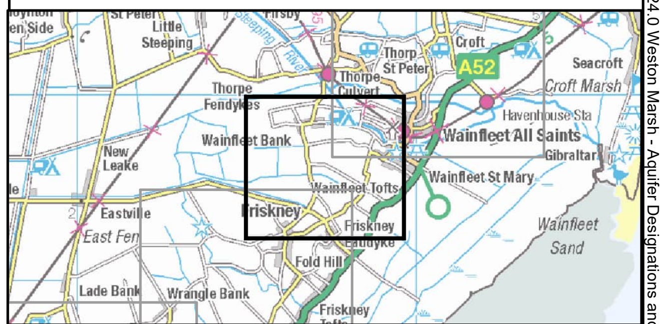

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:15,000

Preliminary Environmental Information Report

A2 - Aquifer Designations and Source Protection Zones

Figure 24.41

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.409 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.410 Groundwater beneath the segment is present within the Principal aquifers of the Spilsby Sandstone Formation. Inland superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.411 The southern part of the segment is not designated as a SPZ. To the north of the segment, the area is designated as Zone 3 of groundwater SPZ associated with the Principal aquifer.

24.4.412 The aquifer designations and SPZs for this segment are shown within Figure 24.41.

Groundwater Sensitivity

24.4.413 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.414 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. There are no formal flood defences located within this segment.

24.4.415 Surface water flood risk mapping produced by the EA[1] indicates there are limited areas in the segment at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.416 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.417 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.418 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.419 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

There are no monitored water body catchments within this segment.

Groundwater Quality

24.4.420 Under the Anglian RBMP the monitored groundwater bodies within the river basin area have been grouped into management catchments. Each groundwater body is classified based on assessment of monitored data for quantitative criteria (possible categories of 'good' or 'poor') and chemical criteria (possible categories of 'good'; or 'poor'), with an overall status classification based on these assessments.

24.4.421 There is a groundwater catchment assessed as part of the RBMP which is within the northern part of this segment of the ECC. This is the Spilsby Sandstone Unit water body which has poor overall status with poor quantitative status and good chemical status.

Pollution Incidents

24.4.422 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. There are no pollution incidents within this segment.

Discharge Consents

24.4.423 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.19 below.

Table 24.19: A2 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
M.J. Worth Ltd	Not Supplied	Agricultural effluents	Unknown Tributary
Anglian Water Services Limited	Not Given	Public Sewage: Storm Sewage Overflow	Unnamed Drain Steeping Haven
Roughton Farms Ltd	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Public Sewage: Storm Sewage Overflow	Unnamed Drain Steeping Haven
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Public Sewage: Storm Sewage Overflow	Unnamed Drain Steeping Haven
Anglian Water Services Limited	Lymn/steeping River (Spilsby)	Sewage Discharges - Pumping Station - Water Company	Unnamed Drain Steeping Haven
R Harrison & Sons Ltd	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
M J Worth Ltd	Lymn/steeping River (Spilsby)	Trade Discharge - Process Water	Roadside Ditch

Abstractions

24.4.424 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.425 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.426 There are no ecological designations located within 2km of the segment.

A3 – Fodder Dike Bank/Fen Bank to Broadgate

Hydrological Setting

24.4.427 The Fodder Dike Bank/Fen Bank to Broadgate segment lies within the wider Fens East and West Operational Catchment. On a small scale, the majority of the segment is drained by East and West Fen Drains (ordinary watercourse), which has an entire catchment area of 371.8 km^2.

24.4.428 There are no other Main Rivers within this segment.

24.4.429 The drainage board with responsibility for land within this segment is W4IDB. There are several W4IDB maintained watercourses within this segment including Cranberry, Small End, Skirmore, Claxey, Wrangle Bank to Low Road and Black Bull to Ash Cottage. Wrangle pumping station located approximately 3.9km southeast of the onshore ECC.

24.4.430 The significant watercourses within this segment are shown in Figure 24.42.

Watercourse sensitivity

24.4.431 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.

542000 544000 546000 548000

356000

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A2 - Steeping River to Fodder Dike Bank/Fen Bank

A3 - Fodder Dike Bank/Fen Bank to Broadgate

A3 - Fodder Dike Bank/Fen Bank to Broadgate

A4 - Broadgate to Ings Drove

N

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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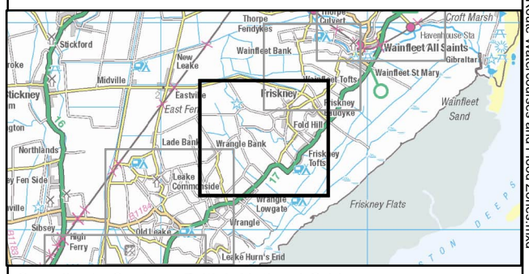

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:20,000

Preliminary Environmental Information Report

A3 - Watercourses and Flood Zones

Figure 24.42

OUTER DOWSING OFFSHORE WIND

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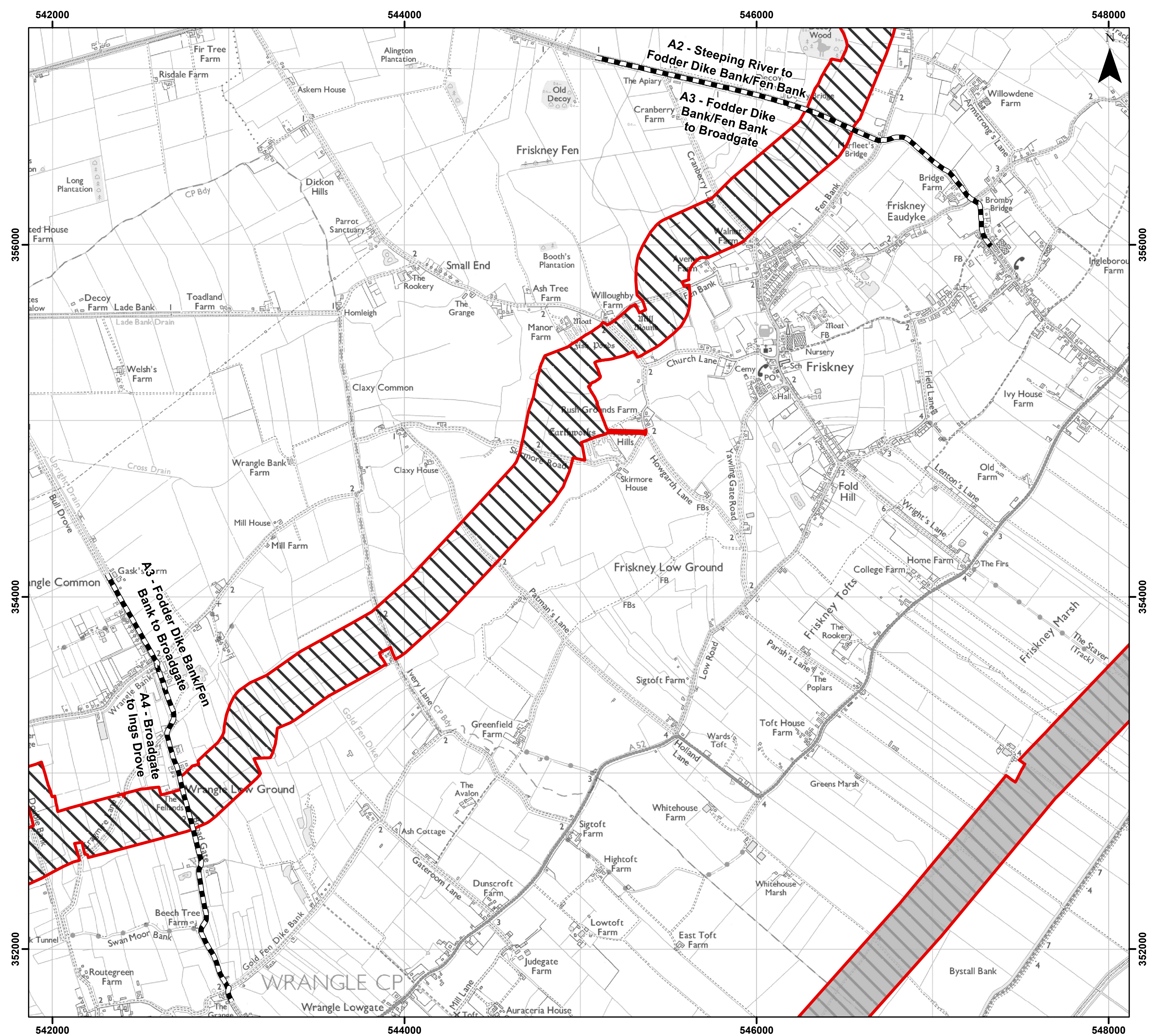

542000
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A2 - Steeping River to Fodder Dike Bank/Fen Bank
A3 - Fodder Dike Bank/Fen Bank to Broadgate
A3 - Fodder Dike Bank/Fen Bank to Broadgate
A4 - Broadgate to Ings Drove
Friskney Fen
Friskney
Friskney Low Ground
Friskney Eaudyke
Friskney Tofts
Friskney Marsh
Small End
Claxy Common
Wrangle Low Ground
WRANGLE CP
Wrangle Lowgate
Fold Hill
Church Lane
Skirmore Road
Howgarth Lane
Yawling Gate Road
Low Road
Ivery Lane
Parish's Lane
Lenton's Lane
Wright's Lane
Field Lane
Fen Bank
Cranberry Lane
Armstrong's Lane
Holland Lane
Gateroom Lane
Mill Lane
Patman's Lane
A52
Fir Tree Farm
Risdale Farm
Askern House
Alington Plantation
Old Decoy
The Apiary
Cranberry Farm
Willowdene Farm
Bridge Farm
Bromby Bridge
Long Plantation
Dickon Hills
Parrot Sanctuary
Booth's Plantation
Ash Tree Farm
Willoughby Farm
Manor Farm
Decoy Farm
Lade Bank
Toadland Farm
Homleigh
The Rookery
The Grange
Welsh's Farm
Rush Grounds Farm
Wrangle Bank Farm
Claxy House
Skirmore House
Mill House
Mill Farm
Ingleborough Farm
Ivy House Farm
Old Farm
College Farm
Home Farm
The Firs
Sigtoft Farm
The Poplars
Greenfield Farm
Wards Toft
Toft House Farm
Greens Marsh
Whitehouse Farm
Whitehouse Marsh
The Avalon
Ash Cottage
Hightoft Farm
Dunscroft Farm
Lowtoft Farm
East Toft Farm
Judgegate Farm
Auraceria House
Beech Tree Farm
Swan Moor Bank
Routegreen Farm
Bystall Bank
Gold Fen Dike Bank
Cross Drain
CP Bdy

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Unproductive Strata

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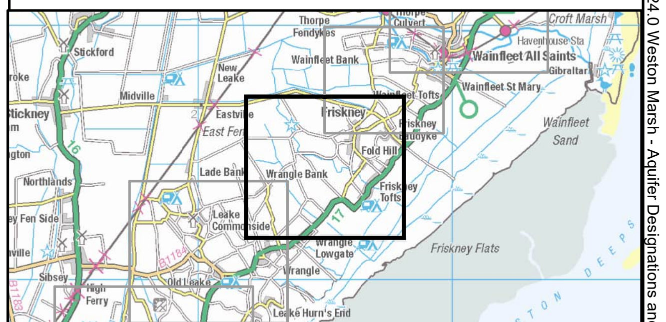

Coordinate System: British National Grid

0 0.5 1 km

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Preliminary Environmental Information Report

A3 - Aquifer Designations and Source Protection Zones

Figure 24.43

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.432 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.433 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Kimmeridge Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.434 The segment is not designated as a SPZ.

24.4.435 The aquifer designations and SPZs for this segment are shown within Figure 24.43.

Groundwater Sensitivity

24.4.436 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.437 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. There are no formal flood defences within this segment.

24.4.438 Surface water flood risk mapping produced by the EA[1] indicates there are limited areas in the segment at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.439 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.440 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.441 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.442 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

24.4.443 The water body catchment in this segment is:

- East and West Fen Drains – bad ecological status and fail chemical status

Groundwater Quality

24.4.444 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution Incidents

24.4.445 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. There are no pollution incidents within this segment.

Discharge Consents

24.4.446 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.20 below.

Table 24.20: A3 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
J P Grala Esq	Not Supplied	Unknown	Into Lane
B. Nettleship Esq.,	Not Supplied	Unknown	Land
East Lindsay D.C.	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary
Mr L Harrison	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Fodder Dike
Waterloo Housing Group Ltd	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Fodder Dike
East Lindsay D.C.	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	A Stream
Mr. A. Willis	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Fodder Dyke
Mrs Wendy Smith	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
Mrs A Faulkner & Mr C Stothard	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of the Fodder Dike
Mrs Wendy Smith	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke

Abstractions

24.4.447 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.448 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.449 There is one ecological designation located within 2km of the segment. This consists of the following statutory designation:

- Wrangle Brick Pits – Local Wildlife Site.

A4 – Broadgate to Ings Drove

Hydrological Setting

24.4.450 The Broadgate to Ings Drove segment lies within the wider Fens East and West Operational Catchment. On a small scale, the segment is drained by East and West Fen Drains (ordinary watercourse), which has an entire catchment area of 371.8km^2.

24.4.451 The drainage board within this segment is W4IDB who are responsible for the management and maintenance of drainage within their area. There are several W4IDB maintained watercourses within the segment, including the following drainage channels: Kirton Dale, Pinders Bridge to Joy Hill, Eel Pool to Pinders & West Branch from Low Lane, Low Lane, White Horse, Fold Hill to Ivy House, Faunt Bridgt Caleb Hill-Wiken Lane, Leake Main, Pode Lane, Leverton Sewer. There are no pumping stations within this segment.

24.4.452 The significant watercourses within this segment are shown in Figure 24.44.

Watercourse sensitivity

24.4.453 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.

Legend

- 🟥 Onshore PEIR Boundary
- Onshore Segment Break
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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Coordinate System: British National Grid

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Scale: 1:20,000

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A4 - Watercourses and Flood Zones

Figure 24.44

OUTER DOWSING OFFSHORE WIND

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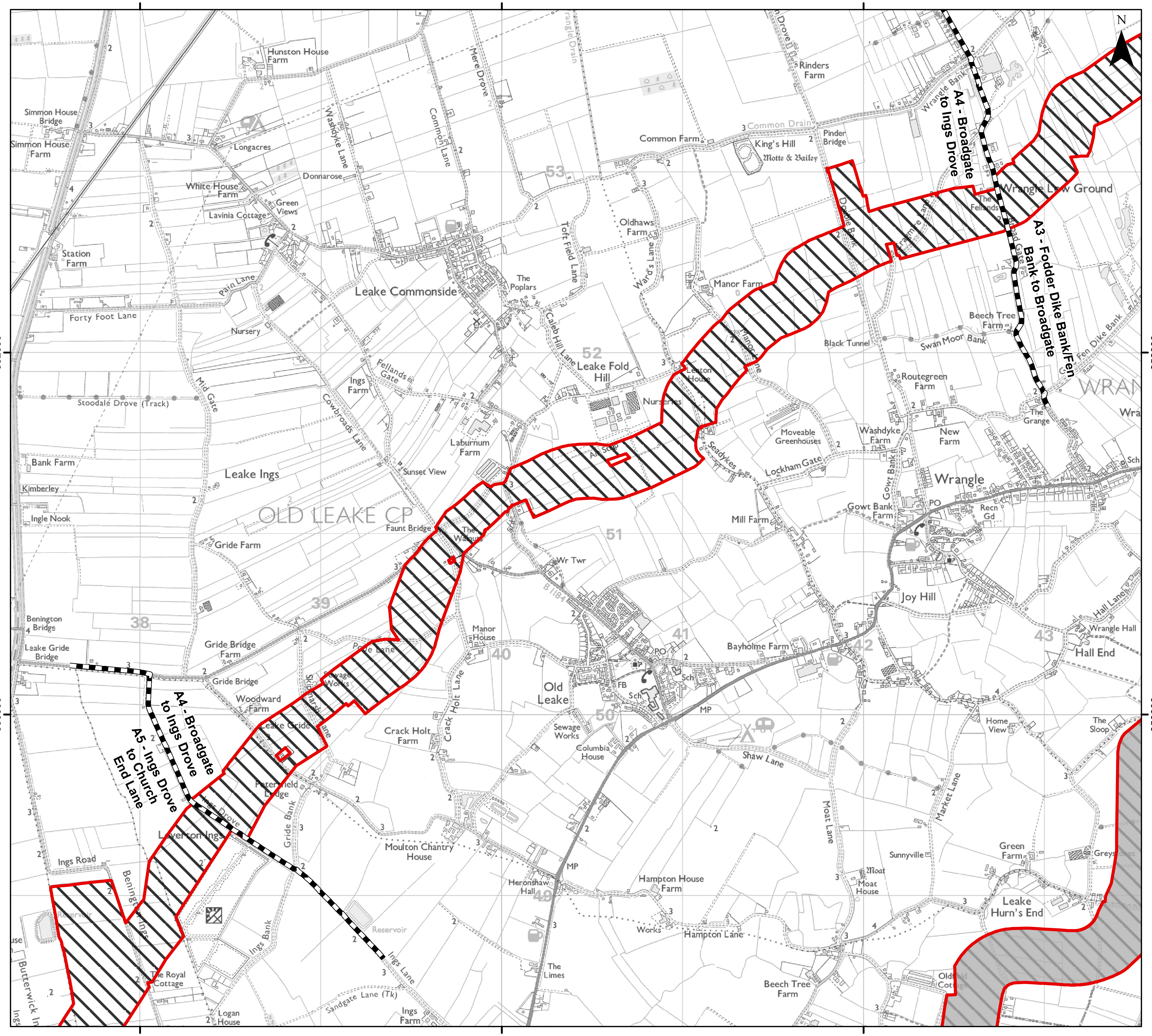
538000
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N
Hunston House Farm
Simmon House Bridge
Simmon House Farm
Longacres
Donnarose
White House Farm
Green Views
Lavinia Cottage
Station Farm
Pain Lane
Forty Foot Lane
Nursery
Leake Commonside
Mere Drove
Common Lane
Washdyke Lane
Toft Field Lane
Oldhaws Farm
Ward's Lane
The Poplars
Caleb Hill Lane
Leake Fold Hill
Common Farm
Common Drain
King's Hill
Motte & Bailey
Pinder Bridge
Rinders Farm
Manor Farm
Double Bank
Black Tunnel
Swan Moor Bank
Beech Tree Farm
Wrangle Low Ground
Wrangle Bank
The Fellands
A4 - Broadgate to Ings Drove
A3 - Fodder Dike Bank/Fen Bank to Broadgate
Fen Dike Bank
Routegreen Farm
The Grange
Stoodale Drove (Track)
Mid Gate
Fellands Gate
Ings Farm
Cowbroads Lane
Laburnum Farm
Sunset View
Nurseries
Lenton House
Seadykes
Moveable Greenhouses
Lockham Gate
Washdyke Farm
New Farm
Wrangle
Gowt Bank
Gowt Bank Farm
Recn Gd
PO
Bank Farm
Kimberley
Ingle Nook
Leake Ings
OLD LEAKE CP
Faunt Bridge
The Walnuts
Mill Farm
Gride Farm
Wr Twr
B1184
Joy Hill
Benington Bridge
Leake Gride Bridge
Gride Bridge Farm
Gride Bridge
Manor House
Pyke Lane
Sewage Works
Crack Holt Lane
Old Leake
Bayholme Farm
Hall Lane
Wrangle Hall
Hall End
Woodward Farm
Leake Gride
Crack Holt Farm
Sewage Works
Columbia House
MP
Shaw Lane
Home View
The Sloop
A4 - Broadgate to Ings Drove
A5 - Ings Drove to Church End Lane
Peterfield Lodge
Ings Drove
Leverton Ings
Gride Bank
Moulton Chantry House
Moat Lane
Market Lane
Ings Road
Benington Ings
Heronshaw Hall
Hampton House Farm
Sunnyville
Moat House
Green Farm
Reservoir
Ings Bank
Works
Hampton Lane
Leake Hurn's End
The Royal Cottage
Ings Lane
The Limes
Beech Tree Farm
Butterwick Ings
Logan House
Sandgate Lane (Tk)
Ings Farm
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Legend

Onshore PEIR Boundary

Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

Unproductive Strata

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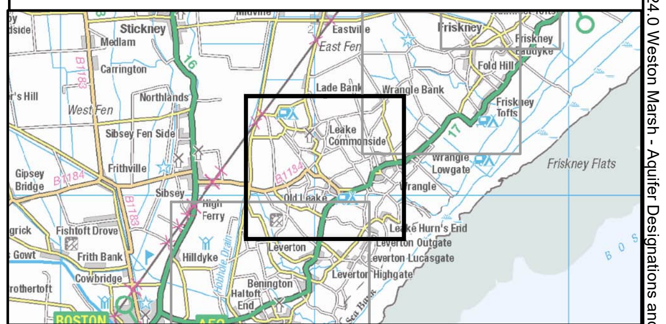

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:20,000

Preliminary Environmental Information Report

A4 - Aquifer Designations and Source Protection Zones

Figure 24.45

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.454 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.455 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Kimmeridge Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.456 The segment is not designated as a SPZ.

24.4.457 The aquifer designations and SPZs for this segment are shown within Figure 24.45.

Groundwater Sensitivity

24.4.458 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.459 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. There are no formal flood defences within this segment.

24.4.460 Surface water flood risk mapping produced by the EA[1] indicates there are limited areas in the segment at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.461 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.462 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.463 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.464 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

24.4.465 The water body catchment in this segment is:

- East and West Fen Drains – bad ecological status and fail chemical status

Groundwater Quality

24.4.466 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution Incidents

24.4.467 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment range from significant to minor and are listed below:

- A 'significant' incident on 28th February 1996 in Lincoln District where an unknown cause led to oils entering an unnamed stream.
- A 'minor' incident on 14th March 1995 in Lincoln District where an unknown cause led to oils entering a tributary of Hobhole Drain.

Discharge Consents

24.4.468 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.21 below.

Table 24.21: A4 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
M & D Crawford-Thomson	Not Supplied	Unknown	Land
M J Crawford	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Mr P English	West Fen/East Fen Catchwater	Unknown	Land
Boston Borough Council	Not Supplied	Unknown	Land
Boston Borough Council	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary
George Bateman & Son Ltd	West Fen/East Fen Catchwater	Sewage and Trade Combined - Unspecified	Tributary Of Sea Lane Dyke
Mr Brian Allen	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Watercourse
J F & J Edwards & Son	Not Supplied	Trade Discharge - Agricultural and Surface	Groundwater
Mr A M Swain	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary

Permit Holder	Catchment	Discharge Type	Receiving Water
Mrs Redford	Not Supplied	Unknown	Land
Boston Borough Council	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Into Dyke
Mr M A Franklin	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Drain 4/78 (Pinder's Bridge)
J R Spikings Esq.	Not Supplied	Unknown	Land
Boston Borough Council	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Dyke
Mr W T Lefley	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Boston Borough Council	Not Supplied	Unknown	Land
Boston Borough Council	Not Supplied	Unknown	Land
Mr.B.T.Eastick	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
Boston Borough Council	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unknown Tributary
Western Power Distribution (East Midlands) Plc	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
White Cat Caravan Park	Not Supplied	Unknown	Land
Mr.B.T.Eastick	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
Mr Mumby	River Hiz (Hitchin)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Village Drain
Boston Borough Council	Not Supplied	Unknown	Land
F Fowcett	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Me Kevin Lannen	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Lawyers Creek
Boston Mayflower	West Fen/East Fen Catchwater	Sewage Discharges -	Tributary of Lade Bank Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
		Final/Treated Effluent - Not Water Company	
East Midlands Electricity Plc	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land
Boston Borough Council	Not Supplied	Unknown	Land
M J Crawford	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Land

Abstractions

24.4.469 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.470 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.471 There are no ecological designations located within 2km of this segment.

24.4.472

A5 – Ings Drove to Church End Lane

Hydrological Setting

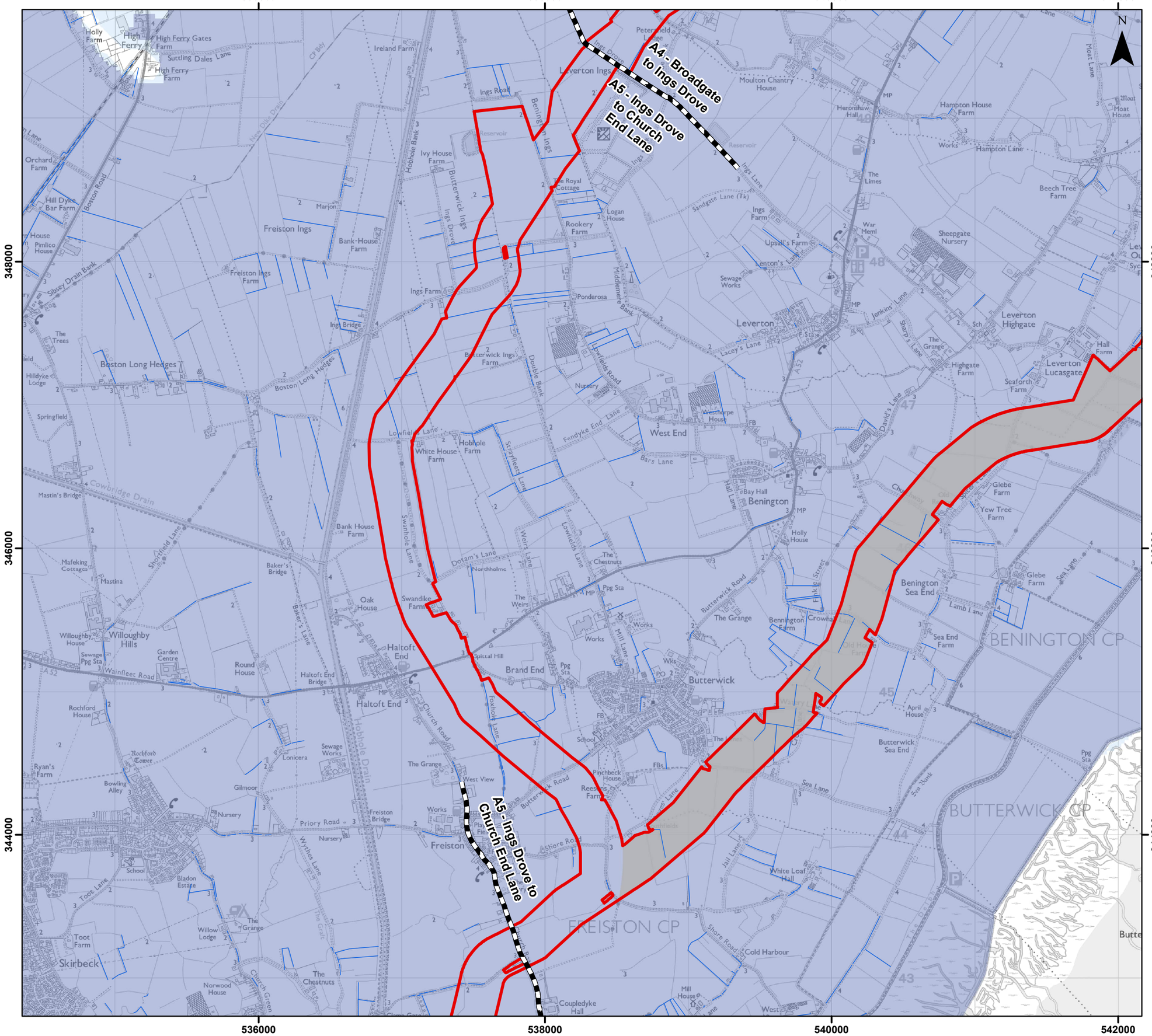
24.4.473 The Ings Drove to Church End Lane segment lies within the wider Fens East and West Operational Catchment. On a small scale, the segment is drained by East and West Fen Drains (ordinary watercourse), which has an entire catchment area of 371.8km^2.

24.4.474 The drainage board within this segment is W4IDB who are responsible for the management and maintenance of drainage within their area. There are several W4IDB maintained watercourses within this segment, including the following drainage channels: Westlands, Scott Dyke, Butterwick Ings, Butterwick Cut, Poynton Hill, and Caythorpe House to Sea Bank. There are no pumping stations within this segment.

24.4.475 The significant watercourses within this segment are shown in Figure 24.46.

Watercourse sensitivity

24.4.476 Sensitivities have been assigned to all watercourses within the study area as defined in Table 24.23.



Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Ordinary Watercourse
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

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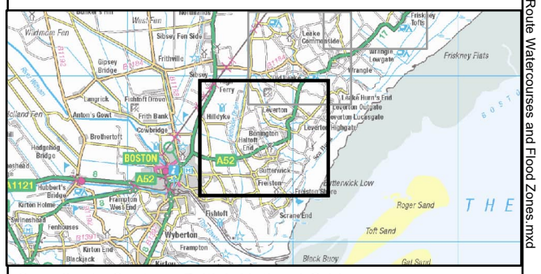

Coordinate System: British National Grid

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Scale: 1:25,000

Preliminary Environmental Information Report

A5 - Watercourses and Flood Zones

Figure 24.46

OUTER DOWSING OFFSHORE WIND

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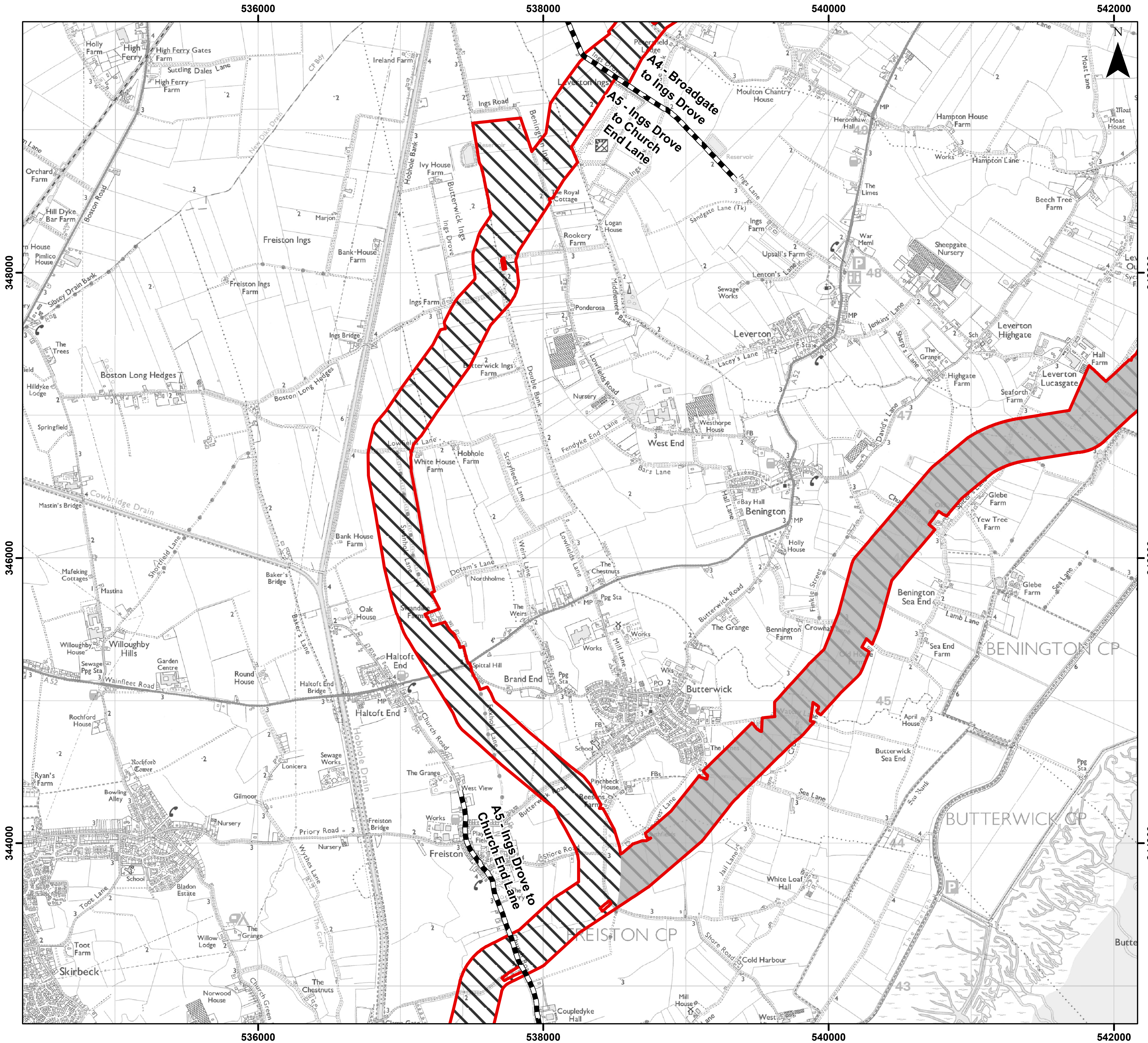

Legend

- Onshore PEIR Boundary
- Onshore Segment Break

Bedrock Aquifer Designation (Clipped to Onshore PEIR Boundary)

- Unproductive Strata

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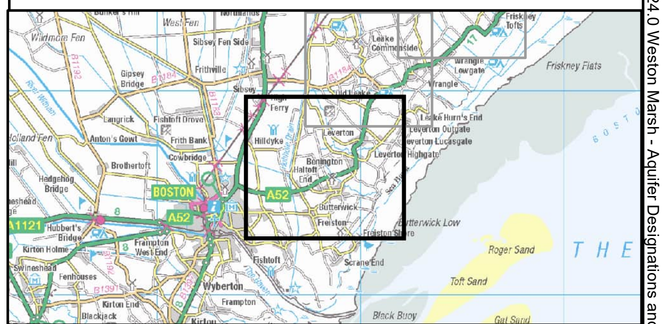

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

Preliminary Environmental Information Report

A5 - Aquifer Designations and Source Protection Zones

Figure 24.47

OUTER DOWSING OFFSHORE WIND

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Geological and Hydrogeological Setting

24.4.477 The geological and hydrogeological setting of this segment and ground conditions are described in detail within Volume 1, Chapter 23: Geology and Ground Conditions.

24.4.478 There is limited groundwater beneath the segment within the Unproductive bedrock aquifers of the Kimmeridge Clay Formation and Ampthill Clay Formation. Superficial deposits underlying the segment comprises of Tidal Flat Deposits. These deposits are classified as Unproductive aquifers.

24.4.479 The segment is not designated as a SPZ.

24.4.480 The aquifer designations and SPZs for this segment are shown within Figure 24.47.

Groundwater Sensitivity

24.4.481 Sensitivities have been assigned to all groundwater bodies beneath the study area, as defined in Table 24.23.

Flood Risk

24.4.482 Fluvial and tidal flood risk mapping shows the segment wholly lies within Flood Zone 3. There are no formal flood defences within this segment.

24.4.483 Surface water flood risk mapping produced by the EA[1] indicates there are limited areas in the segment at risk at potential risk of inundation from extreme rainfall. These areas are limited to small areas of topographical lows which could theoretically hold water during extreme rainfall events and are not associated with any significant overland flow path routes.

24.4.484 Given the predominantly agricultural, greenfield, nature of the land on which the segment is located, there is unlikely to be formal drainage infrastructure controlling runoff from these areas. During a rainfall event, surface water would infiltrate into the ground or, if the soil is saturated, flow over the surface in an uncontrolled manner, ponding in topographic lows or following the local topographic gradients into open drainage ditches/ streams or the main watercourse network.

24.4.485 The segment does not lie within an area at risk of flooding from breach or overtopping of reservoirs.

Floodplain sensitivity

24.4.486 Sensitivity has been assigned to the floodplains within the study area, as defined in Table 24.23.

Water Quality

River Water Quality

24.4.487 Under the WFD, monitored watercourses and water bodies within river basins are grouped into management catchments which are made up of smaller waterbody catchments. Each water body is classified based on assessment of monitored data for ecological (possible categories of ‘high’; ‘good’; ‘moderate’; ‘poor’; or ‘bad’) and chemical criteria (possible categories of ‘good’; or ‘fail’).

24.4.488 The water body catchment in this segment is:

- East and West Fen Drains – bad ecological status and fail chemical status

Groundwater Quality

24.4.489 Under the Anglian RBMP there are no monitored groundwater bodies within the river basin area associated with this segment of the onshore ECC.

Pollution Incidents

24.4.490 Envirocheck reporting has identified pollution incidents to controlled waters within the study area. The severity of these incidents within this segment are minor and are listed below:

- A 'minor' incident on 26th August 1996 in Lincoln District where an accidental spillage led to oils entering a tributary of Hobhole Drain.

Discharge Consents

24.4.491 Envirocheck reporting has identified discharge consents which are recorded within 2km of the proposed onshore ECC boundary. The discharge consents within 2km of this segment are shown in Table 24.22 below.

Table 24.22: A5 – Discharge Consents

Permit Holder	Catchment	Discharge Type	Receiving Water
J Hardwick	Not Supplied	Unknown	Land
Boston Mayflower	River Rhee / River Mel / River Shep	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Tributary Hob Hole Drain
Arable & Bulb Chemicals Limited	Not Supplied	Unknown	Land
G. Paul Esq.,	Not Supplied	Unknown	Land
T H Clements & Son Ltd	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company	Hobhole Drain
B Henton	Not Given	Sewage Discharges - Final/Treated Effluent - Not Water Company	Unnamed Watercourse
Mrs Day	Non-Tidal (River Slea)	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of the Graft (Drain)
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company	Hobhole Drain
T H Clements & Son Ltd	West Fen/East	Sewage Discharges -	Tributary of Hobhole Drain

Permit Holder	Catchment	Discharge Type	Receiving Water
	Fen Catchwater	Final/Treated Effluent - Not Water Company	
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company	Hobhole Drain
Mr G Pearson	Non-Tidal (River Slea)	Sewage Discharges - Final/Treated Effluent - Not Water Company	The Graft Drain
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	Hobhole Drain
Boston Mayflower Housing Company	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	A Tributary of The Hobhole Drain
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	Hobhole Drain
A & E Pearson & Sons	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Boston Borough Council	Not Supplied	Unknown	Land
Mrs Rose Wise	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Not Water Company	Tributary of Hobhole Drain
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	Hobhole Drain
Marshall Bros (Potatoes) Ltd	West Fen/East Fen Catchwater	Trade Discharge - Process Water	A Stream
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company	Hobhole Drain
Anglian Water Services Limited	West Fen/East Fen Catchwater	Sewage Discharges - Final/Treated Effluent - Water Company	Hobhole Drain
J R & L A Horry	Catchment 29 Unknown Detail	Trade Discharge - Agricultural and Surface	Groundwater
Mr Robert Taylor	Not Supplied	Sewage Discharges - Final/Treated Effluent - Not Water Company	Hobhole Drain

Abstractions

24.4.492 Local Authority data has been requested and will be assessed as part of the final EIA when this data becomes available.

Designated Sites

24.4.493 The ecological setting of this segment is described in detail within Volume 1, Chapter 21: Onshore Ecology and Volume 1, Chapter 22: Onshore Ornithology.

24.4.494 There are no ecological designations located within 2km of the segment.

Baseline Sensitivity

24.4.495 Sensitivity values have been assigned to potential receptors, as presented in Table 24.23. Overall, the watercourse receptors range in sensitivity from **minor** to **moderate**; the near-shore coastal waters of the North Sea are considered to have a **major** sensitivity; areas of floodplain within the study area are considered to be of a **minor** sensitivity; and groundwater bodies have a **major** or **moderate** sensitivity. For the purpose of assessment, individual receptors may be grouped by type (e.g., all watercourses are assessed as a receptor against the potential for impact on water quality).

Table 24.23: Sensitivity values for potential receptors.

Receptor	Value (Sensitivity)	Justification
Anderby Main Drain	Medium	Ordinary watercourse of local importance, not monitored under the WFD. Passes through local wildlife sites at coast.
Boygrift Drain	Medium	Ordinary watercourse of local importance, not monitored under the WFD.
Willoughby High Drain	Medium	Main River watercourse monitored under the WFD with moderate ecological status and fail chemical status. Watercourse of local importance.
Ingoldmells Main Drain	Medium	Main River watercourse monitored under the WFD with moderate ecological status and fail chemical status. Watercourse of local importance.
Wedlands and North Drains	Medium	Ordinary watercourse monitored under the WFD with moderate ecological status and fail chemical status. Watercourse of local importance.
Cow Bank Drain	Medium	Ordinary watercourse monitored under the WFD with moderate ecological status and fail chemical status. Watercourse of local importance.
Lymn/Steeping	Medium	Main River watercourse monitored under the WFD with moderate ecological status and fail chemical status. Watercourse of local importance.
East and West Fen Drains	Low	Ordinary watercourse monitored under the WFD with bad ecological status and fail chemical status.
Kirton Marsh Drain	Medium	Ordinary watercourse monitored under the WFD with good ecological status and fail chemical status.

Receptor	Value (Sensitivity)	Justification
		Watercourse of local importance.
Black Sluice IDB draining to the South Forty Foot Drain	Medium	Ordinary watercourse monitored under the WFD with good ecological status and fail chemical status. Watercourse of local importance.
Fosdyke Bridge Outfall	Low	Ordinary watercourse monitored under the WFD with bad ecological status and fail chemical status.
Risegate Eau	Low	Ordinary watercourse monitored under the WFD with poor ecological status and fail chemical status.
Whaplode River	Medium	Ordinary watercourse monitored under the WFD with moderate ecological status and fail chemical status. Watercourse of local importance.
Moulton River	Medium	Ordinary watercourse monitored under the WFD with moderate ecological status and fail chemical status. Watercourse of local importance.
Non-Main River watercourses not monitored under WFD	Negligible	Ordinary watercourses not monitored under the WFD. Watercourses of limited local importance.
Groundwater within the Burnham Chalk Formation and Welton Chalk Formation	High	Bedrock aquifer is a Principal aquifer designated as SPZ.
Groundwater within the Claxby Ironstone Formation, Tealby Formation and Roach Formation	Low	Bedrock aquifer is a Secondary A or Secondary B aquifer.
Spilsby Sandstone Formation	High	Bedrock aquifer is a Principal aquifer designated as SPZ
Kimmeridge Clay Formation, Ampthill Clay Formation, West Walton Formation and Oxford Clay Formation	Negligible	Non-productive geology in terms of groundwater resource.
Groundwater within the Tidal Flat Deposits, Till and Glaciofluvial Deposits	Negligible	Non-productive geology in terms of groundwater resource.
Areas of floodplain within the study area	Low	Large proportion of the study area is within Flood Zone 3, i.e., within the tidal and fluvial floodplain; The tidal and fluvial floodplain within the study area is located on land uses which are undeveloped with few buildings. There are no urbanised areas within the areas of floodplain that are within the study area. All land uses are 'less vulnerable'.

Receptor	Value (Sensitivity)	Justification
		The tidal and fluvial floodplain within the study area is relatively wide and accommodates a large volume of water relative to the volume potentially displaced/increased by the proposed onshore infrastructure. It is considered to have a low sensitivity in terms of changes in flood levels and floodplain shape.
Lincolnshire coastal water body	High	Assessed water body under River Basin Management Plan/ WFD. Coastal waters form part of the Greater Wash SPA. Bathing water quality at the coastline is classified as excellent.
Witham transitional waterbody	Low	Assessed water body under River Basin Management Plan/ WFD with bad ecological status and fail for chemical status. Drains to the Greater Wash SPA.
Welland transitional waterbody	Low	Assessed water body under River Basin Management Plan/ WFD with moderate ecological status and fail for chemical status. Drains to the Greater Wash SPA.

24.4.496

Future Baseline

24.4.497 The baseline will evolve over a period of time regardless of the Project. The most significant change with regard to hydrology, hydrogeology and flood risk will be due to climate change and the impact of this change on hydrological regimes and flooding. Guidance is provided by the Environment Agency with regard to the anticipated changes in rainfall intensity, peak river flows and increases in sea levels and coastal action. These climatic changes and subsequent impacts are predicted to take place based on national and global modelling.

24.4.498 It is assumed that the Environment Agency will continue to work towards improvements in WFD classification for water bodies within the study area. This work may include strategies which would see physical geomorphological changes to existing surface water features; changes in local land use to improve chemical water quality of runoff reaching monitored water bodies; and/ or other schemes such as ecological improvement projects which could impact on existing surface water quality.

24.5 Basis of Assessment

Scope of the Assessment

Impacts Scoped in for Assessment

24.5.1 The following impacts have been scoped into this assessment:

- Construction:
  - Generation of turbid runoff which could enter the water environment;
  - Changes to surface water runoff patterns which could affect flood risk;
  - Potential for damage to flood defence or surface water drainage infrastructure; and
  - Pollution or disruption of flow to groundwater through ground excavations or piling;
- Operation and maintenance:
  - Changes to surface water drainage at the onshore substation location.
- Decommissioning:
  - Generation of turbid runoff which could enter the water environment; and
  - Potential for damage to flood defence or surface water drainage infrastructure, including potential impact on the future maintenance or improvement works to flood defences.

Impacts Scoped out of Assessment

24.5.2 In line with the Scoping Opinion (The Inspectorate, 2022), and based on the receiving environment, expected parameters of the Project (Volume 1, Chapter 3: Project Description), and expected scale of impact/ potential for a pathway for effect on the environment, the following impacts have been scoped out of the assessment:

- Construction:
  - Accidental spillages and leakages of oils, fuel and other polluting substances which could potentially enter the water environment.
- Operation and maintenance:
  - Accidental spillages and leakages of oils, fuel and other polluting substances which could potentially enter the water environment; and
  - Any impact on WFD status for assessed surface water or groundwater bodies.
- Decommissioning:
  - Accidental spillages and leakages of oils, fuel and other polluting substances which could potentially enter the water environment;
  - Pollution or disruption of flow to groundwater through ground excavations or piling (providing any piling remains in situ at the time of decommissioning).

Realistic Worst Case Scenario

24.5.3 The following section identifies the Maximum Design Scenario (MDS) in environmental terms, defined by the project design envelope.

24.5.4 The MDS criteria identified in Table 24.24 have been selected as those aspects of the design which have the potential to result in the greatest effect on an identified receptor or receptor group. The MDS criteria have been selected from the project description details provided (Volume 1, Chapter 3: Project Description). Effects of greater significance are not predicted to arise should any other development scenario, based on details within the project design envelope, to that assessed here be taken forward in the final design scheme. The MDS takes into consideration embedded mitigated as described in Table 24.25.

Table 24.24: Maximum design scenario for Onshore Hydrology, Hydrogeology and Flood Risk for the Project alone

Potential effect	Maximum adverse scenario assessed	Justification
Construction		
Onshore ECC Increase in flood risk or change in water quality	For the assessment presented in this chapter, the onshore ECC represents a typical 300m width for the PEIR boundary that is approximately 80km in length to accommodate the greatest extent of disturbance.	The MDS includes the maximum number of cables anticipated and assumes disturbance throughout the onshore ECC area, therefore the greatest area of land disturbance. Open trenching as a crossing option for smaller watercourse crossings has been considered to represent the greatest potential for change to surface hydrology and effect on water quality.
	Cables will be installed directly or in ducts, with installation undertaken in sections. The cables will be installed in one trench per circuit (maximum number of 4 export cable circuits for 12 cables), with each trench up to 5m wide and up to 3m deep.	
	72 logistics compounds (comprising primary and secondary logistics compounds) would be located along the onshore ECC. Indicative maximum logistics compounds area of up to 300m x 150m.	
	Trenched crossing of smaller watercourses (see crossings register provided in Document Reference 8.1.8: Crossing Schedule.	
OnSS Increase in flood risk or change in water quality	The OnSS includes the footprint of the substation infrastructure and development platform (including landscaping).	The MDS includes the maximum development footprint (temporary and permanent) and therefore the largest possible area of disturbance to surface water features.
	Three potential substation locations at two National Grid connection nodes are currently included in the assessment.	
	One logistics compound work area is included (at each OnSS location) to accommodate offices, welfare facilities, car parking, workshops and storage areas. Indicative maximum area of 300m x 150m is assumed for the substation logistic compound.	
Trenchless drilling works Increase in flood risk or change in water quality	Trenchless drilling (or alternative trenchless crossing technique) crossings required for landfall; larger surface watercourses; all IDB watercourses; key roads; and some utility crossings.	HDD (or other trenchless crossing) techniques present a risk of indirectly contaminating surface watercourses or groundwater where they are hydraulically connected, with surface runoff caused by spillages and the movement of excavated earth/ sediments.
	Trenchless drilling (or trenchless crossing) work areas would be located at each end of the crossing, requiring an associated TCC, either with permeable surfacing or suitable drainage where non permeable surfacing used.	

Potential effect	Maximum adverse scenario assessed	Justification
Landfall Increase in flood risk or change in water quality	Trenchless drilling (or alternative trenchless crossing technique) for up to 6 bores (one per circuit plus one spare) will be used from landfall to cross the coastal flood defence line.	The MDS includes the maximum number of cables anticipated at landfall and therefore, the maximum working corridor required. A number of access options for landfall are included in the MDS.
	Temporary access will be required which will cross beach areas which may include a crossing of the Main Drain outfall pipe.	
Operation and Maintenance		
OnSS Increase in flood risk	Permanent area of the OnSS footprint assumes an Air Insulated Switchgear (AIS) substation which has the greater footprint of 180,000 m^2, plus an operational access road. In the absence of detailed design, it has been assumed that the entire permanent footprint of the OnSS will be constructed of impermeable material.	The MDS for flood risk at the OnSS requires the largest footprint for design resulting in the largest possible area of disturbance and largest potential for impermeable ground cover.
OnSS Routine maintenance works affecting surface watercourses	Routine maintenance of the OnSS.	The MDS for water quality of main watercourses during operation is that chemicals and oils would be used in the routine maintenance of OnSS. The onshore ECC provides potential lateral pathways for water flow which could indirectly affect water quality.
	Permanent onshore cables will be buried (apart from joint bay access points).	
Decommissioning		
OnSS Change to flood risk	Removal of the OnSS including areas of hardstanding. Buried cables to be de-energized with the ends sealed and left in place to avoid ground disturbance. Transition Joint Bays (TJBs) at landfall to be left in place. Any final decommissioning methodology will adhere to industry best practice, rules and regulations at the time of decommissioning.	The MDS for flood risk on the surrounding environment during decommissioning is the removal of the OnSS. The change in surfacing and removal of attenuation storage associated with the OnSS could affect flood risk as it would take the natural environment a period of time to re-establish itself to provide natural

Potential effect	Maximum adverse scenario assessed	Justification
		attenuation.
<u>OnSS</u> Works affecting surface watercourses		The MDS for water quality of watercourses during decommissioning is the removal of the OnSS. The onshore export cable remaining in situ provides potential lateral pathways for water flow which could indirectly affect water quality.

Embedded Mitigation

24.5.5 Mitigation measures that were identified and adopted as part of the evolution of the project design (embedded into the project design) and that are relevant to onshore hydrology, hydrogeology and Flood risk are listed in Table 24.25. General mitigation measures, which would apply to all parts of the project, are set out first. Thereafter mitigation measures that would apply specifically to onshore hydrology, hydrogeology and flood risk issues associated with the landfall, onshore ECC and OnSS, are described separately.

24.5.6 The mitigation includes embedded measures such as design changes and applied mitigation which is subject to further study or approval of details; these include avoidance measures that will be informed by pre-construction surveys, and necessary additional consents where relevant. The composite of embedded and applied mitigation measures apply to all parts of the Project development works, including pre-construction, construction, operation and maintenance, and decommissioning.

Table 24.25: Embedded mitigation relating to Onshore Hydrology and Flood Risk

Project phase	Mitigation measures embedded into the project design
General	
Environmental permit	The standards that would be expected in order to meet any licence or environmental permit for works in relation to the water environment (e.g., drilling, crossing, culverting, passing under or through) affecting the sea defence structures, Main Rivers, ordinary watercourses and IDB watercourses will be applied to the proposed works. Embedded mitigation will ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial or tidal flood risk.
Project design	Careful routing of the onshore ECC and design of key crossing points (flood defence structures, Main Rivers, non-main and ordinary watercourses, IDB watercourses, roads, utilities, etc.), including the use of Trenchless techniques to avoid key areas of sensitivity.
Construction	
Construction Method Statement	A final Construction Method Statement (CMS) based on detailed design of the onshore elements of the Project will be submitted (as part of the final CoCP), to provide the detailed design and approach to watercourse crossings and crossings beneath flood defences, for agreement by local authorities, in consultation with the EA, as secured in the DCO. The crossing points would be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial or tidal flood risk.
	An outline version of the CMS is provided as an appendix of the Outline CoCP, in which it is proposed to include the detailed design and approach to watercourse crossings.

Project phase	Mitigation measures embedded into the project design
Surface water drainage	Development of the OnSS will result in the construction of low permeability surfacing, increasing the rate of surface water runoff from the site. A surface water drainage scheme is required to ensure the existing runoff rates to the surrounding water environment are maintained at pre-development rates.
	The detailed (post consent) design of the surface water drainage scheme would be based on a series of infiltration/ soakaway tests carried out on site and the attenuation volumes that will be outlined in the supporting OnSS Flood Risk Assessment (FRA). The tests will be undertaken prior to construction and in accordance with the BRE Digest 365 Guidelines.
	Temporary management of surface water will be required along the onshore ECC during construction. A surface water drainage scheme will be informed by detailed design and provided as part of the final CoCP for approval by local authorities prior to construction which forms a requirement of the DCO.
	Measures to mitigate against water pollution will also apply to the OnSS and will include measures as set out for the onshore ECC below to minimise the risk of water pollution.
Flood risk	Cable trenching and construction site access road widening across surface watercourses will require measures to ensure that the water quality and flow rates are unaffected either directly or indirectly.
	The onshore ECC and the construction site access roads will be designed to minimise land take and to avoid, where possible, impacts on existing drainage networks and features.
	Preparation of a Flood Response Plan setting out actions in the event of flooding or a flood warning during construction works. This would include a procedure for securing or relocating materials stored in bulk.
	The onshore temporary construction compounds (TCCs) and construction access and haul roads would comprise permeable gravel overlying a permeable geotextile membrane of an appropriate standard.
	Where the onshore ECC crosses smaller watercourses and land drainage, measures would be discussed with the relevant stakeholders (e.g., construction access roads installed over pre-installed culverts).
	Open cut and Trenchless drilling crossing techniques will be discussed with Environment Agency and IDBs following submission of the PEIR.
	Cable entry and exit points within transition pits and cable junction bays will be sealed with an appropriate water proofing material to mitigate flood risk.
	The Project will commission a pre-construction land drainage scheme to ensure existing land drainage flow is maintained.

Project phase	Mitigation measures embedded into the project design
	Surface water flowing into work areas and excavated trenches during the construction period will be pumped via settling tanks or ponds to remove sediment and potential contaminants, before being discharged into local ditches or drains via temporary interceptor drains. Where gradients on site are significant, cable trenches will include a hydraulic brake (bentonite or natural clay seals) to reduce flow rates along trenches and hence reduce local erosion.
	Any field drainage intercepted during the cable installation will either be reinstated following the installation of the cable or diverted to a secondary channel through agreement with the appropriate stakeholders.
	Any stockpiles along the onshore ECC would be kept to minimum possible size with gaps to allow surface water runoff to pass through.
Pollution prevention	Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) will be bunded and carefully sited to minimise the risk of hazardous substances entering drainage systems or local watercourses. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. Bunds used to store fuel, oil etc. will have a 110% capacity.
	Any refuelling of machinery will be undertaken within designated areas where spillages can be easily contained.
	Machinery will be routinely checked to ensure it is in good working condition to reduce the risk of leaks.
	Any tanks and associated pipe work containing oils and fuels will be double skinned and be provided with intermediate leak detection equipment.
	A spill procedure will be documented, and spill kits kept in the vicinity of potentially hazardous materials storage areas.
	Disturbance to areas close to watercourses will be reduced to the minimum necessary for the work.
	Excavated material will be placed in such a way as to avoid any disturbance of areas close to the banks of watercourses and any to prevent spillage into water features.
	Use of sediment fences along watercourses when working in close proximity to prevent sediment being washed into watercourses.
	Covers will be used by lorries transporting materials to/ from site to prevent releases of dust/ sediment to watercourses or drains.
	If applicable, storage of stockpiled materials should be on an impermeable surface to prevent leaching of contaminants and covered when not in use to prevent materials being dispersed by wind or rainfall runoff.
	Any visual/ olfactory signs of contamination encountered during excavation should be reported and investigated.

Project phase	Mitigation measures embedded into the project design
	A briefing will be included within the site induction highlighting the importance of water quality, the location of watercourses and pollution prevention measures.
	Drainage works to be constructed to relevant statutory guidance and approved prior to the commencement of construction.
	Consultation with the Environment Agency will be ongoing throughout the construction period to promote best practice and to implement proposed mitigation measures.
Best practice	All construction work will be undertaken in accordance with the CoCP. An outline version of the CoCP is provided in Document Reference 8.1 that sets out the principles to be followed when the CoCP is finalised and secured as part of the DCO. The CoCP will detail good practice guidance including, but not limited to: ▪ Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532) (CIRIA 2001); ▪ CIRIA – SuDS Manual (C753) (CIRIA, 2015b); ▪ No discharge to Main River watercourses will occur without permission from Environment Agency (SuDS Manual) ▪ No discharge to IDB maintained watercourses will occur without permission from the relevant IDB; ▪ Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual); ▪ Regular cleaning of roads of any construction waste and dirt to be carried out (SuDS Manual); and ▪ A construction method statement to be submitted for approval by the responsible authority (SuDS Manual).
Operation and Maintenance	
General	The OnSS would contain potential pollutants which could include cooling oils, lubricants, fuels, greases, etc. The design, maintenance and operation of the facility would follow good practice in line with the prevailing guidance and legislation with regard to measures such as the storage and management of potentially polluting substances, emergency spill response procedures, clean up and control of any potentially contaminated surface water runoff and routine inspection to prevent or contain leaks of any pollutants.
Decommissioning	
General	Decommissioning practices will incorporate measures similar to the construction phase, to prevent pollution and increased flood risk. These measures will include emergency spill response procedures, control of surface water and clean up and remediation of any contaminated soils. Exposed cables ducts will be sealed with an appropriate water proofing material to mitigate flood risk or creation of preferential flow pathways.

Project phase	Mitigation measures embedded into the project design
	A decommissioning plan will be required, to include protection of the water environment, based on guidance that will be appropriate at the time of decommissioning.

24.6 Assessment Methodology

Study Area

24.6.1 The hydrology, hydrogeology and flood risk study area is shown on Figure 24.48 and comprises the onshore elements of the Project (as described in Volume 1, Chapter 3: Project Description) from mean high-water spring (MHWS) to the proposed National Grid connection point at either the Lincolnshire Node or at Weston Marsh, plus a 2km buffer around the proposed OnSS and the onshore ECC (including landfall, access routes and TCC areas).

24.6.2 The buffer size used for the onshore ECC and OnSS study areas were chosen primarily to allow for refinement in final location and alignments of onshore infrastructure. A 2km offset buffer distance is considered appropriate for data collection and assessment taking into account the nature of the development and likely zone of influence on hydrological receptors, including upstream and downstream catchments that are in hydrological continuity with the site. The study area and available data have been discussed and agreed with stakeholders and includes receptors downstream the onshore elements of the Project which are considered to be in hydraulic continuity within the study area.

Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Lincolnshire Node OnSS Search Area
- Weston Marsh North OnSS Search Area
- Weston Marsh South OnSS Search Area
- Hydrology, Hydrogeology and Flood Risk Study Area (Onshore PEIR Boundary 2 km Buffer)

Sources:

Coordinate System: British National Grid

0 5 10 km

Scale: 1:200,000

Preliminary Environmental Information Report

Hydrology, Hydrogeology and Flood Risk Study Area

Figure 24.48

OUTER DOWSING OFFSHORE WIND

Date: 28/04/2023
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Data Sources

24.6.3 Baseline data to inform scoping for hydrology, hydrogeology and Flood risk has been taken from publicly available information and opensource data from a range of sources. The key sources of publicly available information are:

- Environment Agency and data.gov.uk:
  - Flood Zone mapping;
  - Spatial Flood Defence data and mapping;
  - Flood Warning and Flood Alert Areas;
  - Main Rivers;
  - Ordinary Watercourses;
  - Groundwater Source Protection Zones (SPZ); and
  - Water Framework Directive (WFD) surface water and groundwater classification data.
- British Geological Survey (BGS) Mapping:
  - Geology (artificial ground, superficial deposits, bedrock);
  - Borehole/ well data;
  - Aquifer designation; and
  - Groundwater Vulnerability.
- Defra's MAGIC website/Natural England:
  - Statutory and non-statutory environmental designations.
- Cranfield Soil and Agrifood Institute Soilscapes map viewer:
  - Soil type and character.
- Lincolnshire County Council, East Lindsey District Council, Boston Borough Council and South Holland District Council:
  - Local Flood Risk Management Strategy;
  - Shoreline Management Plan– SMP3 and SMP4; and
  - Strategic Flood Risk Assessment.

24.6.4 Targeted data requests and consultation with a number of stakeholders and regulatory bodies have been submitted. The information requested includes:

- EA:
  - Flood modelling and mapping, flood defense asset information and flood event history;

- Catchment data for the management catchments of Witham and Welland relating to water quality and WFD classification;
- Catchment data for the Anglian groundwater catchments relating to water quality and WFD classification;
- Coastal management data; and
- Licensed abstractions or water users including data supporting groundwater Source Protection Zone (SPZ) designations.

- Lincolnshire County Council, East Lindsey District Council, Boston Borough Council and South Holland District Council:
  - Registered private water supplies;
  - Shoreline monitoring data;
  - Sustainable drainage guidance to meet Lead Local Flood Authority (LLFA) requirements; and
  - Local flood event history.
- Internal Drainage Boards (IDB):
  - Details of all assets managed by respective IDBs (drainage channels, sluices, pumping stations);
  - Details of any capital projects, proposals or plans that are in proximity to or which would have an effect on the cable corridor;
  - Operational practices; and
  - Flood modelling and mapping and flood event history.

Assessment Methodology

24.6.5 There are no published guidelines or criteria for assessing and evaluating effects on hydrology within the context of an EIA. The assessment is therefore based on a methodology derived from the Institute of Environmental Management and Assessment (IEMA) guidance. The methodology sets out a list of criteria for evaluating the environmental effects and is outlined in Volume 1, Chapter 5: EIA Methodology.

24.6.6 Professional judgement and a qualitative risk assessment methodology is used to assess the findings in relation to each of these criteria to give an assessment of significance for each potential impact.

24.6.7 As an impact assessment, this chapter does not explicitly consider the risk of flooding to the proposed development but does consider how the proposals may alter flood risk at the site and elsewhere. The flood risk to the proposed development will be considered separately in the onshore FRA to be undertaken following the confirmation of the grid connection point and the indicative design for the OnSS. The FRA will be provided with the ES at DCO application stage 8.8

24.6.8 A qualitative risk assessment methodology has been used to assess the significance of the potential effects associated with the proposed the Project. Two factors have been considered using this approach: the sensitivity of the receiving environment and the potential magnitude of impact, should that potential impact occur. This approach provides a mechanism for identifying the areas where site specific mitigation measures are required and for considering the effectiveness of mitigation measures proposed to manage the risk presented by the Project. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

24.6.9 Effects assessed as minor negative or less would be considered not significant in terms of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations). If the assessment results in moderate or major negative effects, then this effect would be considered to be significant in EIA terms.

24.6.10 This approach provides a mechanism for identifying the areas where site specific mitigation measures will be required and for identifying mitigation measures appropriate to the risk presented by the development proposals. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

Assessment Criteria and Assignment of Significance

24.6.11 The criteria for determining the significance of effects is a two stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts on those receptors. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts. Unless stated otherwise the terms used to define sensitivity and magnitude are based on those used in the Design Manual for Roads and Bridges (DMRB) methodology (DMBR 2009), which is described in more detail in Volume 1, Chapter 5: EIA Methodology.

24.6.12 The criteria for magnitude used in this chapter are outlined in Table 24.26 below.

Table 24.26: Impact magnitude definitions

Magnitude	Description/reason
High	Long term or permanent loss of resource and/or quality and integrity of resource; likely to cause exceedance of statutory objectives and/or breaches of legislation; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major long-term improvement of attribute quality (Beneficial).
	Changes to land within the application boundary resulting in an increase in runoff with flood potential and also significant changes to erosion and sedimentation patterns (Adverse).
	Major changes to groundwater levels, flow regime and risk of groundwater flooding (Adverse)
Medium	Loss of resource, but not adversely affecting the overall integrity; partial loss of/damage to key characteristics, features or elements with/without exceedance of statutory objectives or with/without breaches of legislation (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).

Magnitude	Description/reason
	Moderate changes to erosion and sedimentation patterns (Adverse).
	Moderate changes to groundwater levels, flow regime and risk of groundwater flooding (Adverse).
Low	Some measurable change in attributes, quality or vulnerability; reversible or minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
	Minor changes to erosion and sedimentation patterns (Adverse).
	Minor changes to groundwater levels, flow regime and risk of groundwater flooding (Adverse).
Negligible	Very minor or no loss or detrimental alteration to one or more characteristics, features or elements; impact of insufficient magnitude to affect the use/integrity (Adverse).
	Very minor or no benefit to or positive addition of one or more characteristics, features or elements; impact of insufficient magnitude to affect the use/integrity (Beneficial).
	No alteration or very minor changes with no impact to watercourses, hydrology, hydrodynamics, erosion and sedimentation patterns (Adverse).

24.6.13 The criteria for sensitivity used in this chapter are outlined in Table 24.27 below. Whilst a sensitivity category of 'very high' is proposed as a potential category for sensitivity criteria within the DMRB methodology, for the purposes of the assessment of hydrology, hydrogeology and flood risk effects, the categories within the range of 'major' to 'negligible' are considered to appropriately cover the potential receptors. Where a receptor could be placed within more than one category of value, professional judgement has been applied to determine which category is appropriate.

Table 24.27: Sensitivity/importance of the environment

Receptor sensitivity/ importance	Description	Receptor
High	High importance and rarity, international level and limited potential for substitution	Watercourses or water bodies of good chemical status/ high ecological status and/or high-quality targets under the WFD. Watercourses or water bodies draining through environmentally designated areas of international importance. Watercourses or water bodies supporting highly sensitive abstractions.

Receptor sensitivity/ importance	Description	Receptor
		Watercourses, water bodies or floodplain with a designation for ecological/conservation value. Development classified as 'highly vulnerable' to flood risk (under NPPF). Narrow floodplain where a small increase in volume results in a relatively large increase in flood levels. Public potable water supply from either surface or groundwater source. Aquifer is a Principal Aquifer providing regionally important potable water supply and classified as SPZ.
Medium	Medium importance and rarity, district or regional level, limited potential for substitution	Watercourses or water bodies of good chemical status/ moderate to good ecological status and/or moderate to high quality targets under the WFD. Watercourses or water bodies draining through environmentally designated areas of national importance. Watercourses or water bodies supporting moderately sensitive abstractions. Development classified as 'more vulnerable' to flood risk (under NPPF). Private potable use or non-drinking water abstraction for agricultural use from either surface or groundwater source. Aquifer is a Principal or Secondary A Aquifer not designated as SPZ. Bathing water monitored waterbody
Low	Low importance and rarity, local or district level	Watercourses or water bodies with a chemical water quality status classed as fail or an ecological water quality status classed as poor and/or moderate quality targets under the WFD. Watercourses or water bodies of local importance. Watercourses or water bodies supporting abstractions of limited sensitivity.

Receptor sensitivity/ importance	Description	Receptor
		Receptors classified as 'less vulnerable' to flood risk (under NPPF). Wide floodplain where a large increase in volume results in a small increase in flood levels. Aquifer is a Secondary A or Secondary B Aquifer.
Negligible	Very low importance and rarity, local level	Watercourses or water bodies with a chemical water quality status classed as 'fail' and an ecological water quality status classed as poor and/or low-quality targets under the WFD. Watercourses or water bodies of limited local importance. Watercourses or water bodies supporting no recorded abstractions. Non-productive geology in terms of groundwater resource.

24.6.14 The significance of the effect upon hydrology, hydrogeology and flood risk is determined by correlating the potential magnitude of the impact and sensitivity of the receptor, as defined in the matrix presented at Table 24.28. This approach uses the term "beneficial" for an advantageous or positive effect on an environmental resource or receptor or "adverse", for a detrimental or negative effect on an environmental resource or receptor. Where a range of significance is presented in Table 24.28, the final assessment for each effect is based upon expert judgement.

24.6.15 Adverse effects of moderate and above are considered significant in EIA terms. All beneficial effects and adverse effects below moderate are not considered significant in EIA terms. The broad definitions of the terms used are set out in Volume 1, Chapter 5: EIA Methodology.

Table 24.28: Matrix to determine effect significance

Sensitivity of receptor	Magnitude of impact: *Negligible*	*Minor*	*Moderate*	*Major*
Negligible	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Minor (Not significant)
Minor	Negligible (Not significant)	Minor (Not significant)	Minor (Not significant)	Moderate (Significant)
Moderate	Minor (Not significant)	Minor (Not significant)	Moderate (Significant)	Major (Significant)
Major	Minor (Not significant)	Moderate (Significant)	Major (Significant)	Major (Significant)

Assumptions and Limitations

24.6.16 The assessment is based on publicly available data obtained from the EA, Local Authorities, drainage boards and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.

24.6.17 The assessment is limited by a lack of detailed information on:

- Flow data for all watercourses and drainage channels; and
- Water quality data for specific locations.

24.6.18 Overall, a moderate to high level of certainty has been applied to the study. Where available, catchment data regarding water quality has been used to inform the assessment, with a hydrological site walkover planned for all Main River crossings within the hydrology, hydrogeology and flood risk study area. The information accessible in order to complete the assessment is considered sufficient to establish the baseline within the the Project onshore hydrology, hydrogeology and flood risk study area, therefore, there are no data limitations that would affect the conclusions of this assessment.

24.6.19 The key parameters for assessment identified in Table 24.24 have been selected as Maximum Design Scenario that would have the potential to result in the greatest effect on an identified receptor or receptor group. This scenario has been selected from the details provided in the project description (Volume 1, Chapter 3). Effects of greater significance are not predicted to arise should any other development scenario to that assessed here be taken forward in the final design scheme, within the assessed boundaries.

24.7 Impact Assessment

Construction

24.7.1 This section presents the assessment of impacts arising from the construction phase of the Project.

24.7.2 The impacts of the onshore construction of the Project have been assessed on hydrology, hydrogeology and flood risk in the onshore study area. The impacts arising from the construction of the project are detailed in Section 24.6 above, along which the MDS Table 24.24 against which each construction phase impact has been assessed.

24.7.3 A description of the potential effect on hydrology, hydrogeology and flood risk receptors caused by each identified impact is given below. In general, however, the environmental effects arising from the construction of the project are temporary, as they only occur during the construction phase.

24.7.4 The FRA to be undertaken following the confirmation of the grid connection location and to be provided at the DCO application stage, will assess the effects of flood risk on the temporary work areas associated with the construction phase and demonstrate how the significance of these effects can be reduced to an acceptable level through mitigation measures.

Onshore ECC Installation

Impact 1: Water Quality

24.7.5 Several sections of the onshore ECC involve or require crossing a Main River, ordinary watercourses or drainage ditches, as shown in Figure 24.6 to Figure 24.36. Along the ECC, the cable passes through land, which is within tidal and fluvial floodplain, some of which is afforded protection by the coastal sea wall defences and defences along the course of the rivers.

24.7.6 Landfall Trenchless drilling (or other trenchless crossing technique) exit pits will be located within the subtidal zone.

24.7.7 The CoCP will include measures such as a flood response plan to ensure that procedures are in place in the event of flooding during the construction phase. Through measures such as the ceasing of works, relocation or securing of materials and evacuation of workforce personnel the CoCP will reduce the likelihood of construction activities resulting in incidents detrimental to water quality occurring in the event of flooding and reduce the magnitude of the impact of any such incidents.

24.7.8 The CoCP will also include measures to control runoff from the construction works. This could include, for example, sediment fences when working in proximity to open watercourses, containment of storage areas and treatment of any runoff from work areas or water from dewatering of trenches. Such measures would prevent the potential reduction in water quality associated with increased sediment loading affecting nearby tidal waters, fluvial watercourses or drainage ditches during onshore ECC construction works, especially during excavations or earthwork activities.

24.7.9 Stockpiling of materials during earthworks would be temporary and would only be permitted in designated areas. All designated stockpile areas would be a minimum of 10m from any open watercourse features. The potential for contaminants contained within the stockpiled materials to be leached into water bodies, resulting in a reduction in the quality of the receiving waters, would be reduced through the implementation of embedded mitigation, detailed in Table 24.25 and mitigation measures proposed within the CoCP, including secondary containment of bulk storage areas.

24.7.10 The embedded mitigation measures detailed in Table 24.25 include the implementation of spill procedures and use of spill kits. These measures together with appropriate drainage systems and containment will minimise the potential for any reduction in water quality associated with spills or leaks of stored oils/fuels/chemicals or other polluting substances migrating into nearby water bodies.

24.7.11 The potential presence of ground contamination and resulting effects on the quality of water receptors is considered in Volume 1, Chapter 23: Geology and Ground Conditions.

Impact on watercourses

24.7.12 For watercourses, it is predicted that the impact on water quality from the ECC construction works would be direct and of an intermittent nature and of short duration.

24.7.13 The sensitivity of watercourse receptors ranges from **negligible** to **moderate** and the magnitude of impact with the controls in place is deemed to be **minor** given the embedded mitigation in place and that any direct pollution from spills would be small. The significance of effect is therefore considered to be **minor** (adverse) or **negligible**, which is not significant with regards the EIA Regulations.

Impact on near-shore coastal waters and transitional water bodies

24.7.14 For the near shore coastal water body and the Witham and Well and transitional water bodies, the impact on water quality from the ECC construction works would be direct (shore works only) or indirect (via onshore watercourses discharging to the coast) and of an intermittent nature and of short duration.

24.7.15 The sensitivity of the near shore water body is **major** and the transitional water bodies are **minor**. Potential for water quality impacts from shore works is **negligible** as any excavations will only have potential to mobilise sands and any direct pollution from spills will be very small relative to the receiving environment.

24.7.16 The mechanism for water quality impacts on the near shore coastal water body from inland works will be via watercourses, which will serve to reduce impacts from sediment entrainment and spills through settlement and dilution respectively.

24.7.17 The magnitude of impact with controls in place is assessed to be **negligible**. The significance of effect on near shore coastal water is therefore considered to be **minor** (adverse) and the significance of effect on transitional water bodies is considered to be **negligible**, which are not significant with regards the EIA Regulations.

Impact on groundwater quality

24.7.18 As confirmed in Volume 1, Chapter 23: Geology and Ground Conditions, there are no known point sources of contamination within the study area, however, on a precautionary basis, there is the potential for limited contamination to exist as a result of previous land uses, including agriculture and the use of nitrogen-based fertilisers. Any contamination is likely to be localised in its extent given the sources of contaminants and the characteristics of the underlying geology.

24.7.19 For groundwater, the impact on water quality would be direct and of an intermittent nature and of short duration. The sensitivity of the receptors is **major** to **negligible**, reflecting the range of different aquifer types along the onshore ECC. The magnitude of potential impact is deemed to be **negligible** given the embedded mitigation in place and that any direct pollution from spills would be small. The significance of effect is therefore considered to be **minor** (adverse) or **negligible**, which is not significant with regards the EIA Regulations.

Impact 2: Flood Risk

24.7.20 Spills of bulk materials such as concrete or entrainment of stockpiled material from excavations during cabling works could result in watercourses or drainage ditches becoming restricted or blocked. This could impact flow regimes and could result in an increase in fluvial flood risk.

24.7.21 Implementation of the embedded mitigation measures discussed at Section 1.6 and further measures which will be proposed within the CoCP, would reduce the likelihood of construction activities resulting in spillage incidents occurring and will ensure that there is very limited chance of stockpiled material becoming entrained and entering watercourses. This would reduce the magnitude of impact of any such incident.

24.7.22 Large stockpiles of excavated/ construction materials could block overland flow of surface water during heavy rainfall events and result in changes to existing surface water hydrology and an increase in surface water flood risk.

24.7.23 The laying of temporary surfacing material for the working area (which includes the corridor in which the access road, cable trench, excavated material and equipment are located) could result in a reduction in the permeability of the ground and therefore an increase in surface water flood risk.

24.7.24 These effects would be mitigated through the appropriate siting of stockpiles, provision of gaps to allow passage of surface water and development of a drainage strategy. Therefore, the effects of construction on surface water flood risk would be largely mitigated through the measures proposed within the CoCP.

24.7.25 The onshore ECC crosses main rivers, ordinary watercourses and drainage ditches. At any watercourse crossing there will be potential for the construction works associated with the crossing to increase fluvial flood risk through altering existing hydrological regime.

24.7.26 Construction activities would be undertaken in accordance with the final CMS which would be specified to ensure that construction does not result in an increase in flood risk. The CMS would specify mitigation measures including emergency and contingency plans for flooding incidents which may affect the works. The CMS would specify the need for a minimum cover depth between the cable and hard bed level of the watercourse being crossed.

24.7.27 In accordance with Environmental Permitting (England and Wales) Regulations 2016, consent would be sought from the Environment Agency to undertake works crossing, or within 8m of Main Rivers or within 16m if it is a tidal main river. Ordinary watercourse consent will be required from the LLFA and/or the relevant IDB for works crossing any other watercourse. Construction activities would be undertaken in accordance with the conditions of any consent which would be specified to ensure that construction does not result in an increase in flood risk. The consent would specify mitigation measures including emergency and contingency plans for flooding incidents which may affect the works. The consent would specify the need for a minimum cover depth between the cable and hard bed level of the watercourse being crossed.

24.7.28 Overall, it is predicted that the impact on flood risk from construction of the onshore ECC (including crossing of watercourses) would be direct and of an intermittent nature and of short duration.

24.7.29 The sensitivity of the receptor (the fluvial and tidal floodplain) is considered to be **minor,** and the magnitude of impact is deemed to be **negligible**. The significance of effect would, therefore, be **negligible**, which is not significant with regards the EIA Regulations.

Onshore Substation Construction

Impact 3: Water Quality

24.7.30 As set out for the onshore ECC works above, implementation of the embedded mitigation measures detailed in Table 24.25 and the measures proposed within the CoCP would reduce the likelihood of construction activities resulting in incidents detrimental to water quality occurring and reduce the magnitude of the impact of any such incidents.

Impact on watercourses

24.7.31 The proposed measures would include controls to prevent the potential reduction in water quality associated with increased sediment loading (including potentially contaminated sediment) entering nearby fluvial watercourses or drainage ditches during construction works, especially during excavating works.

24.7.32 Materials excavated during construction works would be stockpiled temporarily in designated areas. All designated stockpile areas would be a minimum of 10m from any open watercourse features. The potential for contaminants contained within the stockpiled materials to be leached into nearby fluvial watercourses or drainage ditches is not considered likely as contaminated land from pre-existing ground conditions has been effectively ruled out of assessment in Volume 1, Chapter 23 Geology and Ground Conditions, as no contamination sources have been identified along the onshore ECC. Where practical, where soil is to be stored for over six months it will be covered to minimise erosion, seeded or allowed to re-vegetate naturally.

24.7.33 The embedded mitigation measures detailed in Table 24.25 include the implementation of spill procedures and use of spill kits on site. This should prevent any potential reduction in water quality associated with spills or leaks of stored oils, fuels or chemicals used during the construction works migrating into nearby watercourses or drainage ditches.

24.7.34 The potential presence of ground contamination and resulting effects on the quality of water receptors is considered in Volume 1, Chapter 23: Geology and Ground Conditions.

24.7.35 Overall, it is predicted that the impact on water quality would be direct and of an intermittent nature and of short duration. The sensitivity of the receptors (receiving watercourses within the vicinity of the OnSS) is **negligible** to **moderate** and the magnitude of impact is deemed to be **minor**. The significance of effect would, therefore, be **minor** (adverse) or **negligible**, which is not significant in EIA terms.

Impact on groundwater quality

24.7.36 For groundwater, the impact on water quality would be direct and of an intermittent nature and of short duration. The sensitivity of the receptors is **major** (Lincolnshire node location) to **negligible** (Weston Marsh node location) and the magnitude of impact is deemed to be **negligible** (adverse) given the embedded mitigation in place and that any direct pollution from spills would be small. The significance of effect is therefore considered to be **minor** (adverse) or **negligible** depending on the location, which are not significant with regards the EIA Regulations.

Impact 4: Flood Risk

24.7.37 Spills of bulk materials such as concrete or entrainment of stockpiled material from excavations during OnSS construction could result in watercourses or drainage ditches becoming restricted or blocked. This could impact flow regimes and could result in an increase in localised fluvial flood risk.

24.7.38 Implementation of the embedded mitigation measures detailed within Table 24.25 and further measures which will be proposed within the CoCP, would reduce the likelihood of construction activities resulting in spillage incidents occurring and will ensure that there is very limited chance of stockpiled material becoming entrained to potentially enter watercourses. This would reduce the magnitude of impact of any such incidents.

24.7.39 Large stockpiles of excavated/ construction materials could block overland flow of surface water during heavy rainfall events and result in changes to existing surface water hydrology and an increase in surface water flood risk.

24.7.40 The laying of temporary surfacing material for access roads, TCC areas or any designated stockpile areas could result in a reduction in the permeability of the ground and therefore an increase in surface water flood risk.

24.7.41 These effects would be mitigated through the appropriate siting of stockpiles, provision of gaps to allow passage of surface water and development of a drainage strategy. Therefore, the effects of construction on surface water flood risk would be largely mitigated through the measures proposed within the CoCP.

24.7.42 The OnSS construction areas (including land for access road options) may disturb existing surface water drainage features (ordinary watercourses) which may require diversion. Ordinary watercourse consent will be required from the LLFA or relevant IDB for works to alter any watercourse affected by the OnSS construction. Any diversion or alteration to existing watercourse features would be undertaken in accordance with the conditions of the consent which would be specified to ensure that works do not result in an increase in flood risk. The consent would specify mitigation measures including emergency and contingency plans for flooding incidents which may affect the works.

24.7.43 The proposed OnSS search areas are within an area that are at a high risk of fluvial and tidal flooding. The activities carried out during construction phase would not impede floodplain flows arising from a tidal or fluvial flood event or reduce floodplain storage.

24.7.44 Overall, it is predicted that the impact on flood risk would be direct and of an intermittent nature and of short duration. The sensitivity of the receptor (the fluvial floodplain) is considered to be **minor,** and the magnitude of impact is deemed to be **minor**. The significance of effect would, therefore, be **minor** (adverse), which is not significant with regards the EIA Regulations.

24.7.45 TCC area(s) would be used during construction of the OnSS. This would be in addition to the land required for the substation and would be used to store plant and equipment whilst construction is being undertaken.

24.7.46 Overall, it is predicted that the impact on flood risk from the TCC areas would be direct and of an intermittent nature and of short duration. The sensitivity of the receptor (the fluvial floodplain) is considered to be **minor,** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **negligible**, which is not significant with regards the EIA Regulations.

Trenchless Drilling Works

Impact 5: Water Quality

24.7.47 As set out for the onshore ECC works above, implementation of the embedded mitigation measures detailed in Table 24.25 and the measures proposed within the CoCP would ensure that the potential for incidents detrimental to water quality occurring is minimised and would reduce the magnitude of the impact of any such incidents.

24.7.48 The CoCP will also include a flood response plan to ensure that procedures are in place in the event of flooding during any trenchless drilling (or other trenchless crossing technique) activity. In the event of a flood warning being received for an area where Trenchless drilling works are taking pace, any activity would be stopped and where possible, all sensitive equipment or plant would be relocated from the risk area and material secured. Workforce personnel would be evacuated from the work area until any such warning was over. These measures will reduce the likelihood of construction activities resulting in incidents detrimental to water quality occurring in the event of flooding and reduce the magnitude of the impact of any such incidents.

24.7.49 Materials excavated during initial excavations or during trenchless crossing works would be stockpiled temporarily in designated areas. All designated stockpile areas would be a minimum of 10m from any open watercourse features where practicable. The potential for contaminants contained within the stockpiled materials to be leached into nearby fluvial watercourses or drainage ditches is not considered likely as contaminated land from pre-existing ground conditions has been effectively ruled out of assessment in Volume 1, Chapter 23: Geology and Ground Conditions as no contamination sources have been identified along the onshore ECC. If required and where practical, where soil is to be stored for over six-months it will be covered to minimise erosion or allowed to re-vegetate naturally.

24.7.50 The potential presence of ground contamination and resulting effects on the quality of water receptors is considered in Volume 1, Chapter 23: Geology and Ground Conditions.

24.7.51 The proposed measures would include controls to prevent the potential reduction in water quality associated with increased sediment loading (including potentially contaminated sediment) and with spills or leaks of oils, fuels or chemicals used during the trenchless crossing works migrating into nearby fluvial or tidal watercourses or drainage ditches during construction works, especially during excavation earthworks and management of spoil from drilling.

Impact on near-shore coastal water

24.7.52 For the near shore coastal water body, and the Witham and Welland transitional water bodies, the impact on water quality from the trenchless crossing works would be direct (shore works only) or indirect (via onshore watercourses discharging to the coast) and of an intermittent nature and of short duration. The sensitivity of the near shore water body is **major** and the transitional water bodies are **minor**. Potential for water quality impacts from shore works is **negligible** as any excavations is likely to only have potential to mobilise sands and any direct pollution from spills will be very small relative to the receiving environment.

24.7.53 The mechanism for water quality impacts on the near shore coastal water body from inland trenchless crossing activity will be via watercourses, which will serve to reduce impacts from sediment entrainment and spills through settlement and dilution respectively. The magnitude of impact with controls in place is assessed to be **negligible**. The significance of effect on near shore coastal water is therefore considered to be **minor** (adverse) and the significance of effect on transitional water bodies is considered to be **negligible**, which are not significant with regards the EIA Regulations.

Impact on watercourses

24.7.54 For inland watercourses the impact on water quality from the trenchless crossing works would be direct and of an intermittent nature and of short duration.

24.7.55 The sensitivity of the receptors range from is **negligible** to **moderate** and the magnitude of impact is deemed to be **minor**. The significance of effect on inland watercourses would, therefore, be **minor** (adverse) or **negligible**, which is not significant with regards the EIA Regulations.

Impact on groundwater

24.7.56 For groundwater, the impact on water quality would be direct and of an intermittent nature and of short duration. The sensitivity of the receptors is **major** to **negligible**, reflecting the range of different aquifer types along the onshore ECC. The magnitude of potential impact is deemed to be **negligible** given the embedded mitigation in place and that any direct pollution from spills would be small. The significance of effect is therefore considered to be **minor (adverse)** to **negligible**, which is not significant with regards the EIA Regulations.

Impact 6: Flood Risk

24.7.57 Spills of bulk materials such as concrete or entrainment of stockpiled material from excavations or spoil from drilling during trenchless crossing works could result in watercourses or drainage ditches becoming restricted or blocked. This could impact flow regimes and could result in an increase in fluvial flood risk.

24.7.58 Implementation of the embedded mitigation measures discussed at Section 1.6 and further measures which will be proposed within the CoCP, would reduce the likelihood of construction activities resulting in spillage incidents occurring and will ensure that there is very limited chance of stockpiled material becoming entrained and entering watercourses. This would reduce the magnitude of impact of any such incident.

24.7.59 Large stockpiles of excavated/ construction materials could block overland flow of surface water during heavy rainfall events and result in changes to existing surface water hydrology and an increase in surface water flood risk.

24.7.60 The laying of temporary surfacing material for the trenchless crossing working areas could result in a reduction in the permeability of the ground and therefore an increase in surface water flood risk.

24.7.61 These effects would be mitigated through the appropriate siting of stockpiles, provision of gaps to allow passage of surface water and development of a drainage strategy. Therefore, the effects of construction on surface water flood risk would be largely mitigated through the measures proposed within the CoCP.

24.7.62 The proposed trenchless crossing works will be used to cross existing flood defences and a number of Main River channels along the ECC. At any watercourse crossing there will be potential for the trenchless crossing works associated with the crossing to increase fluvial flood risk through altering the existing hydrological regime.

24.7.63 In accordance with Environmental Permitting (England and Wales) Regulations 2016, consent would be sought from the Environment Agency to undertake works crossing, or within 8m of flood defences or main rivers or within 16m if it is a tidal main river. Trenchless drilling activities would be undertaken in accordance with the conditions of any consent granted which would be specified to ensure that construction does not result in an increase in flood risk. The consent would specify mitigation measures including emergency and contingency plans for flooding incidents which may affect the works. The consent would specify the need for a minimum cover depth between the cable and hard bed level of the watercourse being crossed.

24.7.64 Overall, it is predicted that the impact on tidal and fluvial flood risk from Trenchless drilling crossings would be direct and of an intermittent nature and of short duration.

24.7.65 The sensitivity of the receptor (the fluvial and tidal floodplain) is considered to be **minor,** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **negligible**, which is not significant with regards the EIA Regulations.

24.7.66 The trenchless crossing TCCs would be used during the construction phase, which would be used to store plant and equipment whilst works are being undertaken. There is potential for the TCCs to be located within the fluvial or tidal floodplain. Further assessment of flood risk for these areas will be covered in the onshore FRA to be provided at the DCO application stage. .

24.7.67 The FRA will identify appropriate mitigation measures to ensure that the flood risk associated with the TCCs is minimised to an acceptable level, including a flood warning service in the event of a potential flood threat to the area in which the compound is located.

24.7.68 Overall, it is predicted that the impact on flood risk associated with trenchless crossing TCCs would be direct and of an intermittent nature and of short duration. The sensitivity of the receptor (fluvial and tidal floodplain) is considered to be **minor,** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **negligible**, which is not significant with regards the EIA Regulations.

Landfall Installation

Impact 7: Water Quality

24.7.69 As set out for the onshore ECC works above, implementation of the embedded mitigation measures detailed in Table 24.25 and the measures proposed within the CoCP would reduce the likelihood of construction activities resulting in incidents detrimental to tidal water quality occurring and reduce the magnitude of the impact of any such incidents. Potential impacts to water quality associated with the 'offshore' construction works, from mean high-water springs to the array, will be mitigated through the application of a Project Environmental Management Plan which will be secured in the Marine Licence(s).

24.7.70 The proposed measures would include controls to prevent the potential reduction in water quality associated with increased sediment loading (including potentially contaminated sediment) entering nearby tidal waters during excavation works or trenchless crossing activities.

24.7.71 Stockpiling of materials during earthworks would be temporary and would only be permitted in designated areas. The potential for contaminants contained within the stockpiled materials or associated with spills or leaks of stored oils, fuels or chemicals becoming mobilised into tidal waters, would be reduced through the implementation of embedded mitigation, detailed in Table 24.25 and mitigation measures proposed within the CoCP.

24.7.72 Should a tidal flood event associated with extreme sea levels occur whilst construction works are in progress, there is the potential for stored materials (e.g., stockpiled soils and excavated material) to be mobilised by the floodwaters and washed into coastal waters, potentially resulting in a reduction in local tidal water quality.

24.7.73 The CoCP will include measures such as a flood response plan to ensure that procedures are in place in the event of flooding during the construction phase. Through measures such as the ceasing of works, relocation or securing of materials and evacuation of workforce personnel the CoCP will reduce the likelihood of construction activities resulting in incidents detrimental to water quality occurring in the event of flooding and reduce the magnitude of the impact of any such incidents.

24.7.74 The potential volume and concentration of any contaminated water entering tidal waters as a result of construction activities is considered to be low compared to that of the receiving tidal waters. The embedded mitigation measures detailed in Table 24.25 includes the implementation of spill procedures and use of spill kits. These measures will minimise the potential for any reduction in water quality associated with spills or leaks migrating into tidal waters.

24.7.75 No potential sources of contamination have been identified from former land uses at landfall and therefore, the probability of mobilising existing contaminants in the vicinity is considered unlikely. The onshore cable would be installed by Trenchless drilling (or other trenchless crossing technique) under the sea defences and the coastal sand dunes. A TCC compound would be established at the trenchless crossing TJB working area, with another TCC located near the exit pit works within the beach area, which are likely to incorporate a storage area for fuels and chemicals. As a result, there is the potential for contaminants to be released as a result of accidental spillage or inappropriate storage and therefore, potentially affect the underlying groundwater. Impact on near-shore coastal water

24.7.76 For the near-shore tidal waters, the impact on water quality from the landfall works would be direct and of an intermittent nature and of short duration.

24.7.77 The sensitivity of the near shore water body is **major**. Potential for water quality impacts from shore works is **negligible** as any excavations are likely to only have potential to mobilise sands and any direct pollution from spills will be very small relative to the receiving environment. The magnitude of impact with controls in place is assessed to be **negligible**. The significance of effect on near shore coastal water is therefore considered to be **minor** (adverse), which is not significant with regards the EIA Regulations.

Impact on watercourses

24.7.78 For inland watercourses along the onshore ECC the impact on water quality from the trenchless crossing works would be direct and of an intermittent nature and of short duration.

24.7.79 The sensitivity of the watercourse receptors close to landfall range from **negligible** to **moderate** and the magnitude of impact is deemed to be **minor**. The significance of effect on watercourses would, therefore, be **minor** (adverse) or **negligible**, which is not significant in EIA terms.

Impact on groundwater

24.7.80 For the landfall trenchless crossing, the underlying bedrock geology is of **major** sensitivity, however the quality of the groundwater is likely to be affected with elevated levels of salinity, which may reduce its importance/ sensitivity. The implementation the CoCP would control the storage and use of fuels and chemicals within the TCCs and therefore reduce the likelihood of contamination occurring. Any risk of increased salinity to groundwater will be localised and small.

24.7.81 For groundwater, the impact on water quality would be direct and of an intermittent nature and of short duration. The sensitivity of the groundwater receptor is **major,** and the magnitude of impact is deemed to be **negligible** given the embedded mitigation in place and that any direct pollution from spills would be small. The significance of effect is therefore considered to be **minor** (adverse) which is not significant with regards the EIA Regulations.

Impact 8: Flood Risk

24.7.82 The laying of temporary surfacing material for the landfall access road, compound and any designated stockpile area could result in a reduction in the permeability of the ground and therefore an increase in surface water flood risk. The increase in surface water runoff volume arising on the impermeable areas is likely to be relatively minor and would discharge directly to tidal waters. The effect of these works on flood risk will be assessed in more detail in the FRA.

24.7.83 Overall, it is predicted that the impact on surface water flood risk would be direct and of an intermittent nature and of short duration.

24.7.84 The sensitivity of the receptor (the fluvial and tidal floodplain) is considered to be **minor,** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **negligible**, which is not significant with regards the EIA Regulations.

24.7.85 Export cables will be installed by trenchless crossing, passing beneath flood defences located along the coast. The potential impact from impairment of the coastal defence structure would result in an increase in tidal flood risk.

24.7.86 In accordance with Environmental Permitting (England and Wales) Regulations 2016, the Project will seek a permit exemption from the Environment Agency for trenchless works passing beneath the defences. If necessary, the necessary protective provisions will be agreed with the EA to allow them to approve the design and construction management plan of works affecting flood defences.

24.7.87 Overall, it is predicted that the impact on tidal flood risk would be direct and of an intermittent nature and of short duration.

24.7.88 The sensitivity of the receptor (the fluvial and tidal floodplain) is considered to be **minor,** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **negligible**, which is not significant with regards the EIA Regulations.

Operations and Maintenance

24.7.89 The impacts of the operation and maintenance of the Project have been assessed on hydrology, hydrogeology and flood risk in the onshore study area. The impacts arising from the operation of the project are detailed in Section 24.6 above, along which the MDS (Table 24.24) against which each operational phase impact has been assessed.

24.7.90 A description of the potential effect on hydrology, hydrogeology and flood risk receptors caused by each identified impact is given below.

24.7.91 The FRA will assess the effects of flood risk on the permanent infrastructure associated with the operational phase and demonstrate how the significance of these effects can be reduced to an acceptable level through mitigation measures. This will be provided at DCO application stage.

Permanent Onshore ECC Infrastructure

Impact 9: Flood Risk and Water Quality

24.7.92 The onshore cable would be buried underground. Restoration of land above the cable would be included in the construction phase, ensuring that the former land use is generally retained. There would be some minor increase in impermeable surfacing associated with the onshore ECC, arising from manholes at ground level for access to link boxes. There is a potential increase in surface water flood risk from these areas due to the greater volume and rate of runoff arising from reduced infiltration potential to ground.

24.7.93 Appropriate surface water drainage measures would be implemented to mitigate against this potential risk by ensuring that runoff from the access routes is restricted to acceptable rates (to be agreed with the LLFA) or passes to tidal waters, thereby not increasing surface water flood risk. Infiltration-based SUDS techniques would be considered where feasible to achieve this.

Impact on environmental receptors

24.7.94 Overall, it is predicted that the impact from the onshore ECC on flood risk and water quality would be direct and of a continuous nature and of medium to long duration.

24.7.95 The sensitivity of the receptors (watercourses, near-shore coastal waters and floodplain) ranges from **negligible** to **moderate** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **minor** (adverse) or **negligible**, which is not significant with regards the EIA Regulations.

Onshore Substation

Impact 10: Flood Risk and Water Quality

24.7.96 The development of the OnSS and permanent access route would result in an increase in impermeable surfacing. The majority of the compound would remain permeable. Through the introduction of impermeable surfacing associated with the substation building and access track, there is a potential increase in surface water flood risk due to the greater volume and rate of runoff arising from reduced infiltration potential to ground.

24.7.97 Appropriate surface water drainage would be implemented to mitigate against this potential risk. Surface water drainage measures would be implemented to ensure that runoff from the site is managed and restricted to rates agreed with the LLFA, thereby not increasing surface water flood risk. A range of feasible SUDS techniques could be used to achieve this, e.g. infiltration features or surface water detention areas.

Impact on flood risk

24.7.98 Overall, it is predicted that the impact on surface water flood risk would be direct and of a continuous nature and of medium to long duration.

24.7.99 The sensitivity of the receptors (watercourses and the floodplain) ranges from **negligible** to **moderate** and the magnitude of impact is deemed to be **negligible**. The significance of effect would, therefore, be **minor** (adverse) or **negligible**, which is not significant with regards the EIA Regulations.

24.7.100 The OnSS search areas are located within tidal and fluvial flood zones. There could be an effect on the fluvial or tidal floodplain associated with the substation during the operational phase. The effect of these works on flood risk will be assessed in more detail in the FRA to be provided at DCO application stage.

24.7.101 Overall, it is predicted that the impact on flood risk to the site would be direct and of a continuous nature and of medium to long duration.

24.7.102 The sensitivity of the receptor (the floodplain) is considered to be **minor,** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **negligible**, which is not significant with regards the EIA Regulations.

Impact on water quality

24.7.103 The OnSS would contain potential pollutants which could include cooling oils, lubricants, fuels, greases, etc. The design, maintenance and operation of the facility would include routine inspection to prevent or contain leaks of any pollutants from the substation, thereby mitigating against the potential for these contaminants to migrate into the local drainage ditch network and cause a reduction in water quality.

24.7.104 Overall, it is predicted that the impact on water quality would be direct and of a continuous nature and of medium to long duration.

24.7.105 The sensitivity of the receptors (watercourses) is considered to range from **negligible** to **moderate** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **minor** (adverse) or **negligible**, which is not significant with regards the EIA Regulations.

Trenchless Crossings

Impact 11: Flood Risk and Water Quality

24.7.106 The trenchless crossing drilling for the onshore ECC would require working areas at either side of each Trenchless drilling crossing. Following construction, these areas would be restored, with the former land use retained. The only permanent features on the surface of the onshore ECC would be the jointing bays, which would be buried. Therefore, the only risk in terms of flooding and water quality would be any access routes required for inspection and maintenance of the joint bays.

24.7.107 Adequate surface water drainage measures would be implemented to mitigate against this potential risk by ensuring that runoff from the access routes is restricted to acceptable rates (to be agreed with the LLFA) or passes to tidal waters, thereby not increasing surface water flood risk. A range of feasible SUDS techniques could be used to achieve this, e.g., infiltration features or surface water detention areas.

Impact on water bodies and floodplain

24.7.108 Overall, it is predicted that the impact on flood risk and water quality would be direct and of a continuous nature and of medium to long duration.

24.7.109 The sensitivity of the receptors (watercourses, near-shore coastal waters and floodplain) ranges from **negligible** to moderate and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **minor** (adverse) or **negligible**, which is not significant with regards the EIA Regulations.

Permanent Landfall Site Infrastructure

Impact 12: Flood Risk and Water Quality

24.7.110 The landfall site would include TJBs and a temporary working area. Following construction, the temporary working area would be restored to its former land. The covers above each TJB chamber will either be buried or set flush with the surrounding ground level. If the detailed design of the landfall requires the TJB to be raised above the existing ground level, the ground level around the TJB would also be raised, so that the covers remain buried or set flush with the surrounding land. The maximum increase above the existing ground level would be 1.5m with a maximum raised area of 1.8ha. The TJB will be located a minimum of 80m west of Roman Bank. The only risk in terms of flooding and water quality would be any access routes required for inspection and maintenance of these features.

24.7.111 Adequate surface water drainage measures would be implemented to mitigate against this potential risk by ensuring that runoff from the access routes is restricted to acceptable rates (to be agreed with the LLFA) or passes to tidal waters, thereby not increasing surface water flood risk. A range of feasible SUDS techniques could be used to achieve this, e.g., infiltration features or surface water detention areas.

Impact on water bodies and floodplain

24.7.112 Overall, it is predicted that the impact on flood risk and water quality would be direct and of a continuous nature and of medium to long duration.

24.7.113 The sensitivity of the receptors (watercourses, near-shore coastal waters and floodplain) ranges from **negligible** to **moderate** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **minor** (adverse) or **negligible** (adverse), which is not significant with regards the EIA Regulations.

Decommissioning

24.7.114 The impacts of the decommissioning of the Project have been assessed on hydrology, hydrogeology and flood risk in the onshore study area. The impacts arising from the decommissioning of the project are detailed in Section 24.6 above, along which the MDS (Table 24.24) against which each decommissioning phase impact has been assessed.

24.7.115 During decommissioning phase, the impacts on hydrology, hydrogeology and flood risk will be similar to those assessed for the construction phase. Good practice measures (similar to those identified within the CoCP) would be employed during decommissioning and would be agreed with statutory authorities at the time of decommissioning through a decommissioning plan.

24.7.116 The significance of effects associated with the temporary impacts on water quality and flood risk would be **minor** (adverse) or **negligible**, as assessed in the construction phase detailed above, which is not significant with regards the EIA Regulations.

24.7.117 Post-decommissioning, the long-term effects of the decommissioned project are described below.

Decommissioning of the Onshore ECC

Impact 13: Flood Risk and Water Quality

24.7.118 With respect to the buried onshore cables, these would be left in place during decommissioning. Allowing the cables to remain in place is considered an acceptable option with minimal environmental impact. TJBs and link boxes may be removed, depending on agreements reached with the landowners and regulatory authorities in place at the time. Removal of TJB or link box structures would return the site to its pre-development state. The maximum adverse scenario in terms of flood risk is therefore for the jointing bays to remain in place.

Impact on all environmental receptors

24.7.119 Overall, it is predicted that the impact of the decommissioned ECC on flood risk and water quality in the maximum adverse scenario (i.e., jointing bays left in situ) would be direct and of a continuous nature and of medium to long duration.

24.7.120 The sensitivity of the receptors (watercourses, near-shore coastal waters, groundwater and floodplain) ranges from **negligible** to **major** and the magnitude of impact is deemed to be **negligible**. The significance of effect would, therefore, be **minor** (adverse) or **negligible**, which is not significant with regards the EIA Regulations.

Decommissioning of Onshore Substation

Impact 14: Flood Risk and Water Quality

24.7.121 It is anticipated that the OnSS would be gradually dismantled on site with certain infrastructure removed for recycling or reuse. Following this, the area is likely to be remediated and restored.

24.7.122 The decommissioning works may involve removal of some or all of the impermeable hard-standing surfacing and restoration of the permeable greenfield land present prior to construction. This action would result in the surface water flood risk being returned to its pre-development state. Specific decommissioning requirements and potential concerns with regards to hydrology, hydrogeology and flood risk would be discussed with the relevant statutory consultees at the time.

Impact on all environmental receptors

24.7.123 Overall, it is predicted that the impact of the decommissioned OnSS on flood risk and water quality would be direct and of a continuous nature and of long duration.

24.7.124 The sensitivity of the receptors (watercourses, groundwater and the fluvial and tidal floodplain) is considered to range from **negligible** to **major** and the magnitude of impact is deemed to be **negligible**. The significance of effect would therefore be **minor** (adverse) or **negligible**, which is not significant with regards the EIA Regulations.

24.8 Cumulative Effects Assessment

24.8.1 The cumulative effects of the onshore elements of the Project have been assessed on hydrology, hydrogeology and flood risk receptors in the study area. A list of other major developments has been compiled for the onshore assessment of cumulative effects, which includes other projects that are considered likely to be present in the area of the onshore works once the Project is operational, or where there may be some overlap in respective construction phases and in decommissioning if appropriate.

24.8.2 It is anticipated that other projects of significance would be constructed in accordance with a CoCP and would require an assessment of flood risk. Surface water drainage for any development proposals would also require approval from the LLFA. Given the requirements to control potential detrimental effects of any development on flood risk or water quality, appropriate mitigation would be in place for these schemes to secure approval. Therefore, no significant cumulative hydrology, hydrogeology and flood risk effects arising during the construction phase of proposed new developments are likely. Furthermore, it is not expected that the project would have an impact on any of the measures that other developments within the vicinity of the onshore works would need to incorporate during the construction phase to prevent detrimental hydrology, hydrogeology or flood risk effects elsewhere.

24.8.3 Where the receptors potentially affected by the Project are the same as those affected by the other projects considered within Volume 2, Appendix 5.2: Onshore Cumulative Effects Assessment there is potential for the combined effect to be of a greater significance than that assessed for the Project in isolation.

24.8.4 Many of the receptors potentially affected by the Project are different to those potentially affected by the projects considered in Volume 2, Annex 5.2: Onshore Cumulative Effects Assessment and in cases where the receptors are the same, the relative location and distance of the other projects to this project mean that there is no significant hydraulic connectivity between them and therefore no cumulative effect.

24.8.5 The list included in Volume 2, Appendix 5.2: Onshore Cumulative Effects Assessment includes a list of projects that have the potential to produce cumulative effects. Following a review of the individual project details, these have all be screened out for hydrology, hydrogeology and flood risk. Details of the screening are provided in Volume 2, Appendix 5.2: Onshore Cumulative Effects Assessment.

Further Mitigation and Future Monitoring

24.8.6 No further mitigation or monitoring measures are considered necessary.

24.9 Inter-Relationships

24.9.1 This chapter has considered the effect of the Project on water quality and flood risk in relation to the proposed onshore infrastructure. Effects on offshore water quality are considered in Volume 1, Chapter 8: Marine Water Quality.

24.9.2 In all cases, the potential for effects of the Project to result in consequential effects on other receptors would be controlled by the measures set out in this chapter. The effects identified within this chapter are predicted to be **minor** (adverse) or **negligible**. None of these effects would be significant with regards the EIA Regulations. Given the localised nature of the effects, there is not considered to be potential for significant inter-related effects on any offshore receptors.

24.9.3 Impacts on water quality arising from spillages or leaching of potentially polluting material may result in contamination of the ground through pollutants being mobilized to ground in water. With the implementation of mitigation measures detailed in this chapter, the effect would be **negligible**.

24.9.4 Impacts on the volume of sediment entering watercourses or coastal waters arising from excavation of ground materials during drilling or trenching may result in increased sedimentation of water bodies. With the implementation of mitigation measures detailed in this chapter, the effect would be **negligible**.

24.9.5 There are not considered to be any significant inter-related effects between offshore and onshore parts of the Project in terms of hydrology, hydrogeology and flood risk.

24.10 Transboundary Effects

24.10.1 The likely effects of the Project would be localised. It is not considered likely that there would be any trans-boundary effects in relation to hydrology, hydrogeology or flood risk.

24.11 Conclusions

24.11.1 The potential hydrological receptors in the study area comprise the tidal and fluvial floodplain; various watercourses, including Main Rivers and ordinary watercourses or drains; groundwater; and the near-shore tidal waters of the North Sea. These receptors vary in their environmental sensitivity from minor to major.

24.11.2 The assessed magnitude of the various identified impacts of the Project on water quality and flood risk varies from **minor** (adverse) to **negligible**. Overall, through the implementation of mitigation measures, including those specified in the CoCP, it is considered that the likely overall effect of the Project on water quality and flood risk throughout the construction, operation and decommissioning of the Project is **not significant** with regards the EIA Regulations.

Table 24.29: Summary of effects

Description of effect	Effect	Additional mitigation measures	Residual impact
Construction			
Onshore ECC			
Impact on watercourses	Minor (adverse) or Negligible	None (CoCP already part of the project)	Not significant
Impact on near-shore coastal waters	Minor (adverse)	None (CoCP already part of the project)	Not significant
Impact on transitional water bodies	Negligible	None (CoCP already part of the project)	Not significant
Impact on groundwater quality	Minor (adverse) or Negligible	None (CoCP already part of the project)	Not significant
Impact on flood risk	Negligible	None (CoCP and FRA already part of the project)	Not significant
Onshore Substation Construction			
Impact on watercourses	Minor (adverse) or Negligible	None (CoCP already part of the project)	Not significant
Impact on groundwater quality	Minor (adverse) or Negligible	None (CoCP already part of the project)	Not significant
Impact on flood risk	Negligible	None (CoCP and FRA already part of the project)	Not significant
Trenchless Drilling Works			
Impact on watercourses	Minor (adverse) or Negligible	None (CoCP already part of the project)	Not significant
Impact on near-shore coastal waters	Minor (adverse)	None (CoCP already part of the project)	Not significant
Impact on transitional water bodies	Negligible	None (CoCP already part of the project)	Not significant
Impact on groundwater quality	Minor (adverse) or Negligible	None (CoCP already part of the project)	Not significant
Impact on flood risk	Negligible	None (CoCP and FRA already part of the project)	Not significant
Landfall Installation			
Impact on watercourses	Minor (adverse) or Negligible	None (CoCP already part of the project)	Not significant

Description of effect	Effect	Additional mitigation measures	Residual impact
Impact on near-shore coastal waters	Minor (adverse)	None (CoCP already part of the project)	Not significant
Impact on transitional water bodies	Negligible	None (CoCP already part of the project)	Not significant
Impact on groundwater quality	Minor (adverse)	None (CoCP already part of the project)	Not significant
Impact on flood risk	Negligible	None (CoCP and FRA already part of the project)	Not significant
Operation and Maintenance			
Permanent ECC Infrastructure			
Impact on all environmental receptors	Minor (adverse) or Negligible	None (CoCP and FRA already part of the project)	Not significant
Onshore Substation			
Impact on watercourses	Minor (adverse) or Negligible	None (CoCP already part of the project)	Not significant
Impact on flood risk	Minor (adverse) or Negligible	None (CoCP and FRA already part of the project)	Not significant
Trenchless Crossings			
Impact on waterbodies and floodplain	Minor (adverse) or Negligible	None (CoCP and FRA already part of the project)	Not significant
Permanent Landfall Site			
Impact on waterbodies and floodplain	Minor (adverse) or Negligible	None (CoCP and FRA already part of the project)	Not significant
Decommissioning			
Decommissioning of ECC			
Impact on all environmental receptors	Minor (adverse) or Negligible	None (CoCP and FRA already part of the project)	Not significant
Decommissioning of Onshore Substation			
Impact on all environmental receptors	Minor (adverse) or Negligible	None (CoCP and FRA already part of the project)	Not significant
Cumulative			
Impact on all environmental receptors	No cumulative effect	N/A	N/A

24.12 References

DECC (2011a) Overarching National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Accessed: March 2023]

DECC (2011b) National Policy Statement for Renewable Energy Infrastructure (EN-3). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf [Accessed: March 2023]

DECC (2011c) National Policy Statement for Electricity Networks Infrastructure (EN-5). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47858/1942-national-policy-statement-electricity-networks.pdf [Accessed: March 2023]

DESNZ (2023a) Draft Overarching National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147380/NPS_EN-1.pdf [Accessed: March 2023]

DESNZ (2023b) Draft National Policy Statement for Renewable Energy Infrastructure (EN-3). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147382/NPS_EN-3.pdf [Accessed: March 2023]

DESNZ (2023c) Draft National Policy Statement for Electricity Networks Infrastructure (EN-5). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147384/NPS_EN-5.pdff [Accessed: Mar 2023]Environment Agency Guidance: Land contamination risk management (LCRM), https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm [Accessed online: March 2023]

Control of Water Pollution from Construction Sites (C532), Construction Industry Research and Information Association, (CIRIA) 2001;

Environmental Good Practice on Site (C741), CIRIA 2015;

Control of water pollution from linear construction projects (C648), CIRIA 2006;

The Environment Agency's approach to groundwater protection, version 1.2, February 2018; and

The SuDS Manual (C753), CIRIA 2015.https://check-long-term-flood-risk.service.gov.uk/postcode