Medworth Energy from Waste
Combined Heat and Power Facility

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Environmental Statement
Chapter 12: Hydrology

Regulation reference: The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 Regulation 5(2)(a)

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Contents

12. Hydrology

12.1 Introduction

12.1.1 This chapter presents the environmental assessment of the likely significant effects of the Proposed Development with respect to surface water and flood risk Receptors.

12.1.2 The chapter should be read in conjunction with the description of the development provided in **Chapter 3: Description of Proposed Development (Volume 6.2)** and with respect to relevant parts of other chapters **Chapter 11: Biodiversity (Volume 6.2)**, **Chapter 13: Geology, Hydrogeology and Contaminated Land (Volume 6.2)** and **Chapter 14: Climate Change (Volume 6.2)**, where common Receptors have been considered and where there is an overlap or relationship between the assessment of effects. A list of terms and abbreviations can be found in **Chapter 1: Introduction, Appendix 1F (Volume 6.4)**.

12.1.3 Following a summary of consultation and stakeholder engagement and relevant policy and legislation, the chapter outlines the data gathering methodology that was adopted as part of the impacts assessment. This leads on to a description of the overall baseline conditions, the scope of the assessment, the environmental measures that have been incorporated into the scheme, the assessment methodology and, for each Receptor, an assessment of potential significant effects. The chapter concludes with a summary of the results of the assessment. This chapter is informed by information provided in the **Flood Risk Assessment** (**FRA**), included in **Appendix 12A: FRA (Volume 6.4)**. Potential inter-related and cumulative effects are considered in **Chapter 18: Cumulative Effects Assessment (Volume 6.2)**.

12.1.4 In undertaking the assessments, consideration has been paid to PINS Advice Note 18, which sets out the approach to the Water Framework Directive (WFD) Assessment. It should be noted that the site is not hydrologically connected with any WFD waterbodies (see **Section 12.5**); therefore, it is not intended that a separate WFD assessment is produced as a part of the Environmental Statement (ES) assessment. However, impacts on the water environment have considered potential impacts on water quality and hydromorphology in a way that mirrors WFD approaches. This ensures that consideration has been paid to the overall objectives of the WFD as transposed into UK law. As noted above, impacts on other elements of a WFD status classification have been considered in **Chapter 11: Biodiversity (Volume 6.2)** and **Chapter 13: Geology, Hydrogeology and Contaminated Land (Volume 6.2).**

12.2 Consultation and stakeholder engagement

12.2.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Chapter 4: Approach to the EIA (Volume 6.2).**

12.2.2 A summary of the relevant responses received in the EIA Scoping Opinion in relation to Hydrology, and confirmation of how these have been considered within the assessment to date, is presented in **Table 12B.1: Summary of EIA Scoping Opinion responses for Hydrology** in **Appendix 12B: Stakeholder engagement (Volume 6.4).**

12.2.3 An overview of the key stakeholders consulted following scoping and a summary of the issues discussed in relation to Hydrology is presented in **Table 12B.2: Summary of engagement subsequent to scoping regarding Hydrology** in **Appendix 12B: Stakeholder engagement (Volume 6.4)**.

12.2.4 A summary of the relevant responses received to the Preliminary Environmental Impact Report (PEIR), together with any subsequent discussions held in relation to Hydrology, and confirmation of how these have been considered within the assessment to date, is presented in **Table 12B.3: Summary of PEIR responses for Hydrology.** Any subsequent engagement is summarised in **Appendix 12B: Stakeholder engagement (Volume 6.4)**.

12.2.5 An overview of the key stakeholders consulted following PEIR, and a summary of the issues discussed in relation to Hydrology, is presented in **Table 12B.4: Summary of engagement subsequent to PEIR regarding Hydrology** in **Appendix 12B: Stakeholder engagement (Volume 6.4)**.

12.3 Relevant legislation, planning policy, technical guidance

Legislative context

12.3.1 Legislation relevant to the assessment of the effects on Hydrology Receptors is provided in **Table 12.1: Legislative context for Hydrology**.

Table 12.1 Legislative context for Hydrology

Legislation	Implications
Water Resources Act 1991 (amended by Water Act 2003)	The Act states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The Act was revised by the Water Act (2003) which sets out regulatory controls for water abstraction, discharge to water bodies, water impoundment and protection of water resources. Within this chapter, the likely significant effects on surface water quality are assessed in **Section 12.6** with embedded environmental measures detailed in **Section 12.7**.
Land Drainage Act 1991	The Act places responsibility for maintaining flows in watercourses on landowners and gives Local Authorities powers to serve a notice on landowners to ensure works are carried out to maintain flow of watercourses. It is also the legislation that sets out the basis for Land Drainage Consenting powers for local authorities (now LLFAs) and Internal Drainage Boards for any works likely to affect flows in Ordinary Watercourses. The draft **DCO (Volume 3.1)** modifies the application of this Act for the Proposed Development. Within this chapter, the likely significant effects and mitigation in relation to ordinary watercourses are assessed in the **FRA (Appendix 12A (Volume 6.4))**. The findings of the **FRA** will be cross referenced in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**.

Legislation	Implications
Environment Protection Act 1990 (as amended by Environment Act 1995)	The Environment Protection Act 1990 makes provision for the improved control of pollution arising from certain industrial and other processes. It re-enacts the provisions of the Control of Pollution Act 1974 relating to waste on land, including modifications to the functions of the regulatory and other authorities concerned in the collection and disposal of waste and makes further provision in relation to such waste. Within this chapter, the likely significant effects on surface water quality are assessed in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**.
Environment Protection Act (Amendment) 2021	The Environment Protection Act 2021 Regulations makes amendments to the Environment Protection Act 1990, relating to the Sections 170, 173 and 175. In particular, the Act introduces the Environmental Improvement Plans and a target-based approach for waterbodies, in line with the WFD targets. Within this chapter, the likely significant effects on surface water quality are assessed in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**
EU Floods Directive (2007/60/EC), as enacted into domestic law by the Flood Risk Regulations 2009	The EU Floods Directive 2007 was transposed into the England and Wales legislation by the Flood Risk Regulations 2009 (Regulations). The Regulations set out the duties for the Environment Agency and Lead Local Flood Authority regarding producing preliminary flood risk assessments, flood hazard maps and flood risk maps and flood risk management plans. The management of flood risk to the Proposed Development and any potential to increase flood risk to third parties due to the Proposed Development are assessed in the **FRA (Appendix 12A (Volume 6.4)).** The **FRA** takes into consideration the local preliminary flood risk assessments, flood hazard maps and flood risk maps and flood risk management plans. The findings of the **FRA** are cross-referenced in Section 12.9 with embedded environmental measures detailed in Section 12.7.
Flood and Water Management Act 2010	This Act aims to help improve flood risk management and ensure the security of water supplies in England and Wales. The Act updates legislation to ensure better protection from flooding, manage water more sustainably, improve public services and secure water resources during periods of drought. The management of flood risk to the Proposed Development and any potential to increase flood risk to third parties due to the Proposed Development are assessed in the **FRA**. The findings of the **FRA** are cross-referenced in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**.
Water Act 2014	This Act reformed legislation concerning the water industry and management and conservation of water resources and related environmental matters in the UK. The purpose of the Act is to: reform the water industry to make it more innovative and responsive to customers and to increase the resilience of water supplies to natural hazards such as drought and floods. Within this chapter, the likely significant effects on surface water quality are assessed in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**.

Legislation	Implications
EU Water Framework Directive (2000/60/EC) (WFD) and The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017	In formulating development proposals, consideration must particularly be given to the WFD which has been transposed into UK law, most recently through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Though the UK is now no longer a Member State the Directive remains relevant as the transposed regulations are part of the UK's own legal framework. Environmental status, objectives and measures for water bodies (both surface and groundwater) can be found in the relevant River Basin Management Plan (RBMP). The Environment Agency is currently consulting on the 3rd RBMPs, which set objectives to 2027. Under the WFD, all surface water bodies are assigned an 'ecological status', based on biological, chemical and physical characteristics, whilst groundwater bodies are assigned an 'overall status', based on quantitative and chemical characteristics. The principal objective of the WFD requires that all inland and coastal waters must reach at least 'good' status over a sequence of six-year planning cycles, with the current cycle ending in 2027, and that the status of all water bodies should not deteriorate. Within this chapter, the likely significant effects on surface water bodies are assessed in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**.
The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015	These Directions have replaced the River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Directions 2010 and the River Basin Districts Surface Water and Groundwater Classification (Water Framework Directive) (England and Wales) Direction 2009. The Directions set out the environmental standards to be used for the second cycle of river basin plans. Along with the Water Environment (WFD) (England and Wales) Regulations 2003, they transpose Directive 2013/39/EC on environmental quality standards for priority substances. Within this chapter, the likely significant effects on surface water bodies are assessed in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**.
Conservation of Habitats and Species Regulations 2017 ("the Habitats Regulations") as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019	These regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and wild flora and fauna ('the Habitats Directive') into national law. The Habitats Regulations provide the framework for the protection of Natura 2000 sites (now referred to as the national site network following the amendments that came into force on 31 December 2020), and for certain flora and fauna (known as European Protected Species (EPS)). The regulations set out the process with regard to the assessment of development. Within this chapter, the likely significant effects are assessed in **Section 12.6** with embedded environmental measures detailed in **Section 12.7**. It is important to note that this chapter assesses potential changes of the Proposed Development on the water environment supporting biodiversity sites, not the biodiversity sites themselves, which instead is a matter for **Chapter 11: Biodiversity (Volume 6.2).**
Environmental Permitting (England and Wales) Regulations 2016 (as amended)	The Regulations include requirements to obtain Flood Risk Activity Permits (FRAP) for works on or near Main Rivers, flood defence structures or sea defences or within a flood plain, and to undertake a specific substances assessment for any discharge of hazardous chemicals and elements to surface water. Within this chapter, the likely significant effects on surface water quality are assessed in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**. It is noted here that the Proposed Development does not interact or fall within 8m of a Main River. On this basis a Flood Risk Activity Permit (FRAP) is not required.

Legislation	Implications
Water Supply (Water Quality) Regulations 2016	These Regulations are primarily concerned with the quality of water supplied in England by water undertakers and licensed water suppliers for domestic or food production purposes and with arrangements for the publication of information about water quality. These regulations repeal the Water Supply (Water Quality) Regulations 2000 and 2010. Within this chapter, the likely significant effects on surface water quality are assessed in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**.
Private Water Supplies (England) Regulations 2018 (Amendment)	The Regulations place a duty on local authorities to regulate private water supplies within their area and to undertake monitoring to determine compliance with drinking water standards. A private water supply is any water supply which supplies one or more properties that is not provided by a water company. Within this chapter, the likely significant effects on surface water quality are assessed in **Section 12.9** with embedded environmental measures detailed in **Section 12.7**.

Planning policy context

12.3.2 There are a number of policies at the national and local level that are relevant to the Proposed Development. The overarching National Policy Statements (NPS), which provide the primary policy basis for the consideration of Nationally Significant Infrastructure Projects (NSIPs_, are provided in **Table 12.2: Planning policy context for Hydrology: Adopted National Policy Statements**. This section should be read in conjunction with **Chapter 5: Legislation and Policy (Volume 6.2)**.

Table 12.2 Planning policy context for Hydrology: Adopted National Policy Statements

Policy reference	Implications for the Hydrology assessment	Section addressed
National Policy		
Overarching National Policy Statement for Energy (EN-1)[1]	Sections of EN-1 that are relevant to the assessment with respect to Hydrology are: • Section 4.8 which discusses climate change adaptation; *" The ES should set out how the proposal will take account of the projected impacts of climate change… Applicants should apply as a minimum, the emissions scenario that the Independent Committee on Climate Change suggests the world is currently most closely following – and the 10%, 50% and 90% estimate ranges. These results should be considered alongside relevant research which is based on the climate change projections"* • Section 4.9 which discusses the environmental issues likely to arise from a Grid Connection; *"…The Government therefore envisages that wherever possible, applications for new generating*	The Flood Management Measures presented in **Table 6.2** of **Section 6** of **Appendix 12A: FRA (Volume 6.4)** take into account the recommended climate change scenarios, with mitigation including raised finished floor levels and Emergency Flood Response Plans. The design of the Proposed Development outlined in **Chapter 3: Description of the Proposed Development (Volume 6.2)** demonstrates that the Grid Connection has

[1] Dept of Energy and Climate Change. Overarching National Policy Statement for Energy (EN-1) (2011).

Policy reference	Implications for the Hydrology assessment	Section addressed
	stations and related infrastructure should be contained in a single application to the IPC or in separate applications submitted in tandem which have been prepared in an integrated way." • Section 5.7 which discusses flood risk, setting out the minimum requirements of a flood risk assessment as well as information on the application of the Sequential and Exception tests; and *"Applications for energy projects of 1 hectare or greater in Flood Zone 1 in England or Zone A in Wales and all proposals for energy projects located in Flood Zones 2 and 3 in England or Zones B and C in Wales should be accompanied by a flood risk assessment (FRA)."* • Section 5.15 which discusses adverse effects on the water quality and resources. *"Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or Equivalent."*	been addressed in the following assessment (see **Section 12.4**, **Section 12.6**, and **Section 12.9**) A Flood Risk Assessment has been undertaken for the Proposed Development and is presented in **Appendix 12A: FRA (Volume 6.4)**. The likely significant effects associated with flood risk are also addressed in **Section 12.6** and **Section 12.9**. The Proposed Development is not hydrologically connected with any WFD waterbodies; however, the assessment has taken into account potential impacts on current and future water quality and hydromorphology in a way which mirrors WFD approaches (**Section 12.8**).
National Policy Statement for Renewable Energy Infrastructure (EN-3)[2]	Sections of EN-3 that are relevant to the assessment with respect to Hydrology are: • Section 2.5.23 which discusses the environmental issues likely to arise from a Grid Connection; and *"Applicants will usually have assured themselves that a viable connection exists before submitting the development proposal to the IPC and where they have not done so, they take that commercial risk. In accordance with Section 4.9 in EN-1, any application to the IPC must include information on how the generating station is to be connected and whether there are any particular environmental issues likely to arise from that connection"* • Section 2.5.85 which discusses adverse effects on water quality and resources and sets out requirements for appropriate measures to be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water. *"Where the project is likely to have effects on water quality or resources the applicant should undertake an assessment as required in EN-1, Section 5.15. The assessment should particularly demonstrate that appropriate measures will be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water."*	Addressed in **Section 12.4**, **Section 12.6**, **Section 12.9** and **Appendix 12A: FRA (Volume 6.4).**

[2] Dept of Energy and Climate Change. National Policy Statement for Renewable Energy Infrastructure (EN-3) (2011).

Policy reference	Implications for the Hydrology assessment	Section addressed
National Policy Statement for Electricity Networks Infrastructure (EN-5)[3]	Sections of EN-5 that are relevant to the assessment with respect to Hydrology are: • Section 2.4 which provides clarification on climate change adaptation. Paragraph 2.4.1 of EN-5 advises that as climate change is likely to increase risks to the resilience of electricity network infrastructure, applicants should set out to what extent the Proposed Development is expected to be vulnerable to extreme weather, including flooding, and, as appropriate, how it would be resilient, particularly for substations that are vital for the electricity transmission and distribution network.	Climate change adaptation is considered in the Flood Risk Assessment (**Appendix 12A: FRA (Volume 6.4))** and embedded environmental measures (**Section 12.7**). To account for the effects of climate change, the proposed EfW CHP Facility Site drainage system has been designed to accommodate a 1 in 100yr rainfall event with 20% (for the construction phase) and 40% (for the construction phase) uplift of rainfall intensity and proposed finished floor levels for the EfW CHP Facility consider the modelled flood levels with an allowance for 20% increase in river flow.

12.3.3 In September 2021 the Department of Business, Energy and Industrial Strategy (BEIS) consulted on a review of energy NPS with consultation closing on 29 November 2021. The energy NPS were reviewed to reflect the policies and broader strategic approach set out in the Energy white paper and ensure a planning framework was in place to support the infrastructure requirement for the transition to net zero.

12.3.4 **Table 12.3: Planning policy context for Hydrology: Draft National Policy Statements** summarises those Draft energy NPS policies which are considered to be relevant to the Proposed Development.

Table 12.3 Planning policy context for Hydrology: Draft National Policy Statements

Policy reference	Implications	Section addressed
Draft Overarching National Policy Statement for Energy (EN-1)[4]	• Section 4.9 which discusses climate change adaptation. The amended policy includes reference to new renewable energy infrastructure, reduced greenhouse gas emissions and the inclusion of coastal change considerations; • Section 4.10 which discusses the environmental issues likely to arise from a Grid Connection. The	This document was used to inform the assessment methodology (**Section 12.8**), embedded environmental measures (**Section 12.7**) and environmental assessments of Hydrology effects (**Section 12.9** and **Appendix 12A: FRA (Volume 6.4)**).

[3] Dept of Energy and Climate Change. National Policy Statement for Electricity Networks Infrastructure (EN-5) (2011).
[4] Dept for Business Energy and Industrial Strategy. Draft Overarching National Policy Statement for Energy (EN-1) (2021).

Policy reference	Implications	Section addressed
	amended policy states that projects must support the government objectives of transitioning to net zero in the UK; • Section 5.8 which discusses flood risk, setting out the minimum requirements of a flood risk assessment as well as information on the application of the Sequential and Exception tests. The amended policy states that projects should aim for climate resilient infrastructure and improve the sustainability of existing infrastructure where possible; and • Section 5.16 which discusses adverse effects on the water quality and resources. The amended policy sets out the responsibility of the applicant to demonstrate appropriate surface water management and pollution control.	
Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)[5]	• Section 2.10 which discusses the environmental issues likely to arise from a Grid Connection; and • Section 2.19 which discusses adverse effects on water quality and resources and sets out requirements for appropriate measures to be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water.	This document was used to inform the assessment methodology (**Section 12.8**), embedded environmental measures (**Section 12.7**) and environmental assessments of Hydrology effects (**Section 12.9** and **Appendix 12A: FRA (Volume 6.4)**).
Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)[6]	Section 2.6 which provides clarification on climate change adaptation. Paragraph 2.6.1 of EN-5 advises that as climate change is likely to increase risks to the resilience of electricity network infrastructure, applicants should set out to what extent the Proposed Development is expected to be vulnerable to flooding and, as appropriate, how it would be resilient to flooding, particularly for substations that are vital for the electricity transmission and distribution network. The amended NPS EN-5 also includes that Grid	This document was used to inform the assessment methodology (**Section 12.8**), embedded environmental measures (**Section 12.7**) and environmental assessments of Hydrology effects (**Section 12.9** and **Appendix 12A: FRA (Volume 6.4)**).

[5] Dept for Business Energy and Industrial Strategy. Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (2021).
[6] Dept for Business Energy and Industrial Strategy. Draft National Policy Statement for Electricity Networks Infrastructure (EN-5) (2021).

Policy reference	Implications	Section addressed
	Connections must be resilient to coastal erosion where necessary.	

12.3.5 Other national and local policies that may provide additional guidance, which can be considered material to the consideration of a NSIP, are detailed in **Table 12.4: Planning policy context for Hydrology: National and local planning policies,** below.

Table 12.4 Planning policy context for Hydrology: National and local planning policies

Policy reference	Implications	Section addressed
National Policy		
National Planning Policy Framework, 2021 (NPPF) and National Planning Practice Guidance, 2014 (NPPG)	These documents provide relevant policy on a range of issues, including the definition of flood zones, development vulnerability classifications, compatibility of development types and flood zones and current climate change allowances guidance.	The NPPF and NPPG were used to inform Flood Risk Assessment (**Appendix 12A: FRA (Volume 6.4)),** including the proposed embedded environmental measures in **Section 12.7.**
Local Policy		
Cambridge and Peterborough Minerals and Waste Local Plan 2021	Policy 22 (Flood and Water Management) states that development will only be permitted where it can be demonstrated that it would not have a significant impact upon surface and groundwater, water abstraction and the flow of ground water in the vicinity of the site. This is supported by other documents which include for the consideration of strategic flood risk.	The assessments undertaken in **Section 12.9** and **Appendix 12A: FRA (Volume 6.4)**, demonstrate that the Proposed Development does not cause a significant impact on surface or groundwater Receptors.
Cambridgeshire County Council, Cambridgeshire Preliminary Flood Risk Assessment, PFRA (2011)[7] and addendum 2017.	Provides a high-level overview of flood risk and historical flooding from a variety of flood sources which in Cambridgeshire are principally associated with surface run-off, groundwater, and ordinary watercourses.	This document was used to inform the baseline conditions in **Section 12.5** and **Flood Risk Assessment** (**Appendix 12A: FRA (Volume 6.4))** which demonstrates the Proposed Development does not cause any significant impact to flood risk Receptors.

[7] Cambridgeshire County Council. Cambridgeshire Preliminary Flood Risk Assessment (2011).

Policy reference	Implications	Section addressed
Cambridgeshire Flood and Water Supplementary Planning Document (2016)[8]	Provides guidance for new developments to reduce flood risk, such as by providing sustainable drainage systems.	This document was used to inform the **Flood Risk Assessment** (**Appendix 12A: FRA (Volume 6.4))** and environmental embedded measures for flood risk (**Section 12.7).**
Cambridgeshire County Council, Cambridgeshire's Local Strategy for Flood Risk 2015-2020 (2015)[9]	The Strategy's main focus is on flooding from surface water, groundwater and ordinary watercourses, such as streams and ditches. Although the risk of flooding from rivers remains the responsibility of the Environment Agency, this strategy looks at the interaction between all forms of flood risk. The public consultation of the draft Cambridgeshire Flood Risk Management Strategy for 2021-2027 has concluded and the updated strategy is expected to be published in spring 2022.	This document was used to inform the baseline conditions in **Section 12.5** and the **Flood Risk Assessment** (**Appendix 12A: FRA (Volume 6.4))** which demonstrates the Proposed Development does not cause any significant impact to flood risk Receptors.
Adopted Fenland Local Plan, 2014[10] **Policy LP14 – Responding to Climate Change and Managing the Risk of Flooding in Fenland** **Policy LP16 - Delivering and Protecting High Quality Environments across the District**	The Fenland Local Development Plan contains the policies and broad locations for the growth and regeneration of Fenland over the next 20 years. Policy LP14 Part (A) Resource Use, Renewable Energy and Allowable Solutions: The Policy recommends that all developments incorporate on-site renewable and/or decentralised renewable or low carbon energy sources, water saving measures and measures to help the development withstand the longer-term impacts of climate change. Policy LP14 Part (B) Flood Risk and Drainage: The Policy requires that: • All development proposals should adopt a sequential approach to flood risk from all forms of flooding; • Sustainable Drainage Systems (SuDS) are used to ensure that run-off from the site (post development) is to greenfield run-off rates for all previously undeveloped sites and for developed sites (where feasible); • The discharge of surface water from developments should be designed to contribute to an improvement in water quality in the receiving water course or aquifer in accordance with the objectives of the Water Framework Directive; and	This document was used to inform the assessments in **Section 12.9** and **Flood Risk Assessment** (**Appendix 12A: FRA (Volume 6.4))** and environmental embedded measures for flood risk (**Section 12.7)** which demonstrate that the Proposed Development does not cause any significant impact to flood risk Receptors.

[8] Cambridgeshire County Council. Cambridgeshire Flood and Water Supplementary Planning Document (2016).
[9] Cambridgeshire County Council. Cambridgeshire Strategy for Flood Risk (2015).
[10] Fenland District Council. Fenland Local Plan (2014).

Policy reference	Implications	Section addressed
	• All proposals should have regard to the guidance and byelaws of the relevant Internal Drainage Board, including, where appropriate the Middle Level Strategic Study and should help achieve the flood management goals from the River Nene and Great Ouse Catchment Flood Management Plans. Policy LP16 sets out the following requirements with respect to Hydrology: • Makes a positive contribution to the local distinctiveness and character of the area, enhances its local setting, responds to, and improves, the character of the local built environment, provides resilience to climate change, reinforces local identity and does not adversely impact, either in design or scale terms, on the street scene, settlement pattern or the landscape character of the surrounding area; • Provides well-designed hard and soft landscaping incorporating sustainable drainage systems as appropriate; • Identifies, manages, and mitigates against any existing or proposed risks from sources of noise, emissions, pollution, contamination, odour and dust, vibration, landfill gas and protects from water body deterioration; • The site is suitable for its proposed use with layout and drainage taking account of ground conditions, contamination and gas risks arising from previous uses and any proposals for land remediation, with no significant impacts on future users, groundwater, or surface waters; and • Complements and enhances the quality of riverside settings, including ecological value, re-naturalisation where possible, and navigation.	
Fenland District Council Strategic Flood Risk Assessment Level 1, SFRA (2011)[11]	Provides an overview of the flood risk issues throughout Fenland in order to facilitate a sequential approach during the allocation of sites for future development.	This document was used to inform the **Flood Risk Assessment** (**Appendix 12A: FRA) (Volume 6.4)** which demonstrates that the Proposed Development does not cause any significant impact to flood risk Receptors**.**

[11] Fenland District Council. Fenland District Council Level 1 Strategic Flood Risk Assessment (2011)

Policy reference	Implications	Section addressed
Wisbech Level 2 SFRA (2012)[12]	The Wisbech SFRA considers the existing flood defence infrastructure in Wisbech and assesses the risk of flooding were these to fail. The results are shown on a series of maps in the Appendix which indicate a range of possible flood events taking the effects of climate change into account.	This document was used to inform the **Flood Risk Assessment (Appendix 12A: FRA (Volume 6.4))** which demonstrates that the Proposed Development does not cause any significant impact to flood risk Receptors**.**
Borough Council of King's Lynn and West Norfolk Strategic Flood Risk Assessment, SFRA, Level 1 (2018)	Provides up to date information and guidance on flood risk for the Borough area, taking into account the latest flood risk information and the current state of national planning policy.	This document was used to inform the **Flood Risk Assessment (Appendix 12A: FRA (Volume 6.4))** which demonstrates that the Proposed Development does not cause any significant impact to flood risk Receptors**.**
Borough Council of King's Lynn West Norfolk SFRA, Level 2 (2019)	Provides a community-based assessment of flood risk across identified communities within the Borough area, informs the Sequential Test, provides guidance for developers to complete the Exception Test and provides an assessment of residual risk and climate change.	This document was used to inform the **Flood Risk Assessment** (**Appendix 12A: FRA (Volume 6.4))** which demonstrates that the Proposed Development does not cause any significant impact to flood risk Receptors**.**
Norfolk County Council PFRA (2011)[13]	Provides a consistent high level overview of the potential risk of flooding from local sources such as surface water, groundwater and ordinary watercourses throughout the county. Whilst no indicative FRAs have been identified in Norfolk, the PFRA process has acknowledged that there is a high risk of flooding from local sources across the county.	This document was used to inform the **Flood Risk Assessment (Appendix 12A: FRA (Volume 6.4))** which demonstrates that the Proposed Development does not cause any significant impact to flood risk Receptors**.**
Norfolk County Council Local Flood Risk Management Strategy[14]	Provides an overview of flood risk and how it can affect the population and assets across Norfolk, before providing more detail on the risk within eight regions across the county. This document also lays out the aims of LLFA in reducing risk through objectives and policies as well as how measures and funding can achieve this.	This document was used to inform the **Flood Risk Assessment** (**Appendix 12A: FRA (Volume 6.4))** which demonstrates that the Proposed Development does not cause any significant impact to flood risk Receptors**.**
King's Lynn and West Norfolk Local	The Core Strategy sets out the spatial planning framework for the development of the borough	This document was used to inform the **Flood Risk Assessment (Appendix**

[12] Fenland District Council. Wisbech Level 2 Strategic Flood Risk Assessment (2012).
[13] Norfolk County Council. Preliminary Flood Risk Assessment (2011).
[14] Norfolk County Council. Norfolk County Council Local Flood Risk Management Strategy (2015).

Policy reference	Implications	Section addressed
Development Framework Core Strategy (2011)[15]	up to 2026 and is part of King's Lynn and West Norfolk's Local Development Framework. Policy CS01 (Spatial Strategy) acknowledges that some development may be required in flood risk areas to meet regeneration objectives and maintain the sustainability of local communities. Policy CS08 (Sustainable Development) sets the following requirements for development proposals in high flood risk areas: • the type of development is appropriate to the level of flood risk identified in the Strategic Flood Risk Assessment, or; • if the development vulnerability type is not compatible with the flood zone as set out in PPS25, proposals will need to demonstrate that the development contributes to the regeneration objectives of King's Lynn or the wider sustainability needs of rural communities; • the development is on previously developed land, or, where proposals are for development of greenfield sites, the development must demonstrate a contribution to the regeneration objectives of King's Lynn, or the wider sustainability needs of rural communities; • flood risk is fully mitigated through appropriate design and engineering solutions. Policy CS14 (Infrastructure Provision) supports the provision of sustainable drainage systems.	**12A: FRA (Volume 6.4))** which demonstrates that the Proposed Development does not cause any significant impact to flood risk Receptors**.**
King's Lynn and West Norfolk Local Development Framework Site Allocations and Development Management Policies (2016)[16]	Policy DM21 (Sites in Areas of Flood Risk) includes the requirements below for sites allocated in flood risk Zones 2 and 3 or flood defence breach Hazard Zones identified by the Council's Strategic Flood Risk Assessment or more recent Environment Agency mapping: • A site-specific flood risk assessment satisfactorily demonstrating the development will be safe for its lifetime, taking climate change into account, and with regard to the vulnerability of its users, without increasing flood risk elsewhere and, where possible, reducing flood risk overall; and	This document was used to inform the **Flood Risk Assessment** (**Appendix 12A: FRA (Volume 6.4))** which demonstrates that the Proposed Development does not cause any significant impact to flood risk Receptors.

[15] King's Lynn & West Norfolk Borough Council. Local Development Framework - Core Strategy (2011).
[16] KLWN. King's Lynn and West Norfolk Local Development Framework Site Allocations and Development Management Policies (2016)

Policy reference	Implications	Section addressed
	• satisfactory demonstration that any design or development features necessary to address flood risk issues are compatible with heritage assets in the vicinity (including conservation areas and listed buildings), local visual amenity and (where relevant) the landscape and scenic beauty of the Norfolk Coast Area of Outstanding Natural Beauty. The sequential test set out in the National Planning Policy Framework (NPPF) policy 101 is deemed to be met by the allocation process, as set out in the Planning Practice Guidance - Flood Risk and Climate Change, so that development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest.	

Technical guidance

12.3.6 Technical guidance used to inform the assessment is listed in **Table 12.5: Technical guidance for Hydrology assessment** below.

Table 12.5 Technical guidance for Hydrology assessment

Technical guidance	Implications
BS6031: Code of Practice for Earthworks (2009)[17]	Provides recommendations and guidance for unreinforced earthworks forming part of general civil engineering construction, with the exception of dams. This standard also gives recommendations and guidance for temporary excavations such as trenches and pits. This guidance has been used in **Section 12.7** for defining environmental measures for good working practices during construction.
Cambridgeshire Flood & Water Supplementary Planning Document, SPD (2016)	Provides guidance on the approach that should be taken to design new developments to manage and mitigate flood risk and include SuDS. This guidance has been used in **Section 12.7** and **Appendix 12A: FRA (Volume 6.4)** for defining embedded environmental measures relating to drainage management.
Construction Industry Research and Information Association (CIRIA) Report C532: Control of Water Pollution from Construction Sites (2001)[18]	Provides practical help on how to plan and manage construction projects to control water pollution. This guidance has been used in **Section 12.7** for defining environmental measures for preventing water pollution.

[17] British Standards Institute BS6031: Code of Practice for Earthworks (2009)
[18] CIRIA Report C532: Control of Water Pollution from Construction Sites (2001)

Technical guidance	Implications
CIRIA Report C624: Development and Flood Risk – Guidance for the Construction Industry (2004)[19]	Provides practical guidance in assessing flood risk as part of the development process. The guidance recommends a tiered approach to flood risk assessment and provides a simple-to-use toolkit to help practitioners complete the assessments. This guidance has been used in **Section 12.7** and **Appendix 12A: FRA (Volume 6.4)** for defining embedded environmental measures relating to flood risk.
CIRIA Report C692: Environmental Good Practice on Site (2010)[20]	Provides practical advice about managing construction on-site to minimise environmental impacts. This guidance has been used in **Section 12.7** for defining environmental measures for good working practices during construction.
Defra: Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009)[21]	Outlines current guidance and legislation concerning the use of soil in construction projects, before offering stage by stage guidance on the use, management, and movement of soil on-site. This guidance has been used in **Section 12.7** for defining environmental measures for good working practices during construction and management of excavated materials.
Flood risk assessments: climate change allowances. Environment Agency (2017)[22]	Provides the appropriate allowances for the effects of climate change to be used in flood risk assessments. This guidance has been used in **Section 12.7** and **Appendix 12A: FRA (Volume 6.4)** for assessing flood risk over the lifetime of the Proposed Development and for defining environmental measures for flood risk. To account for the effects of climate change, the proposed EfW CHP Facility Site drainage system has been designed to accommodate a 1 in 100yr rainfall event with 20% (for the construction phase) and 40% (for the operation phase) uplift of rainfall intensity, and proposed finished floor levels for the EfW CHP Facility consider the modelled flood levels with an allowance for 20% increase in river flow.
Environment Agency Guidance for Pollution Prevention (GPPs)[23]	Provides environmental good practice guidance. Whilst now withdrawn as 'official' guidance, the documents are still available online and are referred to for Good Practice guidance. This guidance has been used in **Section 12.7** for defining environmental measures for good working practices during construction.
Local and Regional Land Drainage Byelaws	Drainage byelaws prevent an increase in flood risk or manage land drainage. This guidance has been used in **Section 12.7** for defining environmental measures for works near the IDB drains and water discharges into the IDB drains.
Ministry for Agriculture, Fisheries and Food (MAFF): Good Practice Guide for Handling Soils (2000)	Provides advice of soil stripping, the forming and taking down of soil storage mounds, and soil replacement operations using excavators, earth scrapers and bulldozers. This guidance has been used in **Section 12.7** for defining environmental measures for good working practices during construction and management of excavated materials.
Surface Water Drainage Guidance for Developers (2018)	Provides guidance to developers in the preparation of surface water documents to support planning applications. It sets out that the run-off volume from previously developed sites (such as the Energy from Waste Combined Heat and Power (EfW CHP) Facility site) to any surface water body or sewer in the 1% Annual Exceedance Probability (AEP), 6-hour rainfall event must be constrained to a value as close to the greenfield run-off volume for the same event but should never

[19] CIRIA Report C624: Development and Flood Risk – Guidance for the Construction Industry (2004)
[20] CIRIA Report C692: Environmental Good Practice on Site (2010)
[21] Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009)
[22] Environment Agency Flood risk assessments: climate change allowances 2016 (last updated in 22 July 2020).
[23] Environment Agency Pollution prevention advice and guidance [withdrawn].

Technical guidance	Implications
	exceed the run-off volume from the existing site. Where it is not reasonably practicable to constrain the volume of run-off, the run-off volume must be discharged at a rate that does not adversely affect flood risk. This guidance has been used in **Section 12.7** and **Appendix 12A: FRA (Volume 6.4)** for defining embedded environmental measures relating to drainage management.
DEFRA Non-statutory technical standards for sustainable drainage systems, 2015[24]	National guidance document that provides a set of standards to be applied when designing SuDS systems for new developments. Standards include controls on peak flow and volume of run-off, and flood risk internal to the development and downstream.

12.4 Data gathering methodology

Study Area

12.4.1 The Proposed Development comprises the EfW CHP Facility, CHP Connection, Temporary Construction Compound (TCC), Access Improvements and Water Connections, which are located to the south of Wisbech, and the Grid Connection, which connects the EfW CHP Facility to Walsoken Substation, to the east of Wisbech.

12.4.2 The Order limits boundary is not intersected by Main Rivers but is intersected by numerous artificial drainage channels (Ordinary Watercourses) within the Hundred of Wisbech Internal Drainage Board (HWIDB) and King's Lynn Internal Drainage Board (KLIDB) areas. The HWIDB drains are pumped into the River Nene (Main River) to the west of the Proposed Development whilst the KLIDB drains are pumped into River Great Ouse (Main River) to the east of the Proposed Development.

12.4.3 The Study Area for the purposes of this Chapter is defined as the geographic area where effects of the Proposed Development to hydraulically connected Hydrology and flood risk Receptors may occur. The Study Area is shown on **Figure 12.1: Proposed Development Location and Study Area (Volume 6.3)** and includes the Proposed Development area and upstream and downstream extents of the IDB drainage network, as described below.

EfW CHP Facility, CHP Connection, TCC, Access Improvements, and Water Connections

- **Upstream extent**: the Study Area was taken to extend to approximately 1km upstream from the Order limits boundary, on the basis that any potential effects to Hydrology Receptors are assumed conservatively to be negligible beyond this distance;
- **Downstream extent within the HWIDB District:** the drainage network in this area discharges into the River Nene approximately 3.5km downstream from the EfW CHP Facility. Any potential impacts from the Proposed Development on the River Nene would be negligible (and therefore scoped out) at some distance

[24] Available online as sustainable drainage systems non-statutory standards.

downstream of the discharge point, assumed conservatively as 4km, due to the large dilution capacity of the River Nene. On this basis, the Study Area within the HWIDB District was taken to extend to the discharge point into the River Nene plus approximately 4km of the River Nene downstream of the discharge point.

Grid Connection

- **Upstream extent**: the Study Area was taken to extend to approximately 1km upstream from the Order limits;
- **Downstream extent within the HWIDB District:** The Grid Connection within the HWIDB district comprises approximately 1.7km of underground cable. Given that the construction works are unlikely to interact with the IDB drainage network (absence of in-channel permanent works, stand-off distance from IDB drains), any potential impacts from the underground Grid Connection on the IDB drains would be negligible (and therefore scoped out) beyond 1.5km downstream of the Order limits. On this basis, the Study Area within the HWIDB District was taken to extend to a distance of approximately 1.5km downstream from the Order limits.
- **Downstream extent within the KLIDB District:** the drainage network within the KLIDB District discharges into the River Great Ouse about 6km east (at its closest) of the Order limits. The Grid Connection in this area comprises 2.5km of underground cable, which connects to the Walsoken Substation. As with the HWIDB, any construction activities are unlikely to interact with the IDB drainage network; as such any potential impacts from the underground Grid Connection on the IDB drains would be negligible (and therefore scoped out) beyond 1.5km downstream of the Order limits for the Proposed Development. On this basis, the Study Area within the KLIDB District was taken to extend to a distance of approximately 1.5km downstream from the Order limits.

12.4.4 Nevertheless, data for a wider area beyond this have also been collected as appropriate, such as topography (to provide an understanding of the surface water catchments) and the location of nature conservation sites (to identify sites reliant on water supply from surface water sources into which runoff from the Proposed Development will drain).

Desk study

12.4.5 A summary of the desktop data used to inform the assessment is provided in **Table 12.6: Desktop data for Hydrology assessment** below.

Table 12.6 Desktop data for Hydrology assessment

Desktop data	Source of desktop data	Details of the information
Aerial imagery	Google Earth Pro Google Maps	Aerial views of the Study Area to inform baseline conditions.

Desktop data	Source of desktop data	Details of the information
Ordnance Survey (OS) maps	Ordnance Survey	Baseline information on the hydrological context of the Study Area including topography, drainage, and water features.
1m resolution 2019 LiDAR data	GOV.UK Open Data [25]	Baseline information on topography ground elevations for Study Area.
Topographic survey	MVV	Baseline information on topography ground elevations at the EfW CHP Facility Site.
Bedrock and superficial geology	British Geological Survey[26]	Baseline information on bedrock, superficial and borehole geology data for the Study Area.
Catchment Data Explorer	Environment Agency[27]	Baseline information on Water Framework Directive (WFD) classification of water bodies within Study Area to establish potential Hydrology Receptors.
Hydrological context	Environment Agency	Baseline information on surface water quality, river flows, licensed water abstractions, licensed discharges to surface water and rainfall data for the Study Area.
Flood Map for Planning	Environment Agency[28]	Map providing baseline information on the flood risk from rivers and the sea for the Proposed Development.
Long term flood risk map	Environment Agency[29]	Maps providing baseline information on the flood risk from rivers and sea, surface water and artificial sources for the Proposed Development.
Multi-Agency Geographic Information for the Countryside (Magic) map	Defra[30]	Maps providing baseline information on biodiversity sites, groundwater vulnerability, aquifer designation, Source Protection Zones for the Proposed Development.
Internal Drainage Board (IDB) drainage network	HWIDB and KLIDB	Shapefiles for HWIDB and KLIDB adopted drains.
Soilscapes	Cranfield Soil and Agrifood Institute, LANDIS soilscape viewer[31]	Map providing baseline information on soil characteristics for the Proposed Development.

[25] GOV.UK Open Data. Composite DTM 2019 - 1m (2019).
[26] British Geological Survey. Geology of Britain Viewer (2021).
[27] Environment Agency. Catchment Data Explorer (2020).
[28] Environment Agency. Flood Map for Planning (2021).
[29] Environment Agency. Long term flood risk map (2021).
[30] Defra. Magic Map (2021)
[31] Cranfield Soil and Agrifood Institute. LANDIS soilscape viewer (2021)

Desktop data	Source of desktop data	Details of the information
Phase 1 Geoenvironmental Desk Study and Interpretative Report	Chapter 13: Geology, Hydrogeology and Contaminated Land **(Volume 6.2)**	Baseline geological and hydrogeological information.

Survey work

12.4.6 A walkover of the area around the EfW CHP Facility Site was carried out on 19 October 2020. Photographs of the walkover are provided in **Appendix 12C: Site visit photos (Volume 6.4)**.

12.5 Baseline

12.5.1 This section provides a description of the current and future baseline environmental characteristics for the Proposed Development and the Study Area, with particular reference to Hydrology and flood risk.

12.5.2 The baseline is described separately for the different elements of the Proposed Development. A description is first provided for the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections. This is then followed by a description for the Grid Connection.

Current baseline

Rainfall

Proposed Development

12.5.3 Much of eastern England receives less than 700mm/yr and includes some of the driest areas in the country. Across most of the region there are, on average, about 30 rain days (rainfall greater than 1mm) in winter (December to February) and less than 25 days in summer (June to August)[32]. Data for the Environment Agency rainfall gauging station at March Sewage Works (8.9km south of the EfW CHP Facility Site) indicates an average total annual rainfall of 595mm/yr (1991 to 2021). Data for Environment Agency rainfall gauging stations within 20km north-west to 14km south-east of the Grid Connection indicate an average total annual rainfall of between 558mm/yr and 600mm/yr (1984 – 2021 and 1996 – 2021, respectively).

[32] Met Office, 2016. UK Regional Climate Summaries: Eastern England.

Land Use and Topography

EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections

12.5.4 The dominant land use in this area on the southern side of Wisbech is industrial and business purposes. This development consists primarily of industrial buildings, many of which are metal-clad surrounded by hardstanding and storage areas interspersed with lengths of drainage ditches. The Study Area includes sections of the town of Wisbech to the north, the River Nene to the west and arable fields to south and east (**Figure 12.1: Proposed Development Location and Study Area (Volume 6.3)**).

12.5.5 The EfW CHP Facility Site includes an existing Waste Transfer Station and an aggregates supply yard, the WTS. It is bordered to the west by the disused March to Wisbech Railway, the route of which is retained as a linear strip of scrubland and trees. The EfW CHP Facility Site is located on the edge of an existing industrial estate and is currently accessed via Algores Way. The area is predominantly compacted ground, and the soil has been scraped back from the working area to form perimeter bunds. The bunds are present along the whole length of the southern and western borders and the southern half of the eastern boundary. Drains maintained by the HWIDB flow around the north, east and south edges of the EfW CHP Facility Site. In addition, a HWIDB drain bisects the area (**Figure 12.1: Proposed Development Location and Study Area (Volume 6.3)**).

12.5.6 The CHP Connection Corridor runs north along the disused March to Wisbech Railway. This area includes the old railway line track bed and is heavily overgrown with vegetation. The area is bounded on both sides by further industrial uses and at the north-east end by residential development. This route terminates approximately 1.2km north-north-east of the EfW CHP Facility Site, at the Nestlé Purina factory (**Figure 12.1: Proposed Development Location and Study Area (Volume 6.3)**).

12.5.7 The Access Improvements would cover a section of New Bridge Lane on the southern edge of the EfW CHP Facility Site and Algores Way, which is an existing access route to the eastern edge (**Figure 12.1: Proposed Development Location and Study Area (Volume 6.3)**). Both roads are bound mainly by industrial premises. New Bridge Lane connects to the B198 Cromwell Road to the west, which in turn connects to the A47; whilst Algores Way tracks to the north-east to Weasenham Lane.

12.5.8 The area for the TCC (**Figure 12.1: Proposed Development Location and Study Area (Volume 6.3)**) is currently undeveloped, vegetated, greenfield land. The area would be located adjacent to the eastern boundary of the EfW CHP Facility Site and a HWIDB maintained drainage ditch.

12.5.9 The topography across the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections and the wider Study Area is flat and low lying. Ground elevations obtained from LiDAR are shown on **Figure 12.2: LiDAR topography elevations (Proposed Development) (Volume 6.3).** The topographical survey for the EfW CHP Facility Site (supplemented by LiDAR data where required) is provided within the FRA (**Appendix 12A: FRA (Volume 6.4)**). The topography is discussed below for the different development elements. The

areas of higher elevation are generally associated with road infrastructure and the areas of lower elevation (below sea level) are related to watercourses, such as the River Nene, and the IDB drainage network.

- EfW CHP Facility Site: ground levels are typically within 1.5 to 2.5m Above Ordnance Datum (AOD). Areas of high elevation (up to 6m AOD) are associated with soil/aggregate bunds reflecting the current site activities. Ground levels are slightly higher (2.2m to 2.5m AOD) in the area to the north of the IDB drain which bisects the site compared to the southern area (1.5 to 2m AOD).
- TCC: ground levels are typically within 1.5 to 2.0m AOD. The ground surface slopes very slightly to the south. A small area of higher elevation (4m AOD) is shown on the western edge. Lower elevations (around 0.6m AOD) are shown for the adjacent IDB drain which runs across this area.
- CHP Connection Corridor: ground levels are typically within 2m to 4m AOD. The ground surface rises along the connection route from south to north. Areas of lower elevation (0m to 2m AOD) relate to drainage ditches on the western side of the connection route.
- Access Improvements: ground levels are typically within 2m to 3m AOD. Areas of lower elevation (-1m to 0m AOD) relate to IDB drains along and crossing New Bridge Lane.
- Water Connections: ground levels are typically similar to those recorded for the Access Improvements Site, for the potable supply and typical with those of the EfW CHP Facility for the foul water connection.

Grid Connection

- The underground cable follows New Bridge Lane and then the western verge of the A47 to Broadend Road. At Broadend Road, the cable follows the verge of the road to Walsoken Substation, to be located to the front of the UKPN Walsoken DNO Substation (**Figure 12.1: Proposed Development Location and Study Area (Volume 6.3)**).
- The topography along the Grid Connection and the wider Study Area is flat and low lying. Ground elevations obtained from LiDAR are shown on **Figure 12.2: LiDAR Topography elevations (Proposed Development) (Volume 6.3)**. Ground levels are typically within 2m to 4m AOD. The ground elevation rises along the connection route from south to north. Areas of lower elevation (0m to 2m AOD) relate to drainage ditches on the western side of the connection route.

Hydrology and Drainage

EfW CHP Facility Site, CHP Connection, TCC, Access Improvements, Water Connections and Wider Study Area

12.5.10 The EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are located within the catchment of the River Nene, a designated Main River. The River Nene flows in a north easterly direction, approximately 0.6km to the west of the EfW CHP Facility Site (**Figure 12.3ii: Water environment (EfW CHP Facility Site and surroundings) (Volume 6.3)**). The tidal

limit of the River Nene is the Dog-in-a-Doublet sluice which forms the upstream limit of the tidal defences for the River Nene to the north of Whittlesey. This is about 19.8km south-west (upstream) of the EfW CHP Facility Site. The stretch of the Nene near the EfW CHP Facility Site is, therefore, tidally influenced.

12.5.11 The Environment Agency was contacted to obtain river flow data within the Study Area and indicated that no data is available. The closest permanent flow gauging station is on the River Nene (River Nene at Orton [33]) is approximately 32km (upstream) of the EfW CHP Facility Site. The data from this station indicates a mean flow rate of 9.3m^3/s (1939 to 1996).

12.5.12 The EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections and the wider Study Area are situated within an area served by an extensive network of artificial drainage channels (Ordinary Watercourses) within the area of HWIDB (**Figure 12.4: Internal Drainage Board Districts (Volume 6.3)**). The HWIDB system provides a network of arterial watercourses that are used to manage water levels and reduce flood risk within its district. The HWIDB adopted drains discharge into the River Nene via a pumping station approximately 3.5km downstream from the EfW CHP Facility. The HWIDB's drainage network plan is provided in **Appendix 12D: IDB drainage plans (Volume 6.4)**. The HWIDB's adopted drains and unadopted drains are shown on **Figure 12.3i: Water environment (Proposed Development) (Volume 6.3)** and **Figure 12.3ii: Water environment (EfW CHP Facility Site and surroundings) (Volume 6.3)**.

12.5.13 HWIDB adopted watercourses (open drains) flow adjacent to the north (between nodes 34 and 47), east (between nodes 46 and 47) and south (between nodes 43 and 44 and nodes 48 and 49) edges of the EfW CHP Facility (**Graphic 12.1: Extract from the HWIDB's District plan showing the IDB adopted watercourses, flow direction, node numbers and separation dam near EfW CHP Facility Site**). A short stretch of the watercourse between nodes 46 and 47, on the north-east corner of the EfW CHP Facility, is culverted to allow access to the existing WTS site from Algores Way. A HWIDB-adopted watercourse (open drain) running west to east (between nodes 33 and 46) bisects the EfW CHP Facility Site. This drain is culverted for a short distance in the west of the EfW CHP Facility Site to provide vehicular access to the southern portion. This drain also includes a separation dam that controls flows within the drain to manage water levels downstream. The HWIDB advised during the consultation meeting held on 20 August 2020 (**Appendix 12B: Stakeholder engagement (Volume 6.4)**) of the importance of this drain in transferring flows received from Cromwell Road and Boleness Road sub-catchments (to the west and to the east of the EfW CHP Facility) to the downstream IDB network and subsequent discharge to the River Nene. An unadopted drain flows adjacent to the southern boundary of the EfW CHP Facility Site. During the site visit this drain was observed to have limited/no flow.

12.5.14 The TCC area is crossed by HWIDB adopted watercourses (open drains) flowing north to south (between nodes 47 and 46 and 45 and 48).

12.5.15 The CHP Connection Corridor is bordered by a HWIDB adopted watercourse (open drain) flowing north to south (between nodes 31 and 36) along the western boundary

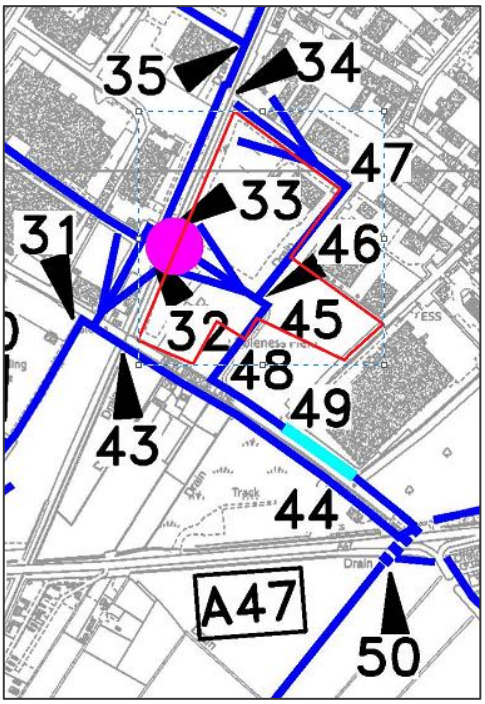
[33] UK Centre for Ecology and Hydrology. National River Flow Archive (2021).

and is crossed by a HWIDB adopted watercourse (open drain) flowing west to east on the northern end of the route (between nodes 63 and 62).

12.5.16 The Access Improvements area is crossed by an HWIDB drain to the north (between nodes 33 and 43) and bordered by HWIDB drains on the southern edge (between nodes 43 and 44) and northern edge (between nodes 48 and 49).

12.5.17 The Water Connections area is crossed by a small number of HWIDB drains along New Bridge Lane (between nodes 43 and 50 and 48 and 50) and the A47 (between nodes 50 and 51).

Graphic 12.1 Extract from the HWIDB's District plan showing the IDB adopted watercourses, flow direction, node numbers and separation dam (pink circle) near the EfW CHP Facility Site and TCC (red line)[34]



12.5.18 Review of the OS maps and aerial imagery has not identified ponds within the EfW CHP Facility Site, CHP Connection Corridor, TCC, Access Improvements, Water Connections or wider Study Area (**Figure 12.3ii: Water environment (EfW CHP Facility Site and surroundings) (Volume 6.3)**).

Grid Connection

12.5.19 The Grid Connection crosses the catchments of the River Nene to the west and River Great Ouse to the east. The boundary between the catchments aligns with the HWIDB and KLIDB district areas (**Figure 12.3i: Water environment (Proposed Development) (Volume 6.3)**). At its closest, the River Great Ouse, flows from south to north approximately 10km east of the Grid Connection.

[34] Mapping provided by HWIDB on email dated 25th January 2021 (Appendix 12D)

12.5.20 Similar to the EfW CHP Facility Site, the Grid Connection Corridor and the wider Study Area lie within an area served by an extensive network of artificial drainage channels (Ordinary Watercourses) which fall within the HWIDB and KLIDB areas. The KLIDB adopted drains are pumped into the River Great Ouse via Islington pumping station about 12km east (at its closest) of the Grid Connection. The KLIDB's adopted watercourses are shown on **Figure 12.3i: Water environment (Proposed Development) (Volume 6.3)** and **Figure 12.3ii: Water environment (EfW CHP Facility Site and surroundings) (Volume 6.3).** The wider KLIDB's drainage network plan is provided in **Appendix 12D: IDB drainage plans (Volume 6.4)**. The underground cable route crosses a small number of drains which are culverted beneath the A47: two HWIDB drains, three KLIDB drains and up to five non-IDB drains (**Figure 12.3i: Water environment (Proposed Development) (Volume 6.3).**

12.5.21 The Environment Agency was contacted to obtain river flow data within the Study Area and indicated that no data is available.

12.5.22 Review of the OS maps and aerial imagery identified a total of 12 ponds within the Grid Connection and wider Study Area (**Figure 12.3i: Water environment (Proposed Development) (Volume 6.3)**). These vary in shape and size, but there are no particularly large waterbodies (for example large drinking water reservoirs) with the vast majority being less than a hectare in extent. These ponds are described in detail in **Chapter 11: Biodiversity (Volume 6.2)**.

Geology and Hydrogeology

EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections

12.5.23 The geology and hydrogeology baseline is described in detail in **Chapter 13: Geology, Hydrogeology and Contaminated Land (Volume 6.2)**. In summary, the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are underlain by made ground, Tidal Flat Deposits (clay and silt with thick peat bands), Glaciofluvial Deposits (dense gravelly sand) and Glacial Till (sandy gravelly clay). The solid geology comprises the Ampthill Clay (silty clay). Both the superficial deposits and the Ampthill Clay Formation are classified as Unproductive Aquifers (rock layers or drift deposits with low permeability that have negligible significance for water supply or river baseflow).

12.5.24 The 2020 site investigation at the EfW Facility Site[35] encountered groundwater in silt/clay (Tidal Flat Deposits) at 2.7m and 4.5m below ground level (bgl) in trial pits. This investigation also found perched groundwater in made ground at 0.32m bgl. Groundwater on the site was noted to be influenced by nearby drainage channels. Based on the available information dewatering will be required during excavations and any underground works on the EfW CHP Facility Site. The groundwater environment is of low sensitivity due to the underlying superficial deposits and bedrock being classed as unproductive strata with a negligible significance for water supply.

[35] Wood. Wisbech Phases 1 and 2 Geoenvironmental Desk Study and Interpretative Report, Draft Report, July 2020 (41310-WOOD-XX-XX-RP-OC-0001_S3_1).

12.5.25 The EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections and the wider Study Area do not lie within a Source Protection Zone (SPZ) for a public water supply.

Grid Connection

12.5.26 The geology and hydrogeology baseline is described in detail in **Chapter 13: Geology, Hydrogeology and Contaminated Land (Volume 6.2)**. The Grid Connection is underlain by Tidal Flat Deposits and Ampthill Clay Formation. Both the superficial deposits and the Ampthill Clay Formation are classified as Unproductive Aquifers. The Grid Connection and wider Study Area do not lie within a SPZ for a public water supply.

12.5.27 The BGS borehole records suggest that groundwater is held within the superficial deposits as perched discontinuous groundwater bodies. This suggests that shallow groundwater may be encountered locally in excavations for the Grid Connection in permeable layers within the tidal flat deposits, or, where made ground is present, at the base of made ground above less permeable natural materials.

12.5.28 The groundwater environment within the Grid Connection and the wider Study Area is of low sensitivity. This is based on the underlying superficial deposits and bedrock being classed as unproductive strata with a negligible significance for water supply.

Water Resources

EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections

Abstractions

12.5.29 The Environment Agency[36] advised that there is one licenced surface water abstraction located within the Study Area on the banks of the River Nene within Wisbech. The closest development element is the CHP Connection Corridor at approximately 0.1km east of the abstraction. The abstraction is associated with a brewery and permits abstraction from the River Nene, of quantities up to 45Ml/day for the purpose of non-evaporative cooling. No other licenced abstractions have been identified within the Study Area.

12.5.30 Fenland District Council (FDC)[37] indicated that there are no registered private (unlicensed) surface water abstractions within the Study Area.

Discharges

12.5.31 The Environment Agency[38] advised that there are 10 discharge consents within the Study Area (**Appendix 12E: Discharge consents (Volume 6.4)**). Of the 10 discharge consents, five consents are associated with pumping stations and storm tanks on sewerage networks, three consents relate to waste water treatment works,

[36] Environment Agency. 2021. Email reference: NR204635, Enquiry regarding Data Request for Medworth EfW CHP Wisbech (02/03/21).
[37] Fenland District Council, 2021. Email reference Private water supplies data request for Medworth EfW site (05/03/21)
[38] Environment Agency. 2021. Email reference: NR204635, Enquiry regarding Data Request for Medworth EfW CHP Wisbech (02/03/21).

three consents relate to waste management discharges and two consents relate to industry discharges. The receiving watercourses vary, with discharge either directly to the River Nene or to its tributaries.

Grid Connection

Abstractions

12.5.32 The Environment Agency[39] advised that there are no licenced surface water abstractions within the Study Area of the Grid Connection. FDC indicated that there are no registered private (unlicenced) surface water abstractions within the Study Area. The Borough Council of King's Lynn and West Norfolk (KLWN) was contacted regarding details of private water abstractions, but no response was provided.

Discharges

12.5.33 The Environment Agency[40] advised that there are eight discharge consents present within the Study Area of the Grid Connection (**Appendix 12E: Discharge consents (Volume 6.4)**). Two of the discharge consents are located upstream of the Grid Connection. The remaining discharges are located mostly within Wisbech, with a few located near Walton Highway and Walton St Peter. The consents include five water company sewerage discharges (including sewage treatment works, wastewater pumping stations and intermittent storm water overflows) and three consents relate to waste management discharges. Most of the discharges are received by the River Nene and other watercourses such as the Smeeth Lode and River Great Ouse.

Water Quality

EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections

12.5.34 River Basin Management Plans (RBMPs) have been drawn up for the 11 river basin districts in England and Wales as a requirement of the WFD. The plans for England have been developed by the Environment Agency through consultations with organisations and individuals. The plans are designed to protect and improve the quality of the water environment, by providing information on what needs to be done to tackle water issues, i.e., measures to improve water quality in rivers, lakes, estuaries, coasts and in groundwater. The Study Area is covered by the RBMP for the Anglian Region[41].

12.5.35 In relation to surface water bodies, River Basin Districts are divided into Management Catchments, which are further divided into Operational Catchments, within which there are sub-catchment surface waterbodies. The Study Area is within the Nene Lower Surface Water Operational Catchment but is not within a reportable surface water body WFD area. The main pressures within this operational

[39] Environment Agency. 2021. Email reference: NR204635, Enquiry regarding Data Request for Medworth EfW CHP Wisbech (02/03/21).
[40] Environment Agency. 2021. Email reference: NR204635, Enquiry regarding Data Request for Medworth EfW CHP Wisbech (02/03/21).
[41] Environment Agency. Anglian river basin district river basin management plan (2018).

catchment area include pollution from rural areas, pollution from wastewater discharges, watercourse physical modifications and non-native invasive species. The nearest WFD surface waterbody is North Level Main Drain approximately 7.1km north-west of the EfW CHP Facility Site. This waterbody achieved an overall status of 'Moderate' in the 2019 WFD classification (Cycle 2). The North Level Main Drain is not located downstream of the EfW CHP Facility Site and therefore would not be affected by the Proposed Development. The EfW CHP Facility Site is not within a WFD Groundwater Management Catchment.

12.5.36 The Environment Agency indicated that there are no surface water sampling points within the Study Area. The closest sampling point is in the River Nene at Wisbech (sampling point ID AN-NENE690W) [42], approximately 9km downstream of the EfW CHP Facility Site. Recent data (January 2019 to February 2020) for selected parameters show neutral to slightly alkaline pH (7.68 to 8.21), relatively low ammoniacal-nitrogen concentrations (0.02 and 0.29mg/l) and chloride concentrations typically close to 250mg/l with occasional spikes up to 1,400mg/l, which is indicative of saline influence in this tidal watercourse.

Grid Connection

12.5.37 The Grid Connection and the wider Study Area are within the RBMP for the Anglian Region. The Grid Connection is located within the North-west Norfolk Rivers Surface Water Operational Catchment and Nene Lower Surface Water Operational Catchment. The Grid Connection is not within a reportable surface water body WFD area. The nearest WFD surface waterbody is the River Great Ouse Relief Channel, approximately 12km south-east of the Grid Connection. This waterbody achieved an overall status of 'Poor' in the 2019 WFD classification (Cycle 2). The River Great Ouse Relief Channel is not located within the Study Area and is not affected by the Proposed Development. The Grid Connection is not within a WFD Groundwater Management Catchment.

12.5.38 The Environment Agency indicated that there are no surface water sampling points within the Study Area. The closest sampling point is the Reeds Drain which discharges to the River Great Ouse (sampling point ID: AN-54M13)[43] within the KLIDB District. Data for the period 2011 to 2019 focuses on nitrogen and pesticides and shows low nitrate (typically <1mg/l except for isolated peaks) and pesticides below analytical detection limits.

Flood Risk

EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections

Tidal Flood Risk

12.5.39 The detailed flood risk data provided by the Environment Agency indicates that the primary flood risk to the EfW CHP Facility Site, CHP Connection, TCC and Access Improvements is from the tidal River Nene (data included in the FRA, **Appendix**

[42] Environment Agency. Water Quality Archive (2020).
[43] Environment Agency. Water Quality Archive (2020).

12A: FRA (Volume 6.4)). The Fenland District is reliant on tidal flood defences and pumped drainage to minimise flood risk. The tidal defences along the River Nene that protect the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections consist of earth embankments and concrete floodwalls. The Environment Agency indicated that the defences are in 'fair' condition (contain defects that could reduce performance of the asset) and provide a level of protection of 0.5% Annual Exceedance Probability (AEP) of sea flooding in any year at the present day (**Appendix 12A: FRA (Volume 6.4)**). The Environment Agency inspect these defences routinely to ensure potential defects are identified and, if required, rectified.

12.5.40 The Environment Agency Flood Map for Planning (**Figure 12.5ii: Hydrological Receptors within the study area (EfW CHP Facility Site and surroundings) (Volume 6.3)**) shows that the entirety of the EfW CHP Facility Site and CHP Connection Corridor and large areas of the Access Improvements, TCC and Water Connections lie within Flood Zone 3 (land having 0.5% or greater AEP of tidal flooding in any one year). Small areas of the TCC, Access Improvements and most of the Water Connections lie within Flood Zone 2 (land having between 0.5% and 0.1% AEP of tidal flooding in any one year). The flood risk mapping assumes no flood defences along the River Nene and does not take account of climate change (i.e., represents present day flood risk).

12.5.41 The Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping provided by the Environment Agency indicates that there is no flood risk to the EfW CHP Facility Site, CHP Connection, TCC and Access Improvements during the overtopping of the flood defences in the River Nene for both the 0.5% AEP and 0.1% AEP plus climate change event in 2115. However, part of the EfW CHP Facility Site, CHP Connection and TCC and the entirety of the Access Improvements and Water Connections are at residual flood risk during breach of the defences in both the 0.5% AEP event (present day) and 0.5% AEP and 0.1% AEP plus climate change event in 2115. The modelled flood levels are discussed in detail in the FRA (**Appendix 12A: FRA (Volume 6.4)**). In the northern part of the EfW CHP Facility Site, where most of the permanent infrastructure will be located, flood depths range between 0m (dry) to 0.6m, which correspond to a peak water level between 2.5m and 2.6m AOD during the residual 0.5% AEP and 0.1% AEP plus climate change breach flood events.

Fluvial Flood Risk

12.5.42 The detailed flood data provided by the Environment Agency advises that EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are not considered to be at risk of flooding from main rivers (data included in the FRA, **Appendix 12A: FRA (Volume 6.4)**). On this basis, fluvial flood risk has been scoped out of the assessment (see **Section 12.6**). Fluvial flood risk from the IDB network is considered under surface water flood risk below.

Surface Water Flood Risk

12.5.43 Surface water flooding occurs when the intensity of rainfall is greater than the local drainage and infiltration capacity, causing water to flow overland. Where low-points

or barriers to flow are present, particularly deep areas of flooding may occur. These areas are not limited to river corridors or floodplains.

12.5.44 The Environment Agency's Surface Water Flood Risk Map gives an indication of the broad areas likely to be at risk of surface water flooding at present, i.e., areas where surface water would be expected to flow or pond. It defines areas at Very Low (less than 0.1% AEP), Low (between 0.1% and 1% AEP), Medium (between 1% and 3.3% AEP) and High (greater than 3.3% AEP) probability of surface water flooding. The map shows that the majority of the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are at Very Low risk of flooding from surface water run-on (**Figure 12.7i: Environment Agency Surface Water Flood Risk Map (EfW CHP Facility Site and surroundings) (Volume 6.3)**). The map also shows small areas of Low to Medium surface water flood risk within the EfW CHP Facility Site, TCC and Access Improvements and Low to High surface water flood risk within the CHP Connection Corridor. These areas of Low to High risk correspond to topographic low areas and to the drainage network. The EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are located in an area with extensive drainage network provided by the IDB drains, which allow surface water to drain from the fields into the nearby channels. The flat and low-lying nature of the IDB districts also result in low fluvial risk from the IDB drains, as evidenced by the lack of large flow pathways in the Environment Agency's Surface Water Flood Risk Map.

12.5.45 The HWIDB indicated that the EfW CHP Facility Site is within a Critical Drainage Area (**Appendix 12B: Stakeholder engagement (Volume 6.4)**). This is an area which has critical drainage problems, and which has been notified to the local planning authority by the Environment Agency.

Groundwater Flood Risk

12.5.46 Groundwater flooding occurs as a result of water issuing to the surface from the underlying aquifers. This tends to occur after long periods of sustained high rainfall, with areas most at risk being situated on permeable geology and in low-lying positions compared to the local water table.

12.5.47 The EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are underlain by Unproductive Aquifers with shallow groundwater within the made ground and Tidal Flat Deposits. Shallow groundwater is likely to be in continuity with the managed surface water levels in the IDB drainage network, which will prevent increases in water level due to groundwater. This indicates that there is a limited risk of groundwater flooding at the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections other than in excavations during construction (where works are required below existing ground levels). These will include the waste bunker at the EfW CHP Facility Site which could extend to a depth of 14m below finished floor levels (FFLs). This could therefore be liable to groundwater flooding if not sealed appropriately or be at risk of groundwater uplift (floating) if not adequately engineered to avoid this. This is addressed in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**).

Sewer Flood Risk

12.5.48 The EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are located within an existing industrial development estate (except for northern end of CHP connection which borders a residential area and the Water Connection which connects to an existing Anglian Water supply on the eastern side of the A47), and therefore whilst the potential for sewer flooding could exist, the risk is considered to be low. Any water that surcharged would drain to nearby more low-lying areas to the south and/or would be intercepted by the local HWIDB drainage network. The risk of sewer flooding in the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections is therefore low. On this basis, sewer flood risk has been scoped out of the assessment (see **Section 12.6**).

Artificial Flood Risk

12.5.49 The Whittlesey Washes, located approximately 8km south-west (upstream) of the Proposed Development, is a large area of open land surrounded by embankments, which act as a flood storage reservoir when high tides and high river levels in the River Nene coincide. The updated[44]Environment Agency Flood Risk from Reservoirs Mapping shows the flood risk from a reservoir failure for two hydrological scenarios. The map shows the maximum flood extent for a "dry-day", where river levels are at normal levels, and a "wet-day" where reservoir flooding occurs alongside wider river flooding. The updated mapping shows that no part of the Proposed Development area is within an area that would be affected by an extreme event of a breach to the Whittlesey Washes flood storage reservoir, which lies to the south-west (**Figure 12.8: Environment Agency Reservoir Flood Risk Map (Volume 6.3)**).

12.5.50 There are no other raised/impounded/artificial sources of flooding near the EfW CHP Facility Site. On this basis, artificial flood risk has been scoped out of the assessment (see **Section 12.6**).

Grid Connection

Tidal Flood Risk

12.5.51 The detailed flood data provided by the Environment Agency indicates that the primary flood risk to the Grid Connection is tidal from the River Nene to the west and the tidal River Great Ouse to the east (data included in the **FRA**, **Appendix 12A: FRA (Volume 6.4)**). The tidal defences along the River Great Ouse, protecting the Grid Connection, consist of earth embankments and concrete floodwalls. The defences are in 'fair' condition (contain defects that could reduce performance of the asset) and provide a level of protection of 0.66% AEP and 0.5% AEP or greater of sea flooding in any year in the present day (depending on location along the route). The Environment Agency inspect these defences routinely to ensure potential defects are identified and, if required, rectified.

12.5.52 The Environment Agency Flood Map for Planning (**Figures 12.6i: Environment Agency Flood Map for Planning (Proposed Development)** and **Figure 12.6ii:**

[44] The Environment Agency's reservoir flood maps were updated in November 2021. Website. Accessed 08/02/22.

Environment Agency Flood Map for Planning (EfW CHP Facility Site and surroundings) (Volume 6.3)) shows that most of the Grid Connection is within Flood Zones 2 and 3. The area between the junction of New Bridge Lane with the A47 and Meadowgate Lane (to the east of the EfW CHP Facility Site) makes up the majority of the Flood Zone 1 area which is along the Grid Connection. The Walsoken substation is within Flood Zone 2.

12.5.53 The Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping provided by the Environment Agency indicates that there is no flood risk to the Grid Connection during the overtopping of the flood defences in the River Nene for the 0.5% AEP plus climate change event in 2115. The Grid Connection also remains dry during the 0.1% AEP plus climate change event in 2115. The majority of the Grid Connection, including Walsoken substation, is not at residual flood risk during breach of the defences in both the 0.5% AEP event (present day) and 0.5% AEP plus climate change event in 2115 (data included in the **FRA**, **Appendix 12A: FRA (Volume 6.4)**).

Fluvial Flood Risk

12.5.54 The detailed flood data provided by the Environment Agency advises that the Grid Connection is not considered to be at risk of flooding from main rivers (data included in the **FRA**, **Appendix 12A: FRA (Volume 6.4)**). On this basis, fluvial flood risk has been scoped out of the assessment (see **Section 12.6**). Fluvial flood risk from the IDB network is considered under surface water flood risk below.

Surface Water Flood Risk

12.5.55 The Environment Agency's Surface Water Flood Risk Map shows that the majority of the Grid Connection and Study Area is at Very low risk of flooding from surface water run-on (**Figure 12.7ii: Environment Agency Surface Water Flood Risk Map (Grid Connection) (Volume 6.3)**). The map also shows small areas of Low to High surface water flood risk across the Grid Connection which correspond to topographic low areas and the IDB drainage network.

12.5.56 The extensive drainage network provided by the IDB drains, which allow surface water to drain from the fields into the nearby channels, is likely to result in the limited/very low risk of flooding from surface water run-on across the Grid Connection. In addition, the flat and low-lying nature of the IDB districts result in low fluvial risk from the IDB drains, as evidenced by the lack of large flow pathways in the Environment Agency's Surface Water Flood Risk Map.

Groundwater Flood Risk

12.5.57 The Grid Connection is underlain by Unproductive Aquifers with shallow groundwater. Shallow groundwater is likely to be in continuity with the managed water levels in the IDB drainage network. As discussed above, this indicates that there is also a limited risk of groundwater flooding at the Grid Connection, other than in excavations during construction, for example, trenches associated with the cable route, which can be managed through standard construction practices (see embedded measures in **Table 12.10: Summary of the embedded environmental measures and how these influence the Hydrology assessment**).

Sewer Flood Risk

12.5.58 The Grid Connection is situated away from developed areas, and it is anticipated that there are few piped sewer drainage networks in this area. Any flows surcharging from minor sewer systems associated with nearby farm buildings would be expected to be minimal and intercepted by the IDB drainage network. The risk of sewer flooding in the Grid Connection is therefore low and has been scoped out of the assessment.

Artificial Flood Risk

12.5.59 The updated Environment Agency Flood Risk from Reservoirs Mapping shows no part of the Proposed Development area is within an area that would be affected by an extreme event of a breach to the Whittlesey Washes flood storage reservoir, which lies to the south-west (**Figure 12.8: Environment Agency Reservoir Flood Risk Map (Volume 6.3)**). In the absence of other raised/impounded/artificial sources of flooding near the Grid Connection, artificial flood risk has been scoped out of the assessment (see **Section 12.6**).

Nature conservation sites

12.5.60 The statutory and non-statutory nature conservation sites near the Proposed Development are described in detail in **Chapter 11: Biodiversity (Volume 6.2).** There are no statutory and non-statutory nature conservation sites intersecting the Proposed Development.

12.5.61 There are no statutory nature conservation sites of international or national importance designated for water related interest within the Study Area. The closest downstream statutory nature conservation sites with a water dependence are The Wash Ramsar and SPA and The Wash and North Norfolk Coast SAC. These statutory conservation sites are over 20km downstream of the Proposed Development and therefore are not affected by the Proposed Development and scoped out of the assessment.

12.5.62 Other statutory nature conservation sites (Nene Washes Ramsar, SAC and SPA and Ouse Washes SPA) are over 6km upstream of the Proposed Development and therefore are not affected by the Proposed Development and scoped out of the assessment.

12.5.63 There are two non-statutory nature conservation sites (County Wildlife Sites (CWS)) intersecting or close to the Study Area, as identified by the Norfolk Biodiversity Information Service. These are the River Nene CWS and the Honington House Farm CWS.

12.5.64 A summary of the sites with a water dependence and potential hydrological connectivity with the Proposed Development is presented in **Table 12.7 : Summary of water-dependent nature conservation sites with potential hydrological connectivity to the Proposed Development.** Further details are provided in **Chapter 11: Biodiversity (Volume 6.2)** within this document, including their location. The Wash Ramsar and SPA, The Wash and North Norfolk Coast SAC and Honington House Farm CWS are scoped out of the assessment on the basis that the hydrological connectivity to the Proposed Development at a significant distance

is such that any effects would be negligible (**Not Significant**). The River Nene CWS has been scoped in for further assessment.

Table 12.7 Summary of water-dependent nature conservation sites with potential hydrological connectivity to the Proposed Development

Site Name	Distance from Study Area	Site Description	Hydrological Connectivity
Statutory nature conservation sites within Study Area			
No sites			
Non-statutory nature conservation sites intersecting or close to Study Area			
River Nene CWS	0.15km west	The CWS is designated for river habitat supporting nationally scarce plant species.	Connectivity at distance. Connected via the HWIDB drains which flow to the south of the Proposed Development and then discharge into the River Nene, approximately 3.5km downstream of the Proposed Development.
Honington House Farm CWS	4.1km north	The CWS is designated for saltmarsh, grassland, and scrub along the east bank of the River Nene.	Connectivity at significant distance. Connected via the HWIDB drains and River Nene, approximately 11km downstream of the Proposed Development (HWIDB drains flow to the south of the Proposed Development and then discharge into the River Nene, approximately 3.5km downstream of the Proposed Development and then River Nene flows north near the edge of the CWS approximately 11km downstream of the Proposed Development). However, it is likely that any effects would be negligible (not significant) at such distances downstream of the Proposed Development and therefore no effects are predicted on this CWS. On this basis the Honington House Farm CWS is scoped out of the assessment.

Future baseline

12.5.65 Hydrological baseline conditions may change even if the Proposed Development is not constructed, for the following reasons:

- Climate change will result in increased rainfall seasonality, with generally wetter winters and drier summers, high-intensity rainfall events will become more

common[45]. This will lead to greater variation in river flows (low flows and high flows), and increases in flood risk. The assessment of tidal flood risk and drainage strategy in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**) includes a climate change allowance up to 2115 which includes and extends beyond the construction, operational and decommissioning phase (2023 to 2067).

- The location and rate of surface water abstractions in the area could vary over time and may result in changes to the WFD surface water body status and SPZ designations. It is important to note that the Proposed Development is not within a reportable surface water body WFD area, WFD Groundwater Management Catchment and SPZ for a public water supply.
- Improvements to WFD waterbody status associated with improvements to individual quality elements (i.e., phosphate reduction) would result in higher-quality, more sensitive waterbodies. Although the Proposed Development is not hydrologically connected with any WFD waterbodies, the assessment has taken into account potential impacts on current and future water quality and hydromorphology in a way which mirrors WFD approaches.

12.6 Scope of the assessment

Spatial scope

12.6.1 The spatial scope of the Hydrology assessment covers the area of the Proposed Development, together with the Study Area defined in **Section 12.4** and shown in **Figure 12.1: Proposed Development Location and Study Area (Volume 6.3)**. Study Areas for the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections have been combined owing to the proximity of these elements to one another.

12.6.2 The spatial scope for flood risk Receptors includes people, property and infrastructure whose risk of flooding could be changed by the Proposed Development. It should be noted that only flood risk effects on third party Receptors are reported in this chapter. Aspects of the development itself that are at risk of flooding are assessed in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**).

Temporal scope

12.6.3 The temporal scope of the Hydrology assessment is consistent with the period over which the Proposed Development will be carried out (details provided in **Chapter 3: Description of the Proposed Development (Volume 6.2)**) and therefore covers the construction, operational and decommissioning phases as detailed below. This will be achieved by considering the NPS EN-1 climate change emission scenarios and UK Climate Projections[46] appropriate for the Proposed Development's lifetime. Although the Proposed Development is not hydrologically connected with any WFD waterbodies, the assessment has taken into account potential impacts on current

[45] CCC. Climate Change and Environment Strategy (2020).
[46] Met Office (2021) UK Climate Projections: Headline Findings July 2021.

and future water quality and hydromorphology in a way which mirrors WFD approaches:

- The construction period extends over a three-year period from 2023 – 2026;
- The operational period covers 2026 – 2066 (lifespan of approximately 40 years); and
- The decommissioning period is anticipated to last for one year.

Potential Receptors

12.6.4 Three types of Receptors have been identified with respect to the Hydrology assessment:

- Aquatic environment Receptors;
- Water resources Receptors; and
- Flood risk Receptors (people, property, and infrastructure at risk of flooding).

12.6.5 The Receptors within each of these broad Receptor types are summarised in **Table 12.8 Summary of identified Receptors** and discussed further below:

Table 12.8 Summary of identified Receptors

Potential sources	Receptor ID	NGR	Distance from Proposed Development	Summary
Aquatic environment Receptors – watercourses				
The River Nene	WC1	-	0.2km west.	A Main River that flows south to north.
HWIDB adopted drains	WC2	-	Intersects Proposed Development. South of Wisbech with a catchment area of 14km2.	Extensive network of artificial drainage channels which discharge into the River Nene approximately 3.5km south-west of the EfW CHP Facility.
KLIDB adopted drains	WC3	-	Intersects Proposed Development. West of Wisbech with a catchment area of 360km2.	Extensive network of artificial drainage channels which discharge into the River Great Ouse approximately 6km east of the Proposed Development.
Aquatic environment Receptors – ponds				
Ponds	-	Various locations	There are 20 ponds within the Study Area but none within Proposed Development.	Vary in shape and size, but there are no particularly large waterbodies (for example large drinking water reservoirs) with the vast majority being less than a hectare in extent.
Aquatic environment Receptors – Non-statutory nature conservation sites				

Potential sources	Receptor ID	NGR	Distance from Proposed Development	Summary
River Nene CWS	C1	TF458096	0.15km west.	The CWS is designated for river habitat supporting nationally scarce plant species.
Water resource Receptors				
Licensed abstraction from the River Nene	AB1	TF456092	0.2km west.	Licenced abstraction from River Nene by a brewery for 45Ml/day for the purpose of non-evaporative cooling.
Local Anglian Water resources	AB2	-	-	Anglian Water's main water supply network required to meet the water demand of the operational EfW CHP Facility.
Flood risk Receptors				
People, property, and infrastructure at risk of flooding (third party)	-	Various locations	Various locations.	Residential properties, industry/business properties, farm buildings, pumping station south-west of Wisbech and transport infrastructure including A47 and disused March to Bramley railway line

Aquatic environment Receptors

12.6.6 The aquatic environment Receptor represents a range of potential species, interactions and pathways that may be affected by the Proposed Development and changes to water quality and hydromorphology caused by it. These Receptors include watercourses (HWIDB adopted drains, KLIDB adopted drains and the River Nene) and ponds. The location of the Receptors is shown on **Figures 12.5i: Hydrological Receptors within the study area (Proposed Development)** and **Figure 12.5ii: Hydrological Receptors within the study area (EfW CHP Facility Site and surroundings) (Volume 6.3).**

12.6.7 In setting the scope of the assessment consideration has been given to PINS Advice Note 18, which sets out the approach to the WFD Assessment. It is important to note that the Proposed Development is not within a reportable surface water body WFD area and is also not within a WFD Groundwater Management Catchment (see paragraph 12.5.43). The nearest WFD surface waterbodies (North Level Main Drain and River Great Ouse Relief Channel) have their confluence with the Nene downstream of the Proposed Development and are therefore not affected by Proposed Development. Therefore, a separate WFD assessment has not been produced to support the ES. However, as the Proposed Development is intersected by numerous HWIDB and KLIDB drains, water quality and hydromorphology effects on these aquatic environment Receptors are considered within this chapter in a manner which mirrors the WFD approach, to ensure that consideration is paid to the overall objectives of the WFD as transposed into UK law. Potential effects on the

River Nene, which receives flows from the HWIDB drains approximately 3.5km downstream of the Proposed Development, are also considered.

12.6.8 Specific consideration has also been given to those nature conservation sites with a water dependence within the Study Area, as identified in the baseline assessment (**Table 12.7: Summary of water-dependent nature conservation sites with potential hydrological connectivity to the Proposed Development**). These have been identified as distinct aquatic environment Receptors where there appears to be hydrological connectivity between the Proposed Development and the nature conservation site.

12.6.9 Potential effects on specific species and aquatic and riparian biodiversity are assessed within **Chapter 11: Biodiversity (Volume 6.2)**, which should be read in conjunction with this assessment.

Water resource Receptors

12.6.10 Consideration of surface water resources will ensure a consideration of the rights of local water users, primarily abstractors within this assessment. Potential derogation of these rights, as a result of the Proposed Development could occur either as a result of adverse changes to water quantity (e.g., reduced river flows or groundwater levels which could affect the yield of a water resource) or adverse changes to water quality (e.g., deterioration in water quality which may render a water resource unusable or increase treatment costs). The baseline assessment indicates that there is one licensed non-public surface water abstraction within the Study Area. The location of this Receptor is shown on **Figures 12.5a: Hydrological Receptors within the study area (Proposed Development)** and **Figure 12.5ii: Hydrological Receptors within the study area (EfW CHP Facility Site and surroundings) (Volume 6.3).**

Flood risk Receptors

12.6.11 Flood risk Receptors are defined within this assessment as people, property and infrastructure that could be at risk of flooding. An **FRA** (**Appendix 12A: FRA (Volume 6.4)**) has been undertaken for the Proposed Development which has helped to define the baseline flood risk across the Study Area. Where a flood risk to an identified Receptor exists within the baseline environment it is important that this assessment recognises the potential change in risk arising from the Proposed Development.

12.6.12 Review of the OS maps and aerial imagery in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**) has identified various potential flood risk Receptors along the Proposed Development. These include residential properties, industry/business buildings, farm buildings, a pumping station south-west of Wisbech and transport infrastructure including the A47 and the disused March to Wisbech Railway. The potential Receptors have been grouped on the basis of land use vulnerability classes, based on Table 2 of the NPPG PPG on Flood Risk and Coastal Change. These broad groups of Receptors have been assessed instead of individual Receptors.

Likely significant effects

12.6.13 The Hydrology Receptor types that have been taken forward for assessment and the potentially significant effects they may be subject to are summarised in **Table 12.9: Hydrology Receptor types and likely significant effects scoped in for further assessment** below.

12.6.14 Future decommissioning phase effects are considered to be similar to construction phase effects, although with a lesser duration of one year and against a future baseline of greater flood hazard as a result of climate change. It is anticipated that the process of decommissioning would involve the termination of operational activity, following which there would be electrical and process isolation and demolition activities. The EfW CHP Facility Site and CHP Connection would be left in a clear and secure condition in accordance with a Decommissioning Plan; which would include details of water management and flood measurement measures. It is envisaged that the Grid Connection (other than the electrical and data cables), the Access Improvements and Water Connections would be left in situ.

Table 12.9 Hydrology Receptor types and likely significant effects scoped in for further assessment

Receptor type*	Relevant assessment criteria	Likely significant effects
Construction Phase – EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections		
Aquatic environment Receptors and water resource Receptors	WFD and WFD (Standards and Classification) Directions (England and Wales) 2015	Deterioration in the water quality of aquatic environment Receptors via generation of sediment laden run-off as a result of construction activities, e.g., watercourse crossings and excavations. Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance. Deterioration in the water quality of aquatic environment Receptors affected by mobilisation of contaminants from contaminated soil, or accidental spillage of pollutants (e.g., fuel or oil). The potential effects noted above for surface water aquatic environment Receptors could also have implications for surface water resource availability. Changes to watercourse flow conveyance arising from the presence of new or modified temporary watercourse crossings. This has the potential to affect the morphology of aquatic environment Receptors.
Flood risk Receptors (third party Receptors)	NPPF	Changes to tidal flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance. Changes to tidal flood risk associated with compartmentalisation of the floodplain.

Receptor type*	Relevant assessment criteria	Likely significant effects
		Changes to watercourse flow conveyance arising from the presence of new or modified temporary watercourse crossings. This has the potential to increase the risk of flooding to flood risk Receptors. Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.
Operational Phase – EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections		
Aquatic environment Receptors and water resource Receptors	WFD and WFD (Standards and Classification) Directions (England and Wales) 2015#	Deterioration in the water quality of aquatic environment Receptors by accidental spillage of pollutants (e.g., storage of combustion residues, fuel storage and vehicle and wheel washing). Changes to watercourse flow conveyance arising from the presence of new or modified permanent watercourse crossings. This has the potential to affect the morphology of aquatic environment Receptors. The potential effects noted above for surface water aquatic environment Receptors could also have implications for surface water resource availability.
Water resource Receptors	WFD and WFD (Standards and Classification) Directions (England and Wales) 2015#	Increased pressure on local water resources due to an increase in water demand by the EfW CHP Facility.
Flood risk Receptors (third party Receptors)	NPPF	Changes to tidal flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance. Changes to tidal flood risk associated with compartmentalisation of the floodplain. Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces Changes to watercourse flow conveyance arising from the presence of new or modified permanent watercourse crossings. This has the potential to increase the risk of flooding to flood risk Receptors.
Construction Phase – Grid Connection		
Aquatic environment Receptors and water resource Receptors	WFD and WFD (Standards and Classification) Directions	Deterioration in the water quality of aquatic environment Receptors via generation of sediment laden runoff as a result of construction activities, e.g., excavations associated with the underground cable. Potential effects on the hydromorphology and flow conveyance due to increased sediment inputs or direct watercourse disturbance.

Receptor type*	Relevant assessment criteria	Likely significant effects
	(England and Wales) 2015#	Potential change to surface water quality affected by mobilisation of contaminants from contaminated soil, or accidental spillage of pollutants (e.g., fuel or oil). The potential effects noted above for surface water aquatic environment Receptors could also have implications for surface water resource availability.
Flood risk Receptors (third party Receptors)	NPPF	Changes to tidal flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance. Changes to tidal flood risk associated with compartmentalisation of the floodplain. Changes to watercourse flow conveyance arising from the presence of new or modified temporary watercourse crossings. This has the potential to affect the morphology of aquatic environment Receptors and to increase the risk of flooding to flood risk Receptors. Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.
Operational Phase - Grid Connection		
Flood risk Receptors (third party Receptors)	NPPF	Changes to tidal flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance. Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces Changes to watercourse flow conveyance arising from the presence of new or modified permanent watercourse crossings. This has the potential to increase the risk of flooding to flood risk Receptors.

Notes: Receptor types are described in Table 12.7.
Although the Proposed Development is not hydrologically connected with any WFD waterbodies impacts on the water environment have taken into account potential impacts on water quality and hydromorphology in a way which mirrors WFD approaches.

Effects Scoped-Out of the Assessment

12.6.15 The potential effects below have been excluded from further assessment i.e., 'scoped out', on the basis that the effects are not likely to be considered significant:

Proposed Development – Construction and Operational Phases

- Deterioration of the status of WFD waterbodies. The Proposed Development is not within a reportable surface water body WFD area and is also not within a WFD groundwater management catchment. The nearest WFD surface waterbodies (North Level Main Drain and River Great Ouse Relief Channel) are not located downstream of Proposed Development and therefore are not affected by Proposed Development and are scoped out of the assessment.

- Water quality effects on the statutory nature conservation sites The Wash Ramsar and SPA (17km downstream of the Proposed Development), The Wash and North Norfolk Coast SAC (25km downstream of Proposed Development) and the non-statutory nature conservation site Honington House Farm CWS (11km downstream of the Proposed Development). The Wash Ramsar and SPA and Honington House Farm CWS are hydrologically connected to the Proposed Development via the HWIDB drains/River Nene whilst The Wash and North Norfolk Coast SAC is hydrologically connected via the KLIDB drains/River Great Ouse. These sites are located at a considerable distance downstream of the Proposed Development and it is assumed that the proposed embedded environmental measures (**Table 12.10**) to avoid significant effects at the directly affected Hydrology Receptors (HWIDB drains/River Nene and KLIDB drains/River Great Ouse), which are upstream of the nature conservation sites, together with dilution effects with distance downstream, are sufficient to avoid significant effects at the nature conservation sites. Thus, these nature conservation sites at distance from the Proposed Development are scoped out of the assessment.
- Flood risk from fluvial, sewer and artificial sources. As discussed in **Section 12.5 (Flood risk)**, the Proposed Development is not considered to be at risk of flooding from main rivers, whilst sewer flooding poses a low risk and artificial flooding poses a managed risk. Therefore, these flood risk sources are scoped out of the assessment.
- All water environment effects associated with the Water Connections infrastructure during the operational phase. The underground water main will have no impact to flood risk Receptors, surface waterbodies, surface water flow or hydrogeomorphology during its operation. There would also be no impact from maintenance activities, although flood risk to personnel carrying out maintenance activities during the operational phase is still considered as part of the **FRA** (**Appendix 12A: FRA (Volume 6.4)**).

Grid Connection (underground cable) – Operational Phase

- All water environment effects associated with the underground cable infrastructure. The underground cable will have no impact to flood risk Receptors, surface waterbodies, surface water flow or hydrogeomorphology during its operation. There would also be no impact from maintenance activities, although flood risk to personnel carrying out maintenance activities during the operational phase is still considered as part of the **FRA** (**Appendix 12A: FRA (Volume 6.4)**).

Proposed Development – Decommissioning Phase

- It is envisaged that those activities and potential effects that are scoped out of the construction phase can also be scoped out for the future decommissioning phase.

12.7 Embedded environmental measures

12.7.1 Environmental measures have been embedded into the Proposed Development and **Table 12.10: Summary of the embedded environmental measures and how these influence the Hydrology assessment** which outlines how these embedded measures will influence the Hydrology assessment.

Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment

Receptor type	Predicted changes and potential effects	Embedded measures ID and influence on the hydrological assessment
EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections – Construction Phase		
Aquatic environment Receptors	Deterioration in the water quality of aquatic environment Receptors via generation of sediment laden water as a result of construction activities, e.g., watercourse crossings and excavations.	ID1 – Good working practices Good working practices will be implemented during construction, with adherence to the **Outline Construction Environmental Management Plan (Outline CEMP) (Volume 7.12)**, which is secured through a DCO Requirement, and relevant guidance. A water quality monitoring programme will be implemented, as required by the **Outline CEMP**, by the EPC Contractor to ensure that the measures taken to protect the surface water environment are effective. ID2 – Stand-off from IDB adopted drains (construction phase) A minimum stand-off distance from the edge of HWIDB adopted drains of 6m (on both sides of the drain) will be provided to ensure ongoing access for maintenance of the IDB drains. This applies to all construction works associated with the EfW CHP Facility Site and TCC with the exception of hardstanding and car park area (which are acceptable to HWIDB within the 6m strip). A minimum stand-off distance from the edge of the HWIDB adopted drains of 9m (on both sides of the drain) will be provided where possible for all construction works associated with the Access Improvements and Water Connections to ensure ongoing access for maintenance of the HWIDB drains. HWIDB advised that depending on the specific drain conditions the stand-off distance can potentially be reduced. A Consent would be sought from HWIDB for any construction works within the 9m IDB byelaw distances to finalise the relevant stand-off distance for the proposed works. ID3 – Watercourse crossings Where culverts are to be used to enable access at watercourse crossings over IDB drains, these will be appropriately sized to maintain existing flow conveyance. Where existing culverts already exist nearby, similarly sized culverts may be suitable. Multiple pipes will not be used. Circular culverts will have concrete bedding in locations where ground conditions suggest that settlement could occur. The design of the crossings will be agreed with HWIDB, KLIDB and/or National Highways. These will be subject to Consents with HWIDB and/or KLIDB, as appropriate. If dewatering of the excavations is required appropriate treatment

Receptor type	Predicted changes and potential effects	Embedded measures ID and influence on the hydrological assessment
		of the pumped water will be provided before discharge to adjacent ditches or ground, and this could include the use of silt busters (or similar), if necessary. Any temporary dewatering discharge to a watercourse within the HWIDB and KLIDB districts will require temporary consent from HWIDB or KLIDB under Byelaw 3. All equipment containing hazardous fluids will have double skinned fuel tanks or be parked on drip trays with appropriately sized PVC berms to contain any fluid spills or storm water runoff. Spill kits will be carried on all plant that operates with hazardous fluids. ID4 – Drainage Management Plan (DMP) (Construction phase) Implementation of an appropriate Drainage Management Plan for the construction phase of the EfW CHP Facility and Grid Connection, utilising SuDS principles for attenuation storage and treatment, to ensure any discharge into the IDB drains or non-IDB drains is limited to greenfield rates and does not cause pollution of the water environment (as agreed with HWIDB, KLIDB, CCC and NCC). A water quality monitoring programme will be agreed with the EA and implemented prior to, during and following construction. This would be secured through a DCO Requirement, via the **Outline CEMP (Volume 7.12)**. The Outline Water Management Plan for the construction phase is provided within the **Outline CEMP.** ID5 – Water discharges off-site (construction phase) Surface water runoff from the EfW CHP Facility Site and TCC (along with any groundwater dewatered from excavations, such as the waste bunker) is to be discharged to HWIDB drains (rather than the Anglian Water sewer). The installation of the discharge infrastructure is subject to a Consent from the HWIDB. Discharges would be temporarily halted if a flood alert or flood warning is in place downstream as set out in the Outline Water Management Plan within the **Outline CEMP (Volume 7.12)**, (and the on-site discharges could feasibly contribute to the flood event). If any dewatering of the excavations associated with the Water Connections and Access Improvements is required, appropriate treatment of the pumped water (e.g. silt busters or similar) will be provided before discharge to adjacent ditches or ground. Any temporary dewatering discharge to a watercourse within the HWIDB and KLIDB districts will require temporary consent under Byelaw 3. ID6 – Soil stockpiles Stockpiles will be present for the shortest practicable timeframe, with materials being reinstated as the construction work progresses. Stockpiles which remain present for three months or longer will be carefully managed using seeding techniques, as set out in the **Outline CEMP (Volume 7.12)**.

Receptor type	Predicted changes and potential effects	Embedded measures ID and influence on the hydrological assessment
Aquatic environment Receptors	Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	See measures ID1 (Good working practices), ID2 (Stand-off from IDB adopted drains), ID3 (Watercourse crossings (temporary access crossings)), ID4 (DMP), ID5 (Water discharges off-site (construction phase)) and ID6 (Soil stockpiles) listed above to limit sediment-laden water.
Aquatic environment Receptors	Deterioration in the water quality of aquatic environment Receptors affected by mobilisation of contaminants from contaminated soil, or accidental spillage of pollutants (e.g., fuel or oil).	See measures ID1 (Good working practices), ID4 (DMP) and ID5 (Water discharges off-site) above. ID7 – Fuel, oil and chemicals storage Areas that are used for fuel storage, plant maintenance and refuelling will be surfaced with fully impermeable materials to prevent any infiltration of contaminated runoff and contain bunding. An effective accident response protocol will be developed to ensure any spillages or potential pollution incidents are dealt with appropriately including the provision of containment for spills of contaminated liquids. Plant and machinery used during the construction and operation phases will be maintained to minimise the risks of oil leaks or similar. Any tanks containing oils, fuels and chemicals will be double skinned. There will be a bunded capacity of 100% of the maximum tank volume for non-hazardous fluids. For hazardous chemicals, fuels or oils bund capacity will be the larger of 110% of the largest tank volume for single tank bunds, (or, in the case of multi tank bunds, 110% of the largest tank capacity or 25% of the combined tank capacity, whichever is the largest). Fuel storage will be in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001 and other Pollution Prevention Guidelines (PPGs). All stores of fuel will be located at least 20m from any watercourses and away from areas at risk of flooding. These measures are secured through a DCO Requirement, via the **Outline CEMP (Volume 7.12)**. ID8 – Materials Management Plan Excavated materials during construction works will be segregated and stored/re-used on-site in accordance with a Materials Management Plan (in compliance with the CL:AIRE Definition of Waste: Code of Practice). Any temporary onsite storage of excavated materials suspected or confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate/runoff drainage to prevent migration of contaminants from the stockpile. Materials will be segregated where possible to prevent cross-contamination occurring. Such materials will only be reused if they are confirmed as suitable for use in line with the requirements of the Materials Management Plan. This is secured through a DCO Requirement, via the **Outline CEMP (Volume 7.12)**.
Water resources	Potential change to water quality of a	See measures ID1 (Good working practices), ID2 (Stand-off from IDB adopted drains), ID3 (Watercourse crossings (temporary

Receptor type	Predicted changes and potential effects	Embedded measures ID and influence on the hydrological assessment
Receptor	water supply resource which may affect the viability of an abstraction	access crossings)), ID4 (DMP), ID5 (Water discharges off-site), ID6 (Soil stockpiles), ID7 (Fuel/oil/chemicals storage) and ID8 (Materials Management Plan) listed above to limit sediment-laden water and accidental release of pollutants in context of aquatic environment Receptors.
Flood risk Receptors (third party Receptors)	Changes to tidal flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance.	No measures required – no effect on tidal flood risk for the design flood event
Flood risk Receptors (third party Receptors)	Changes to tidal flood risk associated with compartmentalisation of the floodplain.	No measures required – no effect on tidal flood risk for the design flood event
Flood risk Receptors (third party Receptors)	Changes to watercourse flow conveyance as a result of new or modified temporary watercourse crossings (e.g. culvert or bridge).	See measure ID3 (Watercourse crossings).
Flood risk Receptors (third party Receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.	See measures ID4 (DMP) and ID5 (Water discharges off-site (construction phase)) above. ID9 – Reinstatement Once constructed, any temporary access routes, temporary working areas and construction material will be removed and the ground reinstated to its pre-construction state (or similar), with the soil stockpile material used to backfill any excavations (to a level slightly above natural ground level to allow for settlement), as set out in the **Outline CEMP (Volume 7.12)**.
EfW CHP Facility Site- Operational Phase		
Aquatic environment Receptors	Deterioration in the water quality of aquatic environment Receptors by accidental spillage/release of pollutants (e.g., storage of combustion residues, fuel storage and vehicle and wheel washing).	See measure ID7 (Fuel, oil and chemicals storage) above. ID10 – Stand-off from IDB adopted drains (operational phase) A minimum stand-off distance from the edge of HWIDB adopted drains of 6m (on both sides of the drain) will be provided to ensure ongoing access for maintenance of the HWIDB drains. This applies to all permanent development associated with the EfW CHP Facility with the exception of hardstanding and car park area (which are acceptable to HWIDB within the 6m strip). A Consent would be sought from HWIDB for any permanent development within the 9m IDB byelaw distances to finalise the details of these stand-off distances. ID11 – Drainage Strategy Detailed drainage design for the operational elements of the proposed development (EfW CHP Facility and Walsoken

Receptor type	Predicted changes and potential effects	Embedded measures ID and influence on the hydrological assessment
		Substation), utilising SuDS principles for attenuation storage and treatment to ensure discharge rates into the HWIDB drains, KLIDB drains or non-IDB drains are limited to greenfield rates and cause no pollution of the water environment. A water quality monitoring programme will be agreed with EA and implemented during the operational phase. The detailed design will be prepared in accordance with the principles set out in **Appendix 12F Outline Drainage Strategy (Volume 6.4)**. Compliance with this is secured through a DCO Requirement. ID12 – Water discharges off-site (operational phase) Surface water runoff from the EfW CHP Facility Site is to be discharged to HWIDB drains (rather than the Anglian Water sewer). The discharges infrastructure is subject to a Consent from the HWIDB. Discharges would be temporarily halted if a flood alert or flood warning is in place downstream as set out in the Medworth Flood Emergency Management Plan (and the on-site discharges could feasibly contribute to the flood event). ID13 – Watercourse crossings – permanent (access) crossings All permanent watercourse crossings will be appropriately sized to maintain existing flow conveyance. The culvert design will be agreed with the HWIDB, KLIDB and/or National Highways, via an application for consent under Section 23 of the Land Drainage Act 1991.
Water resources Receptors	Potential change to water quality of a water supply resource which may affect the viability of an abstraction	See measures ID7 (Fuel, oil and chemicals storage), ID11 (Drainage Strategy) and ID12 (Water discharges off-site (operational phase)) above.
Water resources Receptors	Increased pressure on local water resources due to an increase in water demand by the EfW CHP Facility.	ID14 – Water reuse and rainwater harvesting Reuse of water and provision of rainwater harvesting systems will be provided where practicable. Compliance with this is secured through a DCO Requirement.
Flood risk Receptors (third party Receptors)	Changes to tidal flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance.	No measures required – no effect on tidal flood risk for the design flood event.
Flood risk Receptors (third party Receptors)	Changes to tidal flood risk associated with compartmentalisation of the floodplain.	No measures required- no effect on tidal flood risk for the design flood event.
Flood risk Receptors	Changes to watercourse flow conveyance as a	See ID15 (Watercourse crossings – permanent (access) crossings)

Receptor type	Predicted changes and potential effects	Embedded measures ID and influence on the hydrological assessment
(third party Receptors)	result of new or modified watercourse crossings (e.g., culvert or bridge).	All permanent watercourse crossings will be appropriately sized to maintain existing flow conveyance. Consent for the works will be obtained from the HWIDB under Section 23 of the Land Drainage Act 1991, for works which may obstruct flows of an Ordinary Watercourse. ID16 – Relocation of separation dam structure The separation dam structure in the HWIDB drain bisecting the EfW CHP Facility will be moved to the open section of the drain as agreed with HWIDB. Consent for the works will be obtained from the HWIDB under Section 23 of the Land Drainage Act 1991, for works which may obstruct flows of an Ordinary Watercourse.
Flood risk Receptors (third party Receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.	See measures ID11 (Drainage Strategy) and ID12 (Water discharges off-site (operational phase)) above.
Decommissioning phase of EfW CHP Facility		
It is anticipated that similar environmental measures to those embedded into the project design for the construction phase will be implemented, pursuant to a Decommissioning Plan.		
Grid Connection – Construction Phase		
Aquatic environment Receptors	Deterioration in the water quality of aquatic environment Receptors via generation of sediment laden runoff as a result of construction activities, e.g., excavations associated with the underground cable.	See measures ID1 (Good working practices), and ID4 (DMP) above. ID17 – Stand-off from IDB adopted drains (construction phase) A minimum stand-off distance from the edge of the HWIDB and KLIDB maintained drains of 9m (on both sides of the drain) will be provided where possible along the Grid Connection and Walsoken substation to ensure ongoing access for maintenance of the IDB drains. HWIDB and KLIDB advised that depending on the specific drain conditions the stand-off distance can potentially be reduced (e.g., where it is impractical to provide the 9m stand-off distance along the cable route). KLIDB indicated that a stand-off distance of 5m can be considered. A Consent would be sought, where necessary, for any permanent infrastructure within the 9m IDB byelaw distances (for both HWIDB and KLIDB) to resolve the final details of these stand-off distances. ID18 – Water discharges off-site (construction phase) As set out in the **Outline CEMP (Volume 7.12)**, the time any excavations (open cut trenching) along the Grid Connection are open will be kept to a minimum to minimise ingress of water and dewatering requirements. Excavation, installation and backfilling will take place overnight. Given the depth of the open cut trenches (1.2-2mbgl) significant dewatering is not anticipated. If dewatering is required, pumped water will be discharged to local ditches or to ground. Appropriate treatment will be installed before discharge

Receptor type	Predicted changes and potential effects	Embedded measures ID and influence on the hydrological assessment
		to surface or groundwater, and this could include the use of siltbusters (or similar) before discharge to surface waters. Any temporary dewatering discharge to a watercourse within the HWIDB and KLIDB districts will require temporary consent under Byelaw 3. If water being pumped from excavations is suspected to be contaminated, appropriate measures will be taken in accordance with Environment Agency guidance and the Environmental Permitting Regulations to prevent uncontrolled or unauthorised releases of this water to ground or to the water environment. ID19 – Soil stockpiles As set out in the **Outline CEMP (Volume 7.12)**, no/limited stockpiles will be present along the cable route. If necessary, excess excavated soil will be transported and stockpiled in the TCC. ID20 – Underground cable construction As set out in the **Outline CEMP (Volume 7.12)**, the underground cable will be constructed in discrete sections with the reinstatement process commenced in as short a timeframe as practicable.
Aquatic environment Receptors	Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	See measures ID1 (Good working practices), ID16 (Stand-off from IDB adopted drains (construction phase)), ID4 (DMP), ID18 (Soil stockpiles), ID17 (Water discharges off-site (construction phase)) and ID19 (Underground cable construction) listed above to limit generation of sediment laden water.
Aquatic environment Receptors	Deterioration in the water quality of aquatic environment Receptors affected by mobilisation of contaminants from contaminated soil or accidental spillage of pollutants (e.g., fuel or oil).	See measures ID1 (Good working practices), ID4 (DMP) and ID17 (Water discharges off-site), and ID7 (Fuel, oil and chemicals storage) above. ID21 – Materials Management Plan As secured via the **Outline CEMP (Volume 7.12)**, where future Phase 2 geo-environmental investigations indicate that historical land contamination is likely, testing of the relevant material would be undertaken to assess the risk, and further measures taken as appropriate. Where a risk of contamination has been identified, intrusive investigations would be undertaken, and suitable measures implemented prior to construction works and soil stockpile creation commencing. The installation of runoff control measures and ensuring that stockpiles are located an appropriate distance away from watercourses, as discussed above, would further minimise the risk of contaminants arising from the excavation of contaminated land from reaching watercourses.
Flood risk Receptors	Changes to tidal flood risk associated with loss of floodplain	No measures required- no effect on tidal flood risk for the design flood event.

Receptor type	Predicted changes and potential effects	Embedded measures ID and influence on the hydrological assessment
(third party Receptors)	storage and/or change in floodplain flow conveyance.	
Flood risk Receptors (third party Receptors)	Changes to tidal flood risk associated with compartmentalisation of the floodplain.	No measures required- no effect on tidal flood risk for the design flood event.
Flood risk Receptors (third party Receptors)	Changes to watercourse flow conveyance as a result of new or modified watercourse crossings (e.g., culvert or bridge).	See measure ID3 (Watercourse crossings (temporary access crossings) above.
Flood risk Receptors (third party Receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.	See measures ID4 (DMP), ID17 (Water discharges off-site (construction phase)) and ID9 (Reinstatement) above.
Grid Connection – Operational Phase		
Flood risk Receptors (third party Receptors)	Changes to watercourse flow conveyance arising from the presence of new or modified temporary watercourse crossings.	ID22 – Permanent watercourse crossings All permanent cable crossings of the culverted drains beneath the A47 will be placed above the culverts using open cut installation method. Strike plates will be used where a minimum 0.9m cover depth is not possible at the crossings. Consent for the works will be obtained from the HWIDB under Section 23 of the Land Drainage Act 1991, for works which may obstruct flows of an Ordinary Watercourse.
Flood risk Receptors (third party Receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.	See ID11 – Drainage Strategy (Operational phase) for Walsoken Substation
Grid Connection - Decommissioning phase		
It is anticipated that similar mitigation measures to those embedded into the project design for the construction phase will be implemented, pursuant to a Decommissioning Plan; a DCO Requirement.		

Notes: * Receptors as defined in **Section 12.6.**

12.8 Assessment methodology

12.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 4 Approach to the EIA (Volume 6.2)**, and specifically in **Sections 4.7** to **4.10**. However, whilst this has informed the approach that has been used in this Hydrology assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this Hydrology assessment.

General approach

12.8.2 This section describes the approach for the assessment of the effects of the Proposed Development on the hydrological and flood risk Receptors.

12.8.3 The significance of an effect resulting from the Proposed Development is primarily determined by the value of a given water feature and the magnitude of the effect. In terms of the Hydrology, the key determinants of magnitude relate to surface water quantity (level and flow) and water quality. Depending on the effects of surface water flows, there may also be indirect effects on downstream morphology and sediment dynamics, river water quality and flood risk. The method and criteria used to determine value, magnitude, and significance of effect are described in paragraph 12.8.4 to paragraph 12.8.7.

Determination of significance

12.8.4 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are "*likely to be significantly affected by the development*".

12.8.5 The EIA Regulations do not define significance and therefore this section explains how this has been defined for the purpose of the assessment. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the adverse effects of the Proposed Development, based on an assessment of the sensitivity and magnitude to assess the significance of the effects.

12.8.6 **Table 12.11: Establishing the sensitivity of Receptors** details the basis for assessing Receptor sensitivity. The value of hydrological water features is based on an assessment of a number of criteria:

- For aquatic environment Receptors:
  - the spatial scale and type of the Receptor water feature;
  - the quality of the watercourse morphology;
  - the WFD ecological status or potential; and
  - the presence of international or national nature conservations designations (where designations relate specifically to water dependent habitats or interest features).

- For water resources Receptors:
  - utilisation of Receptors for potable public or private water supply;
  - current water availability status as defined by EA catchment abstraction management strategy; and
  - quantitative and qualitative status of WFD groundwater body.
- For flood risk Receptors:
  - sensitivity to flooding, principally as defined by the flood risk vulnerability classification in the Planning Practice Guidance that accompanies the NPPF.

Table 12.11 Establishing the sensitivity of Receptors

Sensitivity	Criteria	Receptor Type*	Examples
High	Features with a high yield, quality, or rarity with little potential for substitution.	Aquatic environment	Conditions supporting a site with an international conservation designation (SAC, SPA, Ramsar site), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall High status, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. WFD surface water body (or part thereof) with High status for morphology. A watercourse in natural equilibrium and exhibiting a natural range of fluvial processes and morphological features, with no modification or anthropogenic influence.
	Water use supporting human health and economic activity at a regional scale.	Water use	Regionally important public surface water supply (and associated catchment/Groundwater Management Unit (GWMU)) or permitted discharge.
	Features with a high vulnerability to flooding.	Flood risk	Land use type defined as 'Essential Infrastructure' (i.e., critical national infrastructure, such as essential transport and utility infrastructure) and 'Highly Vulnerable' (e.g., police/ambulance stations that are required to operate during flooding, mobile homes intended for permanent residential use) in the NPPF flood risk vulnerability classification.

Sensitivity	Criteria	Receptor Type*	Examples
Medium	Features with a moderate yield, quality, or rarity, with a limited potential for substitution.	Aquatic environment	Conditions supporting a site with a national conservation designation (e.g., Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR)), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall 'Good' status/potential, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. A watercourse in natural equilibrium and exhibiting a natural range of fluvial processes and morphological features, with modification or anthropogenic influence.
	Water use supporting human health and economic activity at a local scale.	Water use	Local public surface water and groundwater supply (and associated catchment/GWMU) or permitted discharge. Licensed non-public surface water supply abstraction (and associated catchment) which is large relative to available resource, or where raw water quality is a critical issue, e.g., industrial process water, or permitted discharge.
	Features with a moderate vulnerability to flooding.	Flood risk	Land use type defined as 'More Vulnerable' in the NPPF flood risk vulnerability classification (e.g., hospitals and health centres, educational institutions, most types of residential development).
Low	Features with a low yield, quality, or rarity, with some potential for substitution.	Aquatic environment	Conditions supporting a site with a local conservation designation (e.g., Local Nature Reserve (LNR), County Wildlife Site (CWS)), where the designation is based specifically on aquatic features, or an undesignated but highly/moderately water-dependent ecosystem, including a Local Wildlife Site (LWS) and a Groundwater Dependent Terrestrial Ecosystems (GWDTE). WFD surface water body (or part thereof) with overall Moderate or

Sensitivity	Criteria	Receptor Type*	Examples
			lower status/potential, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. A watercourse showing signs of modification and recovery to a natural equilibrium, and currently exhibiting a limited range of fluvial processes and morphological features affected by modification or anthropogenic influence.
	Water use supporting human health and economic activity at household/individual business scale.	Water use	Licensed non-public surface water and groundwater supply abstraction (and associated catchment/GWMU), which is small relative to available resource, or where raw water quality is not critical, e.g., cooling water, spray irrigation, mineral washing or permitted discharge. Unlicensed potable surface water abstraction (and associated catchment) e.g., private domestic water supply, well, spring or permitted discharge.
	Features with a low vulnerability to flooding.	Flood risk	Land use type defined as 'Less Vulnerable' in the NPPF flood risk vulnerability classification (e.g., most types of business premises).
Very Low	Commonplace features with very low yield or quality with good potential for substitution.	Aquatic environment	Conditions supporting an undesignated and low sensitivity water-dependent ecosystem, including LWS, GWDTE and ponds. Non-reportable WFD surface water body (or part thereof), or non-WFD surface water body, not associated with any downstream WFD surface water body. A highly modified watercourse changed by channel modification or other anthropogenic pressures, currently exhibiting no active flow processes or morphological diversity.
	Water use does not support human health, and of only limited economic benefit.	Water use	Unlicensed non-potable surface water abstraction (and associated catchment) e.g., livestock supply.

Sensitivity	Criteria	Receptor Type*	Examples
	Features that are considered compatible with a location in the floodplain.	Flood risk	Land use type defined as 'Water-compatible development' in the NPPF flood risk vulnerability classification and undeveloped land (e.g., flood control infrastructure; water transmission infrastructure).

*Receptor types map onto Receptor lists as follows:
Aquatic environment –watercourses, WFD surface water bodies, watercourse morphology, conditions supporting groundwater dependant terrestrial ecosystems (GWDTEs) and designated biodiversity sites
Water use – springs, abstractions
Flood risk – humans, properties, and infrastructure.

Magnitude of change

12.8.7 The magnitude of change acting on water environment Receptors is independent on the sensitivity of the feature. This is a largely qualitative assessment, which relies on professional judgement, although it may be informed by quantitative information and analysis where data are available and where appropriate. **Table 12.12: Establishing the magnitude of change** provides examples of how various magnitudes of change will be determined with respect to water features.

Table 12.12 Establishing the magnitude of change

Magnitude	Criteria	Receptor Type	Examples
High	Results in major change to feature, of sufficient magnitude to affect its use/integrity.	Aquatic environment	Deterioration in river flow regime, morphology*, or water quality, leading to sustained, permanent, or long-term breach of relevant conservation objectives (COs) or non-temporary downgrading (deterioration) of status of WFD surface water body** (including downgrading of individual WFD elements) or dependent Receptors, or resulting in the inability of the surface water body to attain Good status in line with the measures identified in the RBMP. Loss or extensive damage to geomorphological habitat and processes due to extensive modification and/or fine sediment input. Replacement of a large extent of the natural bed and/or banks with artificial material. Extensive change to channel planform.
		Water use	Complete or severely reduced water availability and/or quality, compromising the ability of water users to abstract.
		Flood risk	Change in flood risk resulting in potential loss of life or major damage to the property or infrastructure.
Medium	Results in noticeable change to feature, of sufficient	Aquatic environment	Deterioration in river flow regime, morphology*, or water quality, leading to periodic, short-term, and reversible breaches of relevant COs, or potential temporary

Magnitude	Criteria	Receptor Type	Examples
	magnitude to affect its use/integrity in some circumstances.		downgrading of status of surface water body status (including potential temporary downgrading of individual WFD elements**) or dependent Receptors, although not affecting the ability of the surface water body to achieve future WFD objectives. Partial loss or damage to geomorphological habitat and processes due to modifications and/or fine sediment input. Replacement of the natural bed and/or banks with artificial material (total length is more than 3% of water body length).
		Water use	Moderate reduction in water availability and/or quality, which may compromise the ability of the water user to abstract on a temporary basis or for limited periods, with no longer-term impact on the purpose for which the water is used.
		Flood risk	Change in flood risk resulting in potential moderate injury or damage to the property or infrastructure.
Low	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances.	Aquatic environment	Slight change in river flow regime, morphology*, or water quality, but remaining generally within COs, and with no short-term or permanent change to status of WFD surface water body** (of overall status or element status) or dependent Receptors. Slight change or deviation from baseline watercourse geomorphology conditions, or partial loss or damage or improvement/gain to in channel habitat and geomorphological processes due to modifications and/or fine sediment input.
		Water use	Minor reduction in water availability and/or quality, but unlikely to affect the ability of a water user to abstract.
		Flood risk	Change in flood risk resulting in potential minor injury or damage to the property or infrastructure.
Very Low	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity	Aquatic environment	No or very slight change in river flow regime or surface water quality, and no consequences in terms of Cos or status of WFD surface water body** or dependent Receptors. Very slight change from surface water baseline geomorphology conditions, approximating to a 'no change' situation*.
		Water use	No, or very slight change in water availability or quality and no change in ability of the water user to exercise licenced rights or continue with small private abstraction.

Magnitude	Criteria	Receptor Type	Examples
		Flood risk	Increased frequency of flood flows, but which does not pose an increased risk to people, property or infrastructure.

*The watercourse morphology Receptor type is only relevant when 'in-channel' works are proposed.
**For the purposes of this assessment of change, relevant WFD elements for surface water body classification include:

- all biological quality elements e.g., fish, macrophytes, invertebrates;
- all physico-chemical quality elements e.g., dissolved oxygen, phosphate;
- hydromorphological supporting elements;
- Priority Hazardous Substances;
- Priority Substances;
- Specific Pollutants; and, for Artificial and Heavily Modified Water Bodies,
- the mitigation measures assessment.

12.8.8 The EIA Regulations require that a final judgement is made about whether or not each effect is likely to be significant. The significance of potential and residual effects is derived by considering both the sensitivity value of the feature and the magnitude of change. In this assessment, effects are considered to be Significant or Not Significant according to the matrix in **Table 12.13 Derivation of significance of potential effects**, with 'Major' and 'Moderate' effects taken to be 'Significant' and 'Minor' and 'Negligible' taken to be 'Not Significant'.

Table 12.13 Derivation of significance of potential effects (dark shading indicates a Significant effect)

		Value/Sensitivity of Receptor			
		High	**Medium**	**Low**	**Very Low**
Magnitude	**High**	Major (Significant)	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)
	Medium	Major (Significant)	Moderate (Probably significant)	Minor (Not significant)	Negligible
	Low	Moderate (Probably significant)	Minor (Not significant)	Negligible	Negligible
	Very Low	Minor (Not significant)	Negligible	Negligible	Negligible

12.9 Environmental assessment of Hydrology effects

EfW CHP Facility Site, Access Improvements, CHP Connection, TCC and Water Connections

Assessment of effects on aquatic environment Receptors

12.9.1 **Table 12.14: Identified potential Receptors and associated value/sensitivity – aquatic environment Receptors** summarises the aquatic environment Receptors

taken forward in this assessment. The sensitivity of each Receptor has been determined in accordance with **Table 12.11: Establishing the sensitivity of Receptors**.

Table 12.14 Identified potential Receptors and associated value/sensitivity – aquatic environment Receptors

Receptor ID	Receptor	Sensitivity	Rationale
WC1	River Nene	Medium	Large Main River. Not designated as WFD surface waterbody. Does not support international or national nature conservation sites. Supports a local nature conservation site (River Nene CWS) about 3.5km downstream of the Proposed Development. Does not support public water abstractions. Supports a licensed non-public abstraction approximately 7.3km downstream of the Proposed Development.
WC2	HWIDB adopted drains	Low	Not designated as WFD surface waterbody. Ordinary Watercourses. Extensive network of artificial drainage channels mainly in the form of field drains along arable field boundaries under the control and management of the HWIDB. The drains discharge into the River Nene (not designated as WFD surface waterbody) about 3.5km downstream of the Proposed Development which is also a local nature conservation site (River Nene CWS). Drains do not support international or national nature conservation sites. Drains support ecological features of local importance (see **Chapter 11: Biodiversity (Volume 6.2)**).
C1	River Nene CWS	Low	Site with a local nature conservation designation (CWS), where the designation is based specifically on aquatic features.
Various locations	Ponds	Very low	Not designated as WFD surface waterbodies. Ponds support ecological features of local importance.

Construction Phase

Deterioration in water quality of aquatic environment Receptors via generation of sediment laden run-off

12.9.2 Construction works associated with the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections have the potential to generate sediment-laden runoff, which could, in the absence of appropriate embedded measures, adversely affect the aquatic environment Receptors (or water resources Receptors). Activities that could potentially produce sediment-laden runoff include:

- Runoff from TCC and other working areas.
- Excavation works associated with EfW CHP Facility foundations and subsequent dewatering activities. Across the EfW CHP Facility Site, where the water table is shallow, there is likely to be some degree of excavation required below the water

table (e.g., waste bunker). Therefore, it is anticipated that short-term excavation dewatering will be required. This water could contain elevated concentrations of suspended sediment.

- In-channel works for the construction of watercourse crossings.
- Excavations associated with the Water Connections (whether HDD or open-cut depending on water pipeline route selected) and if required dewatering activities.
- The use and management of temporary soil stockpiles.

12.9.3 The assignment of significance to suspended sediment-related effects is considered precautionary, given that the IDB drains across the Study Area are likely to experience baseline variation in suspended sediment due to agricultural practices in the area.

12.9.4 The proposed embedded environmental measures to limit sediment-laden runoff are set out in **Table 12.10: Summary of the embedded environmental measures and how these influence the Hydrology assessment**. These measures include implementing good working practices and adherence to the Outline Construction Environmental Management Plan (**Outline CEMP (Volume 7.12)**); in addition to specific measures relating to minimum stand-off distance between the works and the edge of the HWIDB drains (as agreed in consultation with the HWIDB, see **Appendix 12B: Stakeholder engagement (Volume 6.4)**), development of a Drainage Management Plan (DMP), implementation of a water quality monitoring programme, and suitable management of soil stockpiles and excavated materials. The DMP will utilise SuDS principles for attenuation storage and treatment to reduce the discharge to greenfield runoff rates and prevent pollution of the HWIDB drains (as agreed in consultation with the HWIDB and CCC, see **Appendix 12B: Stakeholder engagement (Volume 6.4)**).

12.9.5 Construction of the EfW CHP Facility Site, Access Improvements, TCC and Water Connections includes the watercourse crossings below (**Figure 12.3i: Water environment (Proposed Development) (Volume 6.3)**). It is anticipated that the approval powers of HWIDB and National Highways will be enforced to ensure that the future detailed designs of these crossings and structures will limit sediment-laden runoff.

- Two permanent vehicle crossings (culvert) of the HWIDB drain bisecting the EfW CHP Facility Site and two temporary pedestrian crossings (culvert or bridge) of HWIDB drains on eastern edge of EfW CHP Facility Site. The crossings will be designed to standards agreed with the HWIDB.
- Replacement and extension of culverted HWIDB drain in New Bridge Lane as part of Access Improvements works. The replacement culvert will be designed to standards agreed with the HWIDB.
- One permanent crossing by the Water Connections of a HWIDB drain near the A47 (crossing above culverted watercourse by open trench or crossing below watercourse by HDD, depending on route. The east water main route is entirely open cut including the A47 crossing whilst the west water main route comprises both open cut to the north of the A47 and HDD beneath the A47). The crossing

will be designed to standards agreed with the HWIDB and, if required, National Highways, pursuant to the Protective Provisions for those parties in the DCO.

12.9.6 Taking account of the proposed embedded environmental measures in **Table 12.10: Summary of the embedded environmental measures and how these influence the Hydrology assessment**, the magnitude of change from the potential effects of sediment-laden runoff on aquatic environment Receptors is **Very Low** for the River Nene, River Nene CWS and abstraction from the River Nene and **Low** for the HWIDB drains; based upon the criteria set out in **Table 12.12: Establishing the magnitude of change.** The magnitude of change is higher for the HWIDB drains because of the limited dilution available and proximity to the EfW CHP Facility compared to the River Nene which has a large dilution capacity and is located approximately 3.5km downstream of the EfW CHP Facility Site.

12.9.7 Consideration of the sensitivity of all aquatic environment Receptors (Low for the HWIDB drains, abstraction from the River Nene and River Nene CWS and Medium for the River Nene) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on aquatic environment Receptors is, in this assessment, **Not Significant**.

Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance

12.9.8 Any potential increases in sediment-laden runoff could also result in increased silt deposition within the watercourse network affecting the hydromorphology of the watercourses. Those measures described above to limit sediment-laden runoff will also prevent any resultant sediment deposition and changes to watercourse hydromorphology such that the magnitude of change on the hydromorphology and flow conveyance of the watercourses is Very Low for the River Nene and Low for the HWIDB drains (**Table 12.12: Establishing the magnitude of change**). The magnitude of change is higher for the HWIDB drains for the reasons stated above relating to lower dilution capacity and close proximity to the EfW CHP Facility Site.

12.9.9 Consideration of the sensitivity of HWIDB drains (Low), and the River Nene (Medium) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on aquatic environment Receptors is, in this assessment, **Not Significant**.

Deterioration in the water quality of aquatic environment Receptors affected by mobilisation of contaminants from contaminated soil or accidental spillage of pollutants

12.9.10 The construction works have the potential to further affect water quality conditions and therefore aquatic environment Receptors (and water resources Receptors) within associated water features via:

- Accidental spillage of fuel, oil or other chemicals used during construction.
- Mobilisation/leaching of contaminants from historical soil contamination during excavation works. Site intrusive works summarised in **Chapter 13: Geology, Hydrogeology and Contaminated Land (Volume 6.2)** indicate that organic contaminants associated with on-site current activities are present in soils across the EfW CHP Facility Site.

- Contaminated water pumped from excavations. As discussed above, it is anticipated that short-term excavation dewatering will be required. However, site intrusive works summarised in **Chapter 13: Geology, Hydrogeology and Contaminated Land (Volume 6.2)** indicate that shallow groundwater quality is generally good, with concentrations of contaminants below water quality standards except for one localised area with hydrocarbons above the laboratory detection limit in the southern part of the EfW CHP Facility Site.

12.9.11 The proposed embedded measures to prevent surface water pollution are set out in **Table 12.10: Summary of the embedded environmental measures and how these influence the Hydrology assessment** and include implementation of good working practices with adherence to the **Outline CEMP (Volume 7.12)**, development and implementation of the DMP and water quality monitoring programme for the construction phase, fuel and oil storage design (including an accident response protocol) and, development and implementation of a Materials Management Plan to manage potentially contaminated excavated material.

12.9.12 The magnitude of change from all identified potential effects of mobilisation of contaminants from contaminated soil, or accidental spillage of pollutants on aquatic environment Receptors, taking account of embedded measures, is Very Low for the River Nene, River Nene CWS and abstraction from the River Nene and Low for the HWIDB drains (**Table 12.12: Establishing magnitude of change**). The magnitude of change is higher for the HWIDB drains for the reasons stated above relating to lower dilution capacity and close proximity to the EfW CHP Facility Site.

12.9.13 Consideration of the sensitivity of all aquatic environment Receptors (Low for the HWIDB drains, abstraction from the River Nene and River Nene CWS and Medium for the River Nene) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on aquatic environment Receptors is, in this assessment, **Not Significant**.

Operational Phase

Deterioration in the water quality by accidental spillage/release of pollutants (e.g., storage of combustion residues and fuel storage)

12.9.14 The operation of the EfW CHP Facility has the potential to affect water quality conditions and therefore aquatic environment Receptors (and water resources Receptors) within associated water features via the introduction of contaminants associated with for example servicing of vehicles and plant equipment and accidental spillage of contaminants from areas such as storage of combustion residues and fuel storage).

12.9.15 The proposed embedded measures to prevent surface water pollution are set out in **Table 12.10: Summary of the embedded environmental measures and how these influence the Hydrology assessment** and include the development and implementation of a Drainage Strategy for the operational EfW CHP Facility including a water quality monitoring plan, the provision of oil interceptors and trapped gullies, appropriate storage of chemicals, fuel and oil including implementation of an accident response protocol. The Drainage Strategy will utilise SuDS principles for attenuation storage and treatment to reduce the discharge to

greenfield runoff rates and prevent pollution of the water environment (details in **Appendix 12A: FRA (Volume 6.4)**).

12.9.16 Given the anticipated effectiveness of the embedded environmental measures, the magnitude of effect on the aquatic environment Receptors with respect to release of contaminants is Very Low for the River Nene, River Nene CWS and abstraction from the River Nene and Low for the HWIDB drains for the reasons described above. The magnitude of change is higher for the HWIDB drains for the reasons stated above relating to lower dilution capacity and close proximity to the EfW CHP Facility Site.

12.9.17 On this basis, the level of effect on the Low (HWIDB drains, abstraction from the River Nene and River Nene CWS) and Medium (River Nene) sensitive aquatic environment Receptors is, in this assessment, **Not Significant.**

Decommissioning phase

12.9.18 The decommissioning of the EfW CHP Facility and CHP Connection is expected to have similar potential impacts to the aquatic environment Receptors, as the construction phase discussed above.

Assessment of effects on water resource Receptors

12.9.19 **Table 12.15: Identified potential Receptors and associated value/sensitivity – water resource Receptors** summarises the water resource Receptors taken forward in this assessment. The sensitivity of the Receptor has been determined in accordance with **Table 12.11: Establishing the sensitivity of Receptors**.

Table 12.15 Identified potential Receptors and associated value/sensitivity – water resource Receptors

Receptor ID	Receptor	Sensitivity	Rationale
AB1	Abstraction from the River Nene	Low	Licensed non-public surface water abstraction from the River Nene at considerable distance downstream (8.3km) of the EfW CHP Facility Site (abstraction is hydrologically connected to the EfW CHP Facility Site by approximately 3.5km of HWIDB drains (flowing south and discharging into the River Nene) and 4.8km of the River Nene. Abstraction is by brewery for evaporative cooling (raw water quality is not critical).
AB2	Local Anglian Water resources	Medium	Local water resources required to meet the water demand of the operational EfW CHP Facility. Absence of local WFD surface water bodies Local Main Rivers (River Nene).

Construction Phase

Potential change to water quality of a water supply resource which may affect the viability of an abstraction

12.9.20 Those activities with the potential to affect the water resources Receptor (licensed non-public water supply abstraction from the River Nene) via potential changes to the water quality of watercourses (potential for increases in sediment laden runoff for example), together with the embedded measures associated with these, are presented in the aquatic environment Receptors section above. The potential for soil and groundwater contamination to affect surface water quality is also presented in the aquatic environment Receptors section above.

12.9.21 The magnitude of change from all identified potential effects on the water resource Receptor, taking account of embedded measures is Low.

12.9.22 Consideration of the sensitivity of the water resource Receptor (Low) in combination with the potential magnitude of change acting upon it, concludes that the significance of effects on the water resource Receptor from the construction of the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections is, in this assessment, **Not Significant**.

Operational Phase

Potential change to water quality of a water supply resource which may affect the viability of an abstraction

12.9.23 Those activities with the potential to affect the water resources Receptor (licensed non-public water supply abstraction from the River Nene) via potential changes to the water quality of watercourses upstream of the Receptor (potential for change in water quality via accidental spillage/release of pollutants), together with the embedded measures associated with these, are presented in the aquatic environment Receptors section above.

12.9.24 The magnitude of change from all identified potential effects on the water resource Receptor, taking account of embedded measures is Low.

12.9.25 Consideration of the sensitivity of the water resource Receptor (Low) in combination with the potential magnitude of change acting upon it, concludes that the significance of effects on the water resource Receptor from the operational phase of the EfW CHP Facility Site is, in this assessment, **Not Significant**.

Increased pressure on local Anglian Water water resources due to an increase in water demand by the operational EfW CHP Facility

12.9.26 The water demand of the operational EfW CHP Facility can potentially increase the pressure on local Anglian Water water resources. Anglian Water confirmed at a consultation meeting that a connection to the existing supply main on the southern edge of the A47, approximately 0.41km south-east of the EfW CHP Facility Site, would provide the required capacity of 80m^3/h (**Appendix 12B: Stakeholder engagement (Volume 6.4)**). However, it is noted that the water demand of the EfW CHP Facility appears high because it allows for the full 63t/h CHP steam supply with

zero condensate return as a worst-case scenario. In typical operating conditions, the water demand is significantly lower and there is limited demand for reuse of rainwater in the process (as collected by the proposed surface water drainage system and rainwater harvesting for the weighbridge gatehouse and administration building). Furthermore, the increased demand due to CHP steam supply is likely to be met by an equal reduction in water demand from the receiving CHP steam customer, i.e., the net increase in local water demand due to CHP steam supply would be zero.

12.9.27 As the water demand of the EfW CHP Facility is low in typical operating conditions, there is limited demand for reuse of rainwater in the process. Nevertheless, reuse of water and provision of rainwater harvesting system will be provided where practicable. Considering these embedded environmental measures, the magnitude of effect on the water resources Receptors with respect to the increase in water demand by the operational EfW CHP Facility is Very Low.

12.9.28 On this basis, the level of effect on the Medium (local water resources) sensitive water resources Receptors is, in this assessment, **Not Significant.**

Decommissioning phase

12.9.29 The decommissioning of the EfW CHP Facility is expected to have similar or lower potential impacts to the water resource Receptor, as the construction phase.

Assessment of effects on flood risk Receptors

12.9.30 **Table 12.16 Identified potential Receptors and associated value/sensitivity – flood risk Receptors** summarises the flood risk Receptor groups taken forward in this assessment. The sensitivity of these Receptors has been identified in accordance with the criteria outlined in **Table 12.11: Establishing the sensitivity of Receptors**. Tidal and surface water flooding were identified as the key flood risk mechanisms at the Proposed Development in **Section 12.5** and are discussed further below.

Table 12.16 Identified potential Receptors and associated value/sensitivity – flood risk Receptors

Receptor ID	Receptor	Sensitivity	Rationale
Various locations	Residential properties (for example properties on the edge of the A47 and Elm High Road).	Medium	Land use type defined as 'More vulnerable' in the NPPF flood risk vulnerability classification (buildings used for dwelling houses).
Various locations	Farm buildings (for example Waldersey Farm near pumping station to the south-west of the EfW CHP Facility).	Low	Land use type defined as 'Less vulnerable' (buildings used for professional services) in the NPPF flood risk vulnerability classification.
Various locations	Industry/business buildings (for example industry buildings off	Low	Land use type defined as 'Less vulnerable' (buildings used for professional services) in the NPPF flood risk vulnerability classification.

	Algores Way to the east of the EfW CHP Facility).		
Various locations	Pumping station south-west of Wisbech.	Very Low	Land use type defined as 'Water-compatible development' in the NPPF flood risk vulnerability classification.
Various locations	Transport infrastructure including A47 and the disused March to Bramley railway line (conservative assumption that it becomes operational in the future).	High	Land use type defined as 'Essential Infrastructure' in the NPPF flood risk vulnerability classification (essential transport infrastructure).

Construction and Operational Phases

Changes in flood risk

12.9.31 The magnitude of the potential effect on flood risk Receptors as described in **Table 12.12: Establishing the magnitude of change** is defined in terms of change to the flood risk to the Receptor arising from the Proposed Development. The three potential mechanisms which may have an effect on Receptors that are at risk of flooding are discussed below:

- Loss of tidal floodplain storage and/or change in tidal floodplain flow conveyance;
- Compartmentalisation of the tidal floodplain; and
- Change in Ordinary Watercourse flow conveyance.

Changes in tidal flood risk – Loss of floodplain storage and/or change in floodplain flow conveyance

12.9.32 The development of raised structures (such as temporary working areas and associated topsoil stockpiles during the construction phase and the EfW CHP Facility raised infrastructure during the operational phase), in the floodplain could lead to a loss of floodplain storage and/or change in floodplain flow conveyance.

12.9.33 As assessed in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**), the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are not at risk of tidal flooding during the design flood event (0.5% AEP plus climate change overtopping event). On this basis, there would be no loss of floodplain storage volume or change in floodplain conveyance as a result of the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections during the construction or operational phase.

12.9.34 This enables measures to be put in place at the operational EfW CHP Facility Site to address the residual risk of flooding during an exceedance flood event (a flood of greater magnitude than that required to be considered for assessment) and/or a breach in the flood defences. As set out in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**), a raise in the ground levels of the permanent EfW CHP Facility infrastructure (and any temporary infrastructure if required) is proposed to address this residual flood risk at the EfW CHP Facility Site, for which compensation of loss of floodplain storage is not required because the EfW CHP Facility Site is adequately protected

against the design flood event by the defences of the River Nene. This was discussed and agreed with the Environment Agency during a consultation meeting on 28 April 2021 (**Appendix 12B: Stakeholder engagement (Volume 6.4)**). It can also be drawn from this that there are no significant likely effects to the identified flood risk Receptors as a result of the EfW CHP Facility, CHP Connection, TCC, Access Improvements and Water Connections, as there is no loss of floodplain storage.

12.9.35 As there is no effect on floodplain storage and/or floodplain flow conveyance due to the EfW CHP Facility Site, CHP Connection, TCC and Access Improvements no embedded mitigation measures are proposed in **Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment.** Therefore, the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant**.

Changes in tidal flood risk - Compartmentalisation of the floodplain

12.9.36 The presence of temporary (for example soil stockpiles) and permanent infrastructure (EfW CHP Facility infrastructure) at the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and/or Water Connections within the floodplain have the potential to compartmentalise the floodplain, or in other words affect the conveyance or movement of flood waters across the floodplain, and thus affect flood extent and depths at the local scale.

12.9.37 As discussed in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**) the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections are not at risk of flooding from overtopping of the flood defences in the River Nene but are at risk of flooding during breach of the defences. However, the breach event represents a residual flood risk. The dense network of IDB drainage ditches is likely to provide the main pathways by which floodwaters during the residual risk will spread across the EfW CHP Facility Site. On this basis and as agreed with the EA on a consultation meeting on 28 April 2021 (**Appendix 12B: Stakeholder engagement (Volume 6.4)**), raised structures (temporary soil storage mounds during construction and EfW CHP Facility permanent infrastructure) are unlikely to represent significant additional impediment to the movement of floodwater in these areas.

12.9.38 As there is no effect to flood risk Receptors associated with compartmentalisation of the floodplain as a result of construction or operation of the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections, no embedded mitigation measures are proposed in **Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment**. Therefore, the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant**.

Changes in flood risk – Change in Ordinary Watercourse flow conveyance.

12.9.39 If not appropriately designed, temporary and permanent watercourse crossings have the potential to adversely affect flow conveyance within the affected watercourses and therefore to influence flood depths. Construction of the EfW CHP

Facility Site, Access Improvements, TCC and Water Connections includes the following crossings:

- Two permanent vehicle crossings (culvert) of the HWIDB drain bisecting the EfW CHP Facility Site and two temporary pedestrian crossings (culvert or bridge) of HWIDB drains on eastern edge of EfW CHP Facility Site. The crossings will be designed to standards agreed with the HWIDB and will be subject to approval from the HWIDB, prior to the commencement of the construction of the crossings, pursuant to their Protective Provisions in the DCO.
- Replacement and extension of culverted HWIDB drain in New Bridge Lane as part of Access Improvements works. The replacement culvert will be designed to standards agreed with the HWIDB and will be subject to approval from the HWIDB, prior to the commencement of the construction works, pursuant to their Protective Provisions in the DCO.
- One permanent crossing by the Water Connections of a HWIDB drain near the A47 (crossing above culverted watercourse by open trench or crossing below watercourse by HDD, depending on route. The east water main route is entirely open cut including the A47 crossing whilst the west water main route comprises both open cut to the north of the A47 and HDD beneath the A47). The crossing will be designed to standards agreed with the HWIDB and, if required, National Highways, pursuant to the Protective Provisions for those parties in the DCO.

12.9.40 It is anticipated that these approval powers will be enforced to ensure that the future detailed designs of these crossings and structures will maintain the existing flow conveyance capacities of the wider network. Direct disturbance of the HWIDB drains or deposition of sediment arising from construction activities in the drains could also reduce flow conveyance and potentially increase flood risk. However, as noted in **Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment**, a range of construction phase embedded environmental measures have been specified to control silt-laden runoff from working areas and minimise direct channel disturbance.

12.9.41 Taking account of the proposed embedded environmental measures, the potential magnitude of the effects associated with watercourse flow conveyance is therefore Very Low. Consideration of the sensitivity of the flood risk Receptor groups (Very Low to High) in combination with the potential magnitude of change acting upon the Receptors, concludes that the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant**.

Changes to surface water flood risk

12.9.42 During the construction and operational phases, ground disturbance, development of the TCC and hardstanding areas and the permanent EfW CHP Facility infrastructure have the potential to increase the overall extent of lower permeability surfaces within the Proposed Development. In the absence of effective surface water management measures, this could lead to an increase in peak runoff rates and a consequent increase in flood risk for downstream Receptors. As discussed in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**), a DMP (for the construction phase) and a Drainage Strategy (for operational phase), will be prepared utilising SuDS principles including attenuation storage and treatment. Surface water runoff will be

discharged into the HWIDB drains at the equivalent of greenfield runoff as agreed with the HWIDB (**Appendix 12B: Stakeholder engagement (Volume 6.4)**).

12.9.43 It is concluded that the EfW CHP Facility Site, CHP Connection, TCC, Access Improvements and Water Connections, with the specified embedded environmental measures in place (**Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment**), will not result in increases in the rate of surface runoff and therefore the potential magnitude of the effects associated with surface water flood risk are Very Low. Consideration of the sensitivity of the flood risk Receptor groups (Very Low to High) in combination with the potential magnitude of change acting upon the Receptors, concludes that the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant**.

Decommissioning Phase

12.9.44 Future decommissioning phase effects are considered to be similar to construction phase effects, although with a lesser duration of one year and against a future baseline which accounts for the anticipated impacts of climate change on the water environment. The assessment of tidal flood risk in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**) includes a climate change allowance up to 2115 which includes and extends beyond the decommissioning phase (2066 to 2067). The drainage assessment provided in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**) includes a climate change allowance up to 2115 which suggests that similar sized SuDS features as used during the operational phase are required to control runoff to greenfield discharge rates in the decommissioning phase.

12.9.45 Decommissioning of the EfW CHP Facility Site, with the specified embedded environmental measures in place (**Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment**), will not result in increases in the rate of surface runoff and therefore the potential magnitude of the effects are Very Low. Consideration of the sensitivity of the flood risk Receptor groups (Very Low to High) in combination with the potential magnitude of change acting upon the Receptors, concludes that the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant**.

Grid Connection

Assessment of effects on aquatic environment Receptors

12.9.46 **Table 12.17 Identified potential Receptors and associated value/sensitivity – aquatic environment Receptors** summarises the aquatic environment Receptors taken forward in this assessment. The sensitivity of each Receptor has been determined in accordance with **Table 12.11: Establishing the sensitivity of Receptors**.

Table 12.17 Identified potential Receptors and associated value/sensitivity – aquatic environment Receptors

Receptor ID	Receptor	Sensitivity	Rationale
WC1	River Nene	Medium	Large Main river. Not designated as WFD surface waterbody. Does not support international or national nature conservation sites. Supports a local nature conservation site (River Nene CWS) about 3.5km downstream of the Proposed Development. Does not support public water abstractions. Supports a licensed non-public abstraction approximately 7.3km downstream of the Proposed Development.
WC2	HWIDB adopted drains	Low	Not designated as WFD surface waterbody. Ordinary Watercourses. Extensive network of artificial drainage channels mainly in the form of field drains along arable field boundaries under the control and management of the HWIDB. The drains discharge into the River Nene (not designated as WFD surface waterbody) about 3.5km downstream of the Proposed Development which is also a local nature conservation site (River Nene CWS). Drains do not support international or national nature conservation sites. Drains support ecological features of local importance (see **Chapter 11: Biodiversity (Volume 6.2)**).
WC3	KLIDB adopted drains	Low	Not designated as WFD surface waterbody. Ordinary Watercourses. Extensive network of artificial drainage channels mainly in the form of field drains along arable field boundaries under the control and management of the KLIDB. The drains discharge into the River Great Ouse (not designated as a WFD surface waterbody) about 6km downstream of the Grid Connection. Drains do not support international or national nature conservation sites. Drains support ecological features of local importance (see **Chapter 11: Biodiversity (Volume 6.2)**).
C1	River Nene CWS	Low	Site with a local nature conservation designation (CWS), where the designation is based specifically on aquatic features.
Various locations	Ponds	Very low	Not designated as WFD surface waterbodies. Ponds support ecological features of local importance.

Construction Phase

Deterioration in water quality of aquatic environment Receptors via generation of sediment laden runoff

12.9.47 During the construction phase of the Grid Connection (underground cable and Walsoken Substation) there is a potential to generate sediment-laden runoff, which could, in the absence of appropriate mitigation measures, adversely affect the aquatic environment (or water resources Receptors). Several activities could potentially produce sediment-laden runoff including:

- Construction and removal of temporary access routes (including topsoil stripping) and other working areas;
- Runoff from installed access routes and working areas;
- Excavations associated with the underground cable and if required dewatering activities; and
- The use and management of soil stockpiles.

12.9.48 Similar to the EfW CHP Facility Site, the assignment of significance to suspended sediment-related effects is considered precautionary, given that the IDB drains across the Study Area are likely to experience baseline variation in suspended sediment due to agricultural practices in the area.

12.9.49 Construction of the Grid Connection includes the watercourse crossings below. The underground cable will be placed above the culverted drain using open cut installation method with strike plate protection (where there is reduced cover) as agreed with National Highways and Water Management Alliance IDB (**Appendix 12B: Stakeholder Consultation (Volume 6.4)**). It is anticipated that the approval powers of HWIDB and KLIDB will be enforced to ensure that the detailed method construction statement for these crossings will limit sediment-laden runoff.

- Two permanent crossings by the underground cable of HWIDB drains which are culverted beneath the A47
- Three permanent crossings by the underground cable of KLIDB drains which are culverted beneath the A47;

12.9.50 The proposed embedded measures to limit sediment-laden runoff are set out in **Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment.** These include implementation of good working practices with adherence to the **Outline CEMP (Volume 7.12)**, maintaining minimum stand-off distance between the works and the edge of IDB drains as agreed in consultation with HWIDB and KLIDB, development and implementation of the DMP for the construction phase, underground cable which meets the requirements/standards agreed with HWIDB and KLIDB, and management of soil stockpiles. The DMP will utilise SuDS principles for attenuation storage and treatment to reduce the discharge to greenfield runoff rates and prevent pollution of the water environment (details in **Appendix 12A: FRA (Volume 6.4)**)

12.9.51 Taking account of the proposed embedded measures, the magnitude of change from the potential effects of sediment-laden runoff on aquatic environment Receptors is Very Low for the River Nene, River Nene CWS and abstraction from the River Nene and Low for the IDB drains and ponds. The magnitude of change is higher for the IDB drains and ponds because of the limited dilution available and proximity to the Grid Connection compared to the River Nene which has a large dilution capacity and is located over 3.5km downstream of the Grid Connection.

12.9.52 Consideration of the sensitivity of all aquatic environment Receptors (Very Low for the ponds, Low for IDB drains, abstraction from the River Nene and River Nene CWS and Medium for the River Nene) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on aquatic environment Receptors is, in this assessment, **Not Significant**.

Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance

12.9.53 Any potential increases in sediment laden runoff could also result in increased silt deposition within the watercourse network affecting the hydromorphology of the watercourses. Those measures described above to limit sediment laden runoff will also prevent any resultant sediment deposition and changes to watercourse morphology such that the magnitude of change on the hydromorphology and flow conveyance of the watercourses is Very Low for the River Nene and Low for the HWIDB and KLIDB drains. The magnitude of change is higher for the IDB drains due to the reasons mentioned above in relation to limited dilution capacity and close proximity to the Grid Connection.

12.9.54 Consideration of the sensitivity of HWIDB drains (Low), and the River Nene (Medium) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on aquatic environment Receptors is, in this assessment, **Not Significant**.

Deterioration in water quality of aquatic environment Receptors affected by mobilisation of contaminants from contaminated soil or accidental spillage of pollutants

12.9.55 The construction of the Grid Connection has the potential to further affect water quality conditions and therefore aquatic environment Receptors (and water resources Receptors) within associated water features via accidental spillage of fuels and lubricants or by mobilisation of contaminants from contaminated soil.

12.9.56 The proposed embedded environmental measures to prevent surface water pollution are set out in **Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment**. These include implementation of good working practices with adherence to the **Outline CEMP (Volume 7.12)**, development and implementation of the DMP for the construction phase, appropriate fuel and oil storage including implementation of an accident response protocol and development and management of and development and implementation of a Materials Management Plan to manage potentially contaminated excavated material.

12.9.57 The magnitude of change from all identified potential effects on aquatic environment Receptors, taking account of embedded environmental measures is Very Low for the River Nene, River Nene CWS and abstraction from the River Nene and Low for the HWIDB and KLIDB drains and ponds. The magnitude of change is higher for the IDB drains due to the reasons mentioned above in relation to limited dilution availability and proximity to the Grid Connection.

12.9.58 Consideration of the sensitivity of all aquatic environment Receptors (Very Low for the ponds, Low for IDB drains, abstraction from the River Nene and River Nene CWS and Medium for the River Nene) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on aquatic environment Receptors is, in this assessment, **Not Significant**.

Assessment of effects on water resource Receptors

12.9.59 There are no water resource Receptors within the Study Area associated with the Grid Connection.

Assessment of effects on flood risk Receptors

12.9.60 **Table 12.18: Identified potential Receptors and associated value/sensitivity – flood risk Receptors** summarises the flood risk Receptor groups taken forward in this assessment. The sensitivity of these Receptors has been identified in accordance with the criteria outlined in **Table 12.11: Establishing the sensitivity of Receptors**. Tidal and surface water flooding were identified as the key flood risk mechanisms at the Proposed Development in **Section 12.5** and are discussed further below.

Table 12.18 Identified potential Receptors and associated value/sensitivity – flood risk Receptors

Receptor ID	Receptor	Sensitivity	Rationale
Various locations	Residential properties (for example properties on the edge of the A47 and Elm High Road).	Medium	Land use type defined as 'More vulnerable' in the NPPF flood risk vulnerability classification (buildings used for dwelling houses).
Various locations	Farm buildings (for example Waldersey Farm near pumping station to the south-west of the EfW CHP Facility).	Low	Land use type defined as 'Less vulnerable' (buildings used for professional services) in the NPPF flood risk vulnerability classification.
Various locations	Industry/business buildings (for example industry buildings off Algores Way to the east of the EfW CHP Facility).	Low	Land use type defined as 'Less vulnerable' (buildings used for professional services) in the NPPF flood risk vulnerability classification.
Various locations	Pumping station south-west of Wisbech.	Very Low	Land use type defined as 'Water-compatible development' in the NPPF flood risk vulnerability classification.
Various locations	Transport infrastructure including A47 and the disused March to Bramley railway line (conservative assumption that it becomes operational in the future).	High	Land use type defined as 'Essential Infrastructure' in the NPPF flood risk vulnerability classification (essential transport infrastructure).

Construction and Operational Phases

Changes in flood risk

12.9.61 The three potential mechanisms which may have an effect on Receptors that are at risk of flooding are:

- Loss of tidal floodplain storage and/or change in tidal floodplain flow conveyance;
- Compartmentalisation of the tidal floodplain; and
- Change in Ordinary Watercourse flow conveyance.

Changes in tidal flood risk - Loss of floodplain storage and/or change in floodplain flow conveyance.

12.9.62 The development of raised structures (such as temporary working areas and associated topsoil stockpiles during the construction phase and the Walsoken Substation raised infrastructure during the operational phase), in the floodplain could lead to a loss of floodplain storage and/or change in floodplain flow conveyance.

12.9.63 As assessed in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**), the cable route and Walsoken Substation are not at risk of tidal flooding during the design flood event (0.5% AEP plus climate change overtopping event). On the basis of the cable and substation remaining dry during the design flood event, there would be no loss of floodplain storage volume or change in floodplain conveyance due to the Grid Connection. This was discussed and agreed with the Environment Agency during a consultation meeting on 28 April 2021 (**Appendix 12B: Stakeholder engagement (Volume 6.4)**). In addition, access to the underground cable route is not anticipated to require haul roads and does not intersect or is in the proximity of surface water flow pathways (most pathways coincide with the IDB drains).

12.9.64 As there is no effect on floodplain storage and/or floodplain flow conveyance due to the Grid Connection, it is determined there is no likely significant effect to flood risk Receptors and no embedded mitigation measures are proposed in **Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment**. Therefore, the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant**.

Changes in tidal flood risk - Compartmentalisation of the floodplain.

12.9.65 Temporary (for example topsoil stockpiles) and/or permanent (Walsoken Substation infrastructure) raised structures in the floodplain could lead to a compartmentalisation of the floodplain. However, as discussed in the section above (loss of floodplain), the Grid Connection is not at risk of tidal flooding during the design flood event and therefore it will not cause compartmentalisation of the floodplain.

12.9.66 As there is no effect associated with compartmentalisation of the floodplain due to the Grid Connection, it is determined there is no likely significant effect to flood risk Receptors and no embedded mitigation measures are proposed in **Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment**. Therefore, the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant**.

Changes in flood risk - Change in Ordinary Watercourse flow conveyance.

12.9.67 The underground cable and joint bays are located within the alignment of the adopted highway along New Bridge Lane and Broadend Road and the western

verge of the A47. On this basis the route will be accessed from the roadside of New Bridge Lane and Broadend Road and the western verge of the A47.

12.9.68 Temporary watercourse crossings are not anticipated. In the event that culverts are used to enable access at temporary watercourse crossings over IDB drains, these would be appropriately sized to maintain existing flow conveyance and would be subject to Land Drainage Consents with HWIDB and/or KLIDB. Reduction of flow conveyance and potential increase in flood risk can also occur due to direct disturbance of the IDB drains or deposition of sediment arising from construction activities.

12.9.69 The underground cable route includes a small number of permanent crossings of drains (two HWIDB drains and three KLIDB drains), see **Figure 12.3i: Water environment (Proposed Development) (Volume 6.3)**) which are culverted beneath the A47. As agreed with HWIDB, KLIDB and National Highways all permanent cable crossings of the culverted drains will be placed above the culverts using open cut installation method. Strike plates will be used where a minimum 0.9m cover depth is not possible at the crossings. Details of these works will be approved pursuant to those parties' Protective Provisions in the DCO.

12.9.70 A range of embedded environmental measures have been specified to ensure any temporary and permanent watercourse crossings are appropriately sized and to control silt-laden runoff from working areas and minimise direct channel disturbance, as set out in **Section 12.9**. Provided these are enacted, the potential magnitude of the effects associated with watercourse flow conveyance is Very Low. Consideration of the sensitivity of the flood risk Receptor groups (Very Low to High) in combination with the potential magnitude of change acting upon the Receptors, concludes that the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant**.

Changes to surface water flood risk

12.9.71 Ground disturbance and creation of impermeable surfaces as part of construction works associated with the Grid Connection have the potential to increase surface water runoff rates and therefore flood risk to downstream Receptors. In addition, the permanent Walsoken Substation infrastructure has the potential to increase the overall extent of lower permeability surfaces within the Proposed Development. In the absence of effective surface water management measures, this could lead to an increase in peak runoff rates and a consequent increase in flood risk for downstream Receptors.

12.9.72 The proposed embedded measures to limit changes in runoff rates are set out in **Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment**. These include development and implementation of the DMP (for the construction phase) and a Drainage Strategy (for operational phase), and reinstatement of access routes and work areas to its pre-construction state (or similar), with the soil stockpile material used to backfill any excavations (to a level slightly above natural ground level to allow for settlement).

12.9.73 It is concluded that the construction and operation of the Grid Connection, with the specified environmental embedded measures in place will not result in increases in the rate of surface runoff and therefore the potential magnitude of the effects

associated with surface water flood risk are Very Low. Consideration of the sensitivity of the flood risk Receptor groups (Very Low to High) in combination with the potential magnitude of change acting upon the Receptors, concludes that the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant**.

Decommissioning Phase

12.9.74 Future decommissioning phase effects are considered to be similar to construction phase effects, although with a lesser duration of one year and against a future baseline which accounts for the anticipated impacts of climate change on the water environment. The assessment of tidal flood risk in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**) includes a climate change allowance up to 2115 which includes and extends beyond the decommissioning phase (2066 to 2067).

12.9.75 Decommissioning of the Grid Connection, with the specified embedded environmental measures in place (**Table 12.10 Summary of the embedded environmental measures and how these influence the Hydrology assessment**) and within a Decommissioning Plan, will not result in increases in the rate of surface runoff and therefore the potential magnitude of the effects is Very Low. Consideration of the sensitivity of the flood risk Receptor groups (Very Low to High) in combination with the potential magnitude of change acting upon the Receptors, concludes that the significance of effects on the flood risk Receptors is, in this assessment, **Not Significant.**

Cumulative effects

12.9.76 The potential for cumulative effects on Hydrology features as a result of inter- and intra-project impacts is addressed within **Chapter 18 Cumulative Effects Assessment (Volume 6.2)**.

Summary

12.9.77 A summary of the results of the assessment of the Hydrology is provided in **Table 12.19: Summary of significance of adverse effects**.

Table 12.19 Summary of significance of adverse effects

Receptor and summary of predicted effects	Sensitivity/importance/value of Receptor[1]	Magnitude of change[2]	Significance[3]	Rationale for preliminary assessment conclusion
EfW CHP Facility Site, Access Improvements, CHP Connection, TCC and Water Connections- Construction and Decommissioning phases				
Aquatic environment Receptors (River Nene, HWIDB drains and River Nene CWS) **Water resource Receptors (licensed abstraction from River Nene)** **Predicted effect: increase in sediment laden runoff**	Low (least sensitive) Medium (most sensitive)	Very Low and Low	Negligible to Minor (**Not Significant**)	Effect of limited duration and potentially within baseline fluctuation of suspended sediment concentrations due to agricultural practices in the area. Adoption of suitable embedded measures to limit sediment-laden runoff, including standard good working practices (ID1), maintaining the stand-off distances from watercourses (ID2), measures to control pollution from construction of watercourse crossings (ID3), development and implementation of a DMP utilising SuDS principles (ID4), measures to control pollution from water discharges off-site (ID5) and appropriate management of soil stockpiles (ID6) would render effects on aquatic environment Receptors and water resources Receptors as **Not Significant**.
Aquatic environment Receptors (River Nene and HWIDB drains) **Predicted effect: changes to hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance**	Low (least sensitive) Medium (most sensitive)	Very low and Low	Negligible to Minor (**Not Significant**)	The implementation of the embedded measures designed to prevent silt-laden runoff (ID1 to ID6) would ensure the effect on hydromorphology and flow conveyance of aquatic environment Receptors is **Not Significant**.
Aquatic environment Receptors (River Nene, HWIDB drains and River Nene CWS) **Water resource Receptor (licensed abstraction from River Nene)**	Low (least sensitive) Medium (most sensitive)	Very Low and Low	Negligible to Minor (**Not Significant**)	The implementation of the embedded measures designed to prevent surface water pollution would ensure the effect on aquatic environment Receptors and water resources Receptors is **Not Significant**. These include appropriate pollution prevention measures in

Receptor and summary of predicted effects	Sensitivity/importance/value of Receptor[1]	Magnitude of change[2]	Significance[3]	Rationale for preliminary assessment conclusion
Predicted effect: deterioration in the water quality due to mobilisation of contaminants from contaminated soil or accidental spillage of pollutants				line with recommended guidance, pollution incident response planning, water quality monitoring programme (ID1), implementation of the DMP for the construction phase (ID4), fuel and oil storage design (ID7), and development and implementation of a Materials Management Plan to manage potentially contaminated excavated material (ID8).
Flood risk Receptors (third party Receptors) Predicted effect: Loss of floodplain storage and/or change in floodplain flow conveyance	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	As set out in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**), compensation of loss of floodplain storage due to temporary raised structures is not required because the area is adequately protected against the design flood event by the defences of the River Nene. This was discussed and agreed with the Environment Agency (**Appendix 12B: Stakeholder engagement (Volume 6.4)**). On this basis, the effect of loss of floodplain storage and/or change in floodplain flow conveyance on the flood risk Receptors is **Not Significant**.
Flood risk Receptors (third party Receptors) Predicted effect: Compartmentalisation of the floodplain.	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	As discussed in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**), the area is not at risk of flooding from overtopping of the flood defences in the River Nene. Temporary raised structures (for example soil storage mounds) are unlikely to represent significant additional impediment to the movement of floodwater in this area. On this basis, the effect of compartmentalisation of the floodplain on the flood risk Receptors is **Not Significant.**
Flood risk Receptors (third party Receptors) Predicted effect: Change in watercourse flow conveyance	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	All temporary installed structures will be sized to maintain existing flow conveyance. Detailed design will require approval from HWIDB via Consents. It is anticipated that these approval powers will be enforced

Receptor and summary of predicted effects	Sensitivity/importance/value of Receptor[1]	Magnitude of change[2]	Significance[3]	Rationale for preliminary assessment conclusion
				to ensure that the future detailed designs of these crossings and structures will maintain the existing flow conveyance capacities of the wider network. With the specified embedded environmental measures in place (ID3), the effect of changes on watercourse flow conveyance on the flood risk Receptors is **Not Significant.**
Flood risk Receptors (third party Receptors) **Predicted effect: Changes to surface water flood risk**	Very Low (least sensitive) High (most sensitive)	Very low	Negligible to Minor (**Not Significant**)	A DMP (ID4) will be prepared for the construction phase, utilising SuDS principles including attenuation storage and treatment. Surface water runoff will be discharged into the HWIDB drains at equivalent of greenfield runoff as agreed with HWIDB (**Appendix 12B: Stakeholder engagement (Volume 6.4)**). Volumetric and quality limits on the discharge will be secured via the DCO Requirement that the Drainage Strategy has to be approved by the LPA post grant of the DCO. With the specified embedded environmental measures in place, the effect of changes to surface water flood risk on the flood risk Receptors is **Not Significant.**
EfW CHP Facility Site, Access Improvements, CHP Connection, TCC and Water Connections – Operational Phase				
Aquatic environment Receptors (River Nene, HWIDB drains and River Nene CWS) **Water resource Receptors (abstraction from River Nene)** **Predicted effect: change in water quality via accidental spillage/release of pollutants**	Low (least sensitive) Medium (most sensitive)	Very low and Low	Negligible to Minor (**Not Significant**)	The proposed embedded measures to prevent surface water pollution would ensure the effect on aquatic environment Receptors and water resources Receptors is **Not Significant**. These include implementation of appropriate fuel and oil storage design (ID7), stand-off from IDB adopted drains (ID10), a Drainage Strategy utilising SuDS for attenuation storage and treatment including pollution incident response planning and water quality monitoring programme (ID11), measures to

Receptor and summary of predicted effects	Sensitivity/importance/value of Receptor[1]	Magnitude of change[2]	Significance[3]	Rationale for preliminary assessment conclusion
				control pollution from water discharges off-site (ID12) and watercourse crossings (ID13).
Water resources Receptors (local Anglian Water resources required to meet the water demand of the operational EfW CHP Facility) **Predicted effect: Increased pressure on local water resources due to an increase in water demand**	Medium	Low	Minor (**Not Significant**)	In typical operating conditions the water demand of the EfW CHP Facility is low and there is limited demand for reuse of rainwater in the process. Reuse of water and provision of rainwater harvesting systems will be provided where practicable It is concluded that the effect on water resources Receptors is **Not Significant.**
Flood risk Receptors (third party Receptors) **Predicted effect: Loss of floodplain storage and/or change in floodplain flow conveyance**	Very low (least sensitive) High (most sensitive)	Very low	Negligible to Minor (**Not Significant**)	As set out in the **FRA** (**Appendix 12A: FRA (Volume 6.4)**), compensation for loss of floodplain storage due to the raised permanent infrastructure is not required because the area is adequately protected against the design flood event by the defences of the River Nene. This was discussed and agreed with the Environment Agency (**Appendix 12B: Stakeholder engagement (Volume 6.4)**). On this basis, the effect of loss of floodplain storage and/or change in floodplain flow conveyance on the flood risk Receptors is **Not Significant**.
Flood risk Receptors (third party Receptors) **Predicted effect: Compartmentalisation of the floodplain**	Very low (least sensitive) High (most sensitive)	Very low	Negligible to Minor (**Not Significant**)	EfW CHP Facility Site is not at risk of flooding from overtopping of the flood defences in the River Nene. The raised permanent infrastructure is unlikely to represent significant additional impediment to the movement of floodwater in this area. On this basis, the effect of compartmentalisation of the floodplain on the flood risk Receptors is **Not Significant.**

Receptor and summary of predicted effects	Sensitivity/importance/value of Receptor[1]	Magnitude of change[2]	Significance[3]	Rationale for preliminary assessment conclusion
Flood risk Receptors (third party Receptors) **Predicted effect: Change in watercourse flow conveyance**	Very low (least sensitive) High (most sensitive)	Very low	Negligible to Minor (**Not Significant**)	All permanent installed structures will be sized to maintain existing flow conveyance. Detailed design will require approval from HWIDB via Consents from those parties. It is anticipated that these approval powers will be enforced to ensure that the future detailed designs of these crossings and structures will maintain the existing flow conveyance capacities of the wider network (ID14). With the specified embedded environmental measures in place, the effect of changes on watercourse flow conveyance on the flood risk Receptors is **Not Significant.**
Flood risk Receptors (third party Receptors) **Predicted effect: Changes to surface water flood risk**	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	A Drainage Strategy (ID11) will be prepared for the operational EfW CHP Facility, utilising SuDS principles including attenuation storage. Surface water runoff will be discharged into the HWIDB drains at the equivalent of greenfield runoff as agreed with the HWIDB (ID12) (**Appendix 12B: Stakeholder engagement (Volume 6.4)**). Volumetric and quality limits on discharge will be secured via the DCO Requirement that the Drainage Strategy has to be approved by the LPA post grant of the DCO. With the specified embedded environmental measures in place, the effect of changes to surface water flood risk on the flood risk Receptors is **Not Significant.**
Grid Connection – Construction and Decommissioning phase				
Aquatic environment Receptors (River Nene, HWIDB drains, KLIDB drains and River Nene CWS, ponds)	Very Low (least sensitive) Medium (most sensitive)	Very Low and Low	Negligible to Minor (**Not Significant**)	Effect of limited duration and potentially within baseline fluctuation of suspended sediment concentrations due to agricultural practices in the area. Embedded environmental measures (ID1 (good working practices),

Receptor and summary of predicted effects	Sensitivity/importance/value of Receptor[1]	Magnitude of change[2]	Significance[3]	Rationale for preliminary assessment conclusion
Water resource Receptors (Abstraction from River Nene) **Predicted effect: increase in sediment laden runoff**				ID4 (DMP), ID17 (stand-off distance from IDB drains), ID18 (control of pollution from water discharges off-site), ID19 (management of stockpiles) and ID20 (timeframe for construction works)) would render effects on aquatic environment Receptors and water resources Receptors as **Not Significant**.
Aquatic environment Receptors (River Nene, HWIDB drains, KLIDB drains) **Predicted effect: changes on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.**	Low (least sensitive) Medium (most sensitive)	Very Low and Low	Negligible to Minor (**Not Significant**)	The implementation of the embedded measures designed to prevent silt-laden runoff would ensure the effect on hydromorphology and flow conveyance of aquatic environment Receptors is **Not Significant**.
Aquatic environment Receptors (River Nene, HWIDB drains, KLIDB drains and River Nene CWS, ponds) **Water resource Receptors (Abstraction from River Nene)** **Predicted effect: Potential change to surface water quality affected by mobilisation of contaminants from contaminated soil, or accidental spillage of pollutants (e.g. fuel or oil)**	Very Low (least sensitive) Medium (most sensitive)	Very Low and Low	Negligible to Minor (**Not Significant**)	The implementation of the embedded measures designed to prevent surface water pollution (for example implementation of good working practices with adherence to the **Outline CEMP (Volume 7.12)**) would ensure the effect on aquatic environment Receptors and water resources Receptors is **Not Significant**.
Flood risk Receptors (third party Receptors)	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	The Grid Connection is not at risk of tidal flooding during the design flood event and there would be no loss of floodplain storage volume or change in floodplain

Receptor and summary of predicted effects	Sensitivity/importance/value of Receptor[1]	Magnitude of change[2]	Significance[3]	Rationale for preliminary assessment conclusion
Predicted effect: Loss of floodplain storage and/or change in floodplain flow conveyance.				conveyance as a result of the temporary raised structures within the floodplain. This was discussed and agreed with the Environment Agency (**Appendix 12B: Stakeholder engagement (Volume 6.4)**). On this basis, the effect of loss of floodplain storage and/or change in floodplain flow conveyance on the flood risk Receptors is **Not Significant**.
Flood risk Receptors (third party Receptors) Predicted effect: Compartmentalisation of the floodplain.	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	The Grid Connection is not at risk of flooding from overtopping of the flood defences in the River Nene. Temporary raised structures (for example soil storage mounds) are unlikely to represent significant additional impediment to the movement of floodwater in this area. On this basis, the effect of compartmentalisation of the floodplain on the flood risk Receptors is **Not Significant.**
Flood risk Receptors (third party Receptors) Predicted effect: Change in watercourse flow conveyance	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	A range of construction phase embedded environmental measures have been specified to ensure any temporary watercourse crossings are appropriately sized and to control silt-laden run-off from working areas and minimise direct channel disturbance (ID3). With the specified embedded environmental measures in place, the effect of changes on watercourse flow conveyance on the flood risk Receptors is **Not Significant.**
Flood risk Receptors (third party Receptors) Predicted effect: Changes to surface water flood risk	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	A DMP (ID4) will be prepared for the construction phase, utilising SuDS principles for attenuation storage. The discharge infrastructure will require a Land Drainage Consent from the relevant IDB (ID17). Volumetric and quality limits on the discharge will be secured via the DCO Requirement that the Drainage Strategy has to be approved by the LPA post-grant of the DCO. With the

Receptor and summary of predicted effects	Sensitivity/importance/value of Receptor[1]	Magnitude of change[2]	Significance[3]	Rationale for preliminary assessment conclusion
				specified embedded environmental measures in place, the effect of changes to surface water flood risk on the flood risk Receptors is **Not Significant.**
Grid Connection – Operational Phase				
Flood risk Receptors (third party Receptors) **Predicted effect: changes to watercourse flow conveyance as a result of new or modified permanent watercourse crossings**	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	The underground cable route includes a small number of permanent crossings of IDB drains which are culverted beneath the A47. As agreed with HWIDB, KLIDB and National Highways all permanent cable crossings of the culverted drains will be placed above the culverts using open cut installation methods (ID22). Strike plates will be used where a minimum 900mm cover depth is not possible at the crossings. Therefore, the effect of changes to watercourse flow conveyance is **Not Significant.**
Flood risk Receptors (third party Receptors) **Predicted effect: changes to surface water flood risk**	Very Low (least sensitive) High (most sensitive)	Very Low	Negligible to Minor (**Not Significant**)	A range of embedded measures to limit changes in runoff rates have been proposed. These include development and implementation of a Drainage Strategy (for operational phase) (ID11), reinstatement of access routes and work areas to its pre-construction state (or similar), with the soil stockpile material used to backfill any excavations (to a level slightly above natural ground level to allow for settlement). Therefore, the effect of changes to surface water flood risk on the flood risk Receptors is **Not Significant.**

1- The sensitivity/importance/value of a Receptor is defined using the criteria set out in Section 12.8 above and is defined as very low, low, medium and high.
2- The magnitude of change on a Receptor resulting from activities relating to the development is defined using the criteria set out in Section 12.8 above and is defined as very low, low, medium and high.
3- The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a Receptor and the magnitude of change and is expressed as major (significant), moderate (probably significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in Section 12.8.

12.10 Consideration of optional additional mitigation or compensation

12.10.1 No additional mitigation measures are proposed at this stage to further reduce the Hydrology effects that are identified in this chapter of the ES. This is because all relevant and implementable measures have been embedded into the development proposals and are assessed above in this chapter. These measures are considered to be effective and deliverable and address the potentially significant effects of the Proposed Development.

12.11 Implementation of environmental measures

12.11.1 **Table 12.20: Summary of indicative environmental measures to be implemented – relating to Hydrology** describes the environmental measures embedded within the proposed development and the proposed means by which they will be implemented, i.e., they will have been secured through the **Outline CEMP (Volume 7.12)**.

Table 12.20 Summary of indicative environmental measures to be implemented – relating to Hydrology

Environmental measure	Responsibility for implementation	Proposed Compliance mechanism	ES Section reference
1 – Good working practice	EPC Contractor	DCO Requirement – **Outline CEMP (Volume 7.12)** EPC Contractor to implement good working practice to avoid and minimise potential effects on surface water features.	**Section 12.7**
2 – CEMP	EPC Contractor	DCO Requirement – **Outline CEMP (Volume 7.12)** EPC Contractor to adhere to agreed CEMP at all times during construction.	**Section 12.7**
3 – Drainage Management Plan for construction phase	EPC Contractor	DCO Requirement – **Outline CEMP (Volume 7.12)** EPC Contractor to construct temporary site drainage system in accordance with agreed Drainage Management Plan.	**Section 12.7**
4 – Drainage Strategy for operational phase	EPC Contractor	DCO Requirement The detailed design of the permanent site drainage system will be developed in accordance with the agreed Drainage Strategy.	**Section 12.7**
5 – Water discharges off-site	EPC Contractor	DCO Requirement EPC Contractor to adhere to water discharge method (discharge rates, discharge points, appropriate treatment before discharge as required) agreed with the HWIDB, CCC and NCC (depending on receiving watercourse).	**Section 12.7**

Environmental measure	Responsibility for implementation	Proposed Compliance mechanism	ES Section reference
6 – Stand-off distance from IDB drains	EPC Contractor	DCO Protective Provisions EPC Contractor to adhere to agreed minimum stand-off distance from the edge of HWIDB and KLIDB adopted drains. Any works within stand-off distances will be subject to Consent from the relevant IDB.	**Section 12.7**
7 – Watercourse crossings	EPC Contractor	DCO Protective Provisions EPC Contractor to construct the watercourse crossings in accordance with agreed detailed design and construction methods and subject to Consent from the relevant IDB	**Section 12.7**
8 – Materials Management Plan	EPC Contractor	DCO Requirement – **Outline CEMP (Volume 7.12)** EPC Contractor to manage excavated materials during construction works in accordance with agreed Material Management Plan.	**Section 12.7**
9 – Management of soil stockpiles	EPC Contractor	DCO Requirement – **Outline CEMP (Volume 7.12)** EPC Contractor to manage soil stockpiles during construction works in accordance with agreed Outline CEMP.	**Section 12.7**

12.12 Conclusion

12.12.1 The environmental assessment presented in this chapter has concluded that during the construction, operation and decommissioning phase there will be no significant effects on Hydrology Receptors as a result of the Proposed Development.

12.12.2 The current suite of environmental measures, which have been refined to reflect the Proposed Development design and consultation responses, is considered sufficient to mitigate any of the potential effects identified.