# SUNNICA ENERGY FARM

EN010106

Volume 6

Environmental Statement

## 6.1 Chapter 9: Flood Risk, Drainage and Water Resources

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

18 November 2021
Version number: 00

Planning Act 2008

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009**

# Sunnica Energy Farm

## Environmental Statement
## Chapter 9: Flood Risk, Drainage and Water Resources

| | |
|---|---|
| **Regulation Reference:** | Regulation 5(2)(a) |
| **Planning Inspectorate Scheme Reference** | EN010106 |
| **Application Document Reference** | EN010106/APP/6.1 |
| **Author** | Sunnica Energy Farm Project Team |

| Version | Date | Status of Version |
|---|---|---|
| Rev 00 | 18 November 2021 | Application Version |

# Table of contents

## Table of Figures



## Table of Tables



## Appendices

# 9 Flood Risk, Drainage and Water Resources

## 9.1 Introduction

9.1.1 This chapter identifies the potential impacts on the water environment from the construction, operation, and decommissioning of the Scheme. The water environment includes surface waterbodies (e.g. rivers, streams, ditches, canals, lakes and ponds, etc.), groundwater bodies, as well as flood risk and drainage.

9.1.2 The assessment of impacts on waterbodies considers changes in water quality, physical form and natural processes (i.e. hydromorphology), and water resources. An important consideration is also the impact on the water environment where it is critical for supporting protected aquatic species and the biodiversity and conservation value of water dependent ecological sites that may be designated at a local, national or international level.

9.1.3 This chapter cross-refers to **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]** where appropriate. **Chapter 8: Ecology and Nature Conservation** includes details of aquatic ecology surveys and assessments. This chapter is also supported by a Flood Risk Assessment, which is included in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**, and water resources data provided by the Environment Agency, presented in full in **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]**.

9.1.4 This chapter is supported by the following figures, presented in **Volume 3** of this Environmental Statement **[EN010106/APP6.3]**:

a. Figure 9-1 – Surface Waterbodies and their attributes
b. Figure 9-2 – Groundwater Features
c. Figure 9-3 – Chalk Groundwater Contours

## 9.2 Legislation and Planning Policy

9.2.1 **Appendix 14A** of this Environmental Statement **[EN010106/APP/6.2]** identifies the legislation, policy, and guidance of relevance to the assessment of significant flood risk, drainage and water resource effects of the Scheme.

## 9.3 Assessment Assumptions and Limitations

9.3.1 The quality of the water environment receptors has been defined using published data sources, with the observations of hydromorphological walkover surveys of the watercourses crossed by the Scheme. This chapter also draws on ecological surveys undertaken between 2018 and 2021. The availability of data with which to define the receptor importance of these attributes is considered robust and therefore this approach is considered acceptable.

9.3.2 The assessment is based on the Scheme design set out in **Chapter 3: Scheme Description** of this Environmental Statement **[EN010106/APP/6.1]**.

9.3.3 Groundwater levels for the Scheme area are estimated based on published sources (Ref 9-1 and Ref 9-2), these can be confirmed by ground investigation post-consent.

9.3.4 Within **Chapter 8: Ecology and Nature Conservation**, there is a summary of field surveys undertaken to date. These include: phase 1 habitat, terrestrial habitats and flora, aquatic surveys including scoping and ditch surveys noting the presence of any invasive non-native species, bats, badger, riparian mammals, wintering (non-breeding) birds, breeding birds, reptiles, amphibians, including Great Crested Newts, fish, terrestrial invertebrates, and aquatic macro-invertebrates. The importance of waterbodies has been determined taking into account any relevant ecological nature conservation designation, and also aquatic protected species that may be present.

9.3.5 Cable crossings of watercourses will be via intrusive or non-intrusive directional drilling (e.g. boring, micro-tunnelling or moling techniques that would not disturb the bed of the watercourse). **Table 9-13** provides details of which watercourses will be crossed using intrusive (i.e. open cut) or non-intrusive (i.e. directional drilling) methods. The methodology of the cable route construction and installation below watercourses is outlined in Section 9.8 and in **Chapter 3: Scheme Description** of this Environmental Statement **[EN010106/APP/6.1]** paragraphs 3.6.20 onwards and will follow good industry practice methods. The dimensions stated are indicative but represent the likely maximum parameters, with the exact dimensions of excavations for launch and receiving pits to be determined following the future site and ground investigation.

9.3.6 Watercourses may be crossed anywhere within Order limits along the cable route corridors. It is impractical to survey the entire length of all watercourses within this zone. However, the survey data that has been obtained is considered to be representative of each watercourse and sufficient for the prediction of effects. Site specific variances for final crossing locations will be surveyed as part of pre-works surveys and used to inform reinstatement (with enhancement where possible). With regards to culverts for access roads, only a slight change in location is anticipated and it is assumed that these may vary by 50 m upstream or downstream.

9.3.7 A minimum head room of 2m below the bed will be maintained for non-intrusive crossings (with approximate launch pit excavations to 2m below ground level may be required).

9.3.8 The solar PV panels will be offset from watercourses by a minimum of 10m measured from the water's edge/channel extents under normal flow conditions as typically shown on digital Ordnance Survey (OS) maps (as described in **Chapter 3: Scheme Description** of this Environmental Statement **[EN010106/APP/6.1]**). This would ensure the majority of

construction activities for these panels would take place a minimum of 10m from surface watercourses. The purpose of this buffer reduces the risk of any pollutants entering the watercourse directly, whilst also providing space for mitigation measures (e.g. fabric silt fences) should they be required.

9.3.9 Flood resistance and resilience measures will be included within the design of the Burwell National Grid Substation Extension, and for any solar stations that are located in higher flood risk zones. **Appendix 9C Flood Risk Assessment** of this Environmental Statement **[EN010106/APP.6.2]** outlines these measures in Chapter 5 'Assessment to Flood Risk'. The finished floor levels across the substation extension are proposed to be set 950mm Above Ground Level to account for potential sea level rise and breaches of defences. Solar PV panels located in areas with higher flood risk levels are proposed to be raised by 850mm. The proposed raised solar PV panels in these areas offer approximately 250mm freeboard above the Strategic Flood Risk Assessment (SFRA) +65% climate change map of fluvial flooding extent level for Flood Zone 3A.

9.3.10 The National Grid has its own design guidelines for the established Burwell Substation area, which include flood resistance and resilience measures. National Grid Burwell Substation Extension would benefit from being incorporated in to this established National Grid Framework.

9.3.11 The two operational office / warehouse blocks will be situated on Sunnica East Site A and Sunnica East Site B for management and maintenance of the Scheme. These will contain welfare facilities for the anticipated up to 17 permanent members of staff on shift during the operational phase during a single shift (i.e. relatively low volumes of foul drainage will be generated on site). There will be no discharge to the public sewer system. The foul drainage would be directed to a self-contained foul drainage system such as a septic tank or similar. These tanks would be regularly emptied under contract with a registered recycling and waste management contractor.

9.3.12 The assessment of the construction phase impacts has been based on a 24 month construction programme as outlined in **Chapter 5: EIA Methodology** of this Environmental Statement **[EN010106/APP/6.1]**. It is noted that the construction duration may extend beyond the 24 months or be phased. However, the impacts described in this chapter are considered to be a reasonable worst case because it represents a higher peak demand and discharge, and the effect would therefore be the same or lesser if the construction programme was extended or phased.

## 9.4 Assessment Methodology

### Study Area

9.4.1 For the purposes of this assessment, a general study area of approximately 1km around the Order limits has been considered in order to identify water bodies that are hydrologically connected to the Order limits and potential works associated with the Scheme that could cause direct impacts.

9.4.2 Given that watercourses flow and water quality and flood risk impacts may propagate downstream, where relevant the assessment also considers a wider study area to as far downstream as a potential impact may influence the quality or quantity of the water body (which in this case is typically for a few kilometres). Professional judgement has been applied to identify the extent to which such features are considered having due regard to the local area, watercourses and the Scheme.

**Sources of Information**

*Desktop Research*

9.4.3 The water environment baseline conditions have been determined by a desk study of available baseline and Scheme design information, and a range of online data sources including:

a. Online OS maps viewed to identify any surface waterbodies within 1km of the Scheme (Ref 9-4);
b. Online aerial photography (Ref 9-5);
c. Part 1: Anglian river basin district RBMP (Ref 9-6);
d. Environment Agency Catchment Data Explorer tool (Ref 9-7);
e. British Geological Survey (BGS) Borehole and Geology Mapping (Ref 9-8);
f. Multi-agency geographical information for the countryside website (Ref 9-9);
g. National Rivers Flow Archive (Ref 9-10);
h. The Cranfield University Soilscape website (Ref 9-11);
i. The Met Office website (Ref 9-12);
j. Environment Agency's Water Quality Archive website (Ref 9-13);
k. Environment Agency chalk aquifer reports prepared by Entec (2007 & 2008) (Ref 9-14);

9.4.4 The FRA presented within **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]** provides further details of relevant catchment and flood risk data. This also includes the Drainage Strategy as Annex F.

9.4.5 In addition, further information and data have been obtained directly from the Environment Agency (water quality, resources, pollution incidents, abstraction licences, water activity permits, and biological data) and from East Cambridgeshire District Council (ECDC) and Forest Heath District Council (FHDC) regarding Private Water Supplies (PWS).

*Surveys*

9.4.6 An initial site walkover survey was undertaken in January 2019 along the cable route from publicly accessible locations due to access restrictions at the time. A follow up walkover of the site was undertaken in October 2021.

9.4.7 On the 28th and 29th January 2021 a general and hydromorphological survey of the Order limits was undertaken to visit the location of all proposed watercourse crossings (access permitting) by the cable route. Some locations of interest were not possible to access during the walkover due to standing water being present after a period of high rainfall. Where this is the case, other sources such as Ordnance Survey mapping and aerial mapping have been used alongside the site visit to confirm the location of waterbodies and directions of flow.

9.4.8 On the 11th October 2021 a second more targeted general and hydromorphological survey was undertaken. Weather conditions during, and the days before, this survey were dry and flows along watercourses were low allowing visibility of bedforms. This survey was informed by the final cable corridor and scheme proposals (including culvert locations for site access and works proposed at the Burwell National Grid Substation) and sought to ensure all relevant areas were surveyed, subject to access constraints. Where locations were unable to be surveyed for this reason a precautionary assessment has been undertaken based on desk study and proxy observations of other nearby and similar waterbodies.

**Impact Assessment Methodology**

*Source-Pathway-Receptor Approach*

9.4.9 Based on professional judgement and experience of other similar schemes, a qualitative assessment of the likely significant effects on surface water quality and water resources has been undertaken.

9.4.10 The predominantly qualitative assessment of the likely significant effects has considered the construction, operation, and decommissioning phases, as well as cumulative effects with other developments. It is based on a source-pathway-receptor approach. For an impact on the water environment to exist the following is required:

a. An impact source (e.g. such as the release of polluting chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or the loss or damage to all or part of a water body, or the change to water volume or flow rate within a watercourse);

b. A receptor that is sensitive to that impact (i.e. waterbodies and the services they support); and

c. A pathway by which the two are linked.

9.4.11 The first stage in applying the source-pathway-receptor approach is to identify the causes or 'sources' of potential impact from a development. The sources have been identified through a review of the details of the Scheme, including the size and nature of the development, potential construction methodologies and timescales.

9.4.12 The next step in the model is to undertake a review of the potential receptors, that is, the water environment receptors themselves that have the

potential to be affected. Waterbodies, including their attributes, have been identified through desk study and site surveys.

9.4.13 The last stage of the model is, therefore, to determine if there is a viable exposure pathway or a 'mechanism' linking the source to the receptor. This has been undertaken in the context of local conditions relative to water receptors within the study area, such as topography, geology, climatic conditions and the nature of the impact (e.g. the mobility of a liquid pollutant or the proximity to works that may physically impact a water body).

**Hydromorphology**

9.4.14 Hydormorphological walkover surveys were carried out on 28th and 29th January 2021, and then also on the 11th October 2021in order to better define the baseline catchment characteristics, watercourse typology, flow regime and sediment transport regime of potentially affected watercourses. Information on the hydromorphology of the watercourses is included within the baseline and as part of the Water Framework Directive (WFD) Assessment that is presented within **Appendix 9B** of this Environmental Statement **[EN010106/APP/6.2]**.

**Flood Risk Assessment**

9.4.15 A site-specific FRA has been prepared for the Scheme. This is presented within **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**. The FRA has been prepared in accordance with the requirements of the National Planning Policy Framework 2021 (Ref 9-15) and the accompanying Planning Practice Guidance (Ref 9-16), NPS EN-1 (paragraphs 5.7.1-5.7.25) (Ref 9-44), NPS Draft EN-3 (Ref 9-43), NPS EN-5 (paragraphs 2.4.1-2.4.2) (Ref 9-17), regional and local policy, and taking into account future climate change. The proposed use of the Scheme would be classed as ‘Essential Infrastructure’. Essential infrastructure includes essential utility infrastructure. The existing site use is classified, at worst, as ‘Less Vulnerable’ (which includes buildings not required to be operational during flooding, and buildings used for shops/ financial/ professional/ or other services). It includes a full review of the flood risk to the Order limits and identifies preventative measures to mitigate flood risk from all sources, if necessary. It also demonstrates how the Sequential Test and Exception Test have been met.

**Drainage Strategy**

9.4.16 A drainage technical note, which contains the surface water drainage strategy, has been prepared as part of the DCO Application and is included as Annex F to the FRA presented in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**. The drainage strategy comprises a concept design of the system, proposing above ground conveyance and attenuation features, to mimic the natural flow regime as far as practicable whilst reducing flood risk. The assessment includes:

a. Estimation of surface water attenuation and storage techniques; and

b. Potential locations for above ground surface water attenuation and conveyance features.

9.4.17 The risk from surface water drainage to surface or groundwater bodies has been assessed according to the Simple Index Approach presented in the C753 The SuDS Manual (Ref 9-3). This is included within Annex F: Drainage Technical Note of **Appendix 9C: Flood Risk Assessment (FRA)** of this Environmental Statement **[EN010106/APP/6.2]**.

**Water Framework Directive Assessment**

9.4.18 A WFD Assessment (WFDa) has been prepared as part of the DCO Application for the Scheme and is presented in **Appendix 9B** of this Environmental Statement **[EN010106/APP/6.2]**. The Scheme interacts with seven WFD water bodies. Thus, each activity associated with the Scheme, such as the solar panels, infrastructure and cable crossings of water bodies, have been assessed against the biological, physico-chemical and hydromorphological quality elements that comprise the WFD.

9.4.19 The WFDa considers the compliance of the Scheme against the WFD objectives for those WFD water features which are within or close to the Order limits and that may be impacted. It assesses the impact of relevant aspects of the Scheme on relevant WFD quality elements of each WFD water body. This includes the evaluation of the potential construction, operational and decommissioning phase impacts of the Scheme on hydromorphological, biological and physico-chemical parameters with respect to the WFD objectives of no deterioration and failure to prevent improvement.

9.4.20 The WFDa also takes into account any impact on improvement measures that the Environment Agency has already proposed for waterbodies that are not already at Good Ecological Status / Potential or better. It also considers where there are opportunities for environmental enhancement that could support improving water body status. The WFDa assessment is based on available baseline and Scheme design information, data from open sources, and the general/hydromorphological walkover carried out in January 2021 and October 2021. The WFDa details the survey data on which the assessment has been based.

**Matters Scoped out of the Assessment**

9.4.21 The assessment of potential impact on public potable water supply from the impact assessment has been scoped out; the reasons for this are set out below.

9.4.22 All water companies are required to produce a Water Resources Management Plan (WRMP) to show how they plan to maintain a secure supply of water to all their customers over the next 25 years. Anglian Water's WRMP (Ref 9-18) aims to ensure that they can continue to meet customer demand in the future whilst having a minimum impact on the environment. Anglian Water's WRMP was published in December 2019. The Order limits is within the Newmarket Water Resource Zone.

9.4.23 The Newmarket Water Resource Zone is listed as having a medium deficit in water supply, with all water treatment works in the area being under 10 megalitres per day (Ml/day) capacity. Anglian Water is aiming to have 93% of households metered by the end of 2020, and by 2045 to reduce leakage by 42%.

9.4.24 The Scheme will contain solar PV technology and no residential usage and thus will have a negligible impact on local potable water supplies. The operational site will have approximately 17 staff onsite for work purposes only. Therefore, any assessment of potable water supply has been scoped out from the EIA.

**Determining the Significance of Effects**

9.4.25 The significance of effects will be determined using the principles of the guidance and criteria set out in the Design Manual for Roads and Bridges (DMRB) LA113 Road Drainage and the Water Environment (Ref 9-19) and LA 104 (Ref 9-20) adapted for this assessment to take account of hydromorphology. Although these assessment criteria were developed for road infrastructure projects, this method is suitable for use on any development project and it provides a robust and well tested method for predicting the significance of effects. The criteria that will be used to determine receptors' importance is presented in **Table 9-1**.

9.4.26 In accordance with the stages of the methodology, there are three stages to the assessment of effects on the water environment, which are as follows:

a. A level of importance (low to very high) is assigned to the water resource receptor based on a combination of attributes (such as the size of the watercourses, WFD designation, water supply and other uses, biodiversity, and recreation etc.) and on receptors to flood risk based on the vulnerability of the receptor to flooding;

b. The magnitude of potential and residual impact (classed as negligible, minor, moderate or major adverse / beneficial) is determined based on the criteria listed in **Table 9-2** and the assessor's professional judgment. Embedded or standard mitigation measures are taken into account in the initial assessment, but any other mitigation is not considered until the assessment of residual effects; and

c. A comparison of the importance of the resource and magnitude of the impact (for both potential and residual impacts) results in an assessment of the overall significance of the effect on the receptor using the matrix presented in **Table 9-3**. The significance of each identified effect (both potential and residual) is classed as very large, large, moderate, slight or neutral and either beneficial or adverse significance.

## Table 9-1 Criteria to Determine Receptor Importance (Adapted from LA113) (Ref 9-19)

| Importance | General criteria | Surface Water | Groundwater | Hydromorphology Note 2 | Flood Risk |
|---|---|---|---|---|---|
| Very High | The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance. | EC Designated Salmonid / Cyprinid fishery; Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 $\geq$ 1.0$m^3$/s; site protected / designated under EC or UK habitat legislation (SAC, SPA, SSSI, WPZ, Ramsar site. Critical social or economic uses (e.g. public water supply and navigation). | Source Protection Zone (SPZ) I; Principal aquifer providing a regionally important resource and/or supporting a site protected under EC and UK legislation; Groundwater locally supports GWDTE; Water abstraction: >1,000$m^3$/day | Unmodified, near to or pristine conditions, with well-developed and diverse geomorphic forms and processes characteristic of river and lake type. | Floodplain or defence protecting more than 100 residential properties from flooding; Flood Zone 3a and/or 3b; Essential Infrastructure or highly vulnerable development. |

| Importance | General criteria | Surface Water | Groundwater | Hydromorphology Note 2 | Flood Risk |
|---|---|---|---|---|---|
| High | The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance. | Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 < 1.0$m^3$/s; Major Cyprinid Fishery; Species protected under EC or UK habitat legislation. Critical social or economic uses (e.g. water supply and navigation). Important social or economic uses such as water supply, navigation or mineral extraction. | Principal Aquifer providing locally important source supporting rover ecosystem; SPZ II; Groundwater supports GWDTE; Water abstraction: 500-1,000$m^3$/day. | Conforms closely to natural, unaltered state and will often exhibit well-developed and diverse geomorphic forms and processes characteristic of river and lake type. Deviates from natural conditions due to direct and/or indirect channel, floodplain, bank modifications and/or catchment development pressures. | Floodplain or defence protecting between 1 and 100 residential properties or industrial premises from flooding; Flood Zone 2; More vulnerable development. |

| Importance | General criteria | Surface Water | Groundwater | Hydromorphology Note 2 | Flood Risk |
|---|---|---|---|---|---|
| Medium | The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value or is of regional importance. | Watercourse detailed in the Digital River Network but not having a WFD classification as shown in a RBMP. May be designated as a local wildlife site (LWS) and support a small / limited population of protected species. Limited social or economic uses. | Secondary Aquifer providing water for agricultural or industrial use with limited connection to surface water SPZ III; Water abstraction: 50-499m$^3$/day. | Shows signs of previous alteration and/or minor flow / water level regulation but still retains some natural features, or may be recovering towards conditions indicative of the higher category. | Floodplain or defence protecting 10 or fewer industrial properties from flooding; Flood Zone 2; Less vulnerable development. |
| Low | The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance. | Surface water sewer, agricultural drainage ditch; non-aquifer WFD Class 'Poor' or undesignated in its own right. Low aquatic fauna and flora biodiversity and no protected species. Minimal economic or social uses. | Generally Unproductive strata. Water abstraction: <50m$^3$/day | Substantially modified by past land use, previous engineering works or flow / water level regulation. Watercourses likely to possess an artificial cross-section (e.g. trapezoidal) and will probably be deficient in bedforms and bankside vegetation. Watercourses may also be realigned or channelised with hard bank protection, or culverted and enclosed. May be significantly impounded or abstracted for water resources use. Could be impacted by navigation, with associated high degree of | Floodplain with limited constraints and low probability of flooding of residential and industrial properties; Flood Zone 1; Water compatible development. |

| Importance | General criteria | Surface Water | Groundwater | Hydromorphology Note 2 | Flood Risk |
|---|---|---|---|---|---|
| | | | | flow regulation and bank protection, and probable strategic need for maintenance dredging. Artificial and minor drains and ditches will fall into this category. | |
| Negligible | The receptor is resistant to change and is of little environmental value | Not applicable. | Not applicable. | Not applicable. | Not applicable. |

**Note 1:** Professional judgement is applied when assigning an importance category to all water features. The WFD status of a watercourse is not an overriding factor and in many instances, it may be appropriate to upgrade a watercourse which is currently at poor or moderate status to a category of higher importance to reflect its overall value in terms of other attributes and WFD targets for the watercourse. Likewise, a watercourse may be below Good Ecological Status, this does not mean that a poorer quality discharge can be emitted. All controlled waters are protected from pollution under the Environmental Permitting (England and Wales) Regulations 2016 (Ref 9-23) and the Water Resources Act 1991 (as amended) (Ref 9-24), and future WFD targets also need to be considered.

**Note 2:** Based on the water body 'Reach Conservation Status' presently being adopted for a major infrastructure project (and developed originally by Atkins) and developed from EA conservation status guidance (Environment Agency, 1998a; 1998b (Ref 9-21 and Ref 9-22) as LA113 (Ref 9-19) does not provide any criteria for morphology.

9.4.27 The magnitude of impact will be determined based on the criteria in **Table 9-2** taking into account the likelihood of the effect occurring. The likelihood of an effect occurring is based on a scale of certain, likely or unlikely. Likelihood has been considered in the case of the assessment of potential impacts to water bodies only, as likelihood is inherently included within the flood risk assessment.

**Table 9-2 Magnitude of Impact Criteria (Adapted from LA113) (Ref 9-19)**

| Magnitude of Impact | Description | Examples |
|---|---|---|
| High Adverse | Results in a loss of attribute and/ or quality and integrity of the attribute. | Loss of a fishery; decrease in surface water ecological or chemical WFD status or groundwater qualitative or quantitative WFD status. Change in flood risk to receptor from low or medium to high. |
| Medium Adverse | Results in impact on integrity of attribute, or loss of part of attribute. | Partial loss of a fishery; measurable decrease in surface water ecological or chemical quality, or flow; reversible change in the yield or quality of an aquifer; such that existing users are affected, but not changing any WFD status. Change in flood risk to receptor from low to medium. |
| Low Adverse | Results in some measurable change in attribute's quality or vulnerability. | Measurable decrease in surface water ecological or chemical quality, or flow; decrease in yield or quality of aquifer; not affecting existing users or changing any WFD status. Change in flood risk to receptor from no risk to low risk. |
| Very Low Adverse | Results in impact on attribute, but of insufficient magnitude to affect the use or integrity. | Negligible change discharges to watercourse or changes to an aquifer which lead to no change in the attribute's integrity. |

| Magnitude of Impact | Description | Examples |
|---|---|---|
| Low Beneficial | Results in some beneficial impact on attribute or a reduced risk of negative impact occurring. | Measurable increase in surface water ecological or chemical quality; increase in yield or quality of aquifer not affecting existing users or changing any WFD status. Change in flood risk to receptor from low risk to no risk. |
| Medium Beneficial | Results in moderate improvement of attribute quality. | Measurable increase in surface water quality or in the yield or quality of aquifer benefiting existing users but not changing any WFD status. Change in flood risk to receptor from medium to low. |
| No change | No loss or alteration of characteristics, features or elements; no observable impact in either direction. | |

9.4.28 The following significance categories have been used for both potential and residual effects:

a. **Negligible**: An imperceptible effect or no effect to a water resources receptor;

b. **Beneficial**: A beneficial / positive effect on the quality of a water resource receptor; or

c. **Adverse**: A detrimental / negative effect on the quality of a water resources receptor.

9.4.29 In the context of this assessment, an effect can be temporary or permanent, with effects quantified temporally as being short-term (0-5 years), medium term (6-10 years) and long-term (>10 years).

9.4.30 At a spatial level, ‘local’ effects are those affecting the Order limits and neighbouring receptors, while effects upon receptors beyond the vicinity of the Order limits are considered to be at a ‘regional’ level. Effects which affect different parts of the country, or England as a whole, are considered being at a ‘national’ level.

9.4.31 The importance of the receptor (**Table 9-1**) and the magnitude of impact (**Table 9-2**) are determined independently from each other and are then used to determine the overall significance of effects (**Table 9-3**). Options for mitigation will be considered and secured where possible to avoid, minimise, and reduce adverse impacts, particularly where significant effects may have otherwise occurred. The residual effects of the Scheme with identified mitigation in place will then be reported. Effects of moderate or greater are considered significant in EIA terms.

**Table 9-3 Matrix for Assessment of Significance**

| Importance of Receptor | Magnitude of Impact | | | | |
|---|---|---|---|---|---|
| | **High** | **Medium** | **Low** | **Very Low** | **No change** |
| **Very High** | Major | Major | Major | Minor | Neutral |
| **High** | Major | Major | Moderate | Minor | Neutral |
| **Medium** | Major | Moderate | Minor | Negligible | Neutral |
| **Low** | Moderate | Minor | Negligible | Negligible | Neutral |
| **Very Low** | Minor | Negligible | Negligible | Neutral | Neutral |

## 9.5 Stakeholder Engagement

9.5.1 Consultation undertaken to date in relation to Flood Risk, Drainage and Water Resources is outlined in the Consultation Report [EN010106/APP/5.1]. submitted with the DCO Application.

9.5.2 **Table 9-4** outlines the matters raised within the Scoping Opinion and statutory consultation and how these have been addressed during the preparation of the ES in relation to Flood Risk, Drainage and Water Resources.

## Table 9-4 Main Matters Raised within the Scoping Opinion and statutory consultation

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| **Planning Inspectorate Scoping Opinion** | | |
| Ref 4.4.1: affects from flooding – grid connection. The inspectorate agrees that grid connections can be scoped out as a receptor. The ES should make it clear whether grid connections A, B or both are scoped out. Furthermore, the ES should clarify whether grid connection only refers to the cables or includes other ancillary structures. | The Grid Connection Routes do not include any permanent above ground ancillary structures. No assessment of operational phase flood risks from the cable routes is included. However, consideration of construction phase impacts is included. The FRA examines risk of flooding from, and to, the entire area of the Order limits. | **Appendix 9C FRA** of this Environmental Statement **[EN010106/APP/6.2]**.<br>Baseline for these are included in Section 9.6 of this chapter. |
| Ref 4.4.2: study area: the ES should clarify whether the wider study area "of up to 2km downstream of the Scheme" will be implemented for all watercourses, or only Internal Drainage Board (IDB) and Water Framework Directive (WFD) watercourses.<br>The ES should provide justification that "2km downstream of the scheme" is sufficient to assess the full extent of likely significant effects to arise from contamination events. | The assessment now considers a wider study area to as far downstream as a potential impact may influence the quality or quantity of the water body (which for the Order limits and this Scheme is typically for a few kilometres). This is based on professional judgement and taking into account the nature of the works, the likely rate of downstream propagation, dispersion and dilution effects, and the application of mitigation measures. | Section 9.4 Assessment Methodology in this chapter, paragraphs 9.4.1 and 9.4.2 discuss the potential propagation of impacts downstream |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Ref 4.4.3: Sunnica East Site – Flood Zone Table 9-1 (in the fluvial flood risk comments) states that the Sunnica East Site is located within Flood Zone 1. This appears to contradict the Environment Agency (EA) Flood Map for Planning website (ref. 94 in the Scoping Report), as land in the west of Sunnica East Site (behind the Kennet-Lee Brook label on Figure 9-1) shows land within Flood Zone 2 and Flood Zone 3. Within the ES, flood zones within the site should be described accurately, and the clarity of figures should not be hindered by labels. | Flood risk has been assessed for the Order limits and includes that for the Lee Brook and the River Lark. | Included in **Appendix 9C FRA** of this Environmental Statement **[EN010106/APP/6.2].**<br>Sunnica East Site A flood risk is assessed in paragraphs 9.8.22 to 9.8.27 of this chapter. Sunnica East Site B flood risk is assessed in paragraphs 9.8.48 to 9.8.52. |
| Ref 4.4.4: River Flow direction: The description of the flow direction of the River Kennet – Lee Brook is not consistent. Paragraph 9.4.14 and Figure 9-1 indicate the river flows northwards, but paragraph 9.4.13 states the river "flows south and west of the Sunnica East Site". The ES should describe the river flow direction using clear and consistent language. | Paragraph 9.4.14 was referring to the direction of flow in the channel and paragraph 9.4.13 the position of the channel relative to the Sunnica East Site A. The description has been rewritten in this chapter of this report. | Please refer to Section 9.6 of this chapter. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Ref 4.4.5: River Snail water quality: The aspect Chapter omits a description of the River Snail's water quality. The River is likely to be impacted by the Scheme as it is located within the north-west of the Sunnica West (North) site and Figure 9-1 shows Cable Route B (Options 1 and 2) may have to cross the River. The ES should include a baseline description of the River Snail's water quality. Any significant adverse effects to the River's water quality should be assessed and appropriate mitigation secured as necessary | Water quality information included within the Sunnica West Site B, section 'surface water quality' of this chapter, **Table 9-6** | Data on the water quality of the River Snail has been obtained from the Environment Agency. This is summarised in **Table 9-7**. |
| Ref 4.4.6: Hydromorphological impacts: The Scoping Report does not state how the assessment of potential hydromorphological impacts arising from cables crossing waterbodies or drainage will be undertaken. The ES should set out a description of the methodology used and assess impacts from underground cables on existing field drainage and groundwater flow regimes. The Applicant should make effort to agree the approach to this assessment with relevant consultation bodies. | For each of the Sites there is a baseline description of relevant hydromorphology and qualitative assessment at this stage. The methodology for the cable crossings is included within Section 9.7, paragraphs 9.7.16to 9.7.28and **Table 9-13**. | The methodology for the cable crossings is included within Section 9.7, paragraphs 9.7.16 to 9.7.28 and **Table 9-13** of this chapter. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Ref 4.4.7: Potential effects – operation: Effects on infiltration rates has not been addressed within the Scoping Report. The Scheme has the potential to impact infiltration rates due to diverting rainwater into drains and by changing the flow of rainwater reaching the soil. The ES should assess impacts associated with the alteration of infiltration rates where significant effects are likely to occur. | The assessment considers changes to the rainfall recharge distribution to the aquifer.<br>Overland runoff is considered in the drainage strategy, and presented in the Drainage Technical Note, alongside the FRA to inform the assessment. The surface water drainage will mimic the natural regime using SuDS principles. | See 'Aquifer Designations (all sites)' in this chapter, paragraphs 9.6.138 to 9.6.155. |
| Ref 4.4.8: surface water drainage strategy: Details of the location and design parameters of Sustainable Drainage Systems (SuDS) and attenuation ponds should be included within the ES and presented on a figure(s). The ES should set out how the delivery of SuDS and attenuation ponds will be secured through the DCO.<br>The Scoping Report paragraphs 2.3.4 and 2.3.5 discuss surface water drainage and states, "a new drainage system… to be constructed" and "new sections of drainage will be constructed". | A drainage strategy has been prepared, and is presented in the Drainage Technical Note, alongside the FRA with this information and to inform the impact assessment presented in this chapter. No below ground drainage has been proposed. | See **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**.<br>The Embedded Design Mitigation Section 9.7 of this chapter presents the SuDS solutions included within the design. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| The ES should clarify whether the “new drainage” is to be part of the SuDS and a figure(s) depicting the design parameters and locations of the “new drainage” should be included in the ES. The ES should also include an assessment of the likely significant effects that may arise from the construction and usage of the “new drainage” and set out how the delivery of the “new drainage” will be secured through the DCO. | | |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Ref 4.4.9: Exception Test: The Scoping Report states that the Scheme should not require an Exception Test as it is situated within Flood Zone 1.<br><br>However, as illustrated on Drawing 2-1A to 2-1D, the Proposal also lies within Flood Zones 2 and 3. Therefore, an Exception Test should be carried out and included within the ES.<br><br>The Exception Test should consider the need for the Proposed Development to remain operational during a worst-case flooding event. If the Proposed Development should remain in operation, the ES should describe how the Proposed Development would remain safe and operational during a worst-case flood event.<br><br>Consideration should also be given for the potential failure of the flood defences in the surrounding area, and the impact this would have on worst-case flood events.<br><br>Furthermore, consideration should be given to the potential for flood defences within the surrounding area to fail and how the Scheme would be resilient to the resulting likely significant effects that may arise. | The Exception Test has been considered as part of the FRA to inform the design development and is presented in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**. Inappropriate development has been moved out of fluvial floodplains where practicable.<br><br>The FRA has considered the SFRA breach model for both the Q100 year and Q100 year + climate change events. The proposed Burwell National Grid Substation Extension site lies within Flood Zone 1, and is at low risk of flooding. | **Appendix 9C FRA** of this Environmental Statement **[EN010106/APP/6.2].** |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Ref 4.4.10 Assessment of significant effects: The assessment of significant effects is to be based on a source-pathway-receptor model. As stated in paragraphs 9.6.11 and 9.6.12, an impact source could be loss, or damage to all or part of the water body. However, changes to water volume and flow rates are not included as impact sources. The ES should consider including changes to water volume and flow rates as an impact source within the source-pathway-receptor model. | Water volume and flow rates are also potential impacts to waterbodies. These are assessed within this chapter and stated as a potential impact source within paragraph 9.4.10 and 9.4.14.<br><br>The drainage strategy mimics the natural greenfield runoff rates, but will reduce existing flood risk where practicable. | 'Assessment of Likely Impacts and Effects' Sections 9.8 of this chapter, each development site and **Table 9-14** to **Table 9-20** outline the assessment of potential impacts, and their effects on the receptors. These include the potential for the impact and effect from changing volume and flow rate within the surface watercourses. |
| Ref 4.4.11 Design manual for roads and bridges (DMRB) HD45/09 – effect category: For the assessment of effects, the Scoping Report paragraph 9.6.12 states that the effect category will be in accordance with HD45/09. The ES should clarify what is meant by the "effect category" and state the section being referred to in HD45/09. | This has been superseded by DMRB LA113 (Ref 9-19). The methodology to determine receptor importance is contained within **Table 9-1**, the Magnitude of impact is defined in **Table 9-2**, with the combination of the above used to assess the significance (**Table 9-3**). | **Table 9-1**, **Table 9-2** and **Table 9-3** of this chapter |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Ref 4.4.12 Fenland SAC: It is noted that the Fenland SAC is designated in part due to calcareous, peat or clay-silt soil and is situated adjacent to the Scheme. The Scoping Report omits reference to protective measures necessary to ensure that the Fenland SAC will not be significantly affected by the Scheme.<br><br>The ES should include a description of the measures necessary to protect the Fenland SAC; and state how such measures will be secured. | A Habitats Regulation Assessment (HRA) is provided in **Appendix 8M** of this Environmental Statement **[EN010106/APP/6.2]** and considers the potential impact on the Fenland SAC.<br><br>This scoping comment has been included in this chapter due to the relevance of potential construction phase pollution risks and changes in hydrology to the conservation of this designated nature conservation site.<br><br>Relevant pollution prevention measures are included in this chapter to ensure that this site is protected from these risks. Please refer to Section 9.7 Embedded Mitigation Measures. Protective measures during the construction of the Scheme are also detailed in the Framework Construction Environmental Management Plan (CEMP) (**Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**.). | Section 9.7 'Embedded Design Mitigation' of this chapter includes standard mitigation which will be used site wide within a Framework CEMP (**Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**) in order to protect all water resource receptors and those sites dependent on them. 'Summary of Effects' sections for Sunnica West Site A and B development, paragraphs 9.8.54 to 9.8.98 and **Table 9-16** and **Table 9-17**. |
| Ref 4.4.13 Cumulative effects: The aspect Chapter omits details on how the cumulative effects will be assessed. This should be addressed in the ES with regards to the potential cumulative effect arising from the Scheme and other developments including the Worlington Quarry. | A description of the methodology used to assess cumulative effects for the Scheme is included in **Chapter 5: EIA Methodology** of this Environmental Statement **[EN010106/APP/6.1].** Cumulative effects on water receptors and flood risk are assessed within this chapter. | Section 9.11 (Cumulative Effects) of this chapter. |
| **Anglian Water Scoping Opinion** | | |
| Anglian Water would welcome further discussions prior to submission of the DCO. | There will be continued consultation with Anglian Water as the detailed design is progressed. There are no proposals to discharge to foul sewer. | Paragraph 9.7.58 of this chapter. There are no public sewer assets in the vicinity of the two compound areas. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Existing water pipes and foul sewers in the area. | Consultation will continue to take place with Anglian Water during detailed design. | Paragraph 9.7.58 of this chapter. There are Anglian Water Assets within the area, there are no public sewer assets in the vicinity of the two compound areas. |
| All sources of flooding need taking into account. | All sources of flooding have been assessed and included within the FRA | **Appendix 9C FRA** of this Environmental Statement **[EN010106/APP/6.2]** |
| Any requirement for supplies of potable or raw water should be via application to Anglian Water | Further discussions will be held with Anglian water during detailed design concerning supplies of potable or raw water for the proposed operational site office/warehouse blocks. | Raw water will be disposed of by private treatment and not via the public sewer. Potable water is dealt with in this Chapter. |
| **East Cambridgeshire District Council Scoping Opinion** | | |
| Climate change resilience to be addressed | The FRA (**Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**) and **Chapter 6: Climate Change** considers the potential impact of climate change. | **Appendix 9C FRA** of this Environmental Statement **[EN010106/APP/6.2]**, considers the potential impact of climate change. Scope of Works within FRA**.** |
| **Environment Agency Scoping Opinion** | | |
| Supports the production of an FRA, and states what the FRA needs to include | The FRA has been produced to relevant guidelines | **Appendix 9C FRA** of this Environmental Statement **[EN010106/APP/6.2]** |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| A number of licensed groundwater abstractions are located within the proposed redevelopment footprint. In addition, our records show unlicensed groundwater abstractions for agriculture and domestic uses were previously present in the area. Please note that certain water supplies do not require a licence and therefore may not be known to the Environment Agency, and our records may not be up-to-date. The locations of private domestic sources may be held by the Local District Council on the register required by the Private Water Supplies Regulations 1991. Also, the regional use of groundwater in this area makes the site highly vulnerable to pollution. | The assessment in this chapter considers the groundwater resource including abstractors. | Section 9.6 of this chapter and **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]** |
| According to Chapter 9 Flood Risk, Drainage and Surface Water, the potential impacts from construction and decommissioning activities have been considered to affect surface water quality and 'local water supplies' including private water supplies. The potential impacts on groundwater quality, licensed abstractions and source protection zones should also be considered given the environmental sensitivity of the site. | The assessment in this chapter considers the surface water and groundwater quality. | The potential effect on groundwater quality, licensed abstractions and SPZs has been considered within the assessment for each site. Please refer to Section 9.8 in this chapter. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Potential contamination should be given due consideration together with any impacts of the development on groundwater and surface water quality it may have during construction and operation. Piling or other ground improvement methods could have an adverse impact on the groundwater quality within the Chalk Aquifer beneath the site or provide preferential pathways for contaminant migration to the Aquifer during construction and after the completion of the development. | The assessment in this chapter considers construction methods and contamination. | 'Summary of Effects' sections in this chapter for each Site and **Table 9-14** to **Table 9-20**. |
| We consider any infiltration Sustainable Drainage System (SuDS) greater than 2.0m below ground level to be a deep system and are generally not acceptable. All infiltration SuDS require a minimum of 1.2m clearance between the base of infiltration SuDS and peak seasonal groundwater levels. | The SuDS systems have been designed to be no more than 600mm in depth to provide freeboard as part of the drainage strategy.<br><br>Groundwater level estimates are discussed in 'Aquifer Designations' paragraph 9.6.139 to 9.6.152 in relation to the Scheme and receptors. | The proposed drainage strategy has been designed for no more than 600mm in depth. A geotechnical investigation will be carried out during detailed design. |
| Soakaways must not be constructed in contaminated ground where they could re-mobilise any pre-existing contamination and result in pollution of groundwater. Soakaways and other infiltration SuDS need to meet the criteria in our Groundwater Protection Position Statements G1 and G9 to G13. | There is no known contaminated land within the Order limits which predominantly comprise agricultural greenfield sites. The Drainage Technical Note (appended to the FRA, **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]** proposes the use of shallow infiltration basins, and there will be no requirement for deep construction for soakaways. . No known historic landfill sites are within the Order limits. | Not applicable. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Only clean water from roofs can be directly discharged to any soakaway or watercourse. Systems for the discharge of surface water from associated hard-standing, roads and impermeable vehicle parking areas shall incorporate appropriate pollution prevention measures and a suitable number of SuDS treatment train components. | The Pollution indices in the SuDS Manual (Ref 9-25) have been reviewed within the drainage technical note and the FRA. | The Simple Index Approach has been carried out and is included within the Drainage Technical Note, appended as Annex I to the FRA, **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**, |
| **Ministry of Defence (MoD) Scoping Opinion** | | |
| The application site also occupies the birdstrike safeguarding zones, the principal concern of the MoD with regards to birdstrike safeguarding and the solar farm is during the construction and decommissioning phase of the development. Large areas of earthworks have the potential to result in a temporary attractant for hazardous birds. Bare earth and temporary ponding and puddling has the potential to attract birds hazardous to air traffic. The potential drainage scheme may also attract hazardous birds if it results in areas of standing water. Therefore, the MoD would require details of any drainage scheme once finalised. | The drainage strategy does not include any permanent bodies of natural water; it mimics the natural regime as far as is practicable.<br>The risk of increased birdstrikes has been assessed in **Chapter 8: Ecology** and Section 16.5, Major Accidents and Disasters of **Chapter 16: Other Environmental Topics** of this Environmental Statement **[EN010106/APP/6/1]**. | Not applicable. |
| **Public Health England Scoping Opinion** | | |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Additional points specific to emissions to water<br><br>When considering a baseline (of existing water quality) and in the assessment and future monitoring of impacts these:<br><br>• should include assessment of potential impacts on human health and not focus solely on ecological impacts<br><br>• should identify and consider all routes by which emissions may lead to population exposure (e.g. surface watercourses; recreational waters; sewers; geological routes etc.)<br><br>• should assess the potential off-site effects of emissions to groundwater (e.g. on aquifers used for drinking water) and surface water (used for drinking water abstraction) in terms of the potential for population exposure<br><br>• should include consideration of potential impacts on recreational users (e.g. from fishing, canoeing etc) alongside assessment of potential exposure via drinking water | The Private Water Supply Abstractions have been requested from West Suffolk Council and East Cambridgeshire Council. Water abstractions data was obtained from the Environment Agency.<br><br>The assessment considers any potential impacts on a source – pathway - receptor basis and includes the PWSs received from the local authorities. The potential for pollution waterbodies (surface and groundwater) has been included within the assessment, with pollution prevention being included within the Framework CEMP, **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**. | 'Aquifer Designations (all sites)' paragraphs 9.6.138 to 9.6.155 within this chapter and **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**. |
| **Suffolk County Council / West Suffolk Council Scoping Opinion** | | |
| Section 9 of the scoping report is satisfactory, and SCC Flood and Water management do not wish to add anything at this time. An FRA and Drainage Strategy (FRA/DS) will be submitted as part of the ES, which is fine. | FRA/Drainage Strategy to be submitted with the ES | **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2**], Annex I Drainage Technical Note. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Given the locations of Sunnica (East), we will expect the site to utilise infiltration type drainage to dispose of its surface water. But please make sure the FRA/DRAINAGE STRATEGY assesses all areas of hardstanding and all building types of the development i.e. substations and battery compound and not just the main solar farm itself. BRE 365 infiltration testing has been referenced in the scoping report and we will expect data gathered from these tests to form the basis of the FRA/DS. | The Drainage strategy has been informed by known geological mapping, which indicates the infiltration potential.<br>The drainage strategy utilises infiltration techniques to mimic natural drainage and incorporates all development areas as part of the Scheme. This considers areas of hardstanding, BESS, and onsite substation. | Drainage Technical Note, Annex I to the FRA**, Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**, confirms the use of infiltration. |
| All watercourses affected by the cable route may need land drainage consent from SCC. | The requirement for consents will be presented within the Application. The watercourses crossed by the route are tabulated in **Table 9-15** within Section 9.7. | Consents and Agreements position statement **[EN010106/APP/3.3]** |
| It is noted that the Burwell Substation Extension site is located in Flood Zones 2 and 3. Given the importance of the substation extension to the scheme it is expected that any operational risks to the substation from flooding are fully considered. | This is included within the FRA, and presented in this chapter | The baseline flood risk for the Burwell National Grid Substation Extension is presented in paragraph 9.6.135 and **Table 9-11** of this chapter. Assessment of likely impacts and effects are presented in Section 9.8. |
| **Cambridgeshire County Council (Lead Local Flood Authority) Scoping Opinion** | | |
| Full FRA required | An FRA and a Drainage Technical Note have been prepared. | **Appendix 9C FRA** of this Environmental Statement **[EN010106/APP/6.2]**. Annex I to the FRA contains the Drainage Technical Note. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Constructions or alterations within an ordinary watercourse (temporary or permanent) require consent from the Lead Local Flood Authority under the Land Drainage Act 1991. Ordinary watercourses include every river, drain, stream, ditch, dyke, sewer (other than public sewer) and passage through which water flows that do not form part of Main Rivers (Main Rivers are regulated by the Environment Agency). The applicant should refer to Cambridgeshire County Council's Culvert Policy for further guidance: https://www.cambridgeshire.gov.uk/business/planning-and-development/water-minerals-and-waste/watercourse-management/ | Section 9.7 states that as part of the embedded design mitigation boring or tunnelling techniques will be used to install power cables beneath watercourses. The cables will be beneath the bed of all watercourses and are not therefore expected to cause obstruction to any ordinary watercourse. | The methodology is presented within paragraphs 9.7.17 to 9.7.22. Details of the consents to be obtained are provided within the Consents and Agreements Positions Statement **[EN010106/APP/3.3]** |
| Please note the council does not regulate ordinary watercourses in Internal Drainage Board areas. | Comment Noted | Paragraph 9.7.8 of this chapter |
| Parts of this site fall within the Swaffham Internal Drainage Board (IDB) district which is part of the Ely Group of IDBs. Under the Land Drainage Act 1991, any person carrying out works on an ordinary watercourse in an IDB area requires Land Drainage Consent from the IDB prior to any works taking place. This is applicable to both permanent and temporary works. Note: In some IDB districts, Byelaw consent may also be required. | Comment noted. Discussions with all relevant drainage authorities will continue regarding their requirements | Paragraph 9.7.8 of this chapter, and the Consents and Agreements Positions Statement **[EN010106/APP/3.3]**. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Surface water and groundwater bodies are highly vulnerable to pollution and the impact of construction activities. It is essential that the risk of pollution (particularly during the construction phase) is considered and mitigated appropriately. It is important to remember that flow within the watercourse is likely to vary by season and it could be dry at certain times throughout the year. Dry watercourses should not be overlooked as these watercourses may flow or even flood following heavy rainfall. | This chapter presents a baseline of environmental receptors and conducts a risk assessment under construction and operation. Mitigation measures are presented in this chapter as well as the Framework CEMP, **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**. | 'Summary of Effects' sections for each Site and **Table 9-14** to **Table 9-20** of this chapter. |
| **Swaffham Internal Drainage Board Scoping Opinion** | | |
| The three proposed energy sites are not within an Internal Drainage District. However, the proposed cable route to the substation site in Burwell will pass through the Swaffham Internal Drainage District.<br>It would appear that the cable will cross several of the Board's Main Drains. Under our Byelaws, the applicant will require the prior consent of this Board before works take place.<br>Therefore, the Board has no objections to this scheme in principle, providing the relevant consents are obtained. | The requirement for consents will be presented within the DCO application. | Paragraph 9.7.8 of this chapter and the Consents and Agreements Positions Statement **[EN010106/APP/3.3].** |
| **West Suffolk Council, East Cambridgeshire District Council, Suffolk County Council and Cambridgeshire County Council s42 consultation** | | |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Environmental impact assessment should include prevention of watercourse and groundwater pollution during construction. | This chapter considers the pollution pathways and mitigation measures and concluded that there were no significant risks to groundwater or surface water resources. Pollution prevention measures are provided in **Appendix 16C Framework Construction Environmental Management Plan** of this Environmental Statement **[EN010106/APP/6.2]**. A drainage technical note is provided in **Appendix 9C** of this ES **[EN010106/APP/6.2]**. | This is considered in this chapter, the Flood Risk Assessment (in Appendix 9C of this Environmental Statement) **[EN010106/APP/6.2]** and Appendix 16C Framework Construction Environmental Management Plan **[EN010106/APP/6.2].** |
| **Natural England s42 consultation** | | |
| It is not clear in the PEI Report where the solar farm drains are likely to be located in relation to the Chippenham sites and what type of drains are being used i.e. are they likely to be tile drains? There is insufficient detail to establish whether there are any pathways that will result in hydrological change to Chippenham Fen RAMSAR, Fenland SAC and the nationally designated sites, soils and landscape. | The Applicant has provided additional information relating to the proposed drainage system for the Scheme within **Appendix 9C Flood Risk Assessment**, including Drainage Technical Note **[EN010106/APP/6.2**]. This proposes to mimic natural drainage, and uses above ground grassed channels, or swales, to pick up overland flows. There are no tile drains or underground drains as part of the Scheme.<br><br>The proposed drainage system has been designed in order to minimise impacts such as hydrological changes. The Scheme is not anticipated to cause impacts upon the Chippenham Fen RAMSAR and Fenland SAC. The groundwater flow which supports the fens will not be impeded by the Scheme. Peat deposits are located within the SAC site and do not extend across the Order limits so will not be impacted. The Battery Energy Storage System (BESS) will be within containers, and self-contained. This allows the drainage system within the containers to be managed and separated from surface water drainage. | This is considered in this chapter and the Flood Risk Assessment in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]** |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Regulation of surface water runoff is the responsibility of the Lead Local Flood Authority. However, the Environment Agency offered the following comments.<br><br>Infiltration SuDS need to meet the criteria in our Groundwater Protection Position Statements and must not be constructed in any contaminated ground. They should be no deeper than 2m and have a minimum of 1.2m clearance above peak seasonal groundwater levels.<br><br>SuDS should be designed according to best practice and have mitigation measures in place to allow for treatment of and reduction in contaminant levels in the surface water run-off. | Proposals for SuDS are described in the drainage technical note and the Flood Risk Assessment **[EN010106/APP/6.2]** in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.1].** Shallow swales were discussed as acceptable during the meeting with the LLFA on 31st March 2021, in the absence of GI information. A maximum depth of 600mm is proposed within the drainage technical note (see **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**). The Applicant has also considered the relationship between the Scheme's proposed infiltration SuDS and viable pollutant linkages with details provided in this chapter. This chapter also contains the results of a Simple Index Approach assessment as per the SuDS Manual (Ref 9-3) to determine the number of treatment train components for different proposed land uses based on the water quality risk they present. This concludes that the level of mitigation being provided is sufficient. These matters were discussed in the consultation meeting with the Environment Agency on 16th April 2021, where it was also confirmed that SuDS did not require mitigation as they were intended to provide the treatment of runoff. | This is considered in this chapter and the Flood Risk Assessment in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]** |
| **Environment Agency s42 consultation** | | |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Provided advice on the flood risk vulnerability classification of the existing land use and proposed development, together with the application of the sequential and exemption tests. The Environment Agency also required verification of flood zones in the Flood Risk Assessment and further consultation on the application of existing breach modelling presented in the SFRA (Ref 9-26). The Environment Agency agreed that no operation phase assessment of flood risk was necessary for the below ground cables but that the FRA would need to consider the temporary change in flood risk during construction works. Records of any sewers should be obtained and reviewed. | The Applicant welcomes the Environment Agency's engagement in the Scheme's development to date and has submitted updated details of the proposed SuDS in the drainage technical note and the Flood Risk Assessment **[EN010106/APP/6.2]** in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.1].** This was also discussed in the consultation meeting on 16th April 2021. Further information on how construction phase risks will be managed are provided in **Appendix 16C** Construction Environmental Management Plan **[EN010106/APP/6.2].** | This is considered in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]** and **Appendix 16C** Framework Construction Environmental Management Plan **[EN010106/APP/6.2].** |
| The assessment needs to consider the risks to Source Protection Zones, various superficial Secondary Aquifers and a bedrock Principal Aquifer (associated with chalk strata and the Cam and Ely Ouse Chalk groundwater body). The regional use of groundwater in this area makes the site highly vulnerable to pollution and construction works will need to be carefully managed and best practice mitigation measures applied. Site investigation is required to evaluate the need for any remediation works to protect the water environment. | The risks to groundwater have been assessed in this chapter. In addition, a Framework CEMP has also been prepared and is presented in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]** that includes measures to ensure the safety of water resources during the Scheme's construction phase. Finally, the required site investigations will be carried out post consent, as stated within this chapter. This was discussed and agreed with the Environment Agency in a meeting in April 2021. In preparing its proposals, the Applicant will follow relevant guidance including the requirements of the National Planning Policy Framework and the Environment Agency Guiding Principles for Land Contamination. This approach was discussed during the consultation meeting on 16 April 2021. | This is considered in this chapter and in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]** |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Confirmed that if infiltration SuDS are to be used it is unlikely that the Scheme will interact with their assets. Anglian Water also provided details of their assets and what easements etc. they would require. Anglian Water requested further consultation to discuss these issues and how any crossing of their assets would be protected during construction, as well as any sewerage connections that the Applicant wished to make. | The Applicant has further engaged with Anglian Water following the conclusion of the statutory consultation. Details of the protective provisions are included within the Draft Development Consent Order **[EN010106/APP/3.1]** and the Explanatory Memorandum to the Draft Development Consent Order **[EN010106/APP/3.2]** which accompany the DCO application. | This is considered in this chapter and the Flood Risk Assessment in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2].** |
| **Worlington Parish Council s42 consultation** | | |
| We would also like to see further clarification on the proposed use of irrigation water (for agricultural use) for cleaning purposes, as it is our understanding that this would not be licenced as it goes against its intended use. | It will be the responsibility of the contractor to ensure there is a suitable water supply for their needs. There may be an option to use water stored in an agricultural irrigation reservoir subject to confirmation that this is a legitimate use in consultation with the Environment Agency. There are no proposals to abstract water from a local watercourse but if this was proposed, any abstraction greater than 20m$^3$/day would require an Abstraction Licence from the Environment Agency. | This is considered in this chapter |
| **S47 responses** | | |
| Various responses highlighted local flood risks to new development but also the risk from development including the compaction of land and reduced infiltration. | A Flood Risk Assessment has been submitted as part of this Environmental Statement at **Appendix 9C [EN010106/APP/6.2].** | **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]** |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| Various responses highlighted the potential for adverse impacts to local watercourses, groundwater and water supplies from cable laying and proximity of the development. Comments referred to the River Kennett, River Lark, River Snail and Lee Brook. | Precautionary working methods will be implemented to minimise potential adverse effects on species prior to and during construction. This will be outlined in the Construction Environmental Management Plan. The Framework CEMP is presented in **Appendix 16C** of this Environmental Statement **[EN/010106/APP/6.2].**<br><br>The installation of cables beneath watercourses is proposed for all of the principle watercourses present on the site. This method avoids the risk of adverse impacts to the channel and water quality as much as reasonably possible, The crossing of watercourses will be undertaken using boring, micro-tunnelling or moling methods, with appropriate setbacks from the top of the banks (depending on habitats and other individual ecological constraints).<br><br>The Scheme is not anticipated to have any significant impact on the water quality of watercourses during construction as development (e.g. solar panels) will be set back by at least 10m from watercourses (measured from the water's edge/channel under normal flow conditions) and by the implementation of standard mitigation measures. In the longer term pollution risk during operation is low, with little risk of any leakage. with runoff to be managed in accordance with SuDS principles and the implementation of a Framework Operational Environmental Management Plan (**Appendix 16F** of this Environmental Statement) **[EN/010106/APP/6.2]**. It should be noted that as fields will no longer be planted with crops there will be a reduction on the use of agro-chemicals. The Scheme is also committed to implemented enhancement of watercourses through a WFD Mitigation and Enhancement Plan. | The embedded mitigation measures, and details of which watercourses would be crossed by intrusive and non-intrusive techniques is included in this chapter the Framework CEMP is presented in **Appendix 16C** of this Environmental Statement **[EN/010106/APP/6.2]** and Framework Operational Environmental Management Plan (**Appendix 16F** of this Environmental Statement) **[EN/010106/APP/6.2].** |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| The potential risk of adverse impacts on the hydrology and water quality of the Fenland SAC/Chippenham Fen were identified. | The fens are supported by groundwater flow which will not be impacted by the Scheme as all solar PV supporting struts in the upgradient groundwater flow direction are anticipated to be above the Chalk aquifer water table.<br><br>The potential BESS foundation option with piling to a depth of 12m at Sunnica West Site A (in the upgradient groundwater flow direction) is likely to encounter groundwater, however the extent of the foundation area is not significant compared to the extent of the aquifer, so no significant impediment to groundwater flow is anticipated.<br><br>The fens are also not supported by surface water overland flow, as there is little/no overland flow in a chalk landscape and the surface water drainage from the site nearest to the SAC drains away from it.<br><br>Standard environmental protection measures will be implemented and adopted during construction, formalised through a Framework CEMP. The Framework CEMP is included in **Appendix 16C** of this Environmental Statement **[EN/010106/APP/6.2].** These measures will include dust suppression and pollution prevention. Consequently, indirect effects to designated sites during construction will not occur and there will be no effect to the integrity of any statutory designated sites. | Potential impact on hydrological features of Fenland SAC have been assessed and are presented in this chapter and **Chapter 8 [EN010106/APP/6.1]** and the Flood Risk Assessment (in **Appendix 9C** of this Environmental Statement) **[EN010106/APP/6.2]**. |

| Main matter raised | How has the concern been addressed | Location of response in chapter |
|---|---|---|
| There is no discussion of potential interactions between dust suppressant measures and water supply. | Where hydrological connections are identified, standard environmental protection measures will be implemented and adopted during construction, formalised through a Framework CEMP. These measures will include dust suppression and pollution prevention measures. The water supply to be used for dust suppression is yet to be determined by the contractor. The contractor will ensure the use of a suitable water supply, which may be from an agricultural irrigation reservoir or other potable supply, but will not be abstracted from local watercourses. | The Framework CEMP is presented in **Appendix 16C** of this Environmental Statement **[EN/010106/APP/6.2].** |

## 9.6 Baseline Conditions

9.6.1 This section provides a description of the current Scheme baseline and identifies the sensitive receptors and their individual importance (value). The Scheme is located within the Cam and Ely Ouse Management catchment of the Anglian RBMP (Ref 9-6). Sunnica East Site A, Sunnica East Site B and Sunnica West Site A are within the Lark Operational catchment, with Sunnica West Site B and the cable route passing westwards into the Cam and Ely Ouse operational catchment.

9.6.2 Please note that for groundwater, the geology underlying each Site is described in turn, and then due to the catchment and regional scale of the aquifers, the aquifer characteristics and groundwater flow is discussed following each site's description applicable to the Scheme as a whole in the section entitled 'Aquifer Designations (all sites)', in paragraph 9.6.138 onwards.

**Existing Baseline**

*Sunnica East Site A*

***Topography, Soils, Land Use and Climate***

9.6.3 The eastern portion of the site is approximately 5 – 10m Above Ordnance Datum (AOD), with the western portion being approximately 5 – 15m AOD. Land use across the site is predominantly arable farming.

9.6.4 According to the Met Office (Ref 9-12) weather station at Mepal (which is around 12km to the northwest) for the period 1981 to 2010, the site is likely to receive around 575mm of rainfall each year, and it is raining on around

110 days per year. In the context of the UK this typical annual rainfall is very low, with the west of the UK experiencing over 800mm typically.

9.6.5 Information from a site at Moulton was received from the Environment Agency, this is located approximately 7km southeast of the Sunnica East Site A, and rainfall in the years 2013 – 2018 was in the range 513mm to 770mm, with an average of 604mm.

9.6.6 From the Cranfield University Soilscape website (Ref 9-11) the soils in the area of the site comprises both freely draining slight acid but base-rich soils, and freely draining lime rich loamy soils.

***Surface Waterbodies***

9.6.7 Sunnica East Site A is within the Lee Brook catchment which drains into the River Lark and into the River Great Ouse downstream of Ely. The Lee Brook flows through Sunnica East Site A. The Lee Brook catchment is within the Environment Agency Lark catchment reporting unit.

9.6.8 Sunnica East Site A is located within the 'River Kennett – Lee Brook' water body (downstream of Freckenham – water body GB105033043020) (Ref 9-7) (the whole of Sunnica East Site A). The River Kennett is also designated as a Main River and is flowing northwards through to Sunnica East Site A to the River Lark. The confluence is located approximately 200m north of the northern extent of Sunnica East Site A.

9.6.9 The River Lark is also designated under the WFD as water body GB105033043052 of the Anglian RBMP. It is also heavily modified (i.e. a water body which as a result of physical alterations by human activity is substantially changed in character). The River Lark is located adjacent to Sunnica East Site A.

9.6.10 At NGR TL 66585 73989 and NGR TL 66582 73838 there are two artificial water storage lagoons that appear to be connected to Lee Farm.

***Surface Water Quality and Flow***

9.6.11 The River Kennett – Lee Brook (GB105033043020, downstream Freckenham) (Ref 9-7) is currently at Poor Ecological Potential with a target of Good Ecological Potential by 2027. Macrophytes and phytobenthos (combined), fish and hydrological regime are all failing to be at Good status. Causes are thought to include physical modification for land drainage and barriers for fish, the presence of Invasive Non-Native Species (INNS) (North American signal crayfish Pacifastacus leniusculus), and groundwater and surface water abstraction (agriculture and water industry). The chemical status is failing due to Polybrominated diphenyl ethers (PBDE) and Perfluorooctane sulphonate (PFOS).

9.6.12 Data from the Environment Agency (Ref 9-13) show there is water quality monitoring information on the River Lark (at Judes Ferry 1km downstream

from Worlington, 28 Determinands, monitored between January 2013 – March 2020). Monitoring has also been undertaken at Beck Bridge, where Beck Road crosses the Kennett-Lee Brook (12 Determinands, monitored January 2012 – May 2021).

9.6.13 The National River Flow Archive website (Ref 9-10) shows that there is a flow gauging station on the Lee Brook at Beck Bridge (Station Ref 33023) approximately 1.3km northwards (and downstream) of Freckenham. The location of the gauging station is where Beck Road crosses the Lee Brook within the southern area of Sunnica East Site A. The catchment area for this gauging station is 1.2km$^2$ at the location, with the elevation being just 3.9m AOD. The catchment itself is low in altitude in the northern section, increasing in elevation to approximately 122m AOD in the southern reaches. This is a rural chalk catchment, containing mixed agricultural land uses. The rainfall in the area is 579mm per year (standard average annual rainfall (SAAR) 1961-1990). The Q95 flow (i.e. that which is exceeded 95% of the time) is 0.017m$^3$/s (period of measurement 1962-2018).

***Surface Water Abstractions***

9.6.14 Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included in Figure 9-1 and detailed in full in **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]**. Within 1km of the boundary of Sunnica East Site A there are abstractions from the Kennett - Lee Brook and also on the River Lark north of the site. These abstractions are all for spray irrigation direct, or for spray irrigation storage, with the exception of one abstraction license on the Kennett - Lee Brook to the east of Sunnica East Site A, which is for 'transfer between sources' (License Number 6/33/38/*S/0057 Thornalley & Sons).

***Consented Discharges***

9.6.15 Details of consented discharges were obtained from the Environment Agency, the point locations of which are included on Figure 9-1. There are no recorded discharge consents within 1km of the boundary of Sunnica East Site A.

***Groundwater***

9.6.16 The Sunnica East Site A consists of land east and west of the Lee Brook. Adjacent to Lee Brook the site is underlain by River Terrace Deposits, comprising sand and gravel; alluvium, comprising sand, clay, silt and gravel; as well as peat, underlain by Zig Zag Chalk (Ref 9-8). The river terrace deposits in this area are in the order of 3m thick.

9.6.17 West of the Lee Brook Sunnica East Site A is directly underlain by Zig Zag Chalk. East of the Lee Brook the Sunnica East Site A is underlain by Head deposits, comprising clay, silt, sand and gravel, underlain by Zig Zag Chalk. At the northern extent, the Sunnica East Site A is underlain by the

Totternhoe Stone and West Melbury Marly Chalk with small areas of chalk overlain by peat or Head deposits.

***Hydromorphology***

9.6.18 The Kennet – Lee Brook is characterised by a heavily modified, lowland watercourse with an over straight planform. The watercourse has a low gradient and flows through a thin band of superficial alluvial deposits within an unconfined valley. Superficial deposits close to the confluence with the River Lark are shown as Peat. Bedrock through this reach is chalk. The earliest available historic mapping dates back to 1885 where the Kennet-Lee Brook is already shown to be in its current alignment. Given the surrounding land use it is considered likely that realignment occurred before that date to make room for agriculture. This watercourse is over straight and uniform suggesting little in the way of morphological or flow variation.

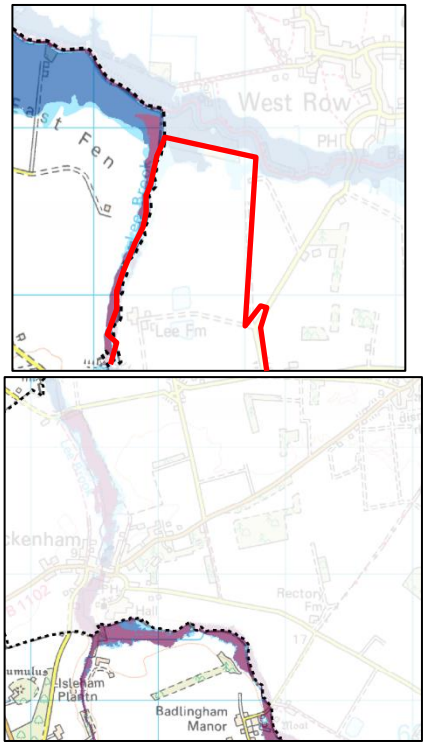
9.6.19 The River Lark through this reach is characterised by a heavily modified, lowland watercourse with a passively meandering planform. The watercourse has a low gradient and flows through a thin band of peat (superficial geological deposits) within an unconfined valley, overlying bedrock geology of chalk. Historic mapping indicates that the watercourse has followed the same planform since 1885, and suggests modification predates this mapping.

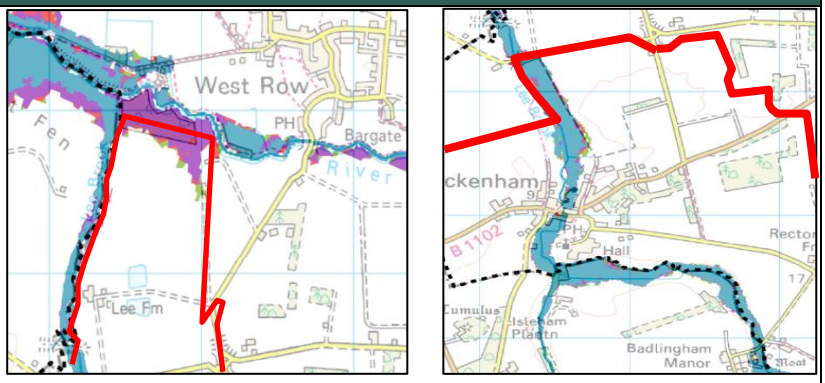
***Flood Risk***

9.6.20 The flood risk for Sunnica East Sites A is summarised in **Table 9-5**, details of which have been taken from the FRA presented in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**.

**Table 9-5 Flood Risk for Sunnica East Site A**

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| Fluvial | Low (Majority)<br>Medium – high (North West side) | Source: Environment Agency *Flood Zone Dataset (Ref 9-41)*<br>The majority of the site lies in Flood Zone 1, however, Flood Zones 2 and 3a are shown to encroach into the site's north west corner; from the Lee Brook (Main River) west of the site in a north/south direction, and north from the River Lark (Main River).<br>Source: Forest Heath District Council (FHDC)& St Edmonsbury (SE) Strategic Flood Risk Assessment (SFRA 2009) (Ref 9-26)<br>SFRA mapping corroborates the Environment Agency mapping above. Flood Zones 2 and 3 are shown to be within a defined Flood Warning Area, with properties within the catchment of the River Lark shown to be benefiting from flood defences.<br>Source: FHDC SFRA 2011 (Ref 9-27)<br>No further information provided for the area. |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| | | Source: East Cambridgeshire District Council (ECDC) SFRA 2017 (Ref 9-28)<br><br>SFRA mapping corroborates the Environment Agency mapping above. However, the SFRA also identifies Flood Zone 3b is present along the Lee Brook. The areas of Flood Zones 2 and 3 encroaching into the site's northern boundary from the River Lark retain that designation. The SFRA climate change mapping shows a slight modification in the location of Flood Zone 3a encroachment; however, this is a negligible increase in extent of this zone. Flood defences are also shown running down the Lee Brook from the River Lark, designed to the 1 in 10 year event<br><br>Summary:<br><br>The majority of the site lies in Flood Zone 1, however, an area of Flood Zone 3b is identified along the Lee Brook running through the west of the site in a north/south direction and bordering its north west boundary. The Flood Zone 2 and 3a areas continue along the northern boundary of the site's north east corner originating from the River Lark. Development should not normally be permitted within the Flood Zone 3b area, unless it is water compatible or essential infrastructure as set out in Table 3 of the National Planning Policy Framework Planning Practice Guidance (NPPF PPG) (Ref 9-16). Refer to figures below for relevant map extracts.<br><br>  <br>*ECDC 2017* (Ref 9-28) Flood Zone mapping – Flood Zone 3b (Purple), Flood Zone 3 (Dark Blue), Flood Zone 2 (Light Blue) |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| | |  <br>ECDC 2017 (Ref 9-28) Climate Change mapping – 1 in 100 year (Blue), 1 in 100 year +CC |
| Tidal | Low | Not in a Tidal area |
| Pluvial (Surface Water) | Very Low | Source: GOV.uk Flood Risk from Surface Water; FHDC SFRA 2011 (Ref 9-27); ECDC SFRA 2017 (Ref 9-28)<br>All reference sources indicate that patches of the site are susceptible to surface water flooding; however, flooding is generally very localised and generally shallow (low risk). Some larger patches are located within the north eastern portion of the site which are at a high risk. Several field ditches displayed within the site are also shown to be susceptible to surface water flooding. However, the majority of the site is at very low risk of surface water flooding. |
| Groundwater | Low (East side) -<br>Medium (North West side) | Source: FHDC&SE SFRA 2009 (Ref 9-26)<br>No mapping is available at the time of writing this report. However, Figure 5-3 of the SFRA displays no record of groundwater flooding on the site, and the Environment Agency response; Ref EAn/2019/136538, dated 30 August 2019, also states they have no records of groundwater flooding.<br>Source: FHDC SFRA 2011 and ECDC SFRA 2017 (Ref 9-27 and Ref 9-28)<br>Figure 8-2 and Appendix E of the SFRA displays groundwater risk mapping showing the eastern half of the site to be within 1km by 1km grid squares of 0% to <25% risk of groundwater emergence. The western portion of the site graduates from 0% in the south to >=50% <75% in the north in proximity to the River Lark. |
| Sewers | Low | Source: FHDC&SE SFRA 2009 and FHDC SFRA 2011(Ref 9-26 and Ref 9-27) / DigDat online service (Ref 9-40) |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| | | There are no confirmed sewers in the vicinity of the proposed site compound areas of the Scheme (confirmed via the DigDat online service, May 2021) (Ref 9-40). The Forest Heath Water Cycle Study has no records of flooding within the site, however, historic external flooding is noted within West Row to the north. Due to the greenfield nature of the site, it is expected that there will be little to no sewerage infrastructure beneath the fields; therefore, the risk is considered low |
| Artificial Sources | Very Low (residual) | The site is not within or near any registered reservoirs (assumed with volumes >10,000m$^3$) or other artificial sources. The site is at very low risk of flooding from artificial sources. |

*Sunnica East Site B*

***Topography, Soils, Land Use and Climate***

9.6.21 The topography of the site varies from approximately 40m AOD down to 10m AOD in the east section, southeast of Worlington, to 10-15m AOD in the remainder of the site.

9.6.22 Land use across the site is predominantly arable farming. Rainfall data for the area is presented in paragraph 9.6.4 – 9.6.5. From the Cranfield University Soilscape website (Ref 9-11) the soils in the area of the site comprises both freely draining lime rich loamy soils, freely draining slightly acid sandy soils, freely draining slight acid but base rich soils, and freely draining sandy Breckland soils.

***Surface Waterbodies***

9.6.23 Sunnica East Site B is mainly located within 'Lark downstream Mill Street Bridge' water body (GB105033043052) (Ref 9-7), with a small section of the southern area within the Kennet-Lee Brook water body (GB105033043020, downstream of Freckenham). The closest parts of the Site to the River Lark are the northern areas of Sunnica East Site B. The River Lark is located some 750m north from the site boundary (see Figure 9-1).

9.6.24 The southern portion of Sunnica East Site B is located with the 'Kennett – Lee Brook' water body (upstream of Freckenham – water body GB105033042990) (area to northwest of Red Lodge).

9.6.25 The closest part of the Site to the Lee Brook are the southern sections of the Site. The Lee Brook is approximately 180m south from the southern boundary of Sunnica East Site B.

9.6.26 Within Order limits and surrounded by land parcels E19, E21 and E22 (see Figure 3-1) there is a water storage reservoir at NGR TL 68557 70790 (see also Figure 9-1).

9.6.27 Within the Order limits, and north of land parcel E12 at NGR TL 69070, 73030, is an area set aside for ecological enhancement, land parcel ECO3 (see Figure 3-1). This contains several existing offline ponds in marshy ground. These are referred to as WB2 in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]** (see Figure 9-1).

9.6.28 Outside of the Order limits at NGR TL 69533 71740 there are a couple of small lagoons on the site of the Worlington Quarry (Hanson). It is suspected that these are used for managing runoff containing high concentrations of fine sediment (based on observations of discolouration of the water on online aerial imagery). These waterbodies appear to be isolated from the Scheme with no obvious flow pathways and thus will not be considered any further in this assessment.

9.6.29 Outside of the Order limits but immediately downstream of land parcel E25 with a connecting drainage ditch is an agricultural pond (NGR TL 69394 72559) (see Figure 3-1 and Figure 9-1).

9.6.30 Outside of the Order limits, south of Worlington, and 100m north of the Order limits at TL69170 73496 is a feature labelled as 'Moat'. This is referred to as WB1 in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]** (see also Figure 9-1). The eDNA surveys in the area showed a positive result for Great Crested Newts. The closest plot for construction would be E12 and is approximately 470m south of the 'Moat' site (see Figure 3-1 and Figure 9-1).

9.6.31 Outside the Order limits, to the north of Golf Links Road, approximately 250m from the Order limits for land parcel E30 (at approximately NGR TL 70380 73400), is a lagoon for water storage (see Figure 3-1 and Figure 9-1).

9.6.32 Outside of the Order limits, an offline pond south of the River Kennet is located at NGR TL 68060, 70600. This is referred to as WB10 in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]**. This is located approximately 380m southwest of land parcel E19 (see Figure 3-1 and Figure 9-1).

9.6.33 Outside of the Order limits at NGR TL 67880 70780 there is an online lake/moat feature close to Badlingham Manor. This is located approximately 500m west of land parcel E19 and downstream on the River Kennett (see Figure 3-1 and Figure 9-1).

9.6.34 Finally, outside of the Order limits but immediately downstream of land parcel E26 at NGR TL 69778 73144 there is a large pond that is believed to be associated with the Royal Worlington and Newmarket Golf (see Figure 3-1 and Figure 9-1).

9.6.35 Other waterbodies are present within the 1km study area, but due to distances to site being over 500m and their lack of hydrological connectivity, they are not considered any further.

***Surface Water Quality and Flow***

9.6.36 A description of the surface water quality for the southern portion of the location within the 'Kennett – Lee Brook' water body (upstream of Freckenham – water body GB105033042990) (Ref 9-7) (area to northwest of Red Lodge) is contained above within Sunnica East Site A. The flow and catchment characteristics for the River Kennett-Lee Brook are given above in paragraph 9.6.13. The location of the flow monitoring station is located approximately 3km downstream from Sunnica East Site B, therefore flow conditions will be similar, but are likely to be lower within the watercourse close to Sunnica East Site B as it is higher in the catchment where flows will be less.

9.6.37 Data from the Environment Agency (Ref 9-13) shows the River Kennett is monitored at the A11 Road Bridge, upstream of, and east, on the River Kennett. The monitoring data has 12 determinands and was monitored between January 2013 to December 2018.

9.6.38 The River Lark (downstream of Mill Street Bridge, water body reference GB105033043052) (Ref 9-7) is currently at Moderate Ecological Potential, which is its target status. This water body is failing to meet Good status due to high phosphate levels because of sewage discharges from the water industry. Physical modifications have also been identified by the Environment Agency in connection to 'urban and transport' and 'local and central government development'. The chemical status is failing due to PBDE.

9.6.39 For the River Lark, within the National River Flow Archive website (Ref 9-10), there has been flow monitoring on the Lark at Isleham (Station Ref 33004) situated approximately 5km northwest (and downstream) of Worlingham. The catchment area is 466km$^2$ at the flow monitoring location, with the elevation being just 2.4m AOD. The catchment itself is low in altitude in the northern western section, increasing in elevation to approximately 124m AOD in the southern reaches of the catchment. This is a rural chalk catchment, with predominantly arable agricultural land use. The rainfall in the area is 585mm per year (SAAR 1961-1990). The Q95 flow (that which is exceeded 95% of the time) is 0.439m$^3$/s (period of measurement 1936-1986). The River Lark is located 750m north of the site, and the monitoring station is located 5km downstream. The River Lark closer to the site is likely to have lower flow conditions than that monitored on the Lark at Isleham, as it is higher in the catchment.

9.6.40 Two smaller ordinary watercourses tributaries of the River Lark rise to the south of Worlington. One, labelled as 'River Lark Tributary 1' on Figure 9-1 appears to rise at a surface water pond, labelled and referred to as WB5.

This is located approximately 1km south of WB1 in Worlington. This then flows in a northerly direction and enters Sunnica East Site B along the eastern edge of land parcel E12 (see Figure 3-1). From OS mapping the path of the watercourse northwards is unclear, as the watercourse is not mapped shortly after it exits the northern border of Sunnica East Site A. It is assumed that as the geology in the area is chalk, the flow may infiltrate to ground at this point and does not continue northwards on the surface.

9.6.41 To the east of the above, 'River Lark Tributary 2' as labelled on Figure 9-1 rises in an area labelled on OS mapping as Coldwell Head, to the east of Newmarket road. The water body is referred to as WB4 in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]**. There is a pumping station marked in the area. The watercourse flows northeast, then north and enters the River Lark north of Worlington.

***Surface Water Abstractions***

9.6.42 Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes are detailed in full in **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]**. Within 1km of the boundary of Sunnica East Site B there are abstractions to the north from the River Lark, and to the south from the Kennett-Lee Brook. These abstractions are all for spray irrigation direct, or for spray irrigation storage.

***Consented Discharges***

9.6.43 Details of consented discharges were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes. Within 1km of the boundary of Sunnica East B there is one recorded discharge consent. This is located downstream of the Site on the Kennett – Lee Brook to the south of the Site. This is for discharge from a domestic property within Baddingham Manor area.

***Groundwater***

9.6.44 Sunnica East Site B is underlain by River Terrace Deposits, comprising sand and gravel, and Holywell Nodular Chalk and New Pit Chalk (undifferentiated) in part, while in other areas the site is directly overlying chalk. Melbourn Rock outcrops between Holywell Nodular Chalk and New Pit Chalk (undifferentiated) and Zig Zag Chalk (Ref 9-8).

9.6.45 Part of the site south of Worlington is underlain by Head deposits comprising clay, silt, sand and gravel, overlying chalk. The Head Deposits in this area are in the order of 4m thick.

### *Hydromorphology*

9.6.46 River Lark Tributary 1 flows through superficial deposits of alluvium, river terrace deposits and head deposits, overlying chalk bedrock. The watercourse is artificially straight, characteristic of a drainage ditch. Historic mapping is available as far back as 1885 and the watercourse is not shown on this initial OS map. This suggests that it is possible that this is a completely artificial channel, created to aid land drainage. The watercourse is present in 1888 – 1913 map iteration, following largely the same straight course as the contemporary channel.

9.6.47 River Lark Tributary 2 is an over straight watercourse, characteristic of an agricultural drainage ditch. No superficial deposits are shown for this watercourse, overlying chalk bedrock. The watercourse is artificially straight indicating historic modification. Historic mapping is available as far back as 1885 and the watercourse is present following the same course as the contemporary channel.

### *Flood Risk*

9.6.48 Review of the FHDC&SE SFRA 2009 (Ref 9-26) shows Sunnica East Site B within Flood Zone 1 and at low risk from all sources. Pluvial risk in Sunnica East Site B is not materially different to that outlined in Sunnica East Site A and is to be managed similarly.

*Sunnica West Site A*

### *Topography, Soils, Land Use and Climate*

9.6.49 The topography of the Site in the east is approximately 30m AOD sloping down to the west and 20m AOD, with the southern block land sloping towards the north from 25 to 20m AOD. An area of land in the western extent of Sunnica West Site A increases to approximately 35m just to the southeast of Snailwell. The land use across the site is predominantly arable farming.

9.6.50 Rainfall data for the area is presented in paragraph 9.6.4 – 9.6.5. From the Cranfield University Soilscape website (Ref 9-11) the soils in the area of the Sunnica West Site A comprises mainly both freely draining slightly acid but base rich soils, with an area of freely draining slight acid but base rich soils and an area of shallow lime rich soils over chalk or limestone to the south of the site.

### *Surface Waterbodies*

9.6.51 Sunnica West Site A is within the Environment Agency Lower Cam catchment reporting unit. The majority of Sunnica West Site A is within the Lee Brook catchment (water body reference GB105033042970) (Ref 9-7) situated on the northwestern boundary of the main portion of the Site. There may be a small online pond that is associated with the headwaters of this

watercourse where it rises to the south of Chippenham Park. This pond will be considered as part of the impact assessment of Lee Brook.

9.6.52 In the Dane Hill area of Sunnica West Site A, this area is part of the Kennett-Lee Brook catchment area (water body reference: GB105033042990). The closest areas of this Site to the River Kennett is land parcel W15, which are approximately 1.3km away (see Figure 3-1 and Figure 9-1). These land parcels appear to be drained by a small watercourse (henceforth referred to as the 'Dane Hill Watercourse'), but the direction of flow and its connectivity beyond the site boundary is uncertain. It appears to rise just to the south close to The Willows and flow north towards the A11 junction with the B1058 where a ditch along the A11 southbound on slip may join it. It is possible that flows are intercepted by the A11 drainage system.

9.6.53 On the Dane Hill watercourse is an online pond, referred to as WB28 in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]** (see also Figure 9-1). This is located within land parcel W15 at approximately NGR TL 68620 67990 (see Figure 3-2).

9.6.54 There is a 3.8 hectare (ha) water storage reservoir located approximately 300m to the northeast of the Sunnica West Site A boundary (land parcel W03) at NGR TL 65842 67967, adjacent to Foxburrow Plantation. This water body is not hydrologically connected to the Sunnica West Site A and thus will not be impacted and so is not considered any further in this assessment.

9.6.55 A small online pond is located close to where the Lee Brook rises around NGR TL 66325 67800. This is located 175m west of the site boundary close to land parcel W08 (see Figure 3-2). As this water body is upstream of where Lee Brook borders the Site, this is not hydrologically connected to the Sunnica West Site A, and thus will not be considered any further in this assessment.

9.6.56 Further north there is a small lake within Chippenham Park, labelled on the OS maps as 'the Canal' at NGR TL 66430 68680, but this water body is also not hydrologically connected to the Sunnica West Site A and thus will also not be considered for any further detailed assessment.

9.6.57 In the centre of the Sunnica West Site A but outside of the Order limits is La Hogue Hall (NGR TL 67705 68072) and La Hogue Farm (NGR TL 67946 68011). There are small ponds associated with both properties, but these ponds are isolated features either within the property grounds or set within an area of woodland. In both cases there does not appear to be any flow pathways with the Order limits and they will not be considered for any further detailed assessment.

9.6.58 Finally, there are a number of small but isolated ponds located around the Dane Hill Farmhouse (NGR TL 68890 68280), referred to as WB 27 in **Chapter 8: Ecology and Nature Conservation** of this Environmental

Statement **[EN010106/APP/6.1]** (see also Figure 9-1), two ponds north of the B1085 (east and west of the A11), and pond features west of Snailwell. However, as with the other ponds nearby these appear to be isolated and not connected to the Sunnica West Site A, and thus no impacts are predicted, and they will not be considered for any further detailed assessment.

***Surface Water Quality and Flow***

9.6.59 Lee Brook (water body reference GB105033042970) (Ref 9-7) is an approximately 4km long WFD heavily modified water body that is currently at Moderate Ecological Potential, its target status. Reasons for not being at Good Ecological Potential include a degraded hydrological regime and phosphate that are associated with reduced flows from surface water abstraction for agriculture, local and central government and water industry, and sewage discharges from water industry.

9.6.60 Kennett-Lee Brook catchment area (water body reference: GB105033042990) (Ref 9-7) is currently at Moderate status, its target status. Reasons for not being at Good Ecological Potential include macrophytes and Phytobenthos combined, and phosphate that are connected with agricultural and rural land management and the water industry. The chemical status is failing due to PBDE and PFOS. Also there are failures for Benzo(b)fluoranthene, Benzo(g-h-i)perylene and Benzo(k)fluoranthene which can originate from road transport.

9.6.61 The flow and catchment characteristics for the River Kennett-Lee Brook and Lee Brook are given above in paragraph 9.6.13 .

***Surface Water Abstractions***

9.6.62 Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes and detailed in full in **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.1]**. Within 1km of the boundary of Sunnica West Site A there are no abstractions, and abstractions in the area to the west are noted under Sunnica West Site B, paragraph 9.6.77.

***Consented Discharges***

9.6.63 Details of consented discharges were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes. Within 1km of the boundary of Sunnica West Site A there is one recorded discharge consent. This is located east of the Order limits in the area of the village of Kennett. This is for discharge from a domestic property within the village area.

### *Groundwater*

9.6.64 Sunnica West Site A is underlain by River Terrace Deposits and Holywell Nodular Chalk and New Pit Chalk (undifferentiated) (Ref 9-8). The River Terrace Deposits consist of sand and gravel and this area are in the order of 5m thick. The eastern part of Sunnica West Site A that sits either side of the A11 is underlain by Lowestoft Formation comprising Till deposits overlying Chalk. The Till deposits in this area are in the order of 30m thick.

9.6.65 A pipeline associated with the Lodes-Granta river augmentations scheme crosses the Site, transporting groundwater abstracted to the south of the Site to discharge points around Chippenham Fen to the north of Site.

### *Hydromorphology*

9.6.66 Lee Brook is a heavily modified watercourse and is over straight, over wide and incised through the study reach. The watercourse flows through a band of alluvium and peat, overlying bedrock of chalk in a low gradient, unconfined valley. The flow regime is considered likely to be uniform with little variation and a lack of bedforms. Historic mapping indicates that the watercourse has followed the same planform since 1885, and suggests modification predates this mapping.

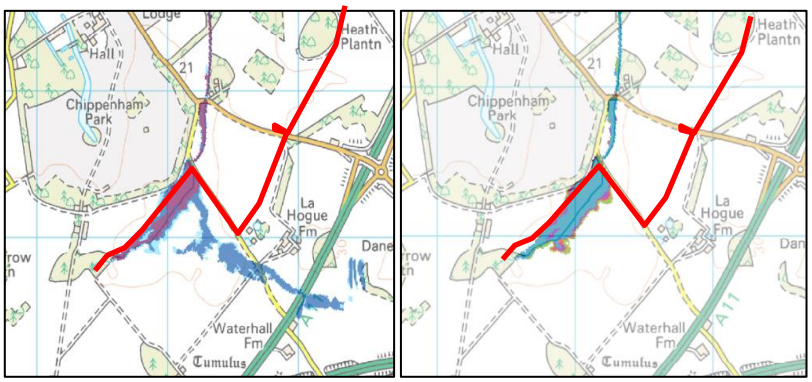
9.6.67 Dane Hill watercourse is artificially straight, particularly in the lower reaches, and follows the contours of Dane Hill. Historic mapping is available as far back as 1885 and the watercourse is not shown on this initial OS map. This suggests that it is possible that this is a completely artificial channel with little/ no morphological or flow variation, created to aid land drainage through historic plantations. The watercourse is present in 1888 – 1913 map iteration, following largely the same straight course as the contemporary channel. Historic mapping shows the watercourse connecting to a series of land drainage ditches to the east, with no apparent connection to the River Kennett.

### *Flood Risk*

9.6.68 The flood risk for Sunnica West Site A is summarised in **Table 9-6** from the FRA (**Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**).

**Table 9-6 Flood Risk for Sunnica West Site A**

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| Fluvial | Low (Majority), | Source: Environment Agency Flood Zone Dataset (Ref 9-41) |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| | Medium – High (West side) | The majority of the site lies in Flood Zone 1, however, an area of Flood Zones 2 and 3a encroaches into the site from an ordinary watercourse along the site's northern boundary (a tributary of the Lee Brook). These Flood Zones then extend further into the site in a south easterly direction perpendicular to the ordinary watercourse for approximately 1.6km.<br><br>Source: FHDC&SE SFRA 2009 (Ref 9-26)<br><br>SFRA mapping shows no flood risk to the area.<br><br>Source: ECDC SFRA 2017 (Ref 9-28)<br><br>SFRA mapping corroborates the Environment Agency mapping. However, an area of Flood Zone 3b is shown in proximity to the ordinary watercourse as shown in Figure below. The SFRA Climate change mapping in the figure below shows no major difference in Flood Zone 3a area in proximity to the ordinary watercourse, however the 1.6km encroachment in a south east direction is not shown. As such, a worst-case approach will be used for this assessment.<br><br>Summary:<br><br>The majority of the site lies in Flood Zone 1, however, an area of Flood Zone 3b is located in proximity to an ordinary watercourse along the northern boundary of the site overlaying Flood Zones 2 and 3a. The Flood Zone extends further into the site in a south easterly direction for 1.6km, designated as Flood Zone 2 and 3a. Development should not normally be permitted within the Flood Zone 3b area, unless it is water compatible or essential infrastructure as set out in Table 3 of the NPPF PPG (Ref 9-16)<br><br>  <br>*ECDC 2017* (Ref 9-28) Flood Zone (left) and Climate Change (right) mapping |
| Tidal | Low | Not in a Tidal area |
| Pluvial (Surface Water) | Very Low | Source: GOV.uk Flood Risk from Surface Water; ECDC SFRA 2017 (Ref 9-28) |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| | | Both reference sources indicate that areas of the site are susceptible to surface water flooding, however, flooding is localised and generally shallow (low risk). The majority of the site is at very low risk of surface water flooding. |
| Groundwater | Low (East side),<br>Medium - High (West side) | Source: ECDC SFRA 2017 (Ref 9-28)<br>Appendix E of the SFRA displays groundwater risk mapping showing the eastern quarter of the site to be within 1km by 1km grid squares of 0% to <25% risk of groundwater emergence. This risk level increases westward to >=75%.<br>Source: FHDC&SE SFRA 2009 (Ref 9-26)<br>Two locations of historic groundwater flooding are noted between the sites southern border and Newmarket.<br>Source: BGS (Ref 9-8) and MAGIC maps (Ref 9-9)<br>The ground makeup of the site therefore has the potential to have a relatively good infiltration capacity making shallow infiltration SuDS a possibility, subject to further ground investigation, groundwater monitoring and infiltration testing.<br>The majority of the site lies in a SPZ III, with a small portion of the site in the north-western of Sunnica West A and Grid Connection Route B designated SPZ II. Therefore, any infiltration techniques must ensure mitigation measures are put in effect to protect these zones. |
| Sewers | Low | Source: ECDC SFRA 2017 (Ref 9-28) / DigDat online service (Ref 9-40)<br>There are no confirmed sewers in the vicinity of the proposed site compound areas of the scheme (confirmed via the DigDat online service, May 2021 (Ref 9-40)). The Forest Heath Water Cycle Study has no records of flooding within the site, however, historic external flooding is noted within West Row to the north. Due to the greenfield nature of the site, it is expected that there will be little to no sewerage infrastructure beneath the fields; therefore, the risk is considered low. |
| Artificial Sources | Very Low (residual) | The site is not within or near any registered reservoirs (assumed with volumes >10,000m3) or artificial sources of flooding. The site is at very low risk of flooding from artificial sources and reservoirs. |

*Sunnica West Site B*

***Topography, Soils, Land Use and Climate***

9.6.69 The topography of Sunnica West Site B is flat with a gentle rise to the southeast from around approximately 15m AOD to 20m AOD. Land use across the site is predominantly arable farming.

9.6.70 Rainfall data for the area is presented in paragraph 9.6.4 – 9.6.5. From the Soilscape website (Ref 9-11) the soils in the majority of the site comprises shallow lime-rich soils over chalk or limestone, with an area of Fen peat soils in the north west, and freely draining slightly acid but base-rich soils in the east.

***Surface Waterbodies***

9.6.71 Sunnica West Site B is within the River Snail catchment, which drains to the Soham Lode and then into the River Great Ouse upstream of Ely. It is within the Environment Agency Cam Lower catchment reporting unit.

9.6.72 Sunnica West Site B is adjacent to the River Snail, with the Chippenham Fen Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Special Area of Conservation (SAC) and Ramsar to the north. These ecological sites are associated with wet ground and are considered to be a Groundwater Dependent Terrestrial Ecosystem (GWDTE). There are small ponds and various ditches on the designated site that drain to the River Snail (e.g. an online pond at NGR TL 63770 68630 which appears to be the rising of a tributary to the River Snail. The River Snail is a Main River and designated under the WFD as part of Soham Lode WFD water body (reference GB105033042860). There is also a trout farm including a series of small ponds at a site within Snailwell, although this receptor appears to be upstream of Sunnica West Site B.

9.6.73 Two ponds included within the ecology surveys, referred to as WB16 and WB17 (at NGR TL 63270 68450 and TL 63030 68300 respectively) within **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]** (see also Figure 9-1) are located 280m west and 590m west of Sunnica West Site B boundary. However, these appear to be isolated and not connected to Sunnica West Site B, and thus no impacts are predicted, and they will not be considered for any further detailed assessment.

***Surface Water Quality and Flow***

9.6.74 Soham Lode water body (GB105033042860) (Ref 9-7) is heavily modified and is currently at Moderate Status, its target status. Reasons for not being at Good Ecological Potential include mitigation measures assessment, and phosphate related to agriculture and land management and the water industry. The chemical status is failing due to PBDE leaching from household waste.

9.6.75 Data on water quality within the River Snail was received from the Environment Agency. Monitoring Site 36M22 has information on 18 determinants collected on 35 occasions between January 2013 and November 2018. **Table 9-7** below summarises the monitoring information.

**Table 9-7 Summary of Water quality: River Snail**

| Determinand | Units | Min | Max | Average |
|---|---|---|---|---|
| Alkalinity to pH 4.5 as calcium carbonate ($CaCO_3$) | mg/l | 191 | 252 | 237.33 |
| Ammonia un-ionised (as Nitrogen (N)) | mg/l | 0.00012 | 0.00075 | 43.00 |
| Ammoniacal Nitrogen (as N) | mg/l | 0.03 | 0.153 | 0.04 |
| Biochemical Oxygen Demand (BOD) (by 5 Day ATU (Allyl thiourea)) | mg/l | 1 | 3.26 | 1.15 |
| Chemical Oxygen Demand (COD) | mg/l | 10 | 252 | 190.90 |
| Chloride | mg/l | 20.6 | 91.8 | 27.58 |
| Chlorophyll (by acetone extract) | µg/l | 0.54 | 4.4 | 1.35 |
| Electrical Conductivity (at 25 °C) | µS/cm | 555 | 924 | 634.23 |
| Nitrate (as N) | mg/l | 5.72 | 18.2 | 7.72 |
| Nitrite (as N) | mg/l | 0.0066 | 0.101 | 0.02 |
| Nitrogen (Total Oxidised as N) | mg/l | 5.73 | 18.3 | 7.74 |
| Orthophosphate (reactive as Phosphorous) | mg/l | 0.01 | 0.826 | 0.08 |
| Dissolved Oxygen (DO) | mg/l | 7.29 | 10.8 | 8.76 |
| Dissolved Oxygen (% Saturation) | % | 66.6 | 97.5 | 79.51 |
| pH | n/a | 7.29 | 7.76 | 7.54 |
| Silica (reactive as Silica oxide, $SiO_2$) | mg/l | 14.4 | 19.4 | 17.91 |
| Total Suspended Solids (at 105 °C) | mg/l | 3 | 22.2 | 4.70 |
| Water Temperature | $^oC$ | 7.7 | 14.6 | 11.02 |

*Source: Environment Agency Monitoring at River Snail Road Bridge*

9.6.76 For the River Snail, the National River Flow Archive website (Ref 9-29) provides details of a flow gauging station on the Snail at Fordham (Station Ref 33050) situated just south of Fordham village (and downstream of Sunnica West Site B). The catchment area of the gauging station is 61km$^2$ at the location, with the elevation being 9.7m AOD. The catchment itself is low in altitude in the northern section, increasing in elevation to approximately 118m AOD in the southern/ south eastern reaches of the catchment. This is a predominantly rural chalk catchment, with predominantly arable agricultural land use, with the town of Newmarket

within the centre of the catchment. The rainfall in the area is 577mm per year (SAAR 1961-1990). The Q95 flow (that which is exceeded 95% of the time) is 0.106$m^3$/s (period of measurement 1960-2018).

***Surface Water Abstractions***

9.6.77 Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes and detailed in full in **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]**. Within 1km of the boundary of Sunnica West Site B, there are abstractions from the River Snail upstream and downstream of the site, together with abstractions from the watercourse bordering the north of the site. These abstractions are all for spray irrigation direct, or for spray irrigation storage, with the exception of one abstraction license on a tributary of the River Snail approximately 300m north of, and downstream of, the site boundary. This is for general farming and domestic use (License Number 6/33/36/*S/0168 Fordham Abbey Farms).

***Consented Discharges***

9.6.78 Details of consented discharges were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes. Within 1km of the boundary of Sunnica West Site B there are numerous recorded discharge consents. These include discharges from domestic property, waste collection/ treatment/ disposal/ materials recovery, and wastewater treatment works.

***Groundwater***

9.6.79 The Sunnica West Site B is underlain by Zig Zag Chalk and West Melbury Marly Chalk in the western part of the Site in the River Snail valley, and also crosses the chalk hardground unit, Melbourn Rock (Ref 9-8). The eastern part of the Sunnica West Site B is underlain by Holywell Nodular Chalk.

9.6.80 In the western part of the site River Terrace Gravels consisting of sand and gravel overlie chalk, and alluvium deposits comprising clay, silt, sand and gravel overlie the river terrace deposits. The alluvium and river terrace deposits in this area are in the order of 4m thick.

9.6.81 Immediately to the north of Sunnica West Site B is Chippenham Fen, which is surrounded by an outcrop of Totternhoe Stone, within this area are peat deposits and West Melbury Marly Chalk.

***Hydromorphology***

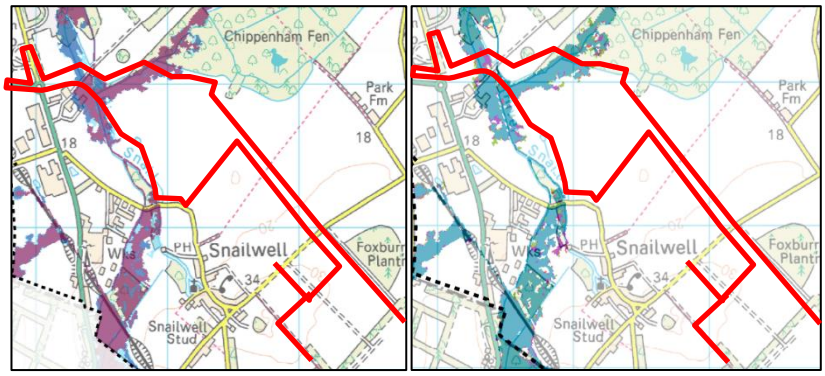
9.6.82 The River Snail in the vicinity of the site is classified as a heavily modified watercourse flowing superficial deposits of alluvium and river terrace deposits, overlying bedrock of chalk. The width of the alluvial deposits suggest that the natural typology of the watercourse was more sinuous than

its contemporary form. Historic mapping is available as far back at 1885 and shows the watercourse in its current alignment. Based on historic land use it is likely that the watercourse was modified to service mills in the area.

***Flood Risk***

9.6.83 The flood risk for Sunnica West Site B is summarised in **Table 9-8** below, which is summarised from the FRA (**Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**):

**Table 9-8 Flood Risk for Sunnica West Site B**

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| Fluvial | Low (Majority)<br>Medium – high (North West side) | Source: Environment Agency Flood Zone Dataset (Ref 9-41)<br>The majority of the site lies in Flood Zone 1, however, an area of Flood Zones 2 and 3a encroaches from the River Snail, running alongside the south western and north western boundaries of the site.<br>Source: FHDC&SE SFRA 2009 (Ref 9-26)<br>No flood risk is shown.<br>Source: East Cambridgeshire District Council (ECDC) Level 1 and Level 2 Strategic Flood Risk Assessment, October 2017 (Ref 9-28)<br>SFRA mapping corroborates the Environment Agency mapping. However, Flood Zone 3b is present overlaying large parts of the Flood Zone 3a areas. The SFRA climate change mapping, shows the Flood Zone 3a extents effectively matching that of the Flood Zone 2.<br>Summary:<br>The majority of the site lies in Flood Zone 1, however, an area of Flood Zone 3b from the River Snail is located along the south western and north western boundaries of the site. Development should not normally be permitted within the Flood Zone 3b area unless it is water compatible or essential infrastructure as set out in Table 3 of the NPPF PPG (Ref 9-16).<br>  |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| | | ECDC 2017 Flood Zone (left) and Climate Change (right) mapping (Ref 9-28) |
| Tidal | Low | Not in a Tidal area |
| Pluvial (Surface Water) | Very Low | Source: GOV.uk Flood Risk from Surface Water; ECDC SFRA 2017 (Ref 9-28)<br>Both reference sources indicate that areas of the site are susceptible to surface water flooding, however, flooding is localised and generally shallow (low risk). Several field ditches displayed within the site are also shown to be susceptible to surface water flooding. The majority of the site is at very low risk of surface water flooding. |
| Groundwater | Low (East side) -<br>Medium (West side) | Source: ECDC SFRA 2017 (Ref 9-28)<br>Appendix E of the SFRA displays groundwater risk mapping showing the majority of the site lies within 1km by 1km grid squares of >=50% to >75%. A small area to the north of the site and east of the A11 displays a lower risk (<25%).<br>Source: BGS (Ref 9-8) and MAGIC maps (Ref 9-9).<br>The ground makeup of the site therefore presents limited potential for infiltration SuDS but may be suitable for shallow infiltration SuDS. However, this is subject to further ground investigation, groundwater monitoring and infiltration testing.<br>The site lies in a SPZ III. Therefore, any infiltration techniques must ensure mitigation measures are put in effect to protect this zone. |
| Sewers | Low | Source: ECDC SFRA 2017 (Ref 9-28) / DigDat online service (Ref 9-40).<br>There are no confirmed sewers in the vicinity of the proposed site compound areas of the scheme (confirmed via the DigDat online service, May 2021) (Ref 9-40). The Forest Heath Water Cycle Study has no records of flooding within the site, however, historic external flooding is noted within West Row to the north. Due to the greenfield nature of the site, it is expected that there will be little to no sewerage infrastructure beneath the fields; therefore, the risk is considered low. |
| Artificial Sources | Very Low (residual) | The site is not within or near any registered reservoirs (assumed with volumes >10,000m$^3$) or other artificial sources. The site is at very low risk of flooding from reservoirs and artificial sources. |

*Grid Connection Route A*

***Topography, Soils, Land Use and Climate***

9.6.84 Grid Connection Route A slopes northwards from approximately 20m AOD down to 15m AOD in the area of the Kennett-Lee Brook crossing. Land use across the site is predominantly arable farming.

9.6.85 Rainfall data for the area is presented in paragraphs 9.6.4 – 9.6.5.

9.6.86 From the Soilscape website (Ref 9-11) the soils in the southern part of the Grid Connection Route A are freely draining slightly acid sandy soils, passing into freely draining slightly acid but base-rich soils for the northern half.

***Surface Waterbodies***

9.6.87 Grid Connection Route A passes between the Sunnica West Site A (south of Chippenham) and Sunnica East Site B. The route from the Sunnica West Site A within the Kennet-Lee Brook water body, crosses agricultural land and the River Kennett, a Main River, and passes into the 'Lark downstream of Mill Street Bridge' water body (upstream of Freckenham – water body GB105033042990) (Ref 9-7).

9.6.88 A large water storage lagoon is located approximately 300m east of Grid Connection Route A, at approximately NGR TL 68770, 69960. This is referred to in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]** as WB9 (see also Figure 9-1). As this appears not to be connected to the River Kennet and is upstream of the Grid Connection Route A crossing of the River Kennet, this is not considered for any further detailed assessment.

***Surface Water Quality and Flow***

9.6.89 Grid Connection Route A passes between Sunnica West Site A and Sunnica East Site B. This route crosses the River Kennett water body (GB105033042990) (Ref 9-7).

9.6.90 The River Kennett – Lee Brook (GB105033042990, upstream of Freckenham) is currently at Moderate Ecological Potential because of phosphate, macrophytes and phytobenthos (combined), and a degraded hydrological regime. The reasons for not achieving Good status are diffuse and point pollution from sewage water treatment and agriculture (phosphate), groundwater abstractions from the water industry, and barriers for fish movement. The Environment Agency has set a lower objective for this water body of Bad Overall Potential by 2015. The chemical status is failing due to PBDE.

9.6.91 Flow and catchment characteristics for the River Kennett – Lee Brook are given above in paragraph 9.6.13.

### *Surface Water Abstractions*

9.6.92 Details of surface water abstractions were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes and detailed in full in **Appendix 9D** of the ES **[EN010106/APP/6.2]**. Within 1km of Grid Connection Route A, there are two abstractions licences. Both are located downstream on the Kennett-Lee, with one being for spray irrigation direct, and one for spray irrigation – storage.

### *Consented Discharges*

9.6.93 Details of consented discharges were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface Waterbodies and their attributes. Within 1km of the boundary of Grid Connection Route A there is one discharge consent to the north and downstream of the crossing of the River Kennett. This is for a discharge from a domestic property in the area of Baddingham Manor.

### *Groundwater*

9.6.94 Grid Connection Route A is underlain by River Terrace Deposits and Holywell Nodular Chalk and New Pit Chalk (undifferentiated). The route crosses the Kennett Brook where alluvium in the order of 1.3m thick overlies chalk (Ref 9-8).

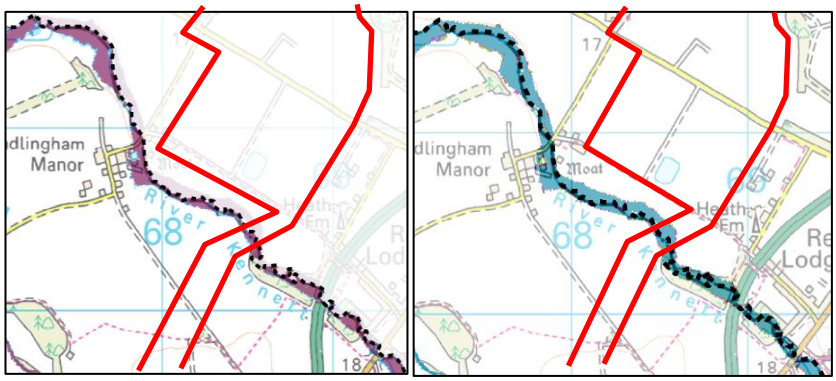
### *Hydromorphology*

9.6.95 The River Kennet through this reach is characterised by a heavily modified, lowland watercourse with a passively sinuous planform. The watercourse has a low gradient and flows through a thin band of alluvial deposits within an unconfined valley. Historic mapping indicates that the planform through this reach was straightened between 1892 and 1914. Present day (i.e. 2020) online ordnance survey mapping suggests that it is possible that some of the meander cut off channels remain in situ. The River Kennett in the vicinity of the crossing location has a wooded riparian zone and therefore potential to create flow variation within the channel through the presence of large woody material.

### *Flood Risk*

9.6.96 The flood risk for Grid Connection Route A is summarised in **Table 9-9** below, which has been summarised from the FRA in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**.

## Table 9-9 Flood Risk for Grid Connection Route A

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| Fluvial | Low | Source: Environment Agency Flood Zone Dataset (Ref 9-41), ECDC SFRA 2017 (Ref 9-28)<br><br>The majority of site is situated within Flood Zone 1, however, an area of Flood Zones 2 and 3a crosses the connection route – the floodplain of the River Kennet, and the River Kennett itself.<br><br>Source: FHDC&SE SFRA 2009 (Ref 9-26)<br><br>SFRA mapping corroborates the EA mapping above.<br><br>SFRA mapping corroborates the Environment Agency mapping. However, Flood Zone 3b is present overlaying large parts of the Flood Zone 3a areas as shown in figures below. Climate change mapping shows the Flood Zone 3a extents effectively matching that of Flood Zone 2.<br><br>Summary:<br><br>The majority of the site lies in Flood Zone 1, however, an area of Flood Zone 3b from the River Kennet is near the site. Development should not normally be permitted within the Flood Zone 3b area, unless it is water compatible or essential infrastructure as set out in Table 3 of the NPPF. Refer to the figures below for map extracts of SFRA mapping.<br><br>  <br><br><br>ECDC 2017 (Ref 9-28) Flood Zone (Left) and Climate Change (Right) mapping |
| Tidal | Low | Not in a Tidal area |
| Pluvial (Surface Water) | Very Low | Source: Environment Agency Flood Zone Dataset (Ref 9-41), ECDC SFRA 2017 (Ref 9-28)<br><br>Both sources indicate that areas of the site are susceptible to surface water flooding; however, flooding is localised and generally shallow (low risk). A higher risk area adjacent to the connection route, approximately 160m perpendicular to the B1085 is shown. This is considered a larger depression. The majority of the site is at very low risk of surface water flooding. |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| Groundwater | Low | Source: ECDC SFRA 2017 (Ref 9-28)<br>Appendix E of the SFRA displays groundwater risk mapping showing that the majority of the site lies within 1km by 1km grid squares of 0% groundwater risk. The lower portion of the site increases in risk shown as >=25% <50% groundwater risk. |
| Sewers | Low | Source: ECDC SFRA 2017 (Ref 9-28) / DigDat online service (Ref 9-40)<br>Grid Connection Route A will not impact existing sewer flood risk, there will be no connections as part of the cable routes. There are no confirmed sewers in the vicinity of the proposed site areas of the Scheme (confirmed via the DigDat online service, May 2021 (Ref 9-40)). The Forest Heath Water Cycle Study has no records of flooding within the site. However, there is no history of sewer flooding noted in SFRA within the site area. Sewers may be present, e.g. trunk mains, in the site area and these will be identified before any construction takes place. However, it is not proposed to connect to a public sewer so the risk will remain low. |
| Artificial Sources | Very Low (residual) | The site is not within or near any registered reservoirs (assumed with volumes >10,000m$^3$) or other artificial sources. The site is at very low risk of flooding from reservoirs and artificial sources. |

9.6.97 Grid Connection Route A, once constructed, will have no residual flood risk associated with it, as it will be buried. The table above for Route A will inform the future construction method statements and risk assessments to ensure flood risk is taken into account and mitigated during construction to avoid increasing the risk of flooding from all sources to nearby areas or downstream (measures are described in the Framework CEMP, which is presented in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**).

*Grid Connection Route B*

***Topography, Soils, Land Use and Climate***

9.6.98 Grid Connection Route B crosses flat lying land, between approximately 5m AOD near Burwell to 10-15m AOD as the route approaches Snailwell.

9.6.99 Land use across the site is predominantly arable farming. Rainfall data for the area is presented in paragraphs 9.6.4 – 9.6.5.

9.6.100 From the Soilscape website (Ref 9-11) the soils in the eastern part of the Grid Connection Route B are freely draining slightly acid but base rich soils, passing into shallow lime rich soils over chalk or limestone for the majority of the route.

### *Surface Waterbodies*

9.6.101 West of the River Snail, small streams form the Burwell Lode in the area of the Grid Connection Route B between Sunnica West Site B and Burwell.

9.6.102 Grid Connection Route B passes westwards to the Burwell National Grid Substation Extension, it begins at the eastern extent in the Soham Lode, New River and Burwell Lode river catchments.

9.6.103 On leaving Sunnica West Site B Grid Connection Route B first crosses the River Snail (see Figure 9-1), which flows in a north-west direction from Snailwell and is a Main River and watercourse that is part of the Soham Lode WFD water body (reference GB105033042860).

9.6.104 The Catch Water Drain and numerous unnamed small drains are connected with the Main Rivers and WFD waterbodies New River (GB105033042780) and Burwell Lode (GB105033042720) (Ref 9-7), in the western extent of the study area, north of Burwell. These two watercourses flow in a north-west direction to the River Cam. This area is within the Swaffham Internal Drainage Board (Ref 9-30), who consider it to be part of the 'South Level Fens'.

9.6.105 The South Level Fens area of the Swaffham Internal Drainage Board District comprises mainly of high-grade agricultural land much of which is below mean sea level and considerably below 'flood level' and is therefore reliant on pumped drainage for its existence. The drains' water levels are terraced / controlled from the upper reaches by a number of structures that drain to the Upware Pumping Station. From here surplus land drainage water is discharged to the River Cam.

9.6.106 There are several surface waterbodies in the study area for Grid Connection Route B. There is a surface water body within woodland within the area of the Grid Connection Route B. This is referred to in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]** as WB18, NGR TL62246 69210 (see also Figure 3-2 and Figure 9-1). Adjacent to the northern boundary of the Grid Connection Route B is a large surface water body at NGR TL60800 65580. This is referred to in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]** as WB22 (see also Figure 3-2 and Figure 9-1). Northwards from WB22 it appears there is a drain connecting northwards to WB21, an online pond east of Crowhall Farm. This is located some 450m northwards from Grid Connection Route B (see also Figure 3-2 and Figure 9-1).

9.6.107 Other surface waterbodies in the study area appear not to be connected or are upstream of Grid Connection Route B and are not considered for any further detailed assessment.

***Surface Water Quality and Flow***

9.6.108 The Soham Lode is a heavily modified WFD water body (GB105033042860) (Ref 9-7) that is at Moderate Ecological Potential, its target status. The reason for not being at a higher status is elevated phosphates, likely due to sewage discharge from the water industry. Physical modifications are due to local and central government, recreation and agriculture (mitigation implementation). The chemical status is failing due to PBDE.

9.6.109 The New River (GB105033042780) (Ref 9-7) heavily modified WFD water body is at Moderate Ecological Potential, with a target of Good Ecological Potential by 2027. The main reasons for not meeting its target are a degraded hydrological regime. Physical modification is due to reasons connected to agriculture, local and central government and recreation. The chemical status is failing due to PBDE.

9.6.110 The Burwell Lode is a heavily modified WFD water body (GB105033042720) (Ref 9-7) that is currently at Moderate Ecological Potential, exceeding its target status of Poor Ecological Potential by 2015. The reasons for not being at a higher status are due to failing to meet good chemical status. This is due to the Priority Hazardous Substances PDBE and PFOS. Physical modification is due to reasons connected to agriculture, local and central government and recreation.

9.6.111 Data received from the Environment Agency (Ref 9-13) show that there is water quality monitoring data for New River (12 determinands, monitored 2013-April 2017), Snailwell Drain (20 determinands, monitored January 2013 to December 2018), and Soham Lode (52 determinands, monitored January 2013 to December 2018).

9.6.112 Flow and catchment characteristics for Soham Lode (River Snail) are given above in paragraph 9.6.76 .

9.6.113 There are no monitoring stations available for flow for New River or Burwell Lode. However, the catchment area of New River at Fordham Abbey is approximately 25km$^2$, increasing in elevation to the south, and containing the western portions of Newmarket town in its middle section.

9.6.114 Burwell Lode catchment, just upstream of the confluence with New River, has a catchment area of approximately 48km$^2$. The catchment stretches south-eastwards and is a predominantly rural catchment, and contains the residential areas of Burwell, Swaffham Prior and Reach.

***Surface Water Abstractions***

9.6.115 Details of surface water abstractions were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface waterbodies and their attributes and detailed in full in **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]**. Within 1km of the boundary

of Grid Connection Route B there are 6 abstractions. These are all for spray irrigation direct, or for spray irrigation storage.

***Consented Discharges***

9.6.116 Details of consented discharges were obtained from the Environment Agency, the point locations of which are included on Figure 9-1 Surface waterbodies and their attributes. Within 1km of the boundary of Grid Connection Route B there are discharge consents for a Wastewater Treatment Works, a pumping station and a discharge from a domestic property north of Burwell.

***Groundwater***

9.6.117 The Grid Connection Route B is underlain by Zig Zag Chalk and West Melbury Marly Chalk west of the River Snail, and also crosses the chalk hardground units, Melbourn Rock and Totternhoe Stone (Ref 9-8). There are small areas of River Terrace Deposits, consisting of sand and gravel, and peat overlying the Chalk.

9.6.118 As Grid Connection Route B crosses the River Snail, River Terrace Deposits consisting of sand and gravel overlie chalk, and alluvium deposits comprising clay, silt, sand and gravel overlie the river terrace deposits. The alluvium and river terrace deposits in this area are in the order of 4m thick.

9.6.119 East of the River Snail the Grid Connection Route B is underlain by Holywell Nodular Chalk and Melbourn Rock. Where the Grid Connection Route B links to Sunnica West Site A it is underlain by River Terrace Deposits, overlying Holywell Nodular Chalk and New Pit Chalk (undifferentiated).

***Hydromorphology***

9.6.120 Burwell Lode is an artificial drainage ditch, straight incised and embanked with no hydromorphological value. The watercourse flows through peat, overlying chalk in a low gradient, unconfined channel. The flow regime is considered likely to be uniform throughout with an absence of bedforms, although this has not been verified. Channel modifications pre-date earliest available OS mapping, however it is considered likely that this watercourse is a completely artificial ditch, created for the purposes of agricultural land drainage.

9.6.121 New River, and the Tributary of New River, flows through a wide area of peat, overlying bedrock of chalk in a low gradient, unconfined valley. The watercourses were observed to be chalk streams, which are a unique valuable habitat within the UK, fed by mineral-rich water from chalk aquifers. The bed substrate of the New River and Tributary of New River is characterised by clean gravels, macrophytes were also present and the water was generally very clear. However, the channels appear to be extremely modified and over-sized, in places they appeared to be 3 to 4m deep, preventing any lateral connectivity with the floodplain and supporting

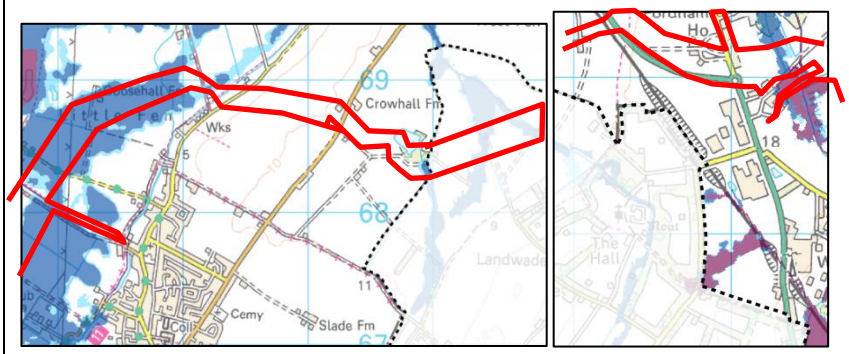
little variation in channel depth or profile. The watercourses are artificially straight through the study area, and the flow regime was observed to be uniform with little variation and a lack of bedforms. Historic mapping indicates that the watercourse has followed the same planform since 1885, and modification predates this mapping.

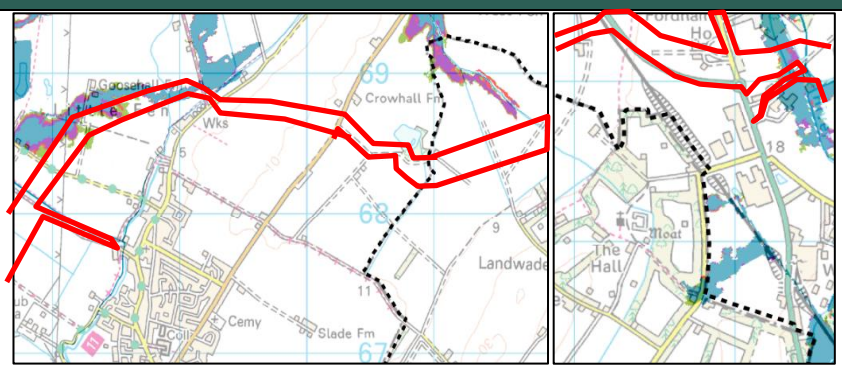
9.6.122 Catch Water Drain, and a number of further drainage ditches in the vicinity are considered to be artificial drainage ditches, with limited hydromorphological value. Channel modifications pre-date earliest available OS mapping, however it is considered likely that these watercourses are completely artificial, created for the purposes of agricultural land drainage.

***Flood Risk***

9.6.123 The flood risk for the Grid Connection Route B is summarised in **Table 9-10** and is from the FRA (**Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**).

**Table 9-10 Flood Risk for Grid Connection Route B**

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| Fluvial | Low | Source: Environment Agency Flood Zone Dataset (Ref 9-41)<br>The route is situated largely within Flood Zone 1 but passes through areas of Flood Zones 2 and 3a. The western extent, an area in the centre and the western connection to the Sunnica West Site B is within Flood Zones 2 and 3a. The western extent is within an area of Defended Flood Zone 3a and the edge of the Sunnica West Site B is designated Flood Zone 3b. SFRA climate change mapping appears to indicate large reductions in the Flood Zone 3a area. It is currently unclear as to the reasons for this; as such, until this is confirmed with the EA, a worst-case approach will be used for this assessment. Refer to the figures below for relevant map extracts of SFRA mapping.<br>  <br><br>ECDC 2017 Flood Zone mapping (Ref 9-28) |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| | |  <br>ECDC 2017 Climate Change mapping (Ref 9-28)<br><br>The SFRA also shows that the site is not within the Fenland flood defence breach model for Q100 year and Q100 year + Climate Change extents. |
| Tidal | Low | Source: ECDC SFRA 2017 (Ref 9-28)<br><br>Not within the Tidal Hazard Mapping (Tidal Great Ouse Breach Modelling) for Q200 and Q200 + Climate Change breach extents. |
| Pluvial (Surface Water) | Low | Source: GOV.uk Flood Risk from Surface Water; ECDC SFRA 2017 (Ref 9-28)<br><br>Both reference sources indicate patches of the site which are susceptible to surface water flooding, however, flooding is localised and generally shallow (low risk). Several field ditches displayed within the site are also shown to be susceptible to surface water flooding. The majority of the connection route is at low risk of surface water flooding. |
| Groundwater | Medium - High (Majority) | Source: ECDC SFRA 2017 (Ref 9-28)<br><br>Appendix E of the SFRA displays groundwater risk is shown to be generally high (>75%) west of Sunnica West Site B, lowering in some areas to >=50% <75%, however, low risk (<25%) between Sunnica West Sites' A and B. |
| Sewers | Low | Source: ECDC SFRA 2017 (Ref 9-28) / DigDat online service (Ref 9-40)<br><br>Grid Connection Route B will not impact existing sewer flood risk, there will be no connections as part of the routes. There are no confirmed sewers in the vicinity of the proposed site areas of the \scheme (confirmed via the DigDat online service, May 2021 (Ref 9-40)). The Forest Heath Water Cycle Study has no records of flooding within the site. However, there is no history of sewer flooding noted in SFRA within the site area. Sewers may be present, e.g. trunk mains, in the site area and these will be identified before any construction takes place. However, it is not proposed to connect to a public sewer so the risk will remain low. |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| Artificial Sources | Very Low (residual) | The site is not within or near any registered reservoirs (assumed with volumes >10,000m$^3$) or other artificial sources. The site is at very low risk of flooding from reservoirs and artificial sources. |

9.6.124 Grid Connection Route B will have no residual flood risk associated with it, as it will be buried. The table above for Grid Connection Route B will inform the construction method statements and risk assessments to ensure flood risk is taken into account and mitigated during construction to avoid increasing the risk of flooding from all sources to nearby areas or downstream (measures are described in the Framework CEMP, which is presented in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**).

*Burwell National Grid Substation Extension*

***Topography, Soils, Land Use and Climate***

9.6.125 The land within the area of the National Grid Substation Extension, for options 1 and 2, is low lying approximately 5m AOD. The land use across the site is that associated with a substation.

9.6.126 Rainfall data for options 1 and 2 is presented in paragraph 9.6.4 – 9.6.5.

9.6.127 From the Soilscape website (Ref 9-11) the soils in the area of the Burwell National Grid Substation Extension, for options 1 and 2, are shallow lime-rich soils over chalk or limestone.

***Surface Water***

9.6.128 Burwell National Grid Substation Extension area is contained within the Burwell Lode (GB105033042720) (Ref 9-7) water body as described within Grid Connection Route B.

9.6.129 Within the National Grid Substation extension located to the west of Burwell, there are two locations being considered for the location of new infrastructure associated with this Scheme. Option 1 is within the east of the current substation site and is adjacent to the eastern boundary, adjacent to a tributary of the Burwell Lode (flows north), which is located approximately 750m north of the substation site. Option 2 is located north of Newnham Drove with drains running along the road and its eastern boundary.

***Surface Water Quality and Flow***

9.6.130 The surface water quality for Burwell Lode (GB105033042720) water body is as described within Grid Connection Route B, and is relevant for options 1 and 2. The Burwell Lode catchment is described above in paragraph 9.6.113.

### *Surface Water Abstractions*

9.6.131 Details of surface water abstractions were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface waterbodies and their attributes and detailed in full in **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]**. Within 1km of the boundary of Burwell National Grid Substation Extension options 1 and 2 there are 16 abstractions. These are all for spray irrigation direct, or for spray irrigation storage.

### *Consented Discharges*

9.6.132 Details of consented discharges were obtained from the Environment Agency, and the point locations of which are included on Figure 9-1 Surface waterbodies and their attributes. Within 1km of the boundary of National Grid Substation there are discharge consents from within the site itself for air conditioning. Within the study area of 1km for options 1 and 2 there are discharge consents for Wastewater Treatment Works, a pumping station and a domestic property.

### *Groundwater*

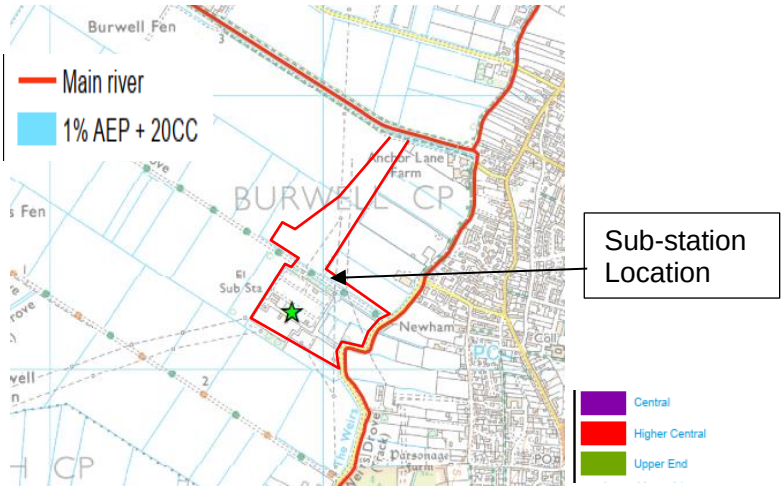
9.6.133 Both locations for the substation extension are underlain by West Melbury Marly Chalk. There are small areas of peat overlying the Chalk (Ref 9-8).

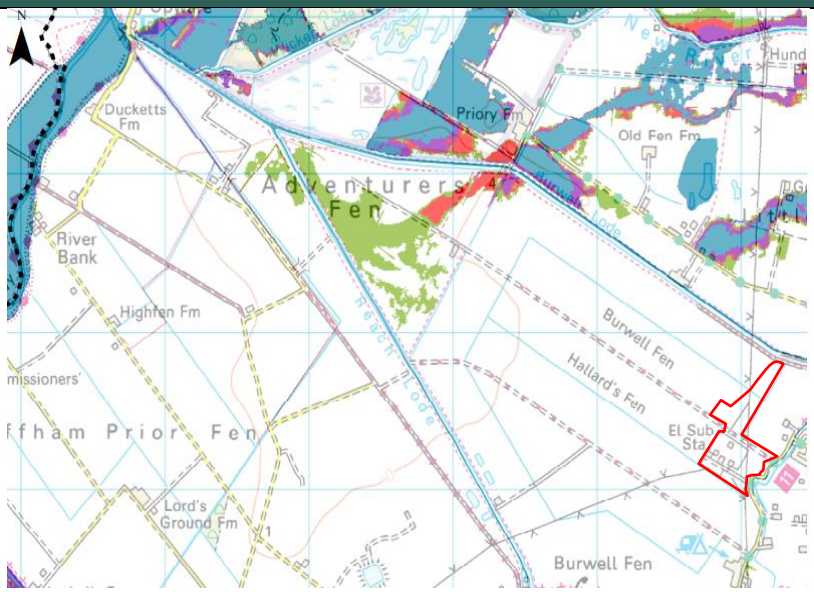
### *Flood Risk*

9.6.134 The flood risk for the Burwell National Grid Substation Extension is summarised in **Table 9-11** and summarised from the FRA (**Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**).

**Table 9-11 Flood Risk for Burwell National Grid Substation Extension**

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| Fluvial | Low | Source: Environment Agency Flood Zone Dataset (Ref 9-41), Accessed, ECDC SFRA 2017 (Ref 9-28)<br>The majority of the Burwell National Grid Substation Extension is shown to be in Defended Flood Zone 3a, although the gov.uk long term flood risk map locates the substation in Flood Zone 2 (Low Risk). However, the latest Product 4 Data from the Environment Agency, provided 9 July 2021, indicates that Options 1 and 2 are in Flood Zone 1 (including from the 20% climate change level of 2.19m AOD) and also from the 1 in 1000 year levels at the nearest model node (WE950) shown as 2.25AOD. The Burwell National Grid Substation Extension site also appears to be surrounded by raised ground in the form of embankments or flood defences, up to a level of 3.20m AOD, according to the topographic survey. |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| | | The ECDC (2017) SFRA climate change maps also indicate large reductions in Flood Zone 3a and 2 areas and exclude the Burwell National Grid Substation Extension site from Flood Zone 2 and 3 (i.e. the site is within Flood Zone 1). The mapping includes modelling of the Cam Lodes.<br>The lowest Burwell Lode Flood Defence level provided is 2.79m AOD. Although this indicates a 1 in 50 year standard of defence, the level would appear to corroborate the EFDC mapping.<br>It is assumed the refined flood extents are a result of finer scale modelling of watercourses and better level data, whereas the older EA floodplain map is a broadscale map that does not take into account watercourse detail at a macro scale.<br>The SFRA also shows that the Burwell National Grid Substation Extension site is not within the Fenland flood defence breach model for Q100 year and Q100 year + Climate Change extents. The screenshots below indicates the flood risk, including climate change, from the ECDC SFRA.<br>In this case it is proposed the site lies within Flood Zone 1, low risk.<br>Refer to the figures below for relevant map extracts of latest mapping (ECDC mapping (Ref 9-28) includes 65% climate change extents for the Upper End).<br>  |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| | |  <br>EA Product 4 Data (top) (provided 8th July 2017), and Figure ECDC_40 of the ECDC 2017 (Ref 9-28) with the modelled 65% Climate change extent indicated in the green shading (bottom) |
| Tidal | Low | Source: ECDC SFRA 2017 (Ref 9-28)<br>Not within the Tidal Hazard Mapping (Tidal Great Ouse Breach Modelling) for Q200 and Q200 + Climate Change breach extents. |
| Pluvial (Surface Water) | Very Low – Low | **Source: *GOV.uk Flood Risk from Surface Water; ECDC SFRA 2017***<br>Both reference sources indicate patches of the site which are susceptible to surface water flooding, however, flooding is localised and shallow (low risk). The majority of the site is at very low risk of surface water flooding. |
| Groundwater | High | Source: ECDC SFRA 2017 (Ref 9-28)<br>Appendix E of the SFRA displays groundwater risk is shown to be high (>75%). |
| Sewers | Low | Source: ECDC SFRA 2017 (Ref 9-28) / DigDat online service (Ref 9-40)<br>There are no confirmed sewers in the vicinity of the proposed site areas of the Scheme (confirmed via the DigDat online service, May 2021) (Ref 9-40). The Forest Heath Water Cycle Study has no records of flooding within the Site. However, there is no history of sewer flooding noted in SFRA within the site area. Sewers may be present, e.g. trunk mains, in the site area and these will be identified before any construction takes place. However, it is not proposed to connect to a public sewer so the risk will remain low. |

| Flood Risk Source | Flood Risk Level | Comments |
|---|---|---|
| Artificial Sources | Very Low (residual) | The site is not within or near any registered reservoirs (assumed with volumes >10,000m$^3$) or other artificial sources. The site is at very low risk of flooding from reservoirs and artificial sources.<br><br>The River Great Ouse has a tidal flood defence level of between 1 in 500 year and 1 in 1000 year. The Great Ouse Tidal River Baseline Report (2017), incorporated within the ECDC SFRA mapping, indicates the substation site is also not at risk of tidal flooding, or at risk of a tidal breach, for the 1 in 200 year plus climate change event.<br><br>In addition, the ECDC SFRA includes flood risk mapping that includes climate change allowances, based on the current allowances provided by the Environment Agency (65% allowance at the Upper End for the Anglian River Basin Management Plan area). As noted in **Table 9-11** the site is not at risk of flooding. |

***Sea Level Rise***

9.6.135 The River Great Ouse tidal defences provide a high level of defence and it is not anticipated that significant benefit would be gained from raising the defences further to account for sea level rise (The Great Ouse Tidal River Strategy, 2009). The Burwell National Grid Substation Extension site is not within the modelled tidal and non-tidal breach extents; however, it has been estimated, using the Agency's online sea level rise tables for the Anglian River Basin area, sea level could rise by up to approximately 800mm by the year 2080.

*Water Pollution Incidents (All Sites and Grid Connection Routes)*

9.6.136 The Environment Agency have confirmed there are no records of water pollution incidents within the area at Category 3 or worse.

*Drinking Water Protected Areas (Surface Water), and Drinking Water Safeguard Zones (All Sites and Grid Connection Routes)*

9.6.137 None of the Sites are located within Drinking Water Protected areas (surface water) or Drinking Water Safeguard Zones (Surface water or Groundwater). The nearest Drinking Water Protected area (surface water) is approximately 4km north east of the Sunnica East Sites A and B boundary near Mildenhall. The nearest Drinking Water Safeguard Zones (Groundwater) is approximately 5km east at Risby.

*Aquifer Designations*

9.6.138 The Grid Connection Routes A and B and Sunnica East Sites A and B and West Sites A and B are underlain by the Chalk, classified as a Principal aquifer. The chalk strata dip toward the south east as part of the northern limb of the London Basin syncline. The hardbands within the Chalk can act

as preferential flow horizons, which include Melbourn Rock and Totternhoe Stone.

9.6.139 In places described above, the Chalk aquifer is overlain by River Terrace Deposits, classified as a Secondary A aquifer.

9.6.140 The alluvium in the River Kennet and River Snail valleys is not explicitly classified as an aquifer but where overlying the gravels they are part of the deposits classified as a Secondary A aquifer.

9.6.141 The connectivity between aquifers is not known but the Chalk aquifer can be expected to be in hydraulic continuity with the gravel aquifers depending on the presence of silt and clay horizons. Alluvium may confine chalk/gravel groundwater levels in the river valleys potentially limiting chalk groundwater discharge depending on the proportion of clay in the alluvium locally. The Lowestoft Formation Till deposits are classified as unproductive and confine groundwater in underlying aquifers.

9.6.142 Groundwater flow in the Chalk aquifer is understood to flow to the north west (Ref 9-1, Ref 9-2) toward the River Great Ouse, at an elevation of approximately 5-20m AOD from the Sunnica East Site A in the north to the Sunnica West A site in the south.

9.6.143 Groundwater levels are estimated to be approximately 15-20mAOD at Sunnica West Site A and the Grid Connection Route A, and approximately 8-9mAOD at Sunnica West Site B. Along the Grid Connection Route B and Burwell National Grid Substation Extension (both locations) groundwater levels are estimated to be approximately 4-8mAOD. At Sunnica East Site A groundwater levels are estimated to be approximately 2-5mAOD, and at Sunnica East Site B approximately 6-9mAOD

9.6.144 Chalk groundwater contouring (1995 annual average representing typical conditions) near the site does not indicate groundwater converging on the River Snail or River Kennett, indicating that Chalk aquifer groundwater does not provide baseflow in the area, at least between low to average groundwater levels, and is limited to certain river reaches rather than accreting across the full length of the river. Ground elevation along the river valleys of the Kennett, and Lee Brook also indicates that the river bed is likely to be above the Chalk aquifer water table until the lowest reaches near the confluence with the River Lark. Similarly, the River Snail river bed is likely to be above the Chalk aquifer water table until the lowest reaches after joining the Soham Lode.

9.6.145 These streams are likely to be supported by groundwater storage in the gravel and alluvial aquifers and Chalk aquifer baseflow in the upper catchment areas. Accretion profiles developed from spot flow gauging in 2006 (Ref 9-29) indicates a small gain in baseflow as the River Snail crosses the chalk hardbands, indicating some preferential flow along these horizons to surface discharge points, but the majority of Chalk aquifer

groundwater flows to the north west to discharge at springs near the base and edge of the Chalk outcrop approximately 5km north west.

9.6.146 There are several Environment Agency groundwater monitoring boreholes in the vicinity of the sites screened in the Chalk aquifer. TL67/099 is situated between the River Snail and River Kennett, and north of Chippenham Fen. TL67/077 is situated east of the River Kennett. TL66/087 is situated west of the River Snail between Landwade and Burwell.

9.6.147 TL67/099 monitoring shows groundwater to be typically approximately 12m below ground level, fluctuating generally between 3-5m AOD. However, groundwater levels here have been on a declining trend and may be influenced by abstraction. TL67/077 monitoring shows groundwater to be typically approximately 7m below ground level, fluctuating generally between 6-7m AOD. TL66/087 monitoring shows groundwater to be typically approximately 19.5m below ground level, fluctuating generally between 8-9m AOD. Therefore, groundwater level fluctuation is generally within 2m in the area.

9.6.148 Chippenham Fen SSSI is part of Fenland SAC, and is situated less than 100m north east of Sunnica West Site B. It is a wetland habitat comprising fen, fen grassland, and basic flush on peat soils as well as calcareous grassland, open grassland, woodland and open water.

9.6.149 Chippenham Fen SSSI is considered to be fed by Chalk groundwater. As the SSSI is surrounded by Totternhoe Stone, this hardband may be a conduit for Chalk groundwater to discharge in the area, creating saturated conditions allowing the fenland habitat to develop.

9.6.150 Chippenham Fen is at an elevation of 12m AOD and therefore groundwater is anticipated to be at least 5m below ground in the area, so upward flow under pressure along this hardband at depth is a possible mechanism for groundwater discharge in this location. The lower permeability marly nature of the Lower Chalk units in this area may cause confinement of groundwater such that it may flow under pressure via high permeability hardbands.

9.6.151 Sunnica West Site B is within 100m of Chippenham Fen, however, it is not considered to be up hydraulic gradient based on Chalk groundwater contours (Ref 9-8). Groundwater flow is to the north west, therefore Sunnica West Site A is likely to be up gradient, situated approximately 2km south east.

9.6.152 The site is underlain by the Cam and Ely Ouse Chalk Groundwater Body (GB40501G400500) (Ref 9-7), which is classified as Poor status. Both quantitative and qualitative elements are classified Poor. All quantitative elements are classified as Poor except the Saline Intrusion test. Chemical status is Poor due to failures of the Drinking Water Protected Area and General Chemical Test elements.

9.6.153 Numerous groundwater abstractions are located around the margins of the sites, in particular to the west of Sunnica East Site A associated with a source SPZ. The SPZI and II are outside of the Order limits except for a small area in the north west of Sunnica West Site A and the Grid Connection Route B to Sunnica West Site B.

9.6.154 **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]** presents the Environment Agency licensed abstractions within 500m of the nearest site boundary. There are 63 abstractions within 500m and 95 within 1km. There are 13 licences within the Order limits.

9.6.155 **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]** presents the private water supply abstractions within 500m of the nearest site boundary registered with West Suffolk and East Cambridgeshire local authorities. There are 5 abstractions registered with West Suffolk Council within 500m. There are 4 abstractions registered with East Cambridgeshire Council within 500m.

*Groundwater Chemistry (All sites)*

9.6.156 Groundwater sampling has not been conducted in the area as part of the ES. The groundwater chemistry is based on a study of the Great Ouse catchment by the BGS for the Environment Agency (Ref 9-31). **Plate 9-1** below shows the Great Ouse chalk area included within the baseline groundwater chemistry area.

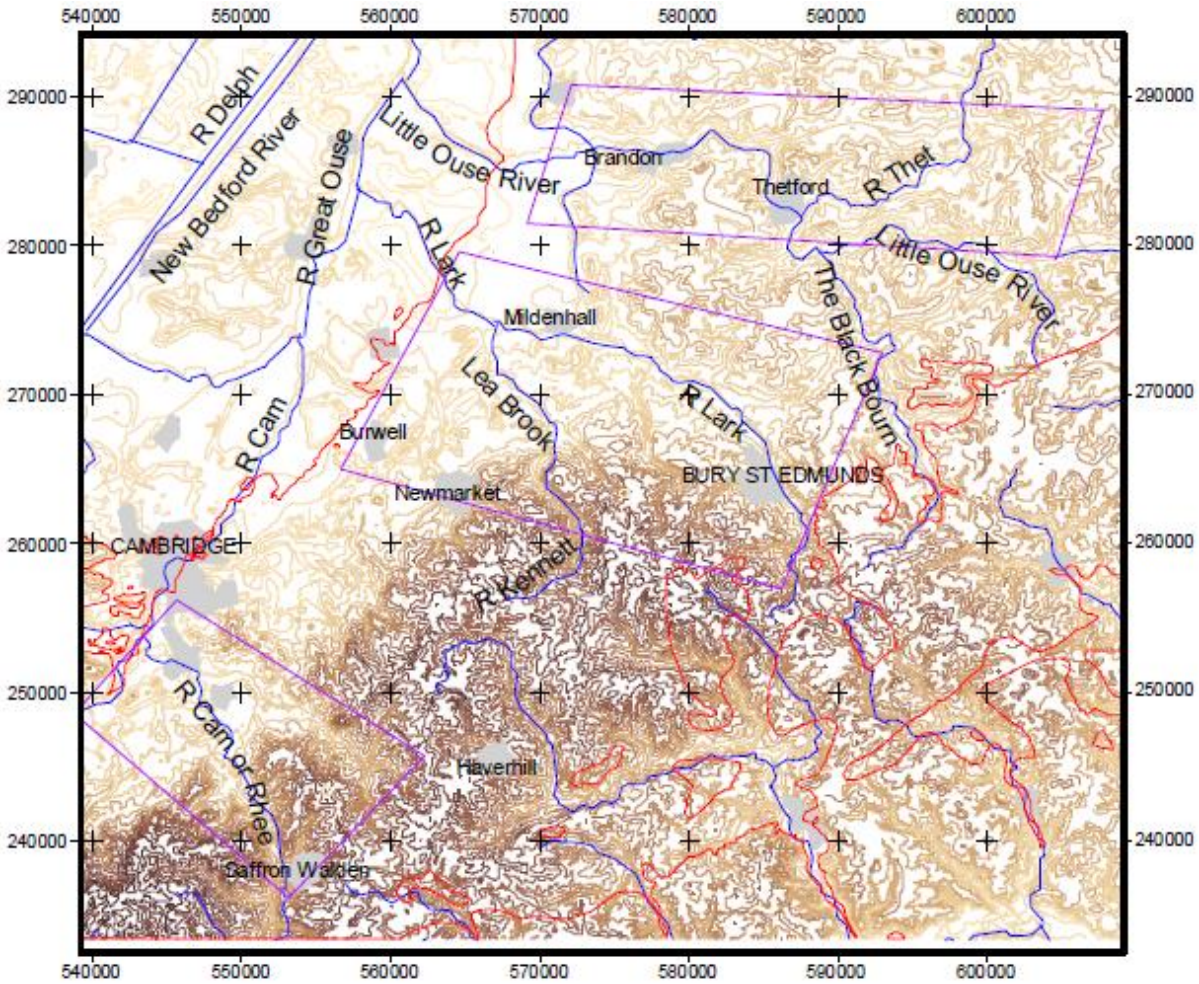



**Plate 9-1 Great Ouse Chalk baseline groundwater chemistry study area (Ref 9-31)**

9.6.157 Natural variability of the structure, mineralogy and geochemistry of the Chalk will result in variations in the groundwater chemistry. The Chalk is a dual porosity aquifer, which may result in pore water chemistry (dominated by diffusion processes) being different to fracture network water chemistry (dominated by advection and dispersion). It has been found that the fracture water composition can differ considerably from the matrix water; the matrix water forms the greater volume within the aquifer (Ref 9-31).

9.6.158 Forty-four (44 no.) samples were collected in July and September 2002 from 38 different sites. The main constituents of the baseline chemistry in the Great Ouse Chalk is given in Table 9D-3 in **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]**.

9.6.159 The chalk groundwater is dominated by calcium and bicarbonate, typical of unconfined chalk groundwater. Higher concentrations of dissolved oxygen are found in the central and lower parts of the catchment, including the land within the Order limits, consistent with unconfined chalk, with the overlying Till deposits to the south leading to lower dissolved oxygen. Nitrate is

recorded at elevated concentrations, typical of agricultural impacts in groundwater, while phosphorus mean concentrations are below detection limits.

9.6.160 Manganese, strontium and barium are the main trace elements, typical of chalk groundwater. Some samples of manganese exceed drinking water guideline with the 97.7 percentile just below the guideline. Trace elements in the baseline groundwater chemistry are given in Table 9D-4 in **Appendix 9D** of this Environmental Statement **[EN010106/APP/6.2]**.

9.6.161 The baseline study (Ref 9-31) concluded that the groundwaters are natural in composition related to the Chalk matrix and in the upper catchment, recharge and runoff recharge related to the overlying Till deposits. It was considered that the Till deposits also provide important contributions of trace metals to the Chalk such as nickel and cobalt. There is an increasing trend in nitrate, the high concentrations being derived from agricultural activities rather than the natural baseline. Point sources of pollution such as septic tanks and sewer leaks may also contribute to the elevated concentrations and rising trend.

*Aquatic Ecology and Nature Conservation Sites (All sites)*

9.6.162 There are several SSSIs, SACs, NNRs, LNRs and Ramsar sites in the study area that are believed to be water dependent and thus relevant to this assessment:

a. Chippenham Fen and Snailwell Poor's Fen SSSI (in favourable status), Fenland SAC and Chippenham Fen NNR and Ramsar Site, is directly adjacent to the north of the Sunnica West Site B;
b. Brackland Rough SSSI is a damp valley woodland located approximately 200m north of Grid Connection Route B, and over 350m north of the Sunnica West Site B;
c. Cherry Hill and The Gallops, Barton Mills SSSI (currently in unfavourable declining condition), and Barton Mills LNR, approximately 1km east of the Sunnica East Site A;
d. Red Lodge Heath SSSI (currently in unfavourable recovering condition), approximately 600m south-east of the Sunnica East Site B; and,
e. Snailwell Meadows SSSI, connected to River Snail (in unfavourable recovering condition), approximately 50m south of the Sunnica West Site B and 500m south of Grid Connection Route B.

9.6.163 The importance of waterbodies will be determined taking account of any relevant ecological nature conservation designation, but also aquatic protected species that may be present. Current information on the potential for aquatic protected species to be present is described in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]**.

### Future Baseline

#### *Surface Water*

9.6.164 Some of the surface WFD waterbodies are predicted to improve in the future, with the aim generally to meet Good Ecological Potential by 2027. Some are already at their target objective (i.e. the River Lark downstream of Mill Bridge, Lee Brook, and Soham Lode). Indeed, there is a general trend for water quality improvements over time in response to improved regulation and treatment practices. However, the current receptor importance criteria presented in **Table 9-1** is largely based on the presence or not of various attributes (e.g. Drinking Water Protected Area, designated nature conservation site or WFD designation) and flow (i.e. the size of the watercourse). The application of these criteria is therefore not sensitive to more subtle changes or improvements in water quality as may be experienced over time. Thus, no significant changes to current baseline conditions are predicted for the future baseline as the principle reasons for differences in water body importance are unlikely to change.

#### *Groundwater*

9.6.165 The future baseline will be largely the same as the current baseline. The Cam and Ely Ouse Chalk groundwater body is currently at Poor status and there is no time objective to reach Good status. Improvements in surface water status and wetlands are planned such that the groundwater body elements ‘Quantitative GWDTEs’ and ‘Quantitative Dependent Surface Water Body Status’ tests have an objective to be Good by 2027 (Ref 9-7). However, the groundwater body overall remains at Poor status.

#### *Flood Risk*

9.6.166 Climate change is predicted to alter the future fluvial flood risk and thus it is important that it is taken into account by FRA. Climate change resilience has been accounted for within the proposed SuDS drainage strategy, accommodating current government climate change projections (refer to **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]** for further information).

### Summary of Water body Importance

9.6.167 **Table 9-12** provides a summary of the waterbodies that may be impacted by the Scheme, a description of their attributes, and states the importance of the water body as used in this assessment. The importance of waterbodies will be kept under review as further information and data becomes available. Please note that separate importance classifications are provided for water quality and morphological aspects of waterbodies as it is not always appropriate to have the same rating (e.g. a water body may be heavily modified or even artificial and thus have a low morphology importance, but the water quality may be high by virtue of supporting

protected species or other important potable or socio-economic and recreational uses).

**Table 9-12 Importance of Attributes**

| Water body | Description of Attributes | Importance |
|---|---|---|
| Surface water quality<br>River Kennett – Lee Brook water body (GB105033043020) | Currently on Poor Ecological Potential (target of Good status for 2027). Q95 Flow recorded downstream of 0.017m$^3$/s used for Abstractions for irrigation. | High |
| Surface water quality<br>River Lark (Lark downstream of Mill Street Bridge water body (GB105033043052) | Currently at Moderate Ecological Potential, its target status. Q95 flow monitored at 0.439m$^3$/s 5km northwest of Worlingham. Abstractions for spray irrigation. | High |
| Surface water quality<br>River Lark Tributary 1, and River Lark Tributary 2 | First order tributary with little or no biodiversity interest and socio-economic uses (based on available information). Potentially ephemeral in its nature. These watercourses are not designated as WFD waterbodies in their own right. River Lark Tributary 1 does flow close to pond WB1, which may support GCN, but this pond is thought to be offline. | Medium |
| Surface water quality<br>Lee Brook (GB105033042970) | Currently at Moderate Ecological Potential, its target status. Q95 Flow recorded downstream of 0.017m$^3$/s. used for abstractions for irrigation. | High |
| Surface water quality<br>Kennett-Lee Brook catchment area (GB105033042990) | Currently at Moderate Ecological status, its target status. Q95 Flow recorded downstream of 0.017m$^3$/s. used for Abstractions for irrigation. | High |
| Surface water quality<br>Dane Hill watercourse | First order tributary with little or no biodiversity interest and socio-economic uses (based on available information). Potentially ephemeral in its nature. This watercourse is not designated as a WFD water body in its own right, and connectivity to other WFD locally is uncertain. It is within the Kennett-Lee Brook catchment. | Low |
| Surface water quality<br>River Snail within the Soham Lode Catchment water body (GB105033042860) and its tributary draining the Chippenham Fen | Currently at Moderate Ecological status, its target status. The Q95 flow (that which is exceeded 95% of the time) is 0.106m$^3$/s. Abstractions for spray irrigation. | High |

| Water body | Description of Attributes | Importance |
|---|---|---|
| Surface water quality<br>New River (GB105033042780) | Currently at Moderate Ecological Potential, with a target of Good Ecological Potential by 2027. No flow information. | High |
| Surface water quality<br>Burwell Lode (GB105033042720) | Currently at Moderate Ecological Potential, exceeding its target status of Poor Ecological Potential by 2015. | Medium |
| Surface water quality<br>Drains within the catchment area of Burwell Lode | Artificial drainage ditches managed by the the IDB. These are not designated under WFD in their own right. They artificially drain with the use of pumps. | Low |
| Surface water quality<br>Pond 'Moat' referred to as WB1 in **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1].** | Positive eDNA survey for GCN | High |
| Surface water quality<br>Other water storage lagoons/ponds in the study area | Ecology surveys for GCN eDNA were all negative for those surveyed (except for WB1 above) | Low |
| Groundwater<br>Cam and Ely Ouse Chalk Groundwater Body (GB40501G400500) | Both quantitative and qualitative elements are classified Poor. Objective Good by 2027 for Quantitative GWDTEs test and Dependent Surface Water Body Status test. | High |
| Flood Risk Sunnica East Site A<br>River Lark<br>Lee Brook | The majority of the site is Flood Zone 1. There are areas of Flood Zone 2/3 associated with the Lee brook and River Lark encroach onto Sunnica East Site A. River Lark fluvial flood zone contains properties benefitting from flood defences.<br>Lee Brook fluvial flood zone contains agricultural land usage. | River Lark: Low<br>Lee Brook: Low |
| Flood Risk Sunnica East Site B<br>River Lark<br>Lee Brook | Both as above. | River Lark: Low<br>Lee Brook: Low |
| Flood Risk Sunnica West Site A<br>Lee Brook<br>Kennett-Lee Brook | The majority of the site is Flood Zone 1. Fluvial Flood Zones 2/3 associated with both watercourses. The fluvial flood zone mapping shows agricultural land usage within the areas potentially affected. | Lee Brook: Low<br>Kennett-Lee Brook: Low |

| Water body | Description of Attributes | Importance |
|---|---|---|
| Flood Risk Sunnica West Site B<br>River Snail | The majority of the site is Flood Zone 1. Majority of site is fluvial Flood Zone 1, but flood zone 2/3 encroach on northern area of the site from the River Snail. Some areas of industrial estate are contained within the associated fluvial Flood Zone 2/3. | River Snail: Medium |
| Flood Risk Grid Connection Route A<br>River Kennet | The majority of the site is Flood Zone 1. The route crosses the River Kennet fluvial flood zones Flood Zone 2/3. The areas at risk of flooding contain agricultural land. | River Kennet: low |
| Flood Risk Grid Connection Route B<br>River Snail<br>New River<br>Burwell Lode | The route is largely Flood Zone 1 but passes through areas of Flood Zone 2/3 associated with River Snail, New River, and Burwell Lode (defended Flood Zone 3a).<br>River Snail floodplain contains some industrial properties. New River fluvial floodplain contains agricultural land use, and Burwell Lode contains some farming properties. | River Snail: Medium<br>New River: Low<br>Burwell Lode: Medium |
| Burwell National Grid Sub Station Extension | Mainly contained within Flood Zone 1, with approximately 15% in Defended Flood zone 3a. | Burwell Lode flood plain area: Medium |
| Hydromorphology Sunnica East Site A<br>River Kennet-Lee Brook | The Kennet–Lee Brook is characterised by a heavily modified, lowland watercourse with an over straight planform. The watercourse has a low gradient and flows through a thin band of superficial alluvial deposits within an unconfined valley. Superficial deposits close to the confluence with the River Lark are shown as Peat. Bedrock through this reach is chalk. The earliest available historic mapping dates back to 1885 where the Kennet-Lee Brook is already shown to be in its currently alignment. Given the surrounding land use it is considered likely that realignment occurred to make room for agriculture. | Medium |

| Water body | Description of Attributes | Importance |
|---|---|---|
| Hydromorphology<br>Sunnica East Site A<br>River Lark | The River Lark through this reach is characterised by a heavily modified, lowland watercourse with a passively meandering planform. The watercourse has a low gradient and flows through a thin band of peat (superficial geological deposits) within an unconfined valley, overlying bedrock geology of chalk. Historic mapping indicates that the watercourse has followed the same planform since 1885, and suggests modification predates this mapping. The tributary to the River Lark to be crossed is assessed the same as the River Lark. | Medium |
| Hydromorphology<br>Sunnica East Site B<br>River Lark Tributary 1 | River Lark Tributary 1 flows through superficial deposits of alluvium, river terrace deposits and head deposits, overlying chalk bedrock. The watercourse is artificially straight, characteristic of a drainage ditch. Historic mapping is available as far back as 1885 and the watercourse is not shown on this initial OS map. This suggests that it is possible that this is a completely artificial channel, created to aid land drainage. The watercourse is present in 1888 – 1913 map iteration, following largely the same straight course as the contemporary channel. | Low |
| Hydromorphology<br>Sunnica East Site B<br>River Lark Tributary 2 | River Lark Tributary 2 is an over straight watercourse, characteristic of an agricultural drainage ditch. No superficial deposits are shown for this watercourse, overlying chalk bedrock. The watercourse is artificially straight indicating historic modification. Historic mapping is available as far back as 1885 and the watercourse is present following the same course as the contemporary channel. | Medium |

| Water body | Description of Attributes | Importance |
|---|---|---|
| Hydromorphology<br>Grid Connection Route A<br><br>River Kennett | The River Kennet through this reach is characterised by a heavily modified, lowland watercourse with a passively sinuous planform. The watercourse has a low gradient and flows through a thin band of alluvial deposits within an unconfined valley. Historic mapping indicates that the planform through this reach was straightened between 1892 and 1914. Present day (2020) OS mapping suggests that it is possible that some of the meander cut off channels remain in situ but this has not been confirmed. The River Kennett in the vicinity of the crossing location has a wooded riparian zone and therefore potential to create flow variation within the channel through the presence of large woody material. | Medium |
| Hydromorphology<br>Grid Connection Route B<br><br>Burwell Lode | Burwell Lode is an artificial drainage ditch, straight incised and embanked with no hydromorphological value. The watercourse flows through peat, overlying chalk in a low gradient, unconfined channel. The flow regime is considered likely to be uniform throughout with an absence of bedforms, although this has not been verified. Channel modifications pre-date earliest available OS mapping, however it is considered likely that this watercourse is a completely artificial ditch, created for the purposes of agricultural land drainage | Low |
| Hydromorphology<br>Grid Connection Route B<br><br>New River | New River flows through a wide area of peat, overlying bedrock of chalk in a low gradient, unconfined valley. The watercourse is a heavily modified watercourse and is over-wide, artificially straight through the study reach. Embankments along the length of the watercourse have severed lateral connectivity and the flow regime is considered likely to be uniform with little variation and a lack of bedforms although this has not been verified. Historic mapping indicates that the watercourse has followed the same planform since 1885, and modification predates this mapping. | High (precautionary pending future surveys) |

| Water body | Description of Attributes | Importance |
|---|---|---|
| Hydromorphology<br>Sunnica West Site A<br>Lee Brook | Lee Brook is a heavily modified watercourse and is over straight, over wide and incised through the study reach. The watercourse flows through a band of alluvium and peat, overlying bedrock of chalk in a low gradient, unconfined valley. The flow regime is considered likely to be uniform with little variation and a lack of bedforms. Historic mapping indicates that the watercourse has followed the same planform since 1885, and likely predates this mapping. | Medium |
| Hydromorphology<br>Sunnica West Site A<br>Dane Hill Watercourse | Dane Hill watercourse is artificially straight, particularly in the lower reaches, and follows the contours of Dane Hill. Historic mapping is available as far back as 1885 and the watercourse is not shown on this initial OS map. This suggests that it is possible that this is a completely artificial channel with little/ no morphological or flow variation, created to aid land drainage through historic plantations. The watercourse is present in 1888 – 1913 map iteration, following largely the same straight course as the contemporary channel. Historic mapping shows the watercourse connecting to a series of land drainage ditches with no apparent connection to the River Kennett. | Medium |
| Hydromorphology<br>Sunnica West Site B<br>Grid Connection Route B<br>River Snail | The River Snail in the vicinity of the site is classified by a heavily modified watercourse flowing superficial deposits of alluvium and river terrace deposits, overlying bedrock of chalk. The width of the alluvial deposits suggest that the natural typology of the watercourse was more sinuous than its contemporary form. Historic mapping is available as far back at 1885 and shows the watercourse in its current alignment. Based on historic land use it is likely that the watercourse was modified to service mills in the area. | Medium |
| Hydromorphology<br>Burwell National Grid Substation Extension<br>Drains within the catchment area of Burwell Lode | Artificial drainage ditches managed by the IDB. These are not designated under WFD in their own right. They artificially drain with the use of pumps. | Low |

## 9.7 Embedded Design Mitigation

9.7.1 The Scheme has been designed, as far as possible, to avoid and minimise impacts and effects on the water environment through the process of design development, and by embedding measures into the design of the Scheme.

9.7.2 A number of standard and embedded measures have been identified, which would be implemented by the contractor to manage the impacts and reduce the effects that the construction of the Scheme would have on the water environment.

**Standard Mitigation**

9.7.3 The construction of the Scheme would take place under a Framework CEMP. The Framework CEMP details the measures that would be undertaken during construction to mitigate the temporary effects on the water environment. A Framework CEMP is provided in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]** and provides the framework for the CEMP, which would be updated following the final recommendations of the ES and would be produced in advance of construction works following grant of the DCO, if approved.

9.7.4 The CEMP would comprise good practice methods that are established and effective measures to which the development would be committed through the development consent. The measures within the document would focus on managing the risk of pollution to surface waters and the groundwater environment. It would also consider the management of activities within floodplain areas (i.e. kept to a minimum and with temporary land take required for construction to be located out of the floodplain as far as reasonably practicable).

9.7.5 The CEMP would be reviewed, revised and updated as the Scheme progresses towards construction to ensure potential impacts and residual effects are considered and addressed as far as practicable, in keeping with available good practice at that point in time. The principles of the mitigation measures set out below are the minimum standards that the Contractor would implement. However, it is acknowledged that for some issues, there are multiple ways in which they may be addressed and methods of dealing with pollutant risk would be continually reviewed and adapted as construction works progress (e.g. the management of construction site runoff containing excessive levels of fine sediments).

9.7.6 The CEMP would be standard procedure for the Scheme and would describe the principles for the protection of the water environment during construction. The CEMP would be supported by a Water Management Plan (WMP) that would provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction. The WMP will be secured through a Requirement as part of the CEMP. The potential for adverse impacts would be minimised by the

adoption of the general mitigation measures outlined below, which would be described in the WMP and CEMP.

9.7.7 Where not disapplied through the DCO, temporary and permanent consents would be obtained where necessary from the Environment Agency for works affecting the Main Rivers. However, it is acknowledged that underground techniques would be used to install power cables beneath watercourses which would not impact the channel or the bed. The depth below the riverbed of the cables would be a minimum of 2m.

9.7.8 Where not disapplied through the DCO, Land Drainage consents would be applied for where necessary on the ordinary watercourses from the local authority and the Swaffham IDB.

9.7.9 The Contractor would comply with any conditions imposed by any relevant permissions.

*Management of Construction Site Runoff*

9.7.10 Mitigation measures are described in detail below and would be adhered to during the construction phase of the Scheme. The proposed access roads are an important part of the Scheme construction area. The embedded mitigation measures identified below apply equally to the main construction areas and the access roads.

9.7.11 The construction of the Scheme would be in accordance with good practice as detailed by the guidance documents which are listed in Legislation and Policy **Appendix 9A** of this Environmental Statement **[EN010106/APP/9.1**].

9.7.12 The measures outlined below, which are included in the Framework CEMP (see **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**), would be required for the management of fine particulates in surface water runoff as a result of the construction activities:

a. All reasonably practicable measures would be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse, arising from construction activities. The measures would accord with the principles set out in industry guidelines including the CIRIA report 'C532: Control of water pollution from construction sites' (Ref 9-32) and CIRIA report ‘C649 Control of water pollution from linear construction sites’ (Ref 9-33). Measures may include use and maintenance of temporary lagoons, tanks, bunds and fabric silt fences or silt screens as well as consideration of the type of plant used;

b. A temporary drainage system would be developed to prevent runoff contaminated with fine particulates from entering surface water drains without treatment. This would include identifying all land drains and waterbodies within the Order limits and ensuring that they are adequately protected using drain covers, sand bags, earth bunds,

geotextile silt fences, straw bales, or proprietary treatment (e.g. lamella clarifiers). Infiltration to ground (e.g. by spraying water onto grass fields) may also be an option;

c. Scheme construction drainage would provide appropriate pollution control measures as agreed with the sewerage undertaker or the Environment Agency as appropriate. Holding or settling tanks, separators and other measures as may be required, would be provided and maintained;

d. The relevant sections of BS 6031: Code of Practice for Earthworks (Ref 9-34) would be followed for the general control of site drainage;

e. Where practical, earth works would be undertaken during the drier months of the year. When undertaking earth moving works periods of very wet weather would be avoided, where practical, to minimise the risk of generating runoff contaminated with fine particulates. However, it is likely that some working during wet weather periods would be unavoidable, in which case other mitigation measures (see below) would be implemented to control fine sediment laden runoff. Water may also be required to dampen earthworks during dry weather to reduce dust impacts, and any runoff generated would need to be appropriately managed by the Contractor in accordance with the pollution prevention principles described in this chapter;

f. To protect watercourses from fine sediment runoff, topsoil/subsoil would be stored a minimum of 20m from watercourses on flat lying land. Where this would not be practicable, and it is to be stockpiled for longer than a two-week period, the material would either be covered with geotextile mats, seeded to promote vegetation growth, or runoff prevented from draining to a watercourse without prior treatment;

g. Appropriately sized runoff storage areas for the settlement of excessive fine particulates in runoff would be provided. Construction site runoff would be treated on site and discharged under a Water Discharge Activity Permit from the Environment Agency to controlled waters (potentially also including infiltration to ground), or removed from site for disposal at an appropriate and licenced waste facility;

h. Equipment and plant are to be washed out and cleaned in designated areas within the Scheme compound where runoff can be isolated for treatment before disposal as outlined above;

i. Mud deposits would be controlled at entry and exit points to the Scheme using wheel washing facilities and / or road sweepers operating during earthworks activities or other times as required;

j. Debris and other material would be prevented from entering surface water drainage, through maintenance of a clean and tidy site, provision of clearly labelled waste receptacles, grid covers and the presence of site security fencing; and

k. The WMP would include details of pre, during and post-construction water quality monitoring. This would be based on an olfactory / visual observations and in situ monitoring using a hand held probe.

*Management of Spillage Risk*

9.7.13 The measures outlined below would be implemented to manage the risk of accidental spillages on site and potential conveyance to nearby waterbodies via surface runoff or land drains.

9.7.14 The following mitigation measures relating to the control of spillages and leaks are included in the Framework CEMP in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]** and would be adopted during the construction works:

a. Fuel would be stored and used in accordance with the Control of Substances Hazardous to Health Regulations 2002 (Ref 9-35), and the Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref 9-36). Particular care would be taken with the delivery and use of concrete and cement as it is highly corrosive and alkaline;

b. Fuel and other potentially polluting chemicals would either be in self bunded leak proof containers or stored in a secure impermeable and bunded area (minimum capacity of 110% of the capacity of the containers);

c. Any plant, machinery or vehicles would be regularly inspected and maintained to ensure they are in good working order and clean for use in a sensitive environment. This maintenance is to take place off site if possible or only at designated areas within the Scheme compound. Only construction equipment and vehicles free of all oil/fuel leaks would be permitted on site. Drip trays would be placed below static mechanical plant;

d. All washing down of vehicles and equipment would take place in designated areas and wash water would be prevented from passing untreated into watercourses;

e. All refuelling, oiling and greasing would take place above drip trays or on an impermeable surface which provides protection to underground strata and watercourses, and away from drains as far as reasonably practicable. Vehicles would not be left unattended during refuelling;

f. As far as reasonably practicable, only biodegradable hydraulic oils would be used in equipment working in or over watercourses;

g. All fixed plant used on the Site would be self-bunded;

h. Mobile plant is to be in good working order, kept clean and fitted with plant 'nappies' at all times;

i. The WMP would include details for pollution prevention and would be prepared and included alongside the Framework CEMP. Spill kits and oil absorbent material would be carried by mobile plant and located at high

risk locations across the Scheme and regularly topped up. All construction workers would receive spill response training and tool box talks;

j. The Scheme would be secure to prevent any vandalism that could lead to a pollution incident;

k. Construction waste / debris are to be prevented from entering any surface water drainage or water body;

l. Surface water drains on public roads trafficked by plant or within the construction compound would be identified and, where there is a risk that fine particulates or spillages could enter them, the drains would be protected (e.g. using covers or sand bags) or the road regularly cleaned by road sweeper;

m. Suitable facilities for concrete wash water (e.g. geotextile wrapped sealed skip, container or earth bunded area) would be adequately contained, prevented from entering any drain, and removed from the Site for appropriate disposal at a suitably licenced waste facility; and

n. Water quality monitoring of potentially impacted watercourses would be undertaken to ensure that pollution events can be detected against baseline conditions and can be dealt with effectively.

9.7.15 In addition, any site welfare facilities would be appropriately managed, and all foul waste disposed of by an appropriate contractor to a suitably licenced facility.

*Watercourse Crossings with Non-Intrusive Techniques*

9.7.16 In addition to the control and management measures for site runoff and spillage risk noted above, the methodology of the Horizontal Directional Drilling (HDD), or other trenchless techniques, would include measures to minimise the risk to the environment. Although the use of this techniques avoids the need to excavate a cable trench through the channel, there are risks associated with the use of drilling muds and plant close to the channel. For example, although rare, without due care there is a risk that drilling muds can 'break out' into watercourses leading to pollution. There is also a need to manage drilling muds and wastewater so that this would not be spilt into the channel when working close to the banks of a watercourse.

9.7.17 The method of non-intrusive watercourse crossings seeks to minimise the risk of pollution of nearby watercourse. The send and receive pit excavations would be located at least 10m from the watercourse (measured from the water's/channel edge under normal flows) under which they would be directional drilled.

9.7.18 The exact dimensions of the send and receive pits would be determined by site and ground conditions but will be kept to a safe minimum in terms of length, width and depth. For this assessment, it has been assumed that launch and receive pits will be no greater than 4m by 3m by 2m deep. A shoring system appropriate to the ground conditions would be used to

minimise water ingress into the pits. This may be timbers, sheet piling, or a modular system and would be chosen based on suitability for the site conditions. The ingress of any groundwater will be carefully managed through design of the send or receive pit, shoring method, and a pumping and treatment system. Excessive ingress of water would make the pit unsafe and thus it is important that ingress is minimised and that a suitable system of managing that water is implemented. Once the cable is installed beneath the watercourse the pits and any cable trenches will be backfilled to the original ground level and seeded to reduce the risk of runoff and fine sediments entering the watercourse. The drill fluids used within the HDD machine would be water based, such as naturally occurring bentonite clay. The fluid component of the drilling mud would be mains water, obtained from a nearby supply and tankered to site when required. There would be some recycling of drilling muds by the drilling plant used.

9.7.19 The bentonite within the drilling fluid is a naturally occurring mineral and enables the fluid to have sufficient viscosity to carry the cutting chips back to the surface machine whilst lubricating and keeping cool the drilling bit. HDD, or other trenchless techniques, would be undertaken by a specialist contractor and the water column above the drill path would be continuously monitored during drilling. It is acknowledged that drill fluid leakage into a watercourse is not a common problem. However, where any leakage of bentonite water is observed in the watercourse or there is an increased perceived risk (i.e. lack of drilling mud returns) the HDD operation would be suspended, remediation action implemented, and subsequently the methodology for that crossing re-evaluated. It may be that the excavation, or boring, in that area must take place at a deeper depth than the minimum 2m below the bed of the watercourse.

9.7.20 The reasonable worst case scenario for the rail crossing is drilling and installing the cable duct to approximately 10m depth. The A11 crossing is also intended to be up to 10m depth but may be up to a maximum of 20m depth. The maximum duct depths for all other crossings is 20m, however shallow depths are preferred from an engineering perspective.

9.7.21 The cable ducts are 200 mm diameter, with three ducts in a trefoil formation giving a profile thickness of approximately 440mm and are anticipated to be below the water table over much of their lengths. This will form an obstruction within the Chalk aquifer, but as the profile of the duct is small compared to the aquifer thickness, and the aquifer is considered to be sufficiently permeable, it is not expected that groundwater flow will be impeded around the ducts. Deeper cable ducts to the maximum design depth are not expected to increase the risk of impeding groundwater flow, as at greater depth the quantity of groundwater flow is typically less than in the shallower chalk. Overall, although ‘break out’ of drilling fluids is a risk, it is believed this risk can be managed, and non-intrusive crossings of watercourses remain the least impacting option and the preferred for larger channels.

9.7.22 The drilling fluid that returns to the drilling rig is recycled within that drilling rig (e.g. the Ditch Witch). Any wastewater / drilling products which are not recycled must be stored and removed from the Site by a suitable waste management contractor and disposed of at a licenced wastewater facility.

*Watercourse Crossings with Intrusive Techniques*

9.7.23 Intrusive watercourse crossing techniques will only be used for more minor watercourses/drains, some of which will be dry, ephemeral channels associated with field boundaries. For watercourses identified on site and from online digital OS maps, **Table 9-13** lists those that have been identified to be crossed with an intrusive method. The extent of excavations would be limited to a maximum width of 3.5m.

9.7.24 Where HDD, or other trenchless techniques, would not be used, a pre-works hydromorphological survey must be undertaken to record channel features and provide the baseline against which reinstatement will be provided. Reinstatement will aim to provide an improved channel form with enhancement works to be carried out (where relevant and appropriate to do so) between 5 and 10m upstream and downstream of the open trench. It is anticipated that enhancements will consist of soft engineering techniques and improvements to the riparian corridor to improve channel diversity and biodiversity. The WFD Mitigation Strategy will be secured through the Framework CEMP.

9.7.25 Where possible intrusive watercourse crossings will be carried out during drier periods of the year or during a period of dry weather where flows in the watercourse are low (this may be baseflow or where the channels are very small and not as well connected to groundwater, they may even be dry). However, this cannot be guaranteed and so any water flow within the watercourse would need to be over-pumped/flumed through the works area to maintain a dry trench and to reduce pollution risks.

9.7.26 Bank and bed sediments must be stored separately and in distinct layers as excavated on geotextile layers so they can be reinstated as found following completion of the works. The banks and the bed will need to be appropriately reprofiled with the inclusion of suitable geomorphic features with the aim to provide betterment on the original channel. Banks will be replanted with suitable riparian species. A suitable geotextile will need to be pinned in place to provide bank protection while new planting establishes (or other suitable measures to prevent soil erosion and bank instability). Temporary fencing may also need to be installed where local land use will remain unchanged and fields are used for livestock (to prevent bank poaching).

9.7.27 **Table 9-13** sets out the watercourse crossings and the proposed construction methodology. This table also includes the results of a groundwater risk analysis of the location of each non-intrusive watercourse crossing as shown on Figure 3-23. This is to compare the likely depth of

excavation with available estimates of groundwater level at each site. Ground elevation has been estimated from OS topographical data minus 2m for the proposed maximum depth of pit excavation. Excavations have been categorised according to whether the water table is:

a. Red (higher risk of encountering groundwater): Groundwater is likely to be generally within 2m of ground elevation, which if the pit is 2m deep, groundwater ingress is expected to be a likely occurrence;
b. Amber (medium risk of encountering groundwater): Groundwater is predicted to be around the base of the 2m deep pit excavation and therefore may be encountered; and
c. Green (lower risk of encountering groundwater): Groundwater is estimated to be below the depth of the excavated pit and the excavation is predicted to remain dry.

9.7.28 Please note that in addition to watercourse crossings, the railway, A11, and some other features (e.g. hedgerows) will be crossed by the cable corridor. However, launch/receive pits for these crossings are expected to be no deeper than the excavations for watercourse crossings and thus are unlikely to result in significant ingress of groundwater and are of low sensitivity compared to watercourses. Therefore, these are not considered in **Table 9-13**.

*Methodology for Infilling and Diversion of Ditch within Burwell National Grid Sub-station Extension*

9.7.29 Within the footprint of Option 1 for the Burwell National Grid Substation Extension there is a drain which would be infilled. A replacement drain to connect with the existing drainage system would be excavated to the north. This would tie to drains to the south and north of the area of Option 1. In addition, it is believed that a drain on the corner of Weirs Drove and Newnham Drove will need to be slightly realigned to accommodate widening of the junction for access by a crane. Please note that there is no physical impact on watercourses from Option 1.

9.7.30 The methodology, as currently envisaged, is as follows. As the drains within the substation site drain to the northeast, in order to reduce the potential for sediment load to be transmitted downstream, the ditch to be infilled would be stopped up at the northeastern end initially. This would lead to the water within the drain being cut-off from the network. The standing water could then be pumped out once any fine sediment has settled into the existing drain network at an appropriate rate and in accordance with any permissions as required from the IDB. If the final methodology differs significantly from this approach it would need to demonstrate that there would be no new or materially different adverse impacts with or without the application of current or additional mitigation measures.

9.7.31 The excavation of the new ditch would ensure that the connection to the existing drains is opened only after the ditch has been dug and all material

and equipment removed. Water will initially be allowed to backfill from the downstream end as this will reduce the risk of mobilising any loosened fine sediment. Overall, this approach would minimise the potential for sediment during excavation flowing into the drainage network. A replacement ditch also ensures groundwater can discharge across the same extent of ditch such that groundwater levels do not rise in the area.

9.7.32 The excavation and reuse of material will be controlled through measures in the CEMP. A Framework CEMP is provided in **Appendix 16C [EN/010106/APP/6.2].**

**Table 9-13 Watercourse crossing methodologies**

| Crossing ID (From Figure 3-23) | Site / Grid Connection Route | Watercourse | Indicative NGR | Intrusive / non-intrusive cable installation | Red / Amber / Green (RAG) Rating of encountering groundwater |
|---|---|---|---|---|---|
| W1 | Sunnica East Site A | Kennet-Lee Brook | TL 66131 73742 | Non-intrusive | Elevation ~6m AOD<br>Groundwater level ~5m AOD |
| ICR W1 | Sunnica East Site A (internal cable route crossing) | Tributary of the River Lark | TL 69148 73054 | Intrusive | Elevation ~8m AOD<br>Groundwater level ~6m AOD |
| W2 | Sunnica East Site A | Kennet-Lee Brook | TL 66219 73348 | Non-intrusive | Elevation ~5m AOD<br>Groundwater level ~4m AOD |
| W3 | Grid Connection Route A | River Kennet | TL 68546 70413 | Non-intrusive | Elevation ~15m AOD Groundwater level ~12m AOD |
| W4 | Sunnica West Site B | Unnamed watercourse | TL 64239 68929 | Non-intrusive | Elevation ~12.5m AOD<br>Groundwater level ~7m AOD |
| W5 | Sunnica West Site B | Unnamed watercourse | TL 63908 69017 | Non-intrusive | Elevation ~12m AOD<br>Groundwater level ~7m AOD |
| W6 | Sunnica West Site B | River Snail | TL 63455 68938 | Non-intrusive | Elevation ~12m AOD<br>Groundwater level ~7m AOD |

| Crossing ID (From Figure 3-23) | Site / Grid Connection Route | Watercourse | Indicative NGR | Intrusive / non-intrusive cable installation | Red / Amber / Green (RAG) Rating of encountering groundwater |
|---|---|---|---|---|---|
| W7 | Grid Connection route B | Unnamed watercourse | TL 63328 69099 | Intrusive | Elevation ~11m AOD<br>Groundwater level ~7m AOD |
| W8 | Grid Connection route B | Drain | TL 62455 69142 | Non-intrusive | Elevation ~11m AOD Groundwater level ~6m AOD |
| W9 | Grid Connection route B | Unnamed watercourse | TL 62158 69043 | Non-intrusive | Elevation ~9m AOD Groundwater level ~6m AOD |
| W10 | Grid Connection route B | New River | TL 61586 68802 | Non-intrusive | Elevation ~9m AOD Groundwater level ~6m AOD |
| W11 | Grid Connection route B | Unnamed watercourse | TL 61374 68646 | Non-intrusive | Elevation ~9m AOD Groundwater level ~6m AOD |
| W12 | Grid Connection route B | Unnamed watercourse | TL 60923 68386 | Non-intrusive | Elevation ~9m AOD Groundwater level ~6m AOD |
| W13 | Grid Connection route B | Drain | TL 60273 68642 | Intrusive | Elevation ~9m AOD Groundwater level ~6m AOD |
| W14 | Grid Connection route B | Drain | TL 60252 68652 | Intrusive | Elevation ~9m AOD Groundwater level ~5m AOD |
| W15 | Grid Connection route B | Drain (into Catchwater Drain) | TL 59165 68849 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4m AOD |
| W16 | Grid Connection route B | Catchwater Drain | TL 59187 68804 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4m AOD |
| W17 | Grid Connection route B | Unnamed watercourse | TL 58901 68748 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4m AOD |
| W18 | Grid Connection route B | Black Lake Drain | TL 58753 68508 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4m AOD |

| Crossing ID (From Figure 3-23) | Site / Grid Connection Route | Watercourse | Indicative NGR | Intrusive / non-intrusive cable installation | Red / Amber / Green (RAG) Rating of encountering groundwater |
|---|---|---|---|---|---|
| W19 | Grid Connection route B | Unnamed watercourse | TL 58592 68467 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4m AOD |
| W20 | Grid Connection route B | Unnamed watercourse | TL 58439 68445 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4m AOD |
| W21 | Grid Connection route B | Drain along Factory Road | TL 58351 68229 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4m AOD |
| W22 | Grid Connection route B | Drain along Factory Road | TL 58346 68204 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4m AOD |
| W23 | Grid Connection route B | Burwell Lode Canal | TL 58258 67875 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4.5m AOD |
| W24 | Grid Connection route B | Unnamed watercourse | TL 58114 67602 | Non-intrusive | Elevation ~5m AOD Groundwater level ~4.5m AOD |
| W25 | Grid Connection route B | Drain | TL 58190 67221 | Non-intrusive | Elevation ~5m AOD Groundwater level ~5m AOD |

*Management of Flood Risk*

***Flood Risk***

9.7.33 The Framework CEMP would incorporate measures to prevent an increase in flood risk or pollution during the construction works, in addition to the provision of temporary settlement and drainage measures as detailed above.

9.7.34 Construction works undertaken adjacent to, beneath and within watercourses would comply with relevant guidance during construction, including Environment Agency and Defra guidance documents.

9.7.35 The Framework CEMP would incorporate measures aimed at preventing an increase in flood risk during the construction works. Examples of measures that would be implemented include:

a. Topsoil and other construction materials would be stored outside of the 1 in 100 year floodplain extent. If areas located within Flood Zone 2 are

to be utilised for the storage of construction materials, this would be done in accordance with the applicable flood risk activity regulations, if required;

b. Connectivity would be maintained between the floodplain and the adjacent watercourses, with no changes in ground levels within the floodplain as far as practicable; and

c. During the construction phase, the Contractor would monitor weather forecasts on a monthly, weekly and daily basis, and plan works accordingly. For example, works in the channel of any watercourse would be avoided or halted were there to be a significant risk of high flows or flooding.

d. The construction laydown area site office and supervisor would be notified of any potential flood occurring by use of the Floodline Warnings Direct or equivalent service.

9.7.36 The Contractor would be required to produce an Emergency Response Plan as part of the CEMP (measures included in **Appendix 16C [EN/010106/APP/6.2]**) which would provide details of the response to an impending flood and include:

a. A 24-hour availability and ability to mobilise staff in the event of a flood warning;

b. The removal of all plant, machinery and material capable of being mobilised in a flood for the duration of any holiday close down period where there is a forecast risk that the site may be flooded;

c. Details of the evacuation and site closedown procedures;

d. Arrangements for removing any potentially hazardous material and anything capable of becoming entrained in floodwaters, from the temporary works areas;

e. The Contractor would sign up to Environment Agency flood warning alerts and describe in the Emergency Response Plan the actions it would take in the event of a flood event occurring. These actions would be hierarchal meaning that as the risk increases the Contractor would implement more stringent protection measures;

f. If water is encountered during below ground construction, suitable de-watering methods would be used. Any groundwater dewatering required in excess of the exemption thresholds would be undertaken in line with the requirements of the Environment Agency (under the Water Resources Act 1991 as amended) (Ref 9-24) and the Environmental Permitting Regulations (2016) (Ref 9-37); and

g. Safe egress and exits are to be maintained at all times when working in excavations. When working in excavations a banksman is to be present at all times.

*Management of Risk to Morphology of Waterbodies*

9.7.37 A pre-works morphology survey (as described in the Framework CEMP presented in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**) of the channel of each watercourse to be crossed by high voltage cables would be undertaken. This is to ensure there is a formal record of the condition of each watercourse prior to commencement of works to install cables beneath the channel. The survey is a precautionary measure so that should there be any unforeseen adverse impacts there is a record against which any remedial action can be determined.

*Permissions and Consents*

9.7.38 The Consents and Agreements Position Statement **[EN010106/APP/3.3]** set out what permissions are required for the Scheme.

9.7.39 Various water related permissions may be required where it is not agreed with the relevant regulating authority to disapply them through the DCO. These permissions may include:

a. Land Drainage Consent(s) under Section 23 of the Land Drainage Act 1991 (as amended) (Ref 9-38) for works affecting the flow in Ordinary Watercourses;

b. Flood risk activity permit(s) from the Environment Agency under the Environmental Permitting Regulations (England and Wales) 2016 (Ref 9-37) for temporary/permanent works in, over, under and within 8m of a Main River;

c. Water activity permit(s) from the Environment Agency under the Environmental Permitting Regulations (England and Wales) 2016 (Ref 9-37) during construction;

d. Full or Temporary Water Abstraction Licence under Section 24 of the Water Resources Act 1991 (Ref 9-24) (if more than $20m^3/d$ is to be dewatered / over-pumped and exemptions do not apply);

e. Temporary Water Impoundment Licence under Section 25 of the Water Resources Act 1991 (Ref 9-24) where intrusive cable laying techniques may be required;

f. Approvals from the Swaffham IDB (Land Drainage Byelaw consents); and

g. Trade Effluent Consent under the Water Industry Act 1991 (Ref 9-39) for the purposes of discharging trade effluent from welfare facilities during construction.

9.7.40 There is the potential for requirement of either Full or Temporary Water Abstraction Licences from the Environment Agency for the abstraction of water from the send and receive pits associated with non-intrusive watercourse (and the railway) crossings, other than where exemptions apply. A full licence is required when more than $20m^3$ per day of water may

need to be abstracted for longer than 28 days. A temporary licence is applicable where the abstraction is less than 28 days. Where less than 20m$^3$ per day of water needs to be abstracted no licence is required. However, in all circumstances it may be necessary to also obtain a Water Activity Permit from the Environment Agency to discharge the water to ground or a watercourse if the water is considered to be 'unclean.'

**Design**

9.7.41 The Scheme would preserve access through Sunnica West Site A for the Lodes-Granta augmentation scheme pipeline. Construction activities will avoid all utilities and water pipelines, including the Lodes-Granta augmentation scheme pipeline. This measure is included within **Appendix 16C Framework CEMP** of this Environmental Statement **[EN010106/APP/6.2].** An assessment on the effects on utilities has been undertaken and is provided in **Chapter 16** of this Environmental Statement **[EN010106/APP/6.2]**.

9.7.42 No solar PV panels or other infrastructure would be located within fluvial Flood Zone 3b extents. However, there may be solar PV panels within Flood Zone 3a and 2. These would be raised on higher struts to mitigate any flood risk to them. The detailed design would determine the various heights required and will be at least 850mm above ground level (which provides a minimum of 250mm freeboard above the SFRA +65% climate change map of fluvial flooding extent level for Flood Zone 3A. The solar PV panel struts would not materially affect the floodplain volume or the flow of flood waters. No construction would take place within a 10m buffer from the edge of the typical channel / water's edge of watercourses.

9.7.43 Underground boring techniques would be used to install power cables beneath watercourses encountered along the Grid Connection Routes. Techniques such as boring, micro-tunnelling or moling would be used to avoid direct physical impacts to waterbodies. The cable depth below the bed of all watercourses would be a minimum of 2m. **Table 9-13** sets out the watercourse crossings and the proposed construction methodology. This table also includes the results of a groundwater risk analysis of the location of each non-intrusive watercourse crossing as shown on Figure 3-23. Overall, although this approach would require the temporary excavation of launch and receiving pits either side of the watercourses, this approach would avoid any direct adverse impacts to watercourses from construction works. Once installed there would not be any long-term potential impacts (i.e. the risk of the cables being exposed above the bed of the watercourse).

9.7.44 Flood resistance and resilience measures would be included within the design of the Burwell National Grid Substation Extension, for whichever of the potential sites is chosen. The National Grid has its own design guidelines for the established Burwell Substation area, which include flood resistance and resilience measures. The National Grid Burwell Substation

Extension would benefit from being incorporated in to this established National Grid Framework.

9.7.45 Two operational office/warehouse blocks would be constructed for use during operation within works area E33 on Sunnica East A (located towards the eastern boundary of the site) and works area W17 within Sunnica West B (located in the central area of the site) (as shown in Figures 3-1 and 3-2). The foul drainage provision for these facilities is discussed in paragraphs 9.7.54 to 9.7.57

**Drainage Strategy**

9.7.46 The Drainage Technical Note (appended to **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**) proposes to attenuate surface water runoff from the Order limits, whilst minimising flood risk to the Sites and surrounding areas. Accordance with planning policy guidance from the LLFA (Cambridgeshire LLFA and Suffolk LLFA) runoff from the Order limits would ensure no increase in surface water discharge rates.

9.7.47 The drainage strategy presented in the Drainage Technical Note (appended in Annex F to **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**) has been developed to mimic natural drainage as far as practicable using SuDS, and to provide a number of other benefits to ecological habitat creation (See **Chapter 8: Ecology and Nature Conservation** of this Environmental Statement **[EN010106/APP/6.1]**).

9.7.48 Individual solar PV panels would be held above the ground surface on four struts. This would avoid sealing the ground with impermeable surfaces. As a result, it is assumed that the Order limit's impermeable area within the solar PV fields would remain consistent with its pre-development state. However, runoff from the solar PV panels would alter the existing routing of runoff. To prevent ponding occurring around the panels, a series of boundary (and some routing) swales would be constructed to convey surface water runoff to infiltration basins.

9.7.49 Attenuation in the form of infiltration basins and swales have been incorporated to control any increase in the rate of flow towards the receiving watercourses. The rate of runoff from each development location within the Order limits would ensure nil detriment in terms of no increase in runoff rate from the Order limits to the receiving watercourses.

9.7.50 The Drainage Technical Note (see Annex F of **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**) allows for 100% of the total area for the battery storage and compound areas within the Order limits to be impermeable. Increases to existing runoff would be balanced by swales and infiltration basins to encourage natural infiltration. The solar PV panel areas are to be treated as Greenfield runoff, as existing, i.e. permeable, with nil detriment to existing surface water runoff rates and volumes.

9.7.51 Within the indicative design at this stage there are two areas where there would be an internal access road crossing an unnamed minor watercourse. These are between plots E01 and E02 within Sunnica East Site A and within plot W01 within Sunnica West Site B. For the crossing between E01 – E02, a clear span structure will be designed for the watercourse crossing by the access road, to minimise impacts to the channel bed, banks and watercourse continuity. There may be an option for an alternation access route, to avoid the watercourse or cross at a location further upstream, that will be considered during detailed design. For the crossing at W01, we are assessing as a culvert, but there may be an option for an alternative crossing design, that will consist of a clear span structure to minimise impacts to the channel bed, banks and watercourse continuity, that will be considered during detailed design.

9.7.52 No realignment of the unnamed watercourses would be necessary. As set out within the Consents and Agreements Position Statement **[EN010106/APP/3.3],** Land Drainage Consent (s) under Section 23 of the Land Drainage Act 1991 (as amended) would be obtained for the design and construction of these watercourse crossings for the access roads, if those provisions are not disapplied by the DCO. There is the potential for these internal access roads to be moved at detailed design. It is considered the limit of deviation of these watercourse crossing changes would be ± 50m with no alteration in impact assessment. If at a later stage in the project the access needs to be beyond ± 50m it would be necessary to carry out a sufficient assessment to be sure there are no new or materially different impacts to those predicted in this chapter.

9.7.53 Within the Burwell National Grid Substation Extension potential options 1 and 2, the surface water discharges from the development would be to the IDB controlled watercourses.

**Foul Drainage**

9.7.54 The two operational office / warehouse blocks would be situated on Sunnica East Site A and Sunnica East Site B for management and maintenance of the Scheme. These would contain welfare facilities for the anticipated up to 17 permanent members of staff on shift at a time (i.e. low volumes of foul drainage would be generated).

9.7.55 It is proposed to use a septic tank arrangement to drain the compound areas. Septic tanks would be regularly emptied under contract with a registered recycling and waste management contractor.

9.7.56 Another option may involve a direct discharge of treated effluent to a watercourse, but this would require much more detailed assessment and a permit from the Environment Agency. At this point in time, it is considered that this option would not be viable, and it is not considered any further. Should it be required in the future it would be considered by the Environment Agency under the water discharge activity regime in

accordance with the Environmental Permitting (England and Wales) Regulations 2016 (Ref 9-37) which ensures the effects of any such discharge would be appropriately regulated.

9.7.57 As there would be no discharge of foul water to a watercourse, and only small volumes would removed from site using a suitable waste management contractor, no further assessment of foul waste from the Scheme is proposed.

**Anglian Water Assets**

9.7.58 There are Anglian Water Assets within the area, both foul sewers and water mains. A search on DigDat online service (Ref 9-40) indicates there are no public sewer assets within the vicinity of the two compound areas and discharge to public sewers is not proposed.

**Leaks from Solar PV Panel**

9.7.59 A Framework Operation Environmental Management Plan (OEMP) is provided in **Appendix 16F** of this Environmental Statement **[EN010106/APP/6.2]** and will be in place for the operation and maintenance of the Scheme. The OEMP (to be produced post-construction and prior to operation) would include measures to regulate the environmental effects of the operational phase of the Site, and to ensure any maintenance activities take place in a way to avoid and minimise any potential environmental impacts. This would include measures to manage the risk from pollution from small leaks and spillages from proposed infrastructure and maintenance activities.

9.7.60 The OEMP for the Scheme is to be finalised prior to operation and would include a regular schedule for visual inspection of the panels. This would ensure that the structural integrity of the panels would be regularly observed. In this way, any panels which required maintenance / replacement would be removed before there was any leakage of chemicals from the sealed units. The panels are constructed in a robust manner and their components cannot be separated except with a considerable mechanical load. Therefore, the risk of any liquid leakage from the panels is very low, especially in any large quantities.

**Management of Fire Risk**

9.7.61 The operational site design will include both fire water tanks and associated fire water containment. Fire water will be stored on site at the three Battery Storage System (BESS) compounds (one in each of Sunnica East Site A, Sunnica East Site B, and Sunnica West Site A) in either two half capacity sectional steel panel tanks or two half capacity cylindrical steel panel tanks. Each BESS compound will store 242.5m$^3$ of water. Associated with these fire water storage areas the drainage design also allows for fire water containment by providing a bunded lagoon with a 410m$^3$ capacity. It is not anticipated that active fire fighting would be undertaken as this can spread

chemicals used in the process and which are potentially harmful to the water environment. Instead, any apparatus or containers that catch fire will be allowed to burn out. Water will be sprayed onto adjacent containers to keep them cool and reduce the risk of the fire spreading. The water used will therefore be less likely to be contaminated but will still be directed to the fire water storage areas from where decisions about suitable disposal can be made post incident.

## 9.8 Assessment of Likely Impacts and Effects

9.8.1 A number of activities during construction, operation, and decommissioning phases are likely to generate impacts, which have the potential to affect the water environment, if unmitigated. The impacts and effects (both beneficial and adverse) are outlined in the sections below. The proposed activities have been assessed following consideration of the embedded mitigation measures as described in Section 9.7.

**Construction (2023)**

*Sunnica East Site A – Construction (2023)*

***Surface Water - Construction of Sunnica East Site A***

9.8.2 The greatest risks of adverse impacts during construction, both within the site itself and any access roads, are in the vicinity of Lee Brook. Sunnica East Site A is formed of two areas either side of the Lee Brook, which flows in a northerly direction between them. The boundary of the two sites of Sunnica East Site A include two crossings of Lee Brook for high voltage cables. As the construction would take place beneath the bed of the watercourse, there would be no construction within the channel of the watercourse. Nevertheless, a pre-works survey (as described in the Framework CEMP presented in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**) of the channel would be undertaken and if there were any indirect impacts, these would be remediated appropriately. Lee Brook flows into the River Lark immediately downstream of the Sunnica East Site A, and thus the River Lark may also be indirectly impacted (there is approximately 175m of scrub, trees and grassland with a flat gradient between the River Lark and the boundary to Sunnica East Site A) and direct water quality impacts during construction are unlikely. Finally, surrounded by the proposed solar PV development within the eastern half of Sunnica East Site A are two artificial water storage lagoons serving Lee Farm.

9.8.3 Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a water body there is the potential for direct adverse impacts on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.4 During construction, all works would be carried out in accordance with the mitigation measures set out in the Framework CEMP in **Appendix 16C** of

this Environmental Statement **[EN010106/APP/6.2]**. The implementation of standard implementation measures would help avoid or reduce any potential adverse effects on surface water quality impacts during construction.

9.8.5 The potential for adverse impacts on surface water quality of Lee Brook and the River Lark from construction site runoff and the risk of chemical spillages during construction, and the construction of the crossing between E01- E02, with embedded mitigation being implemented, has been assessed as temporary and very low. On the high importance Lee Brook, this results in a temporary minor effect, a temporary minor effect on the high importance River Lark, and a negligible impact on the Lee Farm water storage lagoons. All effects are considered not significant. There is considered to be a no change impact on the volume and flow rates and morphology in the watercourses, which results in a neutral effect which is not significant. As there is considered to be no change to volume and flow rate within the watercourses, there would be no impact on any surface water abstractions from the watercourses in the area. This is considered to be a neutral effect which is not significant.

9.8.6 No construction works are proposed within the channel of the Lee Brook which is flowing adjacent to the site. The potential for impacts on the morphology of the channel of the Lee Brook, and downstream River Lark, has been assessed as no change. This results in a neutral impact, which is not considered significant.

***Groundwater - Construction of Sunnica East Site A***

9.8.7 The groundwater receptors identified as potentially at risk from the Scheme are:

a. Baseflow and water quality in River Kennett, Lee Brook, and River Lark; and

b. Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.8 With reference to **Chapter 3: Scheme Description** of this Environmental Statement **[EN010106/APP/6.1]** the solar PV panels would be mounted upon a metal structure with strut foundations. These are steel set in the ground similar to small piles. No extensive continuous foundation is part of the design. These strut foundations are to be approximately 2-3.5m in depth depending on ground conditions and installation method (e.g. ramming, ground screw).

9.8.9 Other structures such as the battery compound and substation would likely be placed on a concrete slab approximately 0.2m thick with some individual and smaller structures requiring excavation up to 1m and filling with a compacted gravel base layer. However, there is a design option for the BESS foundations to be augured piles to a most likely depth of 6m, but with a maximum depth of 12m.

9.8.10 In the Sunnica East Site A, Chalk aquifer groundwater may be encountered at approximately 4m in depth, so it is unlikely that the struts would be positioned below the water table. Depending on land elevation, it is considered that only in the far north of Sunnica East Site A is there the possibility that the strut foundations may be set into groundwater. As no continuous foundation is in the design, and the Chalk aquifer is of significant thickness (approximately 50m thinning to the north), the shallow, regularly spaced discrete strut foundations are not considered to cause an impediment to groundwater flow.

9.8.11 The piling solution for the BESS is likely to encounter groundwater, however the extent of the foundation area is not significant compared to the extent of the aquifer, so no significant impediment to groundwater flow is anticipated.

9.8.12 Within the site there would also be other underground cables in the solar PV areas (in addition to the Cable Route) linking the panels to the onsite substations. These are anticipated to be above the water table.

9.8.13 In this area groundwater is anticipated to discharge to the River Lark. No significant impediment to baseflow in the River Lark is anticipated.

9.8.14 No structures are proposed to be built within the gravel and alluvial aquifers in the Lee Brook valley, and therefore there would be no effect on groundwater flow in the secondary aquifers supporting the Lee Brook.

9.8.15 The effect of rainwater infiltrating the ground via runoff from solar PV is considered to be negligible for the distribution of recharge to the Chalk aquifer. Changes to local runoff recharge is therefore considered insignificant to catchment chalk aquifer water resources and the abstractions and river flows dependent on groundwater.

9.8.16 Based on current information, Sunnica East Site A is not known to have a history of potentially contaminating uses. There are no Environment Agency registered historical landfill sites.

9.8.17 The installation of struts to a depth of up to 3.5m below ground is not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table. Piling for BESS foundations to between 6m and 12m will follow the measures listed in the CEMP and is therefore not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.18 There would be minor excavations for swales as part of the drainage strategy. These are to be no more than 0.6m deep and therefore would be above the water table. Excavation would locally cause ground disturbance potentially mobilising fines that may lead to turbidity in groundwater. This is considered to be a low likelihood and on a local scale. Therefore, there

would be a no change impact to groundwater, resulting in a neutral effect which is not significant. The Order limits does not have a history of potentially contaminating uses and therefore the excavation of swales is not considered to be a risk of mobilising contaminants. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk from this component of the Scheme.

9.8.19 **Table 9-13** summarises the locations of non-intrusive crossings and the risk of groundwater ingress. At the crossing locations at Sunnica East A groundwater is anticipated to be encountered. The water table gradient will be very low, so the flow rate will be very slow if it were to enter the excavation. Depending on the permeability of the materials in which the pit is dug, it may remain dry if it is locally clayey, which some of these sites may be, being underlain by alluvium.

9.8.20 To provide a further indication of risk, further analysis has been undertaken using a simple Darcy's Law calculation. This would suggest for these higher risk sites that any groundwater inflow may be less than $1m^3$ per day (based on the flow gradient from the groundwater contours given in Figure 9-3 Chalk Groundwater Contours, and a 10m/d permeability, across an 8m wide excavation). At a local level this value may vary higher or lower, but it would need to be significantly higher to result in groundwater ingress that would require a licence from the Environment Agency and which may have a local impact on groundwater levels. This is not considered likely.

9.8.21 Overall, the impact of construction within Sunnica East Site A on groundwater flow and quality, abstractors, and baseflow to surface waters is considered to result in a temporary no change impact, which would result in a neutral effect, which is not considered to be significant.

***Flood Risk - Construction of Sunnica East Site A***

9.8.22 With the exception of sections E01, E02, E03 and E05, the remainder of Sunnica East Site A is considered to be at low risk from all sources of flooding. Refer to **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]** for layout and areas with identified flood risk.

9.8.23 Surface water risks are generally shown to have little impact on the proposed development and may be mitigated via the use of above ground SuDS features. For further information on flood risk, refer to **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**.

9.8.24 During construction, the following adverse impacts may occur:

a. Temporary changes in flood risk from changes in surface water runoff (e.g. exacerbation of localised flooding due to deposition of silt, sediment in drains, ditches); and

b. Changes in flood risk due to the construction of any part of the Scheme within an area at risk of flooding.

9.8.25 As stated within Section 9.7 Embedded Design Mitigation, the surface water drainage strategy would ensure that any alteration of surface water runoff as a result of the construction of the Scheme would be mitigated by a temporary drainage system and then the construction of swales and infiltration basins that will be associated with the finished development.

9.8.26 Construction activities would take place with a Framework CEMP and WMP in place to ensure no exacerbation of localised flooding from deposition of sediment in new drainage pathways and ditches.

9.8.27 Overall the impact during construction within Sunnica East Site A on flooding and flood risk, to the Scheme and from the Scheme to other developments outside of the Order limits, is considered to result in a temporary no change impact, which would result in a neutral effect, that is not considered significant.

***Summary of Effects - Construction of Sunnica East Site A***

9.8.28 A summary of the assessment is included in **Table 9-14** below.

**Table 9-14 Summary of Magnitude of Impact and Significance of Effect for the Construction Phase for Sunnica East Site A**

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| River Kennett, Lee Brook, water quality | High | Potential harm to riverine habitat and water quality due to pollution | Very Low | Minor | No |
| River Lark water quality | High | Potential harm to riverine habitat and water quality due to pollution | Very Low | Minor | No |
| Lee Farm Lagoons water quality | Low | Potential harm to water quality due to pollution | Very Low | Negligible | No |
| River Kennett, Lee Brook volume and flow rates | High | Potential for changes to volume and flow rates | No Change | Neutral | No |

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| River Kennett, Lee Brook morphology | High | Potential for within channel changes to the watercourses | No change | Neutral | No |
| Groundwater Resource – Chalk aquifer | High | Loss of resource due to pollution for abstraction and baseflow contribution | No change | Neutral | No |
| EA licensed abstractions and private water supplies | High | Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes | No change | Neutral | No |
| Flood Risk: River Lark and Lee Brook | Low | Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site | No change | Neutral | No |

*Sunnica East Site B – Construction (2023)*

***Surface Water - Construction of Sunnica East Site B***

9.8.29 The greatest risks of adverse impacts during construction are in the northern areas from works either side of the Worlington Tributary of the River Lark 1 and 2. There is also a lesser risk to the River Kennett from the southern areas of the Sunnica East Site B that slopes down towards the river, although the channel is nearly 200m south of the southern boundary and poorly connected due to the lack of minor drains and ditches.

9.8.30 Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a water body there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.31 During construction, all works would be carried out in accordance with the mitigation measures set out in the Framework CEMP (**Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**). The implementation of standard mitigation measures would avoid or reduce any potential adverse impacts on surface water quality impacts during construction.

9.8.32 The potential for direct impact on surface water quality during construction has been assessed as very low, on the medium importance Worlington Tributaries of the River Lark 1 and 2 and nearby ponds/water storage lagoon with the embedded mitigation measures being implemented. Also on the high importance receptor of the River Kennet and River Lark, with embedded mitigation measures being implemented. This results in a temporary very low impact on the surface water receptors, leading to a negligible effect on Worlington Tributaries of the River Lark and ponds/water storage lagoons, and a temporary very low adverse impact on the River Kennet and River Lark, leading to a minor effect. There is considered to be a no change impact on the volume and flow rates and morphology in the watercourses, which results in a neutral effect which is not significant. As there is considered to be no change to volume and flow rate within the watercourses, there would be no impact on any surface water abstractions from the watercourses in the area. This is considered to be a neutral effect which is not significant. All potential effects are not considered significant.

9.8.33 No construction works are proposed within the channel of any watercourses and thus there would be no morphological impacts.

***Groundwater - Construction of Sunnica East Site B***

9.8.34 The groundwater receptors identified as potentially at risk from the Scheme are:

a. Baseflow and water quality in River Kennett, Lee Brook, River Lark and their minor tributaries; and

b. Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.35 With reference to **Chapter 3: Scheme Description** of this Environmental Statement **[EN010106/APP/6.1]** the solar PV panels would be mounted upon a steel structure with strut foundations. These are steel set in the ground similar to small piles. No extensive continuous foundation is part of the design. These strut foundations are to be approximately 2-3.5m in depth depending on ground conditions and installation method (e.g. ramming, ground screw).

9.8.36 Other structures such as the battery compound and substation would be placed on a concrete slab approximately 0.2m thick with some other small structures requiring excavation up to 1m and filling with a compacted gravel base layer. However, there is a design option for the BESS foundations to be augured piles to a most likely depth of 6m, but with a maximum depth of 12m.

9.8.37 Chalk aquifer groundwater may be encountered at approximately 5m depth. Therefore, it is unlikely that the strut foundations would be set into groundwater. Depending on changes in land elevation across the site, in lower lying area if struts were founded below the water table it would be of limited extent. As no continuous foundation is in the design for the solar PV

panels, and the shallow depth of foundations of other structures, and the Chalk aquifer is of significant thickness (approximately 50m thinning to the north), the shallow, regularly spaced discrete strut foundations are not considered to cause an impediment to groundwater flow.

9.8.38 The piling solution for the BESS is likely to encounter groundwater, however the extent of the foundation area is not significant compared to the extent of the aquifer, so no significant impediment to groundwater flow is anticipated.

9.8.39 Within the site there would also be other underground cables in the solar PV areas (in addition to the cable route) linking the panels to the onsite substations. These are anticipated to be above the water table.

9.8.40 In this area groundwater is anticipated to discharge to the River Lark. No significant impediment to baseflow in the River Lark is anticipated.

9.8.41 No structures are to be built within the gravel and alluvial aquifers in the Lee Brook or River Kennett valleys, and therefore there would be no effect on groundwater flow in the secondary aquifers supporting the Lee Brook, the River Kennett, and their minor tributaries.

9.8.42 The effect of rainwater infiltrating the ground via runoff from solar PV panels is considered to be negligible for the distribution of recharge to the Chalk aquifer. Changes to local runoff recharge is therefore considered insignificant to catchment chalk aquifer water resources and the abstractions and river flows dependent on groundwater.

9.8.43 Based on current information, the Sunnica East Site B is not known to have a history of potentially contaminating uses. There is an Environment Agency registered historical landfill sites near the southern boundary west of Red Lodge and the A11 (Middleton Aggregates Ltd), which is outside of the Order limits.

9.8.44 The installation of struts to a depth of up to 3.5m below ground is not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table. Piling for BESS foundations to between 6m and 12m is not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table by following the Framework CEMP.

9.8.45 Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.46 There would be excavations for swales as part of the drainage strategy. These are to be no more than 0.6m deep and therefore would be above the water table. Excavation would cause ground disturbance potentially mobilising fines that may lead to turbidity in groundwater. This is considered to be a low likelihood and on a local scale such that there would be negligible impact to groundwater. The Order limits does not have a history of potentially contaminating uses and therefore the excavation of swales is

not considered to be a risk of mobilising contaminants. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.47 Therefore, the impact of construction within Sunnica East Site B on groundwater flow and quality, abstractors, and baseflow to surface waters, is considered to result in a temporary no change impact, which results in a neutral effect, that is not considered significant.

***Flood Risk - Construction of Sunnica East Site B***

9.8.48 Sunnica East Site B is considered to be at low risk from all sources of flooding. For further information on flood risk, refer to **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**.

9.8.49 During the construction phase the following adverse impacts may occur:

a. Temporary changes in flood risk from changes in surface water runoff, e.g. exacerbation of localised flooding, due to deposition of silt, sediment in drains, ditches.

b. Changes in flood risk due to the construction of solar PV panels, which alter the runoff from the site.

9.8.50 As stated within Section 9.7 Embedded Design Mitigation, the surface water drainage strategy would ensure that any alteration of runoff as a result of the construction of the solar PV panels would be mitigated by the construction of swales and infiltration basins.

9.8.51 Construction activities would take place with a Framework CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.52 Therefore, the impact of construction within Sunnica East Site B on flooding and flood risk, from and to the Scheme, is considered to result in a temporary no change impact, which result in a neutral effect, that is not considered significant.

***Summary of Effects - Construction of Sunnica East Site B***

9.8.53 A summary of the assessment is included in **Table 9-15** below.

## Table 9-15 Summary of Magnitude of Impact and Significance of Effect for Sunnica East Site B

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| River Kennett, Lee Brook and their tributaries water quality | High | Harm to riverine habitat and water quality due to pollution | Very low | Minor | No |
| River Lark water quality | High | Harm to riverine habitat and water quality due to pollution | Very low | Minor | No |
| Worlington Tribuatries of the River Lark 1 and 2 | Medium | Harm to riverine habitat and water quality due to pollution | Very Low | Negligible | No |
| Various ponds and water storage lagoons water quality | Low | Impact to water quality and potential impact on use of water | Very low | Negligible | No |
| River Kennett, Lee Brook volume and flow rates | High | Potential for changes to volume and flow rates | No change | Neutral | No |
| River Kennett, Lee Brook morphology | High | Potential for within channel changes to the watercourses | No change | Neutral | No |
| Groundwater Resource – Chalk aquifer | High | Loss of resource due to pollution for abstraction and baseflow contribution | No change | Neutral | No |
| EA licensed abstractions and private water supplies | High | Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes | No change | Neutral | No |

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| Flood Risk | Lee Brook: Low | Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site | No change | Neutral | No |

*Sunnica West Site A – Construction (2023)*

9.8.54 The greatest risks of adverse impacts to surface waterbodies during construction are in the northern areas of the Sunnica West Site A, which borders the upper reaches of Lee Brook, which rises to the south of Chippenham Park and flows eastwards along the northern boundary of this site.

9.8.55 Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a water body there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.56 During the construction phase, all works would be carried out in accordance with the embedded mitigation measures set out in the Framework CEMP (**Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**). The implementation of standard implementation measures would help avoid or reduce any potential adverse effects on surface water quality impacts during construction. There is considered to be a no change impact on the volume and flow rates and morphology in the watercourses, which results in a neutral effect which is not significant. Also a no change impact to water quality on the low importance ponds and water storage lagoons, which results in a neutral effect which is not significant. As there is considered to be no change to volume and flow rate within the watercourses, there would be no impact on any surface water abstractions from the watercourses in the area. This is considered to be a neutral effect which is not significant.

9.8.57 The potential for direct impact on surface water quality during construction has been assessed as temporary very low impact, on a high importance receptor (Lee Brook) and a low importance receptor (Dane Hill Watercourse), which results in a temporary minor and negligible effect, respectively, which is not considered to be significant.

9.8.58 No construction works are proposed within the channel of watercourses and thus no hydromorphological impacts are predicted.

***Groundwater - Construction of Sunnica West Site A***

9.8.59 The groundwater receptors identified as potentially at risk from the scheme are:

a. Baseflow and water quality in the Lee Brook;

b. Chippenham Fen inflow and water quality; and

c. Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.60 With reference to **Chapter 3: Scheme Description** of this Environmental Statement **[EN010106/APP/6.2]**, the solar PV panels would be mounted upon a steel structure with strut foundations. These are steel set in the ground similar to small piles. No extensive continuous foundation is part of the design. These strut foundations are to be approximately 2-3.5m in depth depending on ground conditions and installation method (e.g. ramming, ground screw).

9.8.61 Other structures such as the battery compound and substation would be placed on a concrete slab approximately 0.2m thick with some structures requiring excavation up to 1m and filling with a compacted gravel base layer. However, there is a design option for the BESS foundations to be augured piles to a most likely depth of 6m, but with a maximum depth of 12m.

9.8.62 The ground level at Sunnica West Site A is approximately 23-26m AOD. The Chalk aquifer water table is estimated to be approximately 6-8m below ground level.

9.8.63 All structures are anticipated to be above the Chalk aquifer water table and therefore would not affect groundwater flow to Chippenham Fen, River Snail, or groundwater abstractions. Th exception is the piling foundation option for the BESS, which is likely to encounter groundwater. However, the extent of the foundation area is not significant compared to the extent of the aquifer, so no significant impediment to groundwater flow is anticipated.

9.8.64 Within the site there would also be other underground cables in the solar PV areas (in addition to the Cable Route) linking the panels to the onsite substations. These are anticipated to be above the water table.

9.8.65 The effect of rainwater infiltrating the ground via runoff from solar PV panels is considered to be negligible for the distribution of recharge to the Chalk aquifer. Changes to local runoff recharge is therefore considered insignificant to catchment chalk aquifer water resources and the abstractions and river flows dependent on groundwater.

9.8.66 Based on current information, the Sunnica West Site A is not known to have a history of potentially contaminating uses. There are no Environment Agency registered historical landfill sites.

9.8.67 The installation of struts to a depth of up to 3.5m below ground is not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table. Piling for BESS foundations to between 6m and 12m will follow the CEMP and is therefore not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table.

9.8.68 Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.69 There would be excavations for swales as part of the drainage strategy. These are to be no more than 0.6m deep and therefore would be above the water table. Excavation would cause ground disturbance potentially mobilising fines that may lead to turbidity in groundwater. This is considered to be a low likelihood and on a local scale such that there would be negligible impact to groundwater. The Order limits does not have a history of potentially contaminating uses and therefore the excavation of swales is not considered to be a risk of mobilising contaminants. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.70 Therefore, the impact of construction within Sunnica West Site A on groundwater flow and quality, abstractors, and baseflow to surface waters, is considered to result in a temporary no change impact, which results in a neutral effect, that is not considered significant.

***Flood Risk - Construction of Sunnica West Site A***

9.8.71 With the exception of W08, W10, W11, W12 and W15, the remainder of the site is situated within Flood Zone 1 and not under fluvial influence. Remaining PV panel areas are considered to present negligible change to existing flood risk and mitigation measures are not likely to be required.

9.8.72 Surface water risks are again shown to have little impact to the proposed development and can be mitigated via the use of above ground SuDS features.

9.8.73 Two solar PV installations, within (W10) and (W15), are placed within Flood Zone 3, with two more in very close proximity; within (W11) and (W15). These installations would need to be raised above predicted flood levels. Any raising is to be completed via stilted feet and considered to pose negligible impact to existing flood zones or floodplain displacement. Development has been moved out of W08 and W12 compared to the Scheme assessed at statutory consultation. For further information on flood risk, refer to (**Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**).

9.8.74 During the construction phase the following adverse impacts may occur:

a. Temporary changes in flood risk from changes in surface water runoff, e.g. disruption of stream flows due to deposition of silt, sediment in drains, ditches; and

b. Changes in flood risk due to the construction of PV panels which alter the runoff from the site.

9.8.75 As stated within section 9.7 Embedded Design Mitigation, the surface water drainage strategy would ensure that any alteration of runoff as a result of the construction of the solar panels, compounds and battery storage facilities would be mitigated by the construction of swales and infiltration basins.

9.8.76 Construction activities would take place with the CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.77 Therefore, the impact during construction within Sunnica West Site A on flooding and flood risk, to the Scheme and from the Scheme to other developments outside of the Order limits, is considered to result in a temporary very low impact, which results in a neutral effect, this is not considered significant.

***Summary of Effects - Construction of Sunnica West Site A***

9.8.78 A summary of the assessment is included in **Table 9-16** below.

**Table 9-16 Summary of Magnitude of Impact and Significance of Effect for Sunnica West Site A**

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| Lee Brook water quality | High | Harm to riverine habitat and water quality due to pollution | Very low | Minor | No |
| Dane Hill Watercourse water quality | Low | Harm to riverine habitat and water quality due to pollution | Very low | Negligible | No |
| Lee Brook volume and flow rates | High | Potential for changes to volume and flow rates | No change | Neutral | No |
| Lee Brook morphology | High | Potential for within channel changes to the watercourses | No change | Neutral | No |

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| Various ponds and water storage lagoons water quality | Low (all) | Impact to water quality and potential impact on use of water | No change | Neutral | No |
| Groundwater Resource – Chalk aquifer | High | Loss of resource due to pollution for abstraction and baseflow contribution | No change | Neutral | No |
| Chippenham Fen | High | Harm to wetland habitat due to pollution | No change | Neutral | No |
| Flood risk | Lee Brook: Low | Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site | No Change | Neutral | No |

*Sunnica West Site B – Construction (2023)*

***Surface Water - Construction of Sunnica West Site B***

9.8.79 The greatest risks of adverse impacts during construction are in the northern and western areas of the Sunnica West Site B, which are closest to a tributary to the River Snail draining from the Chippenham Fen, and the River Snail, respectively. Chippenham Fen is upstream of the Sunnica West Site B and thus surface water impacts would not occur.

9.8.80 Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a water body, or in the construction of the crossing within W01, there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.81 During the construction phase, all works would be carried out in accordance with the mitigation measures set out in the Framework CEMP (**Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**). The implementation of standard implementation measures would avoid or reduce any potential adverse impacts on surface water receptors during construction.

9.8.82 The potential for direct impact on surface water quality during construction has been assessed as a temporary very low adverse impact on the high importance receptors of the River Snail and its tributary from Chippenham Fen, which results in a temporary minor effect that is not considered significant. There is considered to be a no change impact on the volume and flow rates and morphology in the watercourses, which results in a neutral effect which is not significant. There is considered to be a no change impact to the water quality within the various ponds and water storage lagoons, which results in a neutral effect which is not significant. As there is considered to be no change to volume and flow rate within the watercourses, there would be no impact on any surface water abstractions from the watercourses in the area. This is considered to be a neutral effect which is not significant.

9.8.83 No construction works are proposed within the channel of the River Snail or its tributary which is flowing northwards on the western boundary of the Sunnica West Site B, and its tributary flowing westwards on the northern border of the site. The potential for impacts on the morphology of the channel of the River Snail and its tributary, has been assessed as no change. This results in a neutral impact, which is not considered significant.

***Groundwater - Construction of Sunnica West Site B***

9.8.84 The groundwater receptors identified as potentially at risk from the construction phase of the Scheme are:

a. Baseflow and water quality in the River Snail;

b. Chippenham Fen inflow and water quality; and,

c. Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.85 With reference to **Chapter 3: Scheme Description** of this Environmental Statement **[EN010106/APP/6.1]**, the solar PV panels would be mounted upon a steel structure with strut foundations. These are steel set in the ground similar to small piles. No extensive continuous foundation is part of the design. These strut foundations are to be approximately 2-3.5m in depth depending on ground conditions and installation method (e.g. ramming, ground screw). Other small but permanent structures such as the battery compound and substation would be placed on a concrete slab approximately 0.2m thick with some structures requiring excavation up to 1m and filling with a compacted gravel base layer.

9.8.86 The ground level at Sunnica West Site B is approximately 12-15m AOD, with a water table depth at approximately 5-7m below ground level.

9.8.87 All structures are anticipated to be above the Chalk aquifer water table and therefore would not affect groundwater flow to Chippenham Fen, River Snail, or groundwater abstractions.

9.8.88 The effect of rainwater infiltrating the ground via runoff from solar PV panels is considered to be negligible for the distribution of recharge to the Chalk aquifer. Changes to local runoff recharge is therefore considered insignificant to catchment chalk aquifer water resources and the abstractions and river flows dependent on groundwater.

9.8.89 Based on current information, the Sunnica West Site B is not known to have a history of potentially contaminating uses. There are no Environment Agency registered historical landfill sites.

9.8.90 The installation of struts to a depth of up to 3.5m below ground is not considered to be a significant risk of mobilising contaminants, creating a contaminant pathway and risking infiltration to the water table. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.91 **Table 9-13** summarises the locations of non-intrusive crossings and the risk of groundwater ingress. At the crossing locations at Sunnica West B the water table is anticipated to be below the base of the pits. If groundwater is encountered, as the water table gradient will be very low the flow rate will be very slow if it were to enter the excavation. Depending on the permeability of the materials in which the pit is dug, it may remain dry if it is locally clayey, which some of these sites may be, being underlain by alluvium.

9.8.92 There would be excavations for swales as part of the drainage strategy. These are to be no more than 0.6m deep and therefore would be above the water table. Excavation would cause ground disturbance potentially mobilising fines that may lead to turbidity in groundwater. This is considered to be a low likelihood and on a local scale such that there would be negligible impact to groundwater. The Order limits does not have a history of potentially contaminating uses and therefore the excavation of swales is not considered to be a risk of mobilising contaminants. Consequently, water quality to rivers receiving baseflow, and groundwater abstractions downgradient are not considered to be at risk.

9.8.93 Therefore, the impact of construction within Sunnica West Site B on groundwater flow and quality, abstractors, and baseflow to surface waters, is considered to result in a no change impact, which results in a neutral effect on all receptors, which is not considered significant.

***Flood Risk - Construction of Sunnica West Site B***

9.8.94 With the exception of W01, the remainder of the site (W02) is situated within Flood Zone 1, and through mitigation there is no change in flood risk to and from the site, from W01. For further information, refer to (**Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**). Refer to **Table 9-8** for flood risk review of W01, and the FRA in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**.

9.8.95 During the construction phase, the following adverse flood risk impacts may occur:

a. Temporary changes in flood risk from changes in surface water runoff (e.g. disruption of stream flows due to deposition of silt, sediment in drains, ditches); and

b. Changes in flood risk due to the construction of solar PV panels, which alter the runoff from the site.

9.8.96 As stated within section 9.7 Embedded Design Mitigation, the surface water drainage strategy would ensure that any alteration of runoff as a result of the construction of the solar panels would be mitigated by the construction of swales and infiltration basins.

9.8.97 Construction activities would take place with the Framework CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.98 Therefore, the impact of construction within Sunnica West Site B on flooding and flood risk, from and to the development, is considered to result in a no change impact, which result in a neutral effect, which is not considered significant.

***Summary of Effects - Construction of Sunnica West Site B***

9.8.99 A summary of the assessment is included in **Table 9-17** below.

**Table 9-17 Summary of Magnitude of Impact and Significance of Effect for the Construction Phase for Sunnica West Site B**

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| River Snail water quality and its tributary | High | Potential harm to riverine habitat and water quality due to pollution | Very low | Minor | No |
| River Snail volume and flow rates | High | Potential for changes to volume and flow rates | No change | Neutral | No |
| River Snail and its tributary - morphology | High | Potential for within channel changes to the watercourses | No change | Neutral | No |

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| Chippenham Fen | High | Potential harm to wetland habitat due to changes in hydrogeology and groundwater quality | No change | Neutral | No |
| Various ponds and water storage lagoons | Low (all low) | Potential impact to water quality and potential impact on use of water | No change | Neutral | No |
| Groundwater Resource – Chalk aquifer | High | Potential loss of resource due to pollution for abstraction and baseflow contribution | No change | Neutral | No |
| EA licensed abstractions and private water supplies | High | Potential reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes | No change | Neutral | No |
| Flood Risk | River Snail: Medium | Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site | No change | Neutral | No |

*Grid Connection Route A – Construction (2023)*

***Surface water – Construction of Grid Connection Route A***

9.8.100 Grid Connection Route A links Sunnica East Site A with Sunnica East Site B, and then Sunnica East Site B with Sunnica West Site A. The link between Sunnica East Site A and Site B is remote from any surface waterbodies and no adverse impacts to surface waterbodies are predicted.

9.8.101 The alignment of Grid Connection Route A from Sunnica East Site B to Sunnica West Site A requires a crossing of the River Kennet. An artificial water storage reservoir (water body 9 on Figure 9-1) is located just south of the River Kennett and north of the A11. However, as the distance between

this reservoir and the alignment of Grid Connection Route A is more than 200m no impacts are predicted.

9.8.102 Where construction works, both within the connection route itself and any access roads, are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a water body there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.103 The cables would be installed beneath the channel of waterbodies using techniques that do not require any works in the channel. The cable would cross at least 2m below the bed of the watercourse to avoid impacts on the bed of the watercourse, or the banks of the watercourse.

9.8.104 During the construction phase, all works would be carried out in accordance with the mitigation measures set out in the CEMP. The implementation of standard implementation measures would avoid or reduce any potential adverse effects on surface water quality impacts during construction.

9.8.105 The potential for direct impact on surface water quality during construction has been assessed as temporary very low impact, on a high importance receptor (the River Kennett), which results in a temporary minor adverse effect, that is not considered significant. There is considered to be a no change impact on the volume and flow rates in the watercourses, which results in a neutral effect which is not significant. As there is considered to be no change to volume and flow rate within the watercourses, there would be no impact on any surface water abstractions from the watercourses in the area. This is considered to be a neutral effect which is not significant.

9.8.106 Due to the proposed use of techniques for the installation of cabled beneath the bed of the River Kennett, no construction works are proposed within the channel of the River Kennett. The potential for impacts on the morphology of the channel of the River Kennett, has therefore been assessed as no change. This results in a neutral impact, which is not considered significant.

***Groundwater – Construction of Grid Connection Route A***

9.8.107 The groundwater receptors identified as potentially at risk from the installation of Grid Connection Route A are:

a. Baseflow and water quality in River Kennet, Lee Brook; and,

b. Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.108 Except where crossing under watercourses or roads / railway, the cables would be set into trenches backfilled with gravel at a depth of approximately 2m and are anticipated to be above the Chalk aquifer water table, with groundwater depth at approximately 3-5m, and therefore would not affect groundwater flow. If the cables were to be below the water table at any

location the profile of the cable is insignificant compared to the thickness of aquifer, and therefore would not affect groundwater flow. The depth of the horizontal boring is not known at the current time, but variation in the depth is not anticipated to affect groundwater flow. This is because the profile of the cable will not change and that at greater depth the quantity of groundwater flow is typically less than in the shallower chalk. The trench would be backfilled with gravel and therefore would not affect groundwater flow.

9.8.109 The cables would be installed using good industry practice methods (as described earlier and in the Framework CEMP presented in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**) and therefore is not considered to pose a groundwater quality risk.

9.8.110 Construction works to install cables beneath watercourses would involve a temporary pit to enable boring beneath the River Kennett. The depth of this pit would be determined at a later stage depending on bed level relative to surrounding ground levels, noting the requirement to achieve a minimum of 2m headroom between the cables and the riverbed. At this stage, it has been assumed that the depth of launch and receiving pits might be up to 2m below ground level.

9.8.111 **Table 9-13** summarises the locations of non-intrusive crossings and the risk of groundwater ingress. At the crossing locations along Grid Connection A the water table is anticipated to be below the base of the pits. If groundwater were encountered, as the water table gradient will be very low the flow rate will be very slow if it were to enter the excavation. Depending on the permeability of the materials in which the pit is dug, it may remain dry if it is locally clayey, which some of these sites may be, being underlain by alluvium.

9.8.112 This creates a risk that groundwater could become contaminated by spillages of oils, fuels, or other construction chemicals, or through sediment mobilisation causing turbidity. However, the works would be very localised and temporary, and through the application of good industry practice mitigation that would be set out in the Framework CEMP, the impact of constructing and using the temporary pits on groundwater is considered to result in a temporary very low impact.

9.8.113 There are no Environment Agency registered historical landfill sites along the cable route

9.8.114 Therefore, the impact of construction within Grid Connection Route A on groundwater flow and quality, abstractors, and baseflow to surface waters is considered to result in a temporary no change impact, result in a neutral effect, that is not considered significant.

***Flood Risk – Construction of Grid Connection Route A***

9.8.115 During the construction phase the following adverse impacts may occur:

a. Temporary changes in flood risk from changes in surface water runoff (e.g. disruption of stream flows due to deposition of silt, sediment in drains, ditches); and

b. Changes in flood risk due to the construction of the Grid Connection Route A crossing the River Kennett.

9.8.116 As stated within Section 9.7 Embedded Design Mitigation, the Grid Connection Route A would cross under the River Kennett. This would ensure there would be no impact on the banks and bed of the watercourse, and therefore no effect on the flow regime or flooding potential of the watercourse.

9.8.117 Construction activities in the area of the river would take place with the Framework CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.118 Flood risk to the connection routes was scoped out at this stage; however, the FRA in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]** considers the flood risk from the Grid Connection Routes. With the mitigation in place, flood risk is considered low.

9.8.119 Therefore, the impact of construction of Grid Connection Route A on flooding and flood risk, from the development, is considered to result in a temporary no change impact, which results in a neutral effect, that is not considered significant.

***Summary of Effects – Construction of Grid Connection Route A***

9.8.120 A summary of the assessment is included in the **Table 9-18** below.

**Table 9-18 Summary of Magnitude of Impact and Significance of Effect for Grid Connection Route A**

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| River Kennett | High | Potential harm to riverine habitat and water quality due to pollution | Very low | Minor | No |
| River Kennett, Lee Brook volume and flow | High | Potential for changes to volume and flow rate | No change | Neutral | No |
| River Kennett | High | Potential for within channel changes to the watercourses | No change | Neutral | No |

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| Groundwater Resource – chalk aquifer | High | Potential loss of resource due to pollution for abstraction and baseflow contribution | No change | Neutral | No |
| EA licensed abstractions and private water supplies | High | Potential reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes | No change | Neutral | No |
| Flood Risk | River Kennet: Low | Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site | No Change | Neutral | No |

*Grid Connection Route B – Construction (2023)*

***Surface water – Construction of Grid Connection Route B***

9.8.121 Grid Connection Route B links land parcels W13 and W14 (see Figure 3-2) with the main Sunnica West Site A, Sunnica Site West A to Site B, and then from the western side of Sunnica West Site B to the proposed Burwell National Grid Substation Extension, passing to the south of Fordham and to the north of Landwade and Burwell. There is also the requirement to install high voltage cables beneath the A11, with one linking land parcel W15 with the main Sunnica West Site B with a route to the north of La Hogue Farm (see Figure 3-2), where there are a number of small ponds. There is a choice of two crossing locations, either location is considered to result in the same assessment conclusion.

9.8.122 The greatest risks of adverse impacts during construction, both within the connection route itself and any access roads, would be as Grid Connection Route B approaches the crossing of the River Snail (Soham Lode water body), New River and Burwell Lode Main rivers, together with tributaries and field drains and with land that slopes down to this watercourse crossing. The Grid Connection B would also cross the River Snail, New River and Burwell Lode.

9.8.123 Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a water

body there is the potential for direct adverse effects on water quality from the deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.124 The methodology for the Grid Connection Routes crossing the waterbodies would be via boring or tunnelling techniques. In this way, the cable would cross at least 2m below the bed of the watercourse to avoid impacts on the bed of the watercourse, or the banks of the watercourse. There is considered to be a no change impact on the volume and flow rates in the watercourses, which results in a neutral effect which is not significant. As there is considered to be no change to volume and flow rate within the watercourses, there would be no impact on any surface water abstractions from the watercourses in the area. This is considered to be a neutral effect which is not significant.

9.8.125 During the construction phase, all works would be carried out in accordance with the mitigation measures set out in the Framework CEMP (**Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**). The implementation of standard mitigation measures would avoid or reduce any potential adverse effects on surface water quality impacts during construction.

9.8.126 The potential for direct impact on surface water quality during construction has been assessed as very low on all the waterbodies, which are high importance receptors, results in a temporary adverse very low magnitude impact effect, which results in a minor effect that is not considered significant. For any small ponds, with low importance, this results a negligible effect which is not considered significant.

9.8.127 Due to the proposed use of boring or tunnelling crossing techniques, no construction works are proposed within the channel of the River Snail, New River, or Burwell Lode (as the cable would cross beneath the bed of the watercourse). The potential for impacts on the morphology of these channels, has therefore been assessed as no change. This results in a no change impact, and a neutral effect, which is not considered significant.

***Groundwater – Construction of Grid Connection Route B***

9.8.128 The groundwater receptors identified as potentially at risk from the installation of Grid Connection Route B are:

a. Baseflow and water quality in the River Snail, Soham Lode, New River and Burwell Lode;

b. Chippenham Fen inflow and water quality; and

c. Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.129 Except where crossing under watercourses or roads/ railways, the cables would be set into trenches backfilled with gravel at a depth of approximately

2m, and are anticipated to be above the Chalk aquifer water table, with groundwater depth at approximately 1-2m in the vicinity of Burwell National Grid Substation Extension, and up to approximately 7m in the vicinity of Sunnica West B. If the cables were to be below the water table at any location the profile of the cable is insignificant compared to the thickness of aquifer, and therefore would not affect groundwater flow. The depth of the horizontal boring is not known at the current time, but variation in the depth is not anticipated to affect groundwater flow. This is because the profile of the cable will not change and that at greater depth the quantity of groundwater flow is typically less than in the shallower chalk. Near the Burwell National Grid Substation Extension, the cable trench has the potential to be marginally below the water table. The trench would be backfilled with gravel and therefore would not affect groundwater flow.

9.8.130 There are no Environment Agency registered historical landfill sites along the cable route.

9.8.131 The cables would be installed using good industry practice methods (as described earlier and in the Framework CEMP presented in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**) and therefore is not considered to pose a groundwater quality risk.

9.8.132 Construction works for the installation of cabled beneath watercourses, and roads / railway crossings would involve temporary pits to enable launching and receiving boring equipment for the boring or tunnelling crossing techniques that are proposed beneath the River Snail, Soham Lode and Burwell Lode. The depth of this pit would be determined at a later stage depending on bed level relative to surrounding ground levels, noting the requirement to achieve a minimum of 2m headroom between the cables and the river bed. At this stage, it has been assumed that the depth of launch and receiving pits might be up to 2m below ground level. This creates a risk that groundwater could become contaminated by spillages of oils, fuels, or other construction chemicals, or through sediment mobilisation causing turbidity. However, the works would be very localised and temporary, and through the application of good industry practice mitigation that would be set out in the Framework CEMP, the impact of constructing and using the temporary pits on groundwater is considered to result in a temporary no change impact.

9.8.133 **Table 9-13** summarises the locations of non-intrusive crossings and the risk of groundwater ingress. The crossing locations along the Grid Connection Route B route near Burwell are anticipated to encounter groundwater. However, in these locations the water table gradient will be very low, so the flow rate will be very slow if it were to enter the excavation. Depending on the permeability of the materials in which the pit is dug, it may remain dry if it is locally clayey, which some of these sites may be, being underlain by alluvium.

9.8.134 To provide a further indication of risk, further analysis has been undertaken using a simple Darcy's Law calculation. This would suggest for these higher risk sites that any groundwater inflow may be less than 1 $m^3$ per day (based on the flow gradient from the contours given in Figure 9-3, and a 10m/d permeability, across an 8m wide excavation. At a local level this value may vary higher or lower, but it would need to be significantly higher to result in groundwater ingress that would require a licence from the Environment Agency and which may have a local impact on groundwater levels. This is not considered likely.

9.8.135 Overall, the impact of construction within Grid Connection Route B on groundwater flow and quality, abstractors, and baseflow to surface waters and Chippenham Fen, is considered to result in a temporary no change impact, and a neutral effect, that is not considered significant.

***Flood Risk – Construction of Grid Connection Route B***

9.8.136 During the construction phase, the following adverse impacts may occur:

a. Temporary changes in flood risk from changes in surface water runoff, e.g. disruption of stream flows due to deposition of silt, sediment in drains, ditches); and

b. Changes in flood risk due to the construction of the Grid Connection Route crossing the Rivers Snail, New River and Burwell Lode.

9.8.137 Flood risk to the connection routes was scoped out at this stage; however, the FRA in **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]** considers the flood risk from the Grid Connection Routes. With the mitigation in place, flood risk is considered low.

9.8.138 As stated within section 9.7 Embedded Design Mitigation, the Grid Connection Route would cross under the watercourses. This would ensure there would be no impact on the banks and bed of the watercourse, and therefore no effect on the flow regime or flooding potential of the watercourses.

9.8.139 Construction activities in the area of the rivers would take place with the CEMP in place to ensure no exacerbation of localised flooding from deposition or silt or sediment in drainage and ditches.

9.8.140 Therefore, the impact of construction of Grid Connection Route B on flooding and flood risk, from the development, is considered to result in a temporary negligible impact, which result in a neutral effect, that is not considered significant.

***Summary of Effects – Construction of Grid Connection Route B***

9.8.141 A summary of the assessment is included in **Table 9-19** below.

**Table 9-19 Summary of Magnitude of Impact and Significance of Effect for Grid Connection Route B**

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| River Snail | High | Harm to riverine habitat and water quality due to pollution | Very Low | Minor | No |
| River Snail volume and flow rate | High | Potential for changes to volume and flow rate | No change | Neutral | No |
| Chippenham Fen | High | Harm to wetland habitat due to pollution | No change | Neutral | No |
| Groundwater Resource – Chalk aquifer | High | Loss of resource due to pollution for abstraction and baseflow contribution | No change | Neutral | No |
| EA licensed abstractions and private water supplies | High | Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes | No change | Neutral | No |
| Flood Risk Grid Connection Route B<br>River Snail<br>New River<br>Burwell Lode | River Snail: Medium<br>New River: Low<br>Burwell Lode: Medium | Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site | No Change | Neutral | No |

*Burwell National Grid Substation Extension – Construction (2023)*

***Surface water – Construction of Burwell National Grid Substation Extension***

9.8.142 There are two sites under consideration within the substation area, with Option 1 adjacent to the road known as Weirs Drove. On the south side of this road is a water body tributary to Burwell Lode. Option 2 is located further northwest from Weir Drove and the tributary of Burwell Lode, to the north of Newnham Drove.

9.8.143 Within the footprint of Option 1 there is a drain oriented northwest-southeast. The proposed layout for Option 1 includes the infilling of this drain, with the construction of a new drain to the southwest to tie into the existing drainage network. As stated within section 9.7 Embedded Design Mitigation, the infilling of the ditch and construction of the alternative route would take place according to the mitigation measures described earlier and secured in the Framework CEMP (**Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**).

9.8.144 Option 2 is located to the north of the existing substation, with a drainage ditch located on the northwestern and southwestern sides. There is a need to widen an access off Newnham Drove in the southeast corner of Option 2 for the location of a crane. This would require a slight diversion of a drain. The drain would be reinstated in a 'like for like' way along a slightly new course. In addition, any surface water runoff will be managed according to the measures described earlier and secured in the Framework CEMP (**Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**)

9.8.145 The land in this area is flat lying, but construction activities in any land that slopes down towards waterbodies, or that has surface water drainage linking to local drains has the potential to impact water quality within Burwell Lode indirectly. Works within the substation area take place within the Burwell Lode catchment, but with the drainage system being controlled by the pumps maintained by the IDB. The tributary to the WFD Burwell Lode, south of Weirs Drove road, is at a higher level compared to level of water in the drains within the substation area. There is no hydrological connection. The drains within the substation site flow to the north-west. Construction work in this area therefore has the potential to result in impact to water quality within the drains to the northwest only and not the tributary to the WFD Burwell Lode.

9.8.146 Where construction works are undertaken in close proximity to waterbodies, close to existing land drains, or on steeper terrain angled towards a water body there is the potential for direct adverse effects on water quality from deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals, or through uncontrolled site run-off.

9.8.147 During the construction phase, all works would be carried out in accordance with the mitigation measures set out in the Framework CEMP (**Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**). The implementation of standard measures would help avoid or reduce any potential adverse effects on surface water quality within the artificial drains during construction.

9.8.148 The potential for direct impact on surface water quality during construction of both options has been assessed as temporary very low impact, on a low importance receptor (for water quality), which results in a temporary negligible effect, that is not considered significant. Following the Embedded Mitigation described within Section 9.7, this is the same for whichever

option is proposed. There is considered to be a no change impact on the volume and flow rates in the watercourses, which results in a neutral effect which is not significant for both options. As there is considered to be no change to volume and flow rate within the watercourses, there would be no impact on any surface water abstractions from the watercourses in the area. This is considered to be a neutral effect which is not significant.

9.8.149 For Option 1 there will be loss of channel of approximately 60m, together with the construction of a new channel of approximately the same length. The new channels will maintain the current capacities, profiles and habitat (once it has established). The construction process will ensure no impact on morphology of the channel outside of the National Grid Substation Option 1 area. The drains are of low importance morphologically. It is considered the works, due to the construction of a replacement ditch, would have a very low impact on a low importance receptor resulting in a temporary negligible effect, that is not considered significant.

9.8.150 For Option 2 there would need to be the slight realignment of a small drain, which would be done on a 'like for like' basis. It is considered the works would have a very low impact on a low importance receptor resulting in a temporary negligible effect, that is not considered significant.

***Groundwater – Construction of Burwell National Grid Substation Extension***

9.8.151 The groundwater receptors identified as potentially at risk from the construction of the Burwell National Grid Substation Extension are:

a. Baseflow and water quality in the Burwell Lode; and

b. Groundwater abstraction, Chalk aquifer groundwater flow and water quality.

9.8.152 The alternative sites proposed for the substation present the same risks for groundwater.

9.8.153 The substation foundations would be placed on a concrete slab approximately 0.2m thick and potentially requiring excavation up to 1m and filling with a compacted gravel base layer.

9.8.154 These groundworks are anticipated to be above the Chalk aquifer water table and therefore would not affect groundwater flow.

9.8.155 The foundations and structure would be installed using good industry practice methods (as described earlier and in the Framework CEMP presented in **Appendix 16C** of this Environmental Statement **[EN010106/APP/6.2]**) and therefore is not considered to pose a groundwater quality risk.

9.8.156 Therefore, the impact of construction within Burwell National Grid Substation Extension on groundwater flow and quality, abstractors, and

baseflow to surface waters, is considered to result in a temporary no change impact, which results in a neutral effect. This is not considered significant.

***Flood Risk – Construction of Burwell National Grid Substation Extension***

9.8.157 The proposed area for the substation extension lies in fluvial Flood Zone 1.

9.8.158 The area of the preferred option for the location of the Burwell National Grid Substation Extension (Option 1), lies within Flood Zone 1.

9.8.159 No part of the proposed areas of development for Options 1 and 2 would be located within functional flood plain, Flood Zone 3b. Therefore, it is considered that any potential for changes to fluvial flooding potential in the area, or impacts to the development, would be a very low impact resulting in a negligible neutral effect, that is not considered significant.

9.8.160 Sea level rise poses a potential risk to the Burwell National Grid Substation Extension. Mitigation is incorporated for this risk, to ensure the substation is designed and constructed to remain operational and safe in times of flood, and to ensure there is no increase in flood risk as a result of development, including allowance for sea level rise, complying with the NPPF and NPS EN-1.

9.8.161 The substation site will have no structures that would be occupied; with staff generally attending only at times of inspection and maintenance. Any building compounds will be located within Flood Zone 1, taking into account the current climate change mapping extents.

9.8.162 National Grid, which has extensive infrastructure at this location already, has a flood risk contingency plan, as part of the National Grid Substation Flood Defence Framework (NGFDF) (2019). It has identified all vulnerable substations and implemented plans to provide protection and mitigation for the next 30 to 80 years. Along with a constant monitoring programme of weather and flood alerts, it is considered the Burwell National Grid Substation Extension will be well catered for flood defence mitigation as part of this process.

9.8.163 Substations will not be manned unless for maintenance / carrying out works. During a flood event, affected infrastructure will not be accessed until flood waters recede. The flood risk to structures and the risk to people is considered low when incorporating sea level rise.

***Summary of Effects – Construction of Burwell National Grid Substation Extension***

9.8.164 A summary of the assessment is included in the **Table 9-20** below.

**Table 9-20 Summary of Magnitude of Impact and Significance of Effect for Burwell National Grid Substation Extension**

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| Burwell Lode | Medium | Harm to riverine habitat and water quality due to pollution | Very low | Negligible | No |
| Burwell Lode volume and flow rate | High | Potential for changes to volume and flow rate | No change | Neutral | No |
| Groundwater Resource – Chalk aquifer | High | Loss of resource due to pollution for abstraction and baseflow contribution | No change | Neutral | No |
| EA licensed abstractions and private water supplies | High | Reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes | No change | Neutral | No |
| Flood Risk | Burwell Lode: Medium | Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site. Flood Resilience and Resistance measures to be used within the design. | Very low | Neutral | No |

*Combined Effects on Receptors – Construction (2023)*

***Surface water – Construction of Sunnica Energy Farm***

9.8.165 Sunnica East Site A and Site B, Grid Connection Route A, and parts of Sunnica West Site B are all within the Lee Brook-River Kennett-River Lark catchment area. Grid Connection Route B and Burwell National Grid Substation Extension are within the Cam Lower Operational Catchment (Burwell Lode, New River, and Soham Lode) Thus, there is the potential for combined effects during the construction phase on the two catchments. However, providing the risk of water pollution is managed effectively on site

through standard mitigation measures during construction no in-combination significant effects are anticipated.

***Hydromorphology – Construction of Sunnica Energy Farm***

9.8.166 There are considered to be no effects on the hydromorphology of any receptors assessed arising from the construction of the Sites, the Grid Connection Route or the Burwell National Grid Substation Extension. Therefore, no combined effects on receptors are predicted at this stage.

***Groundwater – Construction of Sunnica Energy Farm***

9.8.167 No combined effects on receptors are predicted as each scheme component does not affect groundwater flow and quality, abstractors, Chippenham Fen, and baseflow to surface waters and therefore groundwater dependent receptors would not be affected for the scheme components in combination.

***Flood Risk – Construction of Sunnica Energy Farm***

9.8.168 As it is considered there would be a no change impact on flood risk receptors, no combined effects on receptors are predicted.

***Summary of Effects – Sunnica Energy Farm***

9.8.169 A summary of the assessment is included in the Table below.

**Table 9-21 Summary of Magnitude of Impact and Significance of Combined Effect for Construction Phase Impacts for Sunnica East Site A and Site B, West Site A and West Site B, Grid Connections Route A, Grid Connection Route B and the National Grid Substation Extension**

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| River Kennett, Lee Brook, River Lark River Snail, New River, Burwell Lode | High | Potential harm to riverine habitat due to pollution | Very low | Minor | No |
| As above, volume and flow rates | High | Potential for changes to volume and flow rates | No change | Neutral | No |

| Receptor | Importance (Value) | Description of Impact | Magnitude of Impact | Effect Category | Significant effect (Yes / No) |
|---|---|---|---|---|---|
| River Kennett, Lee Brook, River Snail, New River, Burwell Lode | High | Potential for within channel changes to the watercourses | No change | Neutral | No |
| Chippenham Fen | High | Potential harm to wetland habitat due to pollution | No change | Neutral | No |
| Groundwater Resource | High | Potential loss of resource due to pollution for abstraction and baseflow contribution | No change | Neutral | No |
| EA licensed abstractions and private water supplies | High | Potential reduction in water levels (river and groundwater) causing potential risk to yield, and water quality changes | No change | Neutral | No |
| Flood risk | River Lark: Low<br>Lee Brook: Low<br>Kennett Lee Brook: Low<br>River Snail; medium<br>New River: Low<br>Burwell Lode: Medium | Runoff to be attenuated using SuDS features, nil detriment on the flooding potential to or from the site | No Change | Neutral | No |

## Operation

*Sunnica East Site A - Operation*

***Surface water – Operation of Sunnica East Site A***

9.8.170 During the operational phase, the following impacts may occur without adequate mitigation:

a. Impacts on water quality in watercourses from run-off and spillages (including use of fire-fighting water) from new permanent hardstanding and maintenance activities;

b. Potential impacts on hydrology as a result of the Scheme. This may include alterations to natural flow pathways from runoff from areas of hardstanding. This may also have a subsequent effect on aquatic habitats and water-dependant nature conservation sites;

c. Impacts to hydromorphology and riparian habitat from watercourse crossings; and

d. Reduced chemical loading of watercourses associated with cessation of nitrate, pesticide, herbicide and insecticide applications, which would be beneficial.

9.8.171 During the operational phase, Sunnica East Site A would operate using good industry practice and complying with environmental legislation through the application of an Operation Environmental Management Plan (OEMP). A Framework OEMP has been submitted in **Appendix 16F** of this Environmental Statement **[EN010106/APP/6.2]**, which outlines the contents of the OEMP, which would be produced post-construction, prior to operation. The design of the scheme has also included measures to avoid and minimise the risk of water pollution and hydromorphology effects during its operation. These include:

a. During the operational phase there would be surface water runoff from the permanent structures, roofs, solar PV panels and access roads. A surface water drainage technical note (see Annex F of the FRA, **Appendix 9C** of this Environmental Statement **[EN010106/APP/6.2]**) has been prepared and includes a water quality risk assessment following the Simple Index Approach described in C753 The SuDS Manual (Ref 9-3). This is a method to assess water quality risk from different land uses so that sufficient treatment can be provided, preferably using SuDS. According to this risk assessment the proposed SuDS treatment train will provide adequate treatment of diffuse urban pollutants.

b. Battery sites and solar PV panels are to be located away from watercourses, with surface water drainage controlled by swales and small infiltration basins.

c. In the case of the battery sites, each is enclosed with an isolated drainage system and internal fire suppression system.

d. Although each panel may contain liquid substances that are potentially toxic in the water environment, they are robustly manufactured and unlikely to break.

e. Any areas of the site containing oils, such as transformers, would be bunded or have self-contained drainage systems. This would ensure that any leaks are contained and do not enter the surface water drainage system. For the crossing between E01-E02, a clear span structure will be constructed for the watercourse crossing by the access road.

f. The OEMP (to be produced post-construction and prior to operation) would also include a schedule of regular visual observation of the solar PV panels so that were any to leak these would be identified quickly and the leak could be fixed.

9.8.172 As such it is considered that the potential for impacts to occur as a result of surface water runoff, chemical spillages or from the clear span structure over the watercourse would be very low.

9.8.173 In addition to diffuse urban pollutants from routine surface water runoff and chemical spillages, there is also a pollution risk from emergency situations. Although unlikely, should a fire occur at one of the BESS compounds, water will be stored on site for use to contain the fire (rather than douse it). To prevent this fire-fighting water from potentially contaminating the site's SuDS based surface water drainage system, and from potentially being discharged from the site to a local watercourse, a dedicated storage basin will be provided. The capacity of the storage basin will be greater than the capacity of stored water for fire-fighting activities, and if necessary, the basin can be lined to prevent the infiltration of any chemical pollutants if it is used. The fire-fighting water can then be safely stored until the emergency event is over before being pumped out to a tanker for off-site disposal at a licenced wastewater facility. Further information on the management of fire risk and use of water is contained in paragraph 9.7.61.

9.8.174 The OEMP would describe the monitoring of on-site equipment including regular observations of the transformers to ensure that any leaks into the bunded area are dealt with in a way that is compliant with the prevailing environmental legislation (see **Appendix 16F** of this Environmental Statement **[EN010106/APP/6.2]**).

9.8.175 On the basis of the above design, embedded and standard mitigation measures, the impact from diffuse urban pollutants is considered to be no change, leading to a neutral effect on all receiving watercourses (i.e. River Kennet, Lee Brook and River Lark and its tributaries), which is not significant. On the basis of a clear span structure being constructed between E01 – E02, it is considered there would be a very low impact on a tributary of the River Lark, a medium importance receptor, leading to a neutral effect, which is not significant.

9.8.176 During the operational phase, it is anticipated that with the embedded mitigation of the drainage strategy mimicking natural flow status there would be no effect on flow pathways from runoff from the Scheme.

9.8.177 Finally, as the land is being taken out of agricultural usage, it is considered there would a decrease in surface water runoff of agricultural additives to the land (be that nutrients in the form of phosphates and nitrates, or from pesticides, herbicides or insecticides). However, in the context of the whole catchment, it is considered this would be not be a great enough change to result in an effect on the watercourses. Therefore, there is considered to be no change in future baseline conditions resulting in a neutral effect, which is not significant.

***Groundwater – Operation of Sunnica East Site A***

9.8.178 No risks are anticipated from the opening of the Sunnica East Site A to the groundwater receptors identified under the construction phase (paragraph 9.8.7), provided that opening and operation are conducted according to best industry practice to manage the risk of chemical spillages. Such protective measures would be secured through the Framework OEMP.

9.8.179 Upon opening and during operation, the swales would collect runoff which would infiltrate to the water table. On a local scale, there is anticipated to be additional recharge in these areas and less recharge where this rain water has been collected.

9.8.180 Other structures such as building foundations and hardstanding would prevent recharge of rainfall to these footprint areas and would infiltrate the ground adjacent or be routed to swales.

9.8.181 The change in recharge distribution locally is considered to be insignificant. The groundwater resource on a catchment scale would not change and therefore would result in a no change impact and a neutral effect on groundwater levels for abstractors and baseflow to rivers, which is not significant.

9.8.182 The baseline study of groundwater chemistry states there is an increasing trend in nitrate, the high concentrations being derived from agricultural activities rather than being a natural baseline. The operation of the site would result in less nitrate contribution from the infiltrated rainwater due to the cessation of agricultural activities on the site. This is considered to be a potential benefit to the aquifer in the long term. However, it is likely to be of limited magnitude, due to the small scale of the site area compared with the total size of the aquifer. It is considered this would result in a very low magnitude of impact to groundwater, a receptor of high importance. This would result in a minor beneficial impact, which is not significant.

***Flood Risk – Operation of Sunnica East Site A***

9.8.183 The site would be constructed using the surface water drainage strategy in order to ensure no detriment to off-site flooding. Any on-site flooding would be mitigated by slightly higher struts on PV panels, and routed away from compounds and battery storage facilities. It is, therefore, considered that there would be no change to the current scenarios, resulting in a neutral effect, which is not significant.

*Sunnica East Site B - Operation*

***Surface water – Operation of Sunnica East Site B***

9.8.184 It is considered that the presentation of potential impacts for Sunnica East Site A above in paragraph 9.8.170 to 9.8.177 represents those for Sunnica East Site B.

***Groundwater – Operation of Sunnica East Site B***

9.8.185 No risks are anticipated from the opening of the Sunnica East Site B to the groundwater receptors identified under the construction phase (9.8.34), provided that the operation is conducted according to best industry practice to manage the risk of chemical spillages. Such protective measures would be secured through the Framework OEMP.

9.8.186 Upon operation, the swales would collect runoff which would infiltrate to the water table. On a local scale there is anticipated to be additional recharge in these areas and less recharge where this rain water has been collected.

9.8.187 Other structures such as building foundations and hardstanding would prevent recharge of rainfall to these footprint areas and would infiltrate the ground adjacent or be routed to swales.

9.8.188 The change in recharge distribution locally is considered to be insignificant. The groundwater resource on a catchment sale would not change and therefore would result in a no change impact and a neutral effect on groundwater levels for abstractors and baseflow to rivers, which is not significant.

9.8.189 The baseline study of groundwater chemistry states there is an increasing trend in nitrate, the high concentrations being derived from agricultural activities rather than being a natural baseline. The operation of the site would result in less nitrate contribution from the infiltrated rainwater due to the cessation of agricultural activities on the site. This is considered to be a potential benefit to the aquifer in the long term. However, it is likely to be of limited magnitude, due to the small scale of the site area compared with the total size of the aquifer. It is considered this would result in a very low magnitude of impact to groundwater, a receptor of high importance. This would result in a minor beneficial impact, which is not significant.

***Flood Risk – Operation of Sunnica East Site B***

9.8.190 During the operational phase, the Sunnica East Site B would have been constructed using the surface water drainage strategy in order to ensure nil detriment to off-site flooding, and any on-site flooding would be mitigated by slightly higher struts on solar PV panels, and routed away from compounds and battery storage facilities. It is, therefore, considered there would be no change to the current scenarios, resulting in a neutral effect, which is not significant.

*Sunnica West Site A - Operation*

***Surface water – Operation of Sunnica East West A***

9.8.191 It is considered that the presentation of potential impacts for Sunnica East Site A above in paragraph 9.8.170 to 9.8.177 represents those for Sunnica West Site A. With the receptors being Lee Brook and Dane Hill watercourses.

***Groundwater – Operation of Sunnica West Site A***

9.8.192 No risks are anticipated from the opening of the Sunnica West Site A to the groundwater receptors identified under the construction phase (9.8.59), provided that opening and operation are conducted according to best industry practice to manage the risk of chemical spillages. Such protective measures would be secured through the Framework OEMP.

9.8.193 During operation, the swales would collect runoff which would infiltrate to the water table. On a local scale there is anticipated to be additional recharge in these areas and less recharge where this rain water has been collected.

9.8.194 Other structures such as building foundations and hardstanding would prevent recharge of rainfall to these footprint areas and would infiltrate the ground adjacent or be routed to swales.

9.8.195 The change in recharge distribution locally is considered to be insignificant. The groundwater resource on a catchment sale would not change and therefore would result in a no change impact and a neutral effect on groundwater levels for abstractors and baseflow to rivers, which is not significant.

9.8.196 The baseline study of groundwater chemistry states there is an increasing trend in nitrate, the high concentrations being derived from agricultural activities rather than being a natural baseline. The operation of the site would result in less nitrate contribution from the infiltrated rainwater due to the cessation of agricultural activities on the site. This is considered to be a potential benefit to the aquifer in the long term. However, it is likely to be of limited magnitude, due to the small scale of the site area compared with the total size of the aquifer. It is considered this would result in a very low

magnitude of impact to groundwater, a receptor of high importance. This would result in a minor beneficial impact, which is not significant.

***Flood Risk – Operation of Sunnica West Site A***

9.8.197 During the operational phase, the site would have been constructed using the surface water drainage strategy in order to ensure nil detriment to off-site flooding, and any on-site flooding would be mitigated by slightly higher struts on PV panels, and routed away from compounds and battery storage facilities. It is therefore considered there would be no change to the current scenarios, and a neutral effect which is not significant.

*Sunnica West Site B - Operation*

***Surface water – Operation of Sunnica West Site B***

9.8.198 It is considered that the presentation of potential impacts for Sunnica West Site A above in paragraphs 9.8.170 to 9.8.177 represents those for Sunnica West Site B, with the exception of fire water as there will be no battery storage areas within Sunnica West B. The receptors for Sunnica West Site B are the River Snail and its tributary. Also, within Sunnica West Site B, the watercourse crossing within W01 would be a culverted structure, with the potential to be open span which will be considered during detailed design.

***Groundwater– Operation of Sunnica West Site B***

9.8.199 No risks are anticipated from the operation of the Sunnica West Site B to the groundwater receptors identified under the construction phase (9.8.84), provided that opening and operation are conducted according to best industry practice to manage the risk of chemical spillages. Such protective measures are be secured through the Framework OEMP in **Appendix 16F** of this Environmental Statement **[EN010106/APP/6.2]**.

9.8.200 Upon opening and during operation, the swales would collect runoff which would infiltrate to the water table. On a local scale there is anticipated to be additional recharge in these areas and less recharge where this rain water has been collected.

9.8.201 Other structures such as building foundations and hardstanding would prevent recharge of rainfall to these footprint areas and would infiltrate the ground adjacent or be routed to swales.

9.8.202 The change in recharge distribution locally is considered to be insignificant. The groundwater resource on a catchment sale would not change and therefore would result in a no change impact and a neutral effect on groundwater levels for abstractors and baseflow to rivers, which is not significant.

9.8.203 The baseline study of groundwater chemistry states there is an increasing trend in nitrate, the high concentrations being derived from agricultural

activities rather than being a natural baseline. The operation of the site would result in less nitrate contribution from the infiltrated rainwater due to the cessation of agricultural activities on the site. This is considered to be a potential benefit to the aquifer in the long term. However, it is likely to be of limited magnitude, due to the small scale of the site area compared with the total size of the aquifer. It is considered this would result in a very low magnitude of impact to groundwater, a receptor of high importance. This would result in a minor beneficial impact, which is not significant.

***Flood Risk – Operation of Sunnica West Site B***

9.8.204 During the operational phase, the site would have been constructed using the surface water drainage strategy in order to ensure nil detriment to off-site flooding, and any on-site flooding would be mitigated by slightly higher struts on PV panels, and routed away from compounds and battery storage facilities. It is therefore considered there would be no change to the current scenarios, and a neutral effect which is not significant.

*Grid Connection Route A - Operation*

***Surface water – During Operation of Grid Connection Route A***

9.8.205 No operation phase impacts to the surface water environment have been predicted.

***Groundwater – During Operation of Grid Connection Route A***

9.8.206 No operation phase impacts to the groundwater environment have been predicted. The gravel-filled trench and cable would not impede groundwater flow as the cable profile is minimal compared to the thickness of aquifer, and generally the cable would be above the water table.

9.8.207 The cable route beneath rivers would not impede groundwater flow as the cable profile is minimal compared to the thickness of aquifer providing baseflow discharge to the rivers.

9.8.208 Therefore, this is predicted to have a no change impact and a neutral effect.

***Flood Risk– During Operation of Grid Connection Route A***

9.8.209 No part of the cable route is above ground, therefore it is considered there would be a no change impact, with a neutral effect, which is not significant.

*Grid Connection Route B - Operation*

***Surface water – During Operation of Grid Connection Route B***

9.8.210 No operation phase impacts to the surface water environment have been predicted.

***Groundwater – During Operation of Grid Connection Route B***

9.8.211 No operation phase impacts to the groundwater environment have been predicted. The gravel-filled trench and cable would not impede groundwater flow as the cable profile is minimal compared to the thickness of aquifer, and generally the cable would be above the water table.

9.8.212 The cable route beneath rivers would not impede groundwater flow as the cable profile is minimal compared to the thickness of aquifer providing baseflow discharge to the rivers.

9.8.213 Therefore, this is predicted to have a no change impact and a neutral effect.

***Flood Risk – During Operation of Grid Connection Route B***

9.8.214 No part of the cable route is above ground; therefore it is considered there would be a no change to future baseline conditions, resulting in a neutral effect, which is not significant.

*Burwell National Grid Substation Extension - Operation*

***Surface water– During Operation of Burwell National Grid Substation Extension***

9.8.215 It is considered that the presentation of potential impacts for the operation of Sunnica East Site A above in paragraph 9.8.170 represents those for Burwell National Grid Substation Extension for the two potential sites. On the basis of the design, embedded and standard mitigation measures, the impact from diffuse urban pollutants is considered to be very low, leading to a neutral effect on all the Burwell Lode and tributaries within the Burwell Lode catchment.

9.8.216 Due to a section of ditch being infilled, a replacement ditch is being provided on a like for like basis, it is considered that there would be no net overall hydromorphology impacts during the operation of the Burwell National Grid Substation Extension. Therefore, the overall impact is considered to be a no change impact, on a low importance waterbody. This would result in a neutral effect which is not significant.

9.8.217 During the operational phase, it is anticipated that with the embedded mitigation of the drainage strategy mimicking natural flow status there would be no effect on flow pathways from runoff from the Scheme.

9.8.218 Finally, as the land is being taken out of agricultural usage, it is considered there would a decrease in surface water runoff of agricultural additives to the land (be that nutrients in the form of phosphates and nitrates, or from pesticides, herbicides or insecticides). However, in the context of the whole catchment, it is considered this would be not be a great enough change to result in an effect on the watercourses. Therefore, there is considered to be

no change in future baseline conditions resulting in a neutral effect, which is not significant.

***Groundwater – During Operation of Burwell National Grid Substation Extension***

9.8.219 No operational phase impacts to the groundwater environment have been predicted. for either siting option, provided that opening and operation are conducted according to best industry practice to manage the risk of chemical spillages, which would form part of the OEMP (to be produced post-construction and prior to operation). The Framework OEMP is included as **Appendix 16F** of this Environmental Statement **[EN010106/APP/6.2]**. Therefore, this is predicted to have a no change impact and a neutral effect.

***Flood Risk – During Operation of Burwell National Grid Substation Extension***

9.8.220 The Burwell National Grid Substation Extension site will have no structures that would be occupied; with staff generally attending only at times of inspection and maintenance. Any building compound would be located within Flood Zone 1, taking into account the current climate change mapping extents as the flood zone 2 boundary. Sea level is predicted to rise with climate change and mitigation will be incorporated to ensure the Substation is designed and constructed to remain operational and safe in times of flood, and to ensure there is no increase in flood risk as a result of development, including allowance for sea level rise, complying with the NPPF.

9.8.221 National Grid, who has extensive infrastructure on the site already, has a flood risk contingency plan, as part of the National Grid Substation Flood Defence Framework (NGFDF) (2019). It has identified all vulnerable Substations and implemented plans to provide protection and mitigation for the next 30 to 80 years. Along with a constant monitoring programme of weather and flood alerts, it is considered the Burwell National Grid Substation will be well catered for flood defence mitigation.

9.8.222 The flood risk to structures and the risk to people is considered low when incorporating sea level rise

9.8.223 The flood resistance and resilience measures to be employed would result in a no change impact, with a neutral effect, which is not significant.

*Combined Effects on Receptors During Operation*

***Surface water – Combined Effects During Operation***

9.8.224 The Sunnica Energy Farm is contained within several surface water catchments. There is the potential for combined effects during the operation phase. As a requirement of the DCO the drainage systems will be maintained throughout the lifetime of the Scheme, which will manage

effectively the risk of water pollution at source either through suitable drainage measures on the isolated sites that would require positive drainage systems. Therefore, no in-combination significant effects are anticipated.

***Groundwater – Combined Effects During Operation***

9.8.225 No combined effects on receptors are predicted. None of the development sites would affect groundwater flow, levels and quality, and therefore there are no anticipated effects on the identified receptors as a result of the scheme as a whole.

***Flood Risk – Combined Effects During Operation***

9.8.226 The Sunnica Energy Farm would be constructed using the surface water drainage strategy in order to ensure no increase to off-site flood risk, and any on-site flooding would be mitigated by slightly higher struts on PV panels, and routed away from compounds and battery storage facilities. It is therefore considered there would be no change to the current scenarios, leading to a neutral effect which is not significant.

**15 Years Post Opening**

9.8.227 No changes are anticipated for the water environment and flood risk assessment as presented for the Operational Section, paragraphs 9.8.170 onwards.

**Decommissioning**

*Sunnica East Site A - Decommissioning*

***Surface water***

9.8.228 Potential impacts from the decommissioning of Sunnica East Site A are similar in nature to those during construction, as some ground-work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These impacts would be controlled by a Decommissioning Environmental Management Plan (DEMP) (see **Appendix 16E** of this Environmental Statement **[EN010106/APP/6.2]** for the Framework DEMP).

9.8.229 As a result, it is considered that there would be a very low impact, and a temporary minor effect due to the high importance of some of these waterbodies, which is not significant.

***Groundwater***

9.8.230 No risks to the groundwater receptors identified for the construction phase are anticipated from the decommissioning of the Scheme, as the structures

that have been assessed with regard to groundwater flow effects would no longer be present.

9.8.231 It is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. However, some ground works would still be required to remove infrastructure installed. Potential polluting effects would be controlled by the DEMP during decommissioning (see **Appendix 16E** of this Environmental Statement **[EN010106/APP/6.2]** for the Framework DEMP). As a result, it is considered there would be a no change impact, would result in a neutral effect, that is not considered significant.

9.8.232 If swales are removed and the landscape restored, rain water would infiltrate into the aquifer resulting in a recharge pattern as per the baseline. As a result, it is considered there would be a no change impact, which would result in a neutral effect, that is not considered significant.

***Flood Risk***

9.8.233 The decommissioning of the Sunnica East Site A would take place with the DEMP in place to ensure no silts/sediments are deposited within the watercourses (see **Appendix 16E** of this Environmental Statement **[EN010106/APP/6.2]** for the Framework DEMP). The deposition of silts/sediments in watercourses to be avoided as this may result in reduced channel volume and can increase the potential for flooding events. As a result, it is considered there would be a no change to future baseline conditions, resulting in a neutral effect on the receiving waterbodies, that is not significant.

*Sunnica East Site B - Decommissioning*

***Surface water***

9.8.234 Potential impacts from the decommissioning of Sunnica East Site B are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These impacts would be controlled by the DEMP during decommissioning (see **Appendix 16E** of this Environmental Statement **[EN010106/APP/6.2]** for the Framework DEMP). As a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor effect due to the high importance of some waterbodies, which is not significant.

***Groundwater***

9.8.235 No risks to the groundwater receptors identified under construction phase are anticipated from the decommissioning of the Scheme as the structures

that have been assessed with regards to groundwater flow effects would no longer be present.

9.8.236 Ground works would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. Potential polluting impacts would be controlled by the DEMP during decommissioning (see **Appendix 16E** of this Environmental Statement **[EN010106/APP/6.2]** for the Framework DEMP). As a result, it is considered there would be a no change impact due to its temporary nature, which would result in a neutral effect, that is not considered significant.

9.8.237 If swales are removed and the landscape restored, rain water would infiltrate into the aquifer resulting in a recharge pattern as per the baseline. As a result, it is considered there would be a no change impact, which would result in a neutral effect, that is not considered significant.

9.8.238 The findings of the impact on groundwater chemistry assessment, as described in paragraph 9.8.182 for Sunnica East Site A, are also considered to be applicable to Sunnica East Site B, resulting in a minor beneficial impact, which is not significant.

***Flood Risk***

9.8.239 The decommissioning of the Sunnica East Site B would take place with the DEMP in place to ensure no silts/sediments are deposited within the watercourses (see **Appendix 16E** of this Environmental Statement **[EN010106/APP/6.2]** for the Framework DEMP). The deposition of silts/sediments in watercourses to be avoided as this may result in reduced channel volume and can increase the potential for flooding events. As a result, it is considered there would be no change to the future baseline situation, resulting in a neutral effect on the receiving waterbodies, that is not significant.

*Sunnica West Site A - Decommissioning*

***Surface water – Decommissioning of Sunnica West Site A***

9.8.240 Potential impacts from the decommissioning of Sunnica West Site A are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These effects would be controlled by the DEMP in the during decommissioning. As a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor effect due to the high importance of some waterbodies, which is not significant.

***Groundwater – Decommissioning of Sunnica West Site A***

9.8.241 No risks to the groundwater receptors identified for the construction phase are anticipated from the decommissioning of the Scheme as the structures that have been assessed with regard to groundwater flow effects would no longer be present.

9.8.242 Ground works would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. Potential polluting effects would be controlled by the DEMP during decommissioning. As a result, it is considered there would be a no change impact due to its temporary nature, which would result in a neutral effect, that is not considered significant.

9.8.243 If swales are removed and the landscape restored, rain water would infiltrate into the aquifer resulting in a recharge pattern as per the baseline. As a result, it is considered there would be a no change impact, which would result in a neutral effect, that is not considered significant.

9.8.244 The findings of the impact on groundwater chemistry assessment, as described in paragraph 9.8.182 for Sunnica East Site A, are also considered to be applicable to Sunnica West Site A, resulting in a minor beneficial impact, which is not significant.

***Flood Risk– Decommissioning of Sunnica West Site A***

9.8.245 The decommissioning of the Sunnica West Site B would take place with the DEMP in place to ensure no silts/sediments are deposited within the watercourses (see **Appendix 16E** of this Environmental Statement **[EN010106/APP/6.2]** for the Framework DEMP). The deposition of silts/sediments in watercourses to be avoided as this may result in reduced channel volume and can increase the potential for flooding events. As a result, it is considered there would be no change to the baseline situation, with a neutral effect on the receiving waterbodies, that is not significant.

*Sunnica West Site B - Decommissioning*

***Surface water – Decommissioning of Sunnica West Site B***

9.8.246 Potential impacts from the decommissioning of Sunnica West Site B are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These impacts would be controlled by the DEMP during decommissioning. As a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor adverse effect as some of these waterbodies are off high importance, which is not significant.

***Groundwater – Decommissioning of Sunnica West Site B***

9.8.247 No risks to the groundwater receptors identified for the construction phase are anticipated from the decommissioning of the Scheme as the structures that have been assessed with regard to groundwater flow effects would no longer be present.

9.8.248 Ground works would be required to remove infrastructure installed. Potential polluting effects would be controlled by the DEMP during decommissioning. As a result, it is considered there would be a no change impact due to its temporary nature, would result in a neutral effect, that is not considered significant.

9.8.249 If swales are removed and the landscape restored, rain water would infiltrate into the aquifer resulting in a recharge pattern as per the baseline. As a result, it is considered there would be a no change impact, which would result in a neutral effect, that is not considered significant.

9.8.250 The findings of the impact on groundwater chemistry assessment, as described in paragraph 9.8.182 for Sunnica East Site A, are also considered to be applicable to Sunnica West Site B, resulting in a minor beneficial impact, which is not significant.

***Flood Risk – Decommissioning of Sunnica West Site B***

9.8.251 The decommissioning of the Sunnica West Site B would take place with an DEMP in place to ensure no silts/sediments are deposited within the watercourses (see **Appendix 16E** of this Environmental Statement **[EN010106/APP/6.2]** for the Framework DEMP). The deposition of silts/sediments in watercourses to be avoided as this may result in reduced channel volume and can increase the potential for flooding events. As a result, it is considered there would be a no change to future baseline conditions, with a neutral effect on the receiving waterbodies, that is not significant.

*Combined Effects on Receptors*

9.8.252 It is considered there will be no significant effects on any of the water related receptors and the minor effects would be below the threshold of significance, when considered in combination, do not lead to significant in combination effects.

*Grid Connection Route A - Decommissioning*

***Surface Water, Groundwater and Flood Risk– Decommissioning of Grid Connection Route A***

9.8.253 The Grid Connection Route infrastructure are not being decommissioned and will remain in place, therefore there it is considered there would be a no

change impact on the waterbodies, and a neutral effect, which is not significant.

*Grid Connection Route B - Decommissioning*

***Surface Water, Groundwater and Flood Risk– Decommissioning of Grid Connection Route A***

9.8.254 The cable route infrastructure are not being decommissioned and will remain in place, therefore there it is considered there would be a no change impact on the waterbodies, and a neutral effect, which is not significant.

*Burwell National Grid Substation Extension - Decommissioning*

***Surface Water – Decommissioning of Burwell National Grid Substation Extension***

9.8.255 Potential impacts from the decommissioning of any of the two options considered for the Burwell National Grid Substation Extension are similar in nature to those during construction, as some ground work would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. These effects would be controlled by the DEMP during decommissioning. As a result, it is considered there would be a very low impact on the waterbodies as outlined under the construction section. This results in a potentially temporary minor adverse effect due to some waterbodies being classed as high importance, which is not significant.

***Groundwater – Decommissioning of Burwell National Grid Substation Extension***

9.8.256 No risks to the groundwater receptors identified under the construction phase are anticipated from the decommissioning of the Scheme as the structures that have been assessed with regard to groundwater flow effects would no longer be present.

9.8.257 Ground works would be required to remove infrastructure installed, although it is not proposed that cables installed beneath watercourses would be removed but that they would remain in situ. Potential polluting effects would be controlled by the DEMP during decommissioning. As a result, it is considered there would be a no change impact due to its temporary nature, would result in a neutral effect, that is not considered significant.

***Flood Risk – Decommissioning of Burwell National Grid Substation Extension***

9.8.258 The decommissioning of the Burwell National Grid Substation Extension would take place with the DEMP in place to ensure no silts/sediments are deposited within the watercourses (see **Appendix 16E** of this Environmental Statement **[EN010106/APP/6.2]** for the Framework DEMP).

The deposition of silts/sediments in watercourses to be avoided as this may result in reduced channel volume and can increase the potential for flooding events. As a result, it is considered there would be a no change to the future baseline conditions, with a neutral effect on the receiving waterbodies, that is not significant.

*Combined Effects on Receptors - Decommissioning*

9.8.259 Within the Order Limits there is the potential for combined effects on surface water features, and the associated fluvial flood risk, hydromorphology, as well as the underlying groundwater resource.

9.8.260 For East Site A, East Site B, West Site A, West Site B, the Burwell National Grid Substation Extension and Grid Connection Route A and B, there is the potential for an effect on one receptor to combine with an effect on another water receptor.

9.8.261 However, it is considered there will be no significant effects on any of the water related receptors and any minor effects would be below the threshold of significance, when considered in combination, do not lead to significant in combination effects. Therefore, there would be no combined effects on any of the water related receptors.

## 9.9 Additional Mitigation and Enhancement Measures

9.9.1 No additional mitigation and enhancement measures are proposed.

**Monitoring**

9.9.2 There are no monitoring requirements for mitigation and enhancements. The WFD enhancement measures associated with intrusive crossings are considered to be mitigation measures. A pre-construction morphological survey is proposed as part of embedded mitigation to provide a record of channel form should there be any unforeseen impacts during installation of cables using non-open cut techniques that need to be remediated.

## 9.10 Residual Effects

9.10.1 No significant residual effects on surface water or groundwater resources or flood risk are anticipated by the Scheme.

9.10.2 **Table 9-22** outlines the likely residual construction effects with the embedded mitigation including good industry practice measures secured via the Framework CEMP.

9.10.3 There are considered to be no residual effects (significant or not significant) for surface water, groundwater or flood risk during the operation phase of the Scheme. Decommissioning impacts are predicted to be similar to those arising during the construction period and are not significant.

## Table 9-22 Summary of Residual Effects (Construction)

| Receptor | Description of impact | Significance of effect with mitigation | Mitigation/Enhancement measure | Residual effect after mitigation |
|---|---|---|---|---|
| **Sunnica East Site A** | | | | |
| Surface Water | Potential for direct impacts to surface water quality, or morphology of the watercourse | Minor and negligible effect: Not Significant | No extra measures proposed | Slight, and Neutral effect: Not Significant |
| Groundwater | Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Flood Risk | Potential for increase of flooding from the site, or to the site as a result of construction | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| **Sunnica East Site B** | | | | |
| Surface Water | Potential for direct impacts to surface water quality, or morphology of the watercourse | Minor effect: Not Significant | No extra measures proposed | Slight effect: Not Significant |
| Groundwater | Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Flood Risk | Potential for increase of flooding from the site, or to the site as a result of construction | Neutral: Not Significant | No extra measures proposed | Neutral: Not Significant |

| Receptor | Description of impact | Significance of effect with mitigation | Mitigation/Enhancement measure | Residual effect after mitigation |
|---|---|---|---|---|
| **Sunnica West Site A** | | | | |
| Surface Water | Potential for direct impacts to surface water quality, or morphology of the watercourse | Minor and negligible effect: Not Significant | No extra measures proposed | Slight and neutral effect: Not Significant |
| Groundwater | Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Flood Risk | Potential for increase of flooding from the site, or to the site as a result of construction | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| **Sunnica West Site B** | | | | |
| Surface Water | Potential for direct impacts to surface water quality, or morphology of the watercourse | Minor adverse effect: Not Significant | No extra measures proposed | Slight adverse effect: Not Significant |
| Groundwater | Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Flood Risk | Potential for increase of flooding from the site, or to the site as a result of construction | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |

| Receptor | Description of impact | Significance of effect with mitigation | Mitigation/Enhancement measure | Residual effect after mitigation |
|---|---|---|---|---|
| **Grid Connection Route A** | | | | |
| Surface Water | Potential for direct impacts to surface water quality, or morphology of the watercourse during cable route construction, or crossing of the watercourse. | Negligible effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Groundwater | Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Flood Risk | Potential for increase of flooding from the site, or to the site as a result of construction | Neutral effect: Not Significant | No extra measures proposed | Not Significant |
| **Grid Connection Route B** | | | | |
| Surface Water | Potential for direct impacts to surface water quality, or morphology of the watercourse during cable route construction, or crossing of the watercourses. | Negligible effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Groundwater | Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Flood Risk | Potential for increase of flooding from the site, or to the site as a result of construction | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |

| Receptor | Description of impact | Significance of effect with mitigation | Mitigation/Enhancement measure | Residual effect after mitigation |
|---|---|---|---|---|
| **Burwell National Grid Substation Extension** | | | | |
| Surface Water | Potential for direct impacts to surface water quality, or morphology of the watercourse | Negligible effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Groundwater | Potential for direct impacts to groundwater resources and/or quality, surface water or abstraction receptors | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |
| Flood Risk | Potential for increase of flooding from the site, or to the site as a result of construction | Neutral effect: Not Significant | No extra measures proposed | Neutral effect: Not Significant |

## 9.11 Cumulative Effects

9.11.1 The proposed developments within the local area have been assessed (as described in **Chapter 5: EIA Methodology, Chapter 17: Effect Interactions** of this Environmental Statement **[EN010106/APP/6.1]** and described in **Appendix 5A** of this Environmental Statement **[EN010106/APP/6.2]** and presented in Figure 5-1 of this Environmental Statement **[EN010106/APP/6.3]**). They include the following applications, including consideration of Local Plans, which have been divided per watercourse catchment (the closest development site has also been highlighted but please note that cumulative effects may occur with more than one component of the Scheme).

**Table 9-23 Summary of Proposed Developments within 1km**

| Closest Site | ID Fig. 5.1 | Application Description | Watercourse Catchment | Approximate distance to site |
|---|---|---|---|---|
| Sunnica East Site A | 80 | Outline planning application for 110 dwellings in Isleham | South Level and Cut-off Channel – | 780m |
| | 696 | Hybrid planning application for a proposed 70 km pipeline and associated above ground infrastructure at Gazeley, Isleham and Woodditton; b. Outline planning application - for above ground infrastructure at Bexwell, Kentford, Lady's Green and Rede with all matters reserved except for access | R. Lark<br>Kennet-Lee Brook<br>R. Kennet | 0m (and nearest approach – crosses Grid Connection A) |
| Sunnica East Site B and Grid Connection Route A | 562 | Commercial polyhouses | Lark downstream of Mill Street Bridge | 175m |
| | 271 | Installation of washing plant for recycling inert waste | As above | 50m |
| | 319 | Extension to existing caravan park | As above | 510m |
| | 180 | Outline application for 55 dwellings | As above | 645m |
| | 306 | Screening opinion for 130 dwellings | As above | 700m |

| Closest Site | ID Fig. 5.1 | Application Description | Watercourse Catchment | Approximate distance to site |
|---|---|---|---|---|
| | 716 | Planning application for 148 dwellings at Red Lodge on land between the A11 and the B1085. | As above | 300m |
| Sunnica West Site A | 86 | Sustainable garden village extension to village of Kennett, including housing, care home, school. | Kennet-Lee Brook | 740m |
| Sunnica West site B, Grid connection Route B and Burwell National Grid Substation Extension | 95 | 49.9MW battery storage facility | Burwell Lode | Within Scheme area |
| | 96 | 49.9MW battery storage facility | Burwell Lode | 35m |
| | 97 | Proposed solar farm and ancillary development | Burwell Lode | 235m |
| | 296 | Screening opinion for a solar farm | Burwell Lode | 560m |
| | 375 | Japanese Shrine | Snail | 425m |
| | 296 | Screening opinion for a solar farm | New River | 785m |
| | 85 | Demolition and alteration within existing industrial park | Snail | 90m |
| | 756 | Construction of a 30MW battery energy storage system facility and associated access, landscaping and other infrastructure works | Burwell Lode and tributaries | 0m |
| | 757 | National Grid Substation extension to the existing Burwell National Grid Substation Extension. | Burwell Lode and tributaries | 0m |

9.11.2 The above table summarises the applications within 1km of the different areas of the Scheme. For Sunnica East Site A, there are two other applications within 1km of the Order limits. The application for 110m dwellings at Isleham is located within a different watercourse catchment and thus is discounted from the cumulative effects assessment. The other is a 70km pipeline that will pass to the west of Sunnica East Site A and then

crosses the Grid Connection Route A south of Sunnica East Site B. Construction of this development is expected to take five years and although there is some uncertainty regarding the start date, it is likely to coincide with the construction of the Scheme. However, it is expected that the other development will be constructed to a similar minimum level of mitigation to prevent water pollution. On this basis, cumulative adverse impacts with the Scheme are unlikely to occur and overall no cumulative effect is predicted.

9.11.3 Sunnica East Site B has five applications within the same catchment as the Scheme, two for dwellings, one for extension to a caravan park, installation of washing plant and commercial polyhouses. The closest is located just 50m from the Order limits.

9.11.4 Sunnica West Site A has one application located 740m eastwards and upstream of the Order limits, and within the Kennet-Lee Brook Catchment.

9.11.5 Sunnica West Site B, and the Grid Connection Route B/ Burwell National Grid Substation Extension area has seven applications related to solar farm use, with screening opinions and battery storage. Additionally, there are two application within the River Snail catchment, one for a Japanese shrine and one for demolition and alteration within an existing industrial park.

9.11.6 There is a planning application for 148 dwellings on land at Red Lodge between the A11 and the B1085 (ID 695 on Figure 5-1 of the ES **[EN010106/APP/6.3]**). The development is approximately 300m northeast of the River Kennet. However, there are intervening properties with gardens and local roads with no obvious hydrological connection. There remains the possibility that there are indirect flow pathways (e.g. surface water sewers) along which construction site runoff may propagate during the construction phase.

9.11.7 For all these proposed developments, it is assumed they would follow good industry practice in terms of the management of construction works and surface water runoff (and risk to groundwater of minor chemical leaks from static and mobile equipment) in the long term, compliant with all relevant environmental legislation, including that relating to flood risk.

9.11.8 It is considered that any temporary or permanent effects from these developments would not lead to cumulative impacts with the Scheme on the basis of both adopting standard good practice construction measures and appropriate SuDS or proprietary measures for longer term runoff.

9.11.9 Therefore, it is not predicted that there would be any significant changes to the baseline conditions of the water resources in the area, nor any significant cumulative effects.

9.11.10 In addition to the above, there is a proposed development for c. 1300 dwellings and associated infrastructure and community services north of West Row Road, east of Mildenhall (ID 716 on Figure 5-1 of the ES

**[EN010106/APP/6.3]**). The development has not yet been submitted for planning. From a review of Ordnance Survey maps there does not appear to be any direct flow paths between this proposed development and the River Lark, with any flow pathways likely to be restricted to any indirect connection. As above, it is considered that any temporary or permanent effects from this development would not lead to cumulative impacts with the Scheme on the basis of both adopting standard good practice construction measures and appropriate SuDS or proprietary measures for longer term runoff.

9.11.11 Furthermore, another solar farm is proposed to the east of Swaffham Prior, although no planning application has been submitted yet (ID 716 on Figure 5-1 of the ES **[EN010106/APP/6.3]**). The spatial extents of this development are not known but it is a considerable distance away from the Scheme and the solar array itself will not affect any of the same water bodies potentially affected by the Scheme. However, it is expected that this other development would likely require a grid connection using the Burwell National Grid Substation Extension, and this may interact with watercourse that are also affected by the Scheme. Thus, there is the potential for cumulative adverse impacts during construction if the developments were constructed simultaneously. However, as stated above, any construction works should adhere to minimum standards to prevent pollution of waterbodies and assuming this to be the case, no cumulative impact would be likely to occur.

9.11.12 On the basis that all developments would be adopting standard good practice construction measures, and appropriate SuDS or proprietary measures for longer term runoff, it is considered that developments outside of the 1km study area would not lead to cumulative impacts with the Scheme.

## 9.12 References

Ref 9-1 Entec (2007). Cam Bedford Ouse Regional Modelling Study. Hydrogeological Conceptualisation of the Lower Cam Reporting Unit. June 2007. For the Environment Agency.

Ref 9-2 Entec (2008). Project Record for the Ely Ouse Groundwater Resource Investigation Study. Lark Reporting Area. Volume 1, Characterisation of Catchment Behaviour. August 2008. For the Environment Agency.

Ref 9-3 CIRIA (2015) The SuDS Manual 2nd Eds.

Ref 9-4 Ordnance Survey Mapping.

Ref 9-5 Bing Aerial Mapping.

Ref 9-6 Environment Agency (2015) Anglian River Basin Management Plan.

Ref 9-7 Environment Agency Catchment Data Explorer website.

Ref 9-8 British Geological Survey Borehole and online mapping.

Ref 9-9 Multi Agency Geographical Information for the Countryside mapping.

Ref 9-10 National Rivers Flow Archive.

Ref 9-11 The Cranfield University Soilscape website.

Ref 9-12 The Met Office Website.

Ref 9-13 Environment Agency Water Quality Archive Website.

Ref 9-14 Environment Agency Chalk Aquifer Reports, Entec, 2007 and 2008.

Ref 9-15 HMSO (2021) The National Planning Policy Framework.

Ref 9-16 HMSO (2016) Planning Practice Guidance.

Ref 9-17 Department of Energy & Climate Change, (July 2011) National Policy Statement for Overarching Energy (EN-1).

Ref 9-18 Anglian Water (2019) Anglian Waters Water Resources Management Plan.

Ref 9-19 Design Manual for Roads and Bridges, LA113 Road Drainage and Water Environment (2019), UK Highways Agencies.

Ref 9-20 Design Manual for Roads and Bridges, LA104, Environmental Assessment and Monitoring (2019), UK Highways Agencies.

Ref 9-21 Environment Agency, (1998a), River Geomorphology: a practical guide.

Ref 9-22 Environment Agency, (1998b), Geomorphological approaches to river management. Project record. W5A/i661/1, prepared by Thorne, C., Downs, P.W., Newson, M.D., Clarke, M.J. and Sear, D.A., EA, Bristol.

Ref 9-23 HMSO (2016) Environmental Permitting (England and Wales)Regulations.

Ref 9-24 HMSO (1991) Water Resources Act.

Ref 9-25 CIRIA (2015) The SuDS Manual 2nd Eds.

Ref 9-26 Forest Heath District Council and St Edmundsbury Borough council Strategic Flood risk Assessment and Water Cycle study Level 1, August 2009.

Ref 9-27 Forest Heath District Council (2011) Strategic Flood Risk Assessment.

Ref 9-28 East Cambridgeshire District Council (2017) Strategic Flood Risk Assessment.

Ref 9-29 UK Centre for Ecology and Hydrology, National River Flow Archive Website.

Ref 9-30 Swaffham Internal Drainage Board Website.

Ref 9-31 Environment Agency (EA), 2004. Baseline Report Series 13: The Great Ouse Chalk aquifer, East Anglia British Geological Survey Commissioned Report No. CR/04/236N. Environment Agency Science Group: Air, Land & Water Technical Report NC/99/74/13.

Ref 9-32 CIRIA (2001) C532: Control of water pollution from construction sites: guidance for consultants and contractors.

Ref 9-33 CIRIA (2006) C649: Control of water pollution from linear construction projects.

Ref 9-34 British Standards, BS 6031: 2009 Code of Practice for Earthworks.

Ref 9-35 HMSO (2002) Control of substances Hazardous to Human Health (COSHH) Regulations.

Ref 9-36 HMSO (2001) Control of pollution (Oil Storage) (England) Regulations.

Ref 9-37 HMSO (2016) The Environmental Permitting (England and Wales) Regulations.

Ref 9-38 HMSO (1991) Land Drainage Act.

Ref 9-39 HMSO (1991) Water Industry Act.

Ref 9-40 DigDat digital data on demand.

Ref 9-41 Gov.UK website Long Term Flood Risk.

Ref 9-42 BSI (2017) BS 10175:2011: +A2 2017: Investigation of Potentially Contaminated Sites – Codes of Practice.

Ref 9-43 Department for Business, Energy & Industrial Strategy (Draft, September 2021). Draft National Policy Statement for Renewable Energy Infrastructure (EN-3).

Ref 9-44 Department of Energy and Climate Change (2011) Overarching for National Policy Statement for Energy.