Tillbridge Solar

Tillbridge Solar Project

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Environmental Statement
Appendix 10-2: Water Framework Directive Extended Screening and Scoping Assessment
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1. Introduction

1.1 Background

1.1.1 The Tillbridge Solar Project (the Scheme) will comprise the construction, operation (including maintenance), and decommissioning of ground-mounted solar photovoltaic (PV) arrays. The Scheme will also include associated development to support the solar PV arrays.

1.1.2 The Scheme is made up of the Principal Site, the Cable Route Corridor and works to the existing National Grid Cottam Substation. The Principal Site comprises the solar PV arrays, electrical substations, grid balancing infrastructure, cabling and areas for landscaping and ecological enhancement.

1.1.3 The associated development element of the Scheme includes but is not limited to access provision; a Battery Energy Storage System (BESS), to support the operation of the ground mounted solar PV arrays; the development of on-site substations; underground cabling between the different areas of solar PV arrays; and areas of landscaping and biodiversity enhancement.

1.1.4 The Scheme also includes a 400kV underground Cable Route Corridor of approximately 18.5km in length connecting the Principal Site to the National Electricity Transmission System (NETS) at the existing National Grid Cottam Substation. The Scheme will export and import electricity to the NETS.

1.1.5 A full description of the Scheme is included in **Chapter 3: Scheme Description** of the Environmental Statement **[EN010142/APP/6.1]**. An overview of the Scheme and its environmental impacts is provided in the Environmental Statement **Non-Technical Summary [EN010142/APP/6.4]**.

1.1.6 This Water Framework Directive (WFD) Assessment has been produced alongside of the ES for the Scheme which has been commissioned by Tillbridge Solar Ltd (hereafter referred to as 'the Applicant'). In particular, this report relates to **Chapter 10: Water Environment** of this ES **[EN010142/APP/6.1]**.

1.2 Study Area

1.2.1 For the purposes of this assessment, and consistent with **Chapter 10: Water Environment** of this ES **[EN010142/APP/6.1]**, a general Study Area (Zone of Influence) of 1km from the Order limits has been considered to identify water bodies that are hydrologically connected to the Scheme, and have the potential to be directly impacted by the activities associated with it. However, given that impacts may propagate downstream, relevant risks have been checked for downstream connecting WFD water bodies. Professional judgement has been applied to identify the extent to which such features are considered.

1.2.2 The Study Area falls across the following surface water body catchments (Ref. 1):

a. Eau from Source to Northorpe Beck (GB104028057970);
b. Fillingham Beck (GB105030062490);
c. Marton Drain Catchment (tributary of the River Trent) (GB104028057840);
d. River Till (GB105030062411);
e. Seymour Drain Catchment (tributary of the River Trent) (GB104028058340);
f. Skellingthorpe Main Drain (GB105030062390);
g. Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); and
h. Tributary of Till (GB105030062480).

1.2.3 There are also several tributaries of these water bodies present within the Study Area; these are predominantly unnamed agricultural ditches, drains and springs. It should be noted that WFD requirements apply equally to all watercourses regardless of whether they are Environment Agency reportable reaches.

1.2.4 The Study Area is also underlain by two WFD groundwater bodies:

a. Lower Trent Erewash - Secondary Combined (GB40402G990300); and
b. Witham Lias (GB40502G401400).

1.3 Introduction to the Water Framework Directive

1.3.1 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref. 2), commonly referred to as the Water Framework Directive (WFD), aims to protect and enhance the water environment.

1.3.2 The WFD takes a holistic approach to sustainable management of the water environment by considering interactions between surface water, groundwater and water-dependent ecosystems. Ecosystem conditions are evaluated according to interactions between classes of biological, chemical, physico-chemical and hydromorphological elements known as 'Quality Elements'.

1.3.3 Under the WFD, ‘water bodies’ are the basic management units, defined as all or part of a river system or aquifer. Waterbodies form part of a larger ‘river basin district’ (RBD), for which ‘River Basin Management Plans’ (RBMPs) are used to summarise baseline conditions and set broad improvement objectives. RBMPs are produced every six years, in accordance with the river basin management planning cycle. The current RBMPs are in Cycle 3 that were published in 2022. The Scheme interacts with the Humber and Anglian RBMPs (Ref 1).

1.3.4 In England, the Environment Agency (the EA) is the competent authority for implementing the WFD, although objectives are delivered in partnership with other public bodies and private organisations, for example local planning authorities, water companies, rivers trusts, and private landowners and developers.

1.3.5 The EA is also responsible for managing flood risk and other activities on Main Rivers. Local planning authorities or drainage boards are typically responsible

for consenting activities on Ordinary Watercourses. Local planning authorities are typically responsible for highways drains, and landowners are typically responsible for ditches and watercourses within their property including piped watercourses and culverts. While the EA is ultimately responsible for enforcing the WFD on any water body, local authorities are required to plan and consent WFD related activities on Ordinary Watercourses.

1.3.6 As part of its regulatory and statutory consultee role on planning applications and environmental permitting (under the Environmental Permitting Regulations (England and Wales) 2016), the EA and WFD-partnering organisations, must consider whether proposals for new developments have the potential to:

a. Cause a deterioration of any quality element of a water body from its current status or potential; and / or

b. Prevent future attainment of good status or potential where not already achieved.

1.3.7 Regulation 33 of the Water Environment Regulations 2017 (i.e. the WFD) states that public bodies "*must, in exercising their functions so far as affecting a river basin district, have regard to - (a) the river basin management plan for that district as approved under regulation 31, and (b) any supplementary plan prepared under regulation 32.*" The Scheme must therefore reflect water body improvement priorities as outlined in the Humber and Anglian RBMP (Ref 1).

1.3.8 In determining whether a development is compliant or non-compliant with the WFD objectives for a water body, the EA and partnering organisations must also consider the conservation objectives of any Protected Areas (e.g. Natura 2000 sites or water dependent Sites of Special Scientific Interest (SSSIs)) and adjacent WFD water bodies, where relevant.

2. Methodology

2.1 WFD Methodology

2.1.1 There are no fixed methods for WFD assessment. The nature of the water environment and the breadth of the legislation mean that assessments are tailored to proposals on a case-by-case basis.

2.1.2 The following general guidance is available which has been applied for this assessment:

a. Environment Agency (2016a). Water Framework Directive risk assessment. How to assess the risk of your activity (Ref. 3).

b. Environment Agency (2016b). Protecting and improving the water environment. Water Framework Directive compliance of physical works in rivers (Ref. 4).

c. The Planning Inspectorate (2017). Advice Note eighteen: The Water Framework Directive (Ref. 5).

2.1.3 A stepwise approach consisting of screening, scoping and impact assessment phases is generally followed in order to: (a) rationalise the levels of WFD

assessment and impact mitigation that are required; and (b) verify that proposals meet the requirements of the WFD. The general approach is described by in Advice Note Eighteen by the Planning Inspectorate (2017) (Ref. 5) and briefly summarised below.

Stage 1: Screening

2.1.4 Screening identifies the zone of influence of a proposed development, and if proposed activities pose a risk to the water environment. It is used to identify if there are activities that do not require further consideration for WFD objectives, for example activities which have been ongoing since before the current RBMP plan cycle and which have thus formed part of the baseline.

Stage 2: Scoping

2.1.5 Scoping is used to identify any potential impacts of the proposed activities to specific WFD receptors and their water quality elements. This involves review of WFD impact pathways, shortlisting which WFD water bodies and quality elements could or could not be affected by proposed activities, and collecting baseline information from the relevant RBMP on the status and objectives for each water body. As this WFD assessment is being applied retrospectively, where impacts have already been addressed, this has been recorded at Stage 2 of the assessment.

Stage 3: Impact Assessment

2.1.6 This involves rationalised assessment of water bodies and quality elements that could be affected by proposed activities, in order to identify any areas of WFD non-compliance. Proposed activities are reviewed in terms of both positive and negative impacts, and the baseline mitigation measures, enhancements, and contributions to the WFD objectives described in the RBMP. Any proposed activities with potentially deleterious impacts are reviewed simultaneously with their corresponding mitigation proposals, to determine a net effect on WFD objectives.

Mitigation Commitments

2.1.7 Proposed mitigation activities relied upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and sufficiently secured. Mitigation could be secured through Development Consent Order (DCO) requirements, or other legally binding methods.

Further Assessment if WFD Derogation is to be Considered by the Applicant

2.1.8 For information, WFD Regulation 17 and Regulation 19 set out ‘last resort’ planning and legal processes for WFD derogation that are not part of this report. Case review of any proposed justification by an applicant would be a matter for the Secretary of State, and is likely to require a substantial body of multi-disciplinary evidence. As explained in the assessment sections below, no derogation has been considered herein because it is assessed that the scheme will not impede achievement of WFD objectives.

2.1.9 Where the potential for deterioration of water bodies is identified, and the "*body of water is so affected by human activity or its natural condition is such that the achievement of the environmental objectives set would be infeasible or disproportionately expensive*", it is possible for an applicant to present further assessments in the context of WFD Regulation 17. Derogation has not been considered herein and would require detailed further analyses of options, environmental impacts and business cases, for WFD and all relevant legislation pertaining to planning and sustainability. For WFD context, WFD Regulation 17 covers part of the procedures for WFD derogation, including but not limited to that "*the environmental and socio-economic needs served by such human activity cannot be achieved by other means which are a significantly better environmental option not entailing disproportionate costs*".

2.1.10 Where the potential for "*failure is the result of new modifications to the physical characteristics of the body of surface water or alterations to the level of the body of groundwater*", it is possible for an applicant to present further assessments in the context of WFD Regulation 19. Regulation 19 is also still commonly referred to as Article 4.7 of the original EU Directive. Derogation has not been considered herein and as above would require detailed further analyses. For WFD context, WFD Regulation 19 covers part of the procedures for WFD derogation, including but not limited to that:

a. "*All practicable steps are taken to mitigate the adverse impact on the status of the body of water*".

b. "*The reasons for the modifications or alterations, or for the sustainable development activities, are of overriding public interest*".

c. "*The benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development*".

d. "*The beneficial objectives served by the modifications or alterations, or by the sustainable development activities, cannot, for reasons of technical feasibility or disproportionate cost, be achieved by other means which are a significantly better option*".

2.2 Desk Study

2.2.1 A desk-based study was carried out to capture information pertaining to the Scheme that is not attainable through Site survey. Reviewal of relevant information relating to the Study Area was undertaken to develop a baseline for WFD catchments, watercourses and surrounding areas. The following data sources were used for the desk study:

a. Environment Agency WFD data (Ref. 1);

b. Defra's Multi-agency geographical information for the countryside website (MAGIC) (Ref. 6);

c. Historical maps (Ref. 7);

d. Geology and soil data (Ref. 8 and Ref. 9);

e. Aerial photography (Ref. 10);

f. Hydrological information (Ref. 11); and

g. Climate information (Ref. 12).

2.3 Field Survey

2.3.1 A qualitative Site walkover was undertaken by water quality and hydromorphology specialists on 30 March 2023 to establish baseline conditions of watercourses local to the Scheme.

2.3.2 The walkover focused on surface waterbodies in the Study Area, observing their current character and condition, the presence of existing risks and any potential pathways for construction and operation impacts from the Scheme. The walkover also followed 'fluvial audit' principles (Ref. 13), and focussed on aspects such as valley form, river type, substrate characteristics, bank material, and erosional and depositional processes. These observations were then considered within the context of the WFD to establish baseline for each of the Hydromorphological Quality Elements.

2.4 Limitations and Assumptions

2.4.1 This WFD assessment has been undertaken based on the design information of the Scheme that is described in Section 3.4 of **Chapter 3: Scheme Description** - of this ES **[EN010142/APP/6.1]**. Where there is uncertainty in the design, reasonable assumptions have been made and these are described at relevant points within this assessment, such as **Section 3.1**. Further assessment or updates may therefore be required if there are material changes to the design elements post planning or it is determined that proposed embedded mitigation cannot be implemented as currently proposed for whatever reason.

2.4.2 Assessment relies on a combination of published data sources, observations from hydromorphological surveys, and ecological surveys conducted between 2022 and 2023 to define the quality of water environment receptors. While the available data is considered robust for defining receptor importance, there may be inherent uncertainties or gaps in the data. Additionally, groundwater levels are estimated based on published sources and will be confirmed through ground investigation post-consent, introducing a degree of uncertainty regarding the exact groundwater conditions.

2.4.3 There are practical constraints in surveying the entire length of all watercourses within the Cable Route Corridor, however representative data is sufficient for predicting effects. Site-specific variances for final crossing locations will be surveyed as part of pre-works surveys, but slight changes in culvert locations are anticipated. There may be variations in the number of crossing points along the preferred route, but it is assumed that these variations would not significantly impact the overall level of environmental impact. Furthermore, the assessment assumes a minimum headroom and specific techniques for cable installation, with depths and exact parameters subject to ground investigation and appropriate consents. These assumptions and limitations underscore the need for ongoing monitoring and adaptive

management throughout the project lifecycle to address any unforeseen environmental impacts or changes in conditions.

2.4.4 The EA was consulted on water body objectives and Heavily Modified Water Body (HMWB) mitigation measures, which are actions that can be implemented to protect and improve the water environment and help achieve the objectives for each RBMP. However, of the eight water bodies for which information was requested, the data provided by the EA only covered the following water bodies:

a. River Till (GB105030062411); and

b. Skellingthorpe Main Drain (GB105030062390).

2.4.5 Therefore, Section 7Assessment of the Scheme Against WFD of this report only assesses whether the Scheme may prevent the measures outlined for these water bodies to be implemented.

2.4.6 Further information on limitations and assumptions is detailed in **Chapter 10: Water Environment** of this ES **[EN010142/APP/6.1]**.

3. WFD Screening and Scoping

3.1 WFD Screening

3.1.1 The purpose of the WFD screening stage is to identify a zone of influence of the Scheme and to determine whether that influence has the potential to adversely impact upon WFD water body receptors. The screening stage also identifies specific components of the Scheme that could affect receptor water bodies' WFD status and carries them forward to subsequent stages of the assessment process. Water body receptors or activities that are screened out are not carried forward, and justification is provided.

Screening of WFD Water Bodies

3.1.2 The Scheme interacts with a number of WFD surface water and groundwater bodies. WFD Screening of these water bodies is provided in **Table 3-1**. Smaller tributaries within each of the WFD water body catchments that may be impacted by the Scheme are considered in this assessment. Any other remaining downstream waterbodies not mentioned below are considered sufficiently far downstream to avoid impacts of the Scheme or would not interact with the Scheme and are therefore screened out of further assessment.

Table 3-1: Screening of WFD water bodies potentially impacted by the Scheme.

WFD Water Body	Screening Outcomes	Justification
Eau from Source to Northorpe Beck (GB104028057970) - River	In	WFD water bodies may be directly impacted by the Scheme because they are located within the Study Area and due to a range of activities that would interact with the local watercourse network during construction, operation, and decommissioning phases of the Scheme. Potential impacts include, but are not limited to, receiving surface water runoff, spillages, fine sediment, and organic material.
Fillingham Beck (GB105030062490) - River		
Marton Drain Catchment (trib of Trent) (GB104028057840) - River		
River Till (GB105030062411) - River		
Seymour Drain Catchment (trib of Trent) (GB104028058340) - River		
Trent from Carlton-on-Trent to Laughton Drain		

WFD Water Body	Screening Outcomes	Justification
(GB104028058480) - River		
Tributary of Till (GB105030062480) - River		
Skellingthorpe Main Drain (GB105030062390) - River	Out	The Skellingthorpe Main Drain is approximately 8km south from the Order limits and would not be directly impacted by the Scheme. There are watercourses, drains, ditches, and other potential pathways between the Scheme and the WFD water body, however, the distance is deemed sufficient to avoid impact because this distance will allow for the natural processes within the river system to attenuate the concentration of pollutants. In addition, it is anticipated that any water quality impacts will be adequately mitigated by implementation of measures contained within the Construction Environmental Management Plan (CEMP) and associated Water Management Plan (WMP), which will be secured under the DCO and will be produced post consent. A **Framework CEMP [EN010142/APP/7.8]** has been submitted with the DCO Application. Similarly, during decommissioning there would be a Decommissioning Environmental Management Plan (DEMP) in place. A **Framework DEMP [EN010142/APP/7.10]** has been submitted with the DCO Application. Refer to **Section 6** for more details regarding mitigation. Given this mitigation and the lack of any direct works to these water bodies, it is considered that they can be screened out of further assessment.

WFD Water Body	Screening Outcomes	Justification
Lower Trent Erewash - Secondary Combined (GB40402G990300) - Groundwater	In	Activities relating to the construction, operation and decommissioning of the Scheme have been assessed in terms of their potential impact upon this groundwater water body. There are potential anticipated impacts to WFD water bodies, therefore assessment of impacts to groundwater is scoped in.
Witham Lias (GB40502G401400) - Groundwater		

Screening of Activities

3.1.3 As described in **Chapter 3: Scheme Description** of the ES **[EN010142/APP/6.1]**, the Scheme comprises a number of activities, some of which present a potential risk to the WFD status of water bodies. These components and activities are listed in **Table 3-2** together with a screening assessment.

Table 3-2: Screening of the Scheme's activities against WFD quality elements.

Activity	Description	Screening Outcomes	Justification
Construction, operation and decommissioning of Solar PV infrastructure consisting of solar PV panels and mounting structures	Solar PV panels will clear the ground by no less than 0.6m as they will be mounted on PV Mounting Structures. This will avoid the creation of an impermeable surface on the ground or the need for extensive earthworks. The mounting poles are likely to be driven into the ground, to a maximum depth of 4m. Subject to ground conditions or the presence of archaeology; these may require concrete foundations of concrete ballasts. Infrastructure on the Principal Site would maintain a 10m buffer from any watercourses.	**Out** Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); Marton Drain Catchment (tributary of Trent) (GB104028057840); River Till (GB105030062411); Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480); Lower Trent Erewash - Secondary Combined (GB40402G990300); and	There are no direct hydromorphological impacts to watercourses given the at least 10m buffer from panel tables. An **Outline Drainage Strategy** has been developed in accordance with planning policy guidance to manage surface water runoff from the Principal Site (refer to **Appendix 10-4** of this ES **[EN010142/APP/6.2]**). Surface water runoff would be discharged to surface watercourses or to ground (subject to further ground investigations (GI)) following attenuation to ensure no increase in discharge rates and provision of water quality treatment of runoff water. Use of mounting structures for PV panels will avoid sealing the ground with impermeable surfaces. As a result, it is assumed that the Principal Site's impermeable area will remain largely consistent with its pre-development state. However, runoff from the PV panels may alter the existing routing of runoff. To prevent ponding occurring around the solar PV panels, a series of boundary and routing swales will be constructed to convey surface water runoff away from the solar PV panels and towards receiving watercourses. These will be grassed and will have the minimum gradient to provide

Activity	Description	Screening Outcomes	Justification
		Witham Lias (GB40502G401400).	conveyance but not to encourage scour and soil erosion. Any potential water quality issues relating to construction runoff or spillages that have potential to enter tributaries will be mitigated in accordance with the **Framework CEMP** submitted with the DCO application **[EN010142/APP/7.8]**. According to the BGS Geoindex website (Ref. 14), the available groundwater level data in the vicinity of the Principal Site is limited. Three borehole scans, each over 2km away from the Principal Site, indicate a range of groundwater levels from 1m to 27m. Considering the relatively shallow depth and small diameter of the mounting pole, any impact on the groundwater body would be negligible. This is especially true given the large scale of the WFD groundwater bodies. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO application **[EN010142/APP/7.10]**.
Construction, operation and decommissioning of Solar Stations (invertor, transformer and switchgear)	The Solar Stations will comprise of inverters, transformers, and switchgear. There will be up to a maximum of 140 BESS and Solar Stations within the Scheme. A concrete foundation slab will be placed for each of the inverters	**Out** Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490);	The Solar Stations will not be located within 10m of a watercourse and so there is no mechanism for direct hydromorphological impacts to surface water bodies. In accordance with planning policy guidance, runoff from the Scheme would be discharged to surface watercourses or groundwater (subject to further GI) following attenuation to ensure no increase in discharge

Activity	Description	Screening Outcomes	Justification
	and transformers with a levelling layer of thick sand, the depth will be a maximum of 1m. Piling may be required up to 12m bgl for the foundations of solar station infrastructure at the Principal Site. Whilst the groundwater within the Principal Site is anticipated to be not present within the shallower excavations, construction of piles to a depth of 12m may interact with groundwater. However, the cross-sectional area of the piles is not considered sufficient to result in impediment to groundwater flow.	Marton Drain Catchment (tributary of Trent) (GB104028057840); River Till (GB105030062411); Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480); Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).	rates and to provide water quality treatment of runoff water. This will be secured through compliance with the **Outline Drainage Strategy** (refer to **Appendix 10-4** of this ES **[EN010142/APP/6.2]**), which is a requirement of the DCO. Any potential water quality issues relating to construction runoff or spillages that have potential to enter tributaries will be mitigated in accordance with the **Framework CEMP** submitted with the DCO application **[EN010142/APP/7.8]**. Given the above mitigation, there are considered no mechanisms for impacts to surface water bodies. Indicative concrete foundations for the solar station specify that it will have a maximum depth of 1m, which will likely be above the water table across the majority of the Site, based on groundwater data available on the Geoindex website (Ref. 14). For the piling, the cross-sectional area is not considered sufficient to result in impediment to groundwater flow. As such, there would be no significant impact to the groundwater bodies, particularly given the large scale of the WFD groundwater bodies. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO application **[EN010142/APP/7.10]**.
Construction, operation and decommissioning	BESS will be located in individual containers or housed within a larger building or buildings,	**Out**	BESS will not be located within 10m of a watercourse, and so there are no mechanisms for hydromorphological impacts to surface water bodies.

Activity	Description	Screening Outcomes	Justification
of Battery Energy Storage System (BESS) and Battery DC/DC convertor	typically coming in containerised solutions, distributed across many locations across the Principal Site. The precise number of individual BESS storage containers will depend upon the level of power capacity and duration of energy storage that the Scheme will require; subject to detailed design. The footprint for each BESS container would be a maximum of 12.5m in length by 3m in width by 4m in height. The BESS would be placed on a concrete slab or raft foundation depending on ground conditions within a compound also containing the Solar Stations and associated car parking. The exact locations are yet to be determined. Alternatively, a piling solution may be required, depending on the results of geotechnical surveys. If this is the case, piles to a maximum depth of 12m would be used. The DC/DC converter will be installed alongside every BESS container to keep cabling as short as possible and losses low. The footprint for each DC/DC converter	Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); Marton Drain Catchment (tributary of Trent) (GB104028057840); River Till (GB105030062411); Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480); Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).	An **Outline Drainage Strategy** is submitted with the DCO Application (refer to **Appendix 10-4** of this ES **[EN010142/APP/6.2]**), this sets out design principles to provide for the attenuation of surface water runoff from areas of hardstanding associated with BESS Compounds. In accordance with planning policy guidance, runoff from the Scheme would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through compliance with the **Outline Drainage Strategy** (refer to **Appendix 10-4** of this ES **[EN010142/APP/6.2]**), which would be a requirement of the DCO. Transformers will be installed with suitable bunds to contain any oil spillage in case of an oil-leakage event. Bunds will be designed to contain at least 110% of the volume of the oil to ensure there is some tolerance to prevent breaching of the bund. Under normal conditions any rainwater collected within the bund will be removed by use of special pump, which automatically switches off if it detects the smallest presence of oil in the water. Pumps will be linked to control and monitoring equipment to raise alarms if oil is detected. In the unlikely event of a malfunction to one of the BESS arrays, there is a range of integrated controls that will activate depending on the extent and severity of the event. In case the malfunction progresses to a catastrophic fire event and so long as there are no lives under threat, the fire brigade would ensure surrounding elements and structures (intact BESS nearby, other

Activity	Description	Screening Outcomes	Justification
	would be up to 2.5m in length by 1.2m in width by 2.8m in height. The BESS will utilise the inverter, transformer and switchgear within the Solar Station to operate, isolate and control the imported and exported power to and from the BESS. Foundation slabs typically will be a concrete foundation slab with a levelling layer of thick sand, the depth will be a maximum of 1m. Alternatively, a piling solution may be required, depending on the results of geotechnical surveys. If this is the case, piles to a maximum depth of 12m would be used.		electrical equipment, trees etc.) are kept adequately wet and cool to prevent the fire from expanding any further but the battery infrastructure would be allowed to burn within the controlled area. The BESS containers should also have internal water based fixed suppression systems. These should have a separate water containment system because water runoff is likely to contain higher levels of pollution, see **Outline Drainage Strategy [EN010142/APP/6.2]**. In terms of potential polluted runoff associated with a fire event, the principles of this are outlined within the **Framework Battery Safety Management Plan (FBSMP) [EN010142/APP/7.13]**. The FBSMP confirms that a fire water management plan will be developed including the containment, monitoring, and disposal of contaminated fire water where the runoff will be contained, and tested/treated before being discharged to local watercourses. Further details regarding management of firewater are outlined in the **Outline Drainage Strategy** (refer to **Appendix 10-4** of this ES **[EN010142/APP/6.2]**). Indicative concrete foundations for the BESS specify that these will have a maximum depth of 1m, which will likely be above the water table across the majority of the Site, based on groundwater data available on the Geoindex website (Ref. 14). If a 12m piling solution is needed, the cross-sectional area of the piles is not considered sufficient to result in impediment to groundwater flow. As such, there would be no

Activity	Description	Screening Outcomes	Justification
			significant impact to the groundwater bodies, particularly given the large scale of the WFD groundwater bodies. Given this mitigation and the lack of any direct works to these water bodies, it is considered that they can be screened out of further assessment. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO application **[EN010142/APP/7.10]**.
Construction, operation and decommissioning of on-site cabling	Low voltage on-site electrical cabling is required to connect the solar PV panels and BESS to inverters (typically via 1.5 kV cables), and the inverters to the nearby transformers (typically via 0.6/1 kV cables). The dimension of the trenches will vary depending on the number of ducts they contain but would typically be around 4m in width and around 1.2m in depth. For string and DC cables, the trench will require a depth 0.85m or less but can be as wide as 4m to 6m near the inverter DC inputs where several cables will be	**In** Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); and River Till (GB105030062411). **Out** Marton Drain Catchment (tributary of Trent) (GB104028057840); Seymour Drain Catchment (tributary of Trent) (GB104028058340);	The water bodies that are screened out do not have on-site cabling within them. Water bodies where on-site cabling is proposed have been screened in. Infrastructure will not be located within 10m of a watercourse, except where watercourse crossings are required which have the potential to impact channel hydromorphology, ecology and water quality. The cable crossing of watercourses will produce an electromagnetic field (EMF); however, the cable magnetic field is perpendicular to the direction of the cable and an organism moving parallel to the cable magnetic field will not generate an induced electric field. Given that the cables will be laid across the flow and many fish species (particularly salmon) will move with the flow the impact from the EMF will be reduced. The magnetic field from the cables will be well below that of the Earth's magnetic field which is between 30 and

Activity	Description	Screening Outcomes	Justification
	connected to the inverter (20 pairs of DC power cables). Higher rated cables (likely 33kV) are required between the transformers and the switchgear and from switchgear to the on-site substations. The dimension of the trenches will vary depending on the number of ducts/cables they contain but would up to 1m in width and up to 1.7m in depth.	Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480); Lower Trent Erewash – Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).	70µT and may not be detectable by the fish species that are present in the area as they move across the cables. Based on the small proportion of watercourses crossed by cables, the very low levels of EMF produced by the cable, the orientation of the field with the direction of water flow and that the EMF is to be significantly lower than that of the earth's magnetic field the magnitude of the impact is minor. Impacts are not expected to result in noticeable changes in the fish populations, and therefore this impact can be screened out for all water bodies. The requirements for mitigation for the trenched crossings will be determined by pre-works morphology survey of the channel of each watercourse to be crossed prior to construction, in line with the **Framework CEMP** submitted with the DCO application **[EN010142/APP/7.8]**. This is to ensure that there is a formal record of the condition of each watercourse prior to commencement of works. 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. Water flow would be maintained by damming and over pumping during cable installation. Works will be carried out in the drier months where possible as this would reduce the risk of pollution propagating downstream, particularly in the case of ephemeral watercourses. Once the watercourses are reinstated, silt fences, geotextile matting, or straw bales or other suitable method etc. will be used initially to capture mobilised

Activity	Description	Screening Outcomes	Justification
			sediments until the watercourse has returned to a settled state. It will be a requirement that the watercourses are reinstated as found and water quality monitoring will be undertaken prior to, during, and following on from the construction activity. Regular observations of the watercourses will also be required post-works during vegetation re-establishment of the banks, especially following wet weather, to ensure that no adverse impacts have occurred. These requirements will be described in the WMP (which will be produced post consent). WFD groundwater water bodies have been screened out. Due to the thickness of overlying superficial deposits and the shallow depth of Scheme infrastructure, it is unlikely that groundwater will be encountered by the Scheme, but there may be potential to encounter superficial groundwater and the cable routes beneath watercourses are anticipated to be below the water table over part of their routes. However, the profile of the cable ducting is considered to be small compared to the spatial and vertical extent of any aquifers. Furthermore, given that cable trenches will generally have a relatively shallow depth of a maximum of 1.7 m, a negligible impact on groundwater flow is predicted from installation of the cables overall. As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by

Activity	Description	Screening Outcomes	Justification
			measures set out within the **Framework DEMP** submitted with the DCO application **[EN010142/APP/7.10]**.
Construction, operation and decommissioning of on-site substations	There will be two substations on the Principal Site, operating at 400kV/33 kV. Each substation compound would have a footprint of up to 115m in length by 108m in width. The substations will consist of electrical infrastructure, including transformers and switchgear. Foundation slabs typically will be a concrete foundation slab with a levelling layer of thick sand, and the depth will be a maximum of 1m. Alternatively, a piling solution may be required, depending on the results of geotechnical surveys. If this is the case, piles to a maximum depth of 12m would be used.	**Out** Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); Marton Drain Catchment (tributary of Trent) (GB104028057840); River Till (GB105030062411); Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480). Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400)	Substation infrastructure will not be located within 10m of a watercourse and so there is no mechanism for direct hydromorphological impacts to surface water bodies. In accordance with planning policy guidance, runoff from the Scheme would be discharged to surface watercourses or groundwater (subject to further GI) following attenuation to ensure no increase in discharge rates and to provide water quality treatment of runoff water. This will be secured through compliance with the **Outline Drainage Strategy** (refer to **Appendix 10-4** of this ES **[EN010142/APP/6.2]**), which is a requirement of the DCO. Any potential water quality issues relating to construction runoff or spillages that have potential to enter tributaries will be mitigated in line with the **Framework CEMP [EN010142/APP/7.8]** submitted with the DCO application. Given the above mitigation, there are considered no mechanisms for impacts to surface water bodies. Indicative foundations for the substations specify that it will have a maximum depth of 1 m, which will likely be above the water table across the majority of the site, based on groundwater data available on the Geoindex website (Ref. 14). If a piling solution is needed, the cross-sectional area of the piles is not considered sufficient to result in impediment to groundwater flow.

Activity	Description	Screening Outcomes	Justification
			As such, there would be no significant impact to the groundwater bodies, particularly given the large scale of the WFD groundwater bodies. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO Application **[EN010142/APP/7.10]**.
Construction, operation and decommissioning of Solar farm control centre	A Solar Farm Control Centre will be included within the Scheme and will allow up to 12 staff to operate and maintain the plant, in dayshifts only. The Solar Farm Control Centre will be a maximum of 20m in length by 15m in width by 6m in height. Foundation slabs typically will be a concrete foundation slab with a levelling layer of thick sand, the depth will be a maximum of 1m. Alternatively, a piling solution may be required, depending on the results of geotechnical surveys. If this is the case, piles to a maximum depth of 12m would be used.	**Out** Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); Marton Drain Catchment (tributary of Trent) (GB104028057840); River Till (GB105030062411); Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480);	The Solar Farm Control Centre will not be located within 10m of a watercourse, and so there are no mechanisms for hydromorphological impacts to surface water bodies. In accordance with planning policy guidance, runoff from the Scheme would be discharged to surface watercourses or groundwater (subject to further GI) following attenuation to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through compliance with the **Outline Drainage Strategy** (refer to **Appendix 10-4** of this ES **[EN010142/APP/6.2]**), which would be a requirement of the DCO. Given the above mitigation, there are considered no mechanisms for impacts to surface water bodies. Indicative concrete foundations for the control centre specify that it will have a maximum depth of 1 m, which will likely be above the water table across the majority of the site, based on groundwater data available on the Geoindex website (Ref. 14). If a 12m piling solution is needed, the cross-sectional area of the piles is not considered sufficient to result in impediment to

Activity	Description	Screening Outcomes	Justification
		Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).	groundwater flow. As such, there would be no significant impact to the groundwater bodies, particularly given the large scale of the WFD groundwater bodies. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO Application **[EN010142/APP/7.10]**.
Construction, operation and decommissioning of equipment storage	Storage will be provided for spare solar PV panels, trackers, inverters, spare parts for the transformer, switchyard, BESS, CCTV, metrological stations, as well as extra cable reels. This will require an overall Site area of approximately 1,200 m^2. This area will comprise secure storage containers to store spare parts, a new building or the re-use of an existing, vacant building within a suitable location within the Principal Site. Should storage containers be used as an option they will measure a maximum of 12m in length, 2.5m in width and 3m in height. The Scheme would require the provision of a maximum of 40 storage containers for use. Alternatively, an open	**Out** Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); Marton Drain Catchment (tributary of Trent) (GB104028057840); River Till (GB105030062411); Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480);	Equipment storage buildings or containers will not be located within 10m of a watercourse, and so there are no mechanisms for hydromorphological impacts to surface water bodies. In accordance with planning policy guidance, runoff from the Scheme would be discharged to surface watercourses or groundwater (subject to further GI) following attenuation to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water. This will be secured through compliance with the **Outline Drainage Strategy** (refer to **Appendix 10-4** of this ES **[EN010142/APP/6.2]**), which would be a requirement of the DCO. Given the above mitigation, there are considered no mechanisms for impacts to surface water bodies. Due to the thickness of overlying superficial deposits and the shallow depth of Scheme infrastructure, it is unlikely that groundwater in the bedrock aquifers will be encountered by the Scheme but there may be potential to encounter superficial groundwater. However, given

Activity	Description	Screening Outcomes	Justification
	storage area may be used for some spare parts, such as cable drums and solar modules. The open storage area may be covered by an open-sided 3.2m high canopy for weather protection. Foundation slabs typically will be, a concrete foundation slab with a levelling layer of thick sand, the depth will be a maximum of 1m.	Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).	the relatively shallow depth of foundations (1 m), there would be negligible impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO Application **[EN010142/APP/7.10]**.
Construction, operation and decommissioning of fencing, security, and lighting	A security fence will enclose the PV panel areas of the Principal Site. The fence will be a 'deer fence' type, up to 2.5m in height measured from the ground. Pole mounted CCTV systems will also be deployed around the perimeter of the operational areas of the Scheme. These would be a maximum of 3m in height. During operation, permanent security lights with motion detectors will be used for security purposes around the electrical infrastructure, emergency access points to facilities within the Scheme and potentially at other pieces of critical infrastructure.	**Out** Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); Marton Drain Catchment (tributary of Trent) (GB104028057840); River Till (GB105030062411); Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480);	Infrastructure for security and lighting will not be located within 10m of a watercourse, and so there are no mechanisms for hydromorphological impacts to surface water bodies. Fencing infrastructure may be within 10m of a watercourse, however any potential water quality issues relating to construction runoff or spillages that have potential to enter watercourses will be mitigated in line with the **Framework CEMP** submitted with the **DCO Application [EN010142/APP/7.8]**. While there may be some potential to encounter superficial groundwater, given the limited extent of below ground works and their discrete nature, it is anticipated there would be negligible impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. Any potential water quality issues relating to construction runoff or spillages that have potential to enter tributaries will be mitigated in line with the

Activity	Description	Screening Outcomes	Justification
		Tributary of Till (GB105030062480); Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).	**Framework CEMP** submitted with the DCO Application **[EN010142/APP/7.8]**. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO Application **[EN010142/APP/7.10]**.
Construction, operation and decommissioning of Site access and access tracks	The Principal Site will have four points of access, three located along the A631 Harpswell Lane and one located on the B1398 Middle Street. A **Framework Construction Traffic Management Plan (CTMP) [EN010142/APP/7.11]** sets out the Applicant's proposals to manage construction traffic and staff vehicles within the vicinity of the Scheme along the local highway network during the construction period of the works, in order to limit any potential disruptions and implications on the wider transport network. Internal access tracks within the Principal Site will facilitate construction and the operation of the Scheme. The majority of these will utilise existing farm tracks,	**In** Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); and River Till (GB105030062411). **Out** Marton Drain Catchment (tributary of Trent) (GB104028057840); Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480);	No WFD monitored watercourses are directly impacted by site access and access tracks; however, there will be works on existing agricultural ditches that might have some connectivity to these watercourses. The agricultural ditches affected from Site access and access tracks are generally ephemeral or intermittently flowing. Nevertheless, when flowing, there is a potential for adverse water quality impacts from runoff containing fine sediments and chemical spillages related to plant usage adjacent to the watercourses and structural works to install crossings in the riparian margins and over the watercourses. Given the limited potential for conveyance in these generally dry watercourses, any impact would be expected to remain very localised. For culverting, the expectation is the adoption of the least impacting design that is reasonably practicable, such as arches rather than box culverts. The following measures will be implemented for culverts (in the event they cannot be avoided): • Culverts will maintain connectivity along watercourses for aquatic species and riparian

Activity	Description	Screening Outcomes	Justification
	upgrading surfaces as required. The creation of new access tracks will be minimised. The proposed access tracks will be compacted stone tracks up to 4m wide with 1:2 gradient slopes on either side. The primary access points will be wider, up to a maximum of 6m to facilitate two-way Heavy Goods Vehicles (HGVs) traffic and passing bays will be provided along internal access roads to ensure traffic does not impact the local highway network. For any new access crossings, as a design principle, culverts will be avoided wherever possible. However, as a worst-case basis and adopting a precautionary approach, the use of culverts has been considered within this assessment. However, it is expected that where culverts are necessary, the least impacting design that is reasonably practicable is proposed (e.g. arch rather than box culverts, and box culverts in preference to pipes etc.). The crossings will be	Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).	mammals, where present. Mammal ledges with sufficient room will be utilised. • Perched inverts that create a drop from the structure to the downstream bed level will be avoided. • Culverts will ensure capacity for the peak flow rate of the watercourse, preventing any impact on flow. • The base of a culvert will be buried at least 0.3m below bed level to limit the impact on aquatic species migration and sediment transport. The natural bed within the culvert will be maintained. • Length-for-length equivalent watercourse enhancements are required for each new culvert extension to ensure compliance with WFD objectives. Reinstatement will bring the watercourse as close as possible to its original state once the works are completed. This includes vegetation planting and replacement of bed and bank features. • The culvert will cross the channel perpendicularly and be of an appropriate width to contain the entire channel width. • The culvert will be of an appropriate height to allow for environmental mitigation and flood flows. Failure to adhere to these measures could potentially result in negative impacts caused by culverts. However, these impacts are likely to be localised and negligible at the water body scale. Additionally, works would be timed to coincide with drier periods. Good practice measures, as outlined in the **Framework CEMP** submitted with the DCO Application

Activity	Description	Screening Outcomes	Justification
	sized at detailed design in order to not impact on flow conveyance, with the culvert inverts will be buried below the natural bed level to allow for natural bed formation and passage of sediments. Temporary access tracks will be constructed to cross watercourses along the Cable Route Corridor. These will be temporary bailey bridge type construction. The configuration of the bridging units will be confirmed at detailed design stage. However, it is assumed that the length of the bridge deck would be sufficient to ensure no works within the 10m buffer zone from the watercourse. These would clear the channel, and ensure no construction works within the channel or banks of the watercourses to be crossed. There would be a temporary haul road of impermeable stone to access the temporary bridge crossings.		**[EN010142/APP/7.8]** (and subsequently in WMP), would minimise any adverse water quality impacts to these ditches. Cable Route Corridor crossings for access are temporary in nature and expected to last a minimum of 24 months and a maximum of 36 months, making it unlikely that any long-term or permanent negative impacts will occur for these water bodies. It is anticipated that, provided the mitigation outline is implemented, the watercourses will return to its pre-works state once all activities are completed. Given this mitigation, these water bodies can be screened out of further assessment. Crossings within the Principal Site will be used once the Scheme is operational meaning there is potential for long-term or permanent negative impacts for these water bodies and therefore, they are screened in. There is limited potential for impacts on the groundwater body, as no significant changes in runoff patterns compared to existing conditions are expected from the internal access tracks. Given this mitigation, it is considered that groundwater bodies can be screened out of further assessment. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO Application **[EN010142/APP/7.10]**.

Activity	Description	Screening Outcomes	Justification
Construction, operation and decommissioning of Cable Route Corridor cabling	The electricity generated by the Scheme will be exported via interface cables from the on-site substations to National Grid Cottam substation. The Cable Route Corridor will require crossings of watercourses. The cable route and temporary construction corridor will be approximately 40m in width. Cables laid in an open cut trench, a typical trench depth of up to a maximum of 2m and trench width of up to a maximum 3.5m is required. Where the Cable Route Corridor crosses other infrastructure and natural features such as rivers or streams, the cables will need to be installed deeper, with occasional use of trenchless techniques to cross these obstacles. .	**In** Fillingham Beck (GB105030062490); Marton Drain Catchment (tributary of Trent) (GB104028057840); River Till (GB105030062411); Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480). **Out** Eau from Source to Northorpe Beck (GB104028057970); Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).	There is potential for direct hydromorphological impacts to the channel and riparian zone where trenched open cut installation methods are proposed. All WFD monitored water bodies will be crossed by trenchless techniques, but would not be directly impacted with launch and receive pits at least 10m from the channel margins. A minimum head room of 3m below the water body bed will be maintained for trenchless crossings. There is potential for indirect impacts to all watercourses to be crossed from uncontrolled release of construction Site runoff that may include high levels of fine sediment, oils and drilling muds (water based) if this runoff is not carefully managed. Due to the potential impacts all surface water bodies are screened in, apart from Eau from Source to Northorpe Beck (GB104028057970) which does not interact with this activity. There are potential impacts from groundwater ingress to excavations (e.g. launch, receiving and jointing pits) and the risk of 'break out' of drilling muds into watercourses associated with trenchless crossings. The potential for drilling fluids to break out into the watercourse would be mitigated by a site-specific hydraulic breakout risk assessment in line with the **Framework CEMP** submitted with the DCO Application **[EN010142/APP/7.8]**, and therefore can be screened out.

Activity	Description	Screening Outcomes	Justification
			Furthermore, given that cable trenches will generally have a relatively shallow depth, a negligible impact on groundwater flow is predicted from installation of the cables overall. As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies, and therefore they can be screened out. During the decommissioning stage, the cabling can be removed by opening the ground at regular intervals and pulling the cable through to the extraction point, avoiding the need to open up the entire length of the cable route. As such, decommissioning impacts would be less than those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO Application **[EN010142/APP/7.10]**.
Construction, operation and decommissioning of surface water drainage	Surface water is proposed to be directed to and captured within BESS and substation swales before discharging to ordinary watercourses (field ditches). The discharge to these watercourses will be maintained at existing greenfield runoff rates by restricting rates using a flow control. The flow control will use a restriction on the outlet of the swale which will hold water back	**Out** Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); River Till (GB105030062411); Marton Drain Catchment (tributary of Trent) (GB104028057840);	The **Outline Drainage Strategy** (refer to **Appendix 10-4** of this ES **[EN010142/APP/6.2]**) aims to mimic natural drainage conditions and will include suitable sized Sustainable Drainage Systems (SuDS) swales within the drainage design. A green ditch outfall would avoid the need to construct an engineered outfall. However, if engineered outfalls are required, their location, position, and orientation will be carefully determined and informed by a hydromorphological survey to minimise adverse local impacts on river processes.

Activity	Description	Screening Outcomes	Justification
	within the swale and release it at a controlled rate. Where surface water runoff outfalls to a watercourse, it is proposed that the pipe would outfall into a green ditch outfall for the last 10m of the discharge pathway where this is possible. The BESS areas are separated throughout the Principal Site, with up to 140 separate BESS and Solar Stations, the future surface water outfalls will therefore be located throughout the Principal Site.	Seymour Drain Catchment (tributary of Trent) (GB104028058340); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of Till (GB105030062480); Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).	The construction of outfalls will be within a dry working area; however, their construction will result in some temporary disturbance to the bed and banks and the risk of chemical spillages, especially if pre-cast headwalls cannot be used requiring pouring of wet concrete close to water. The majority of the receptors within the Principal Site are agricultural ditches, this will result in a localised, direct, temporary and short term very low adverse magnitude of impact, which will result in a negligible adverse effect. A CIRIA Simple Index Method assessment has been undertaken and in presented in the **Outline Drainage Strategy [EN010142/APP/6.2]**. It concludes the use of swales provides a mitigation potential greater than the pollution potential. Therefore, given the implementation of the **Outline Drainage Strategy** (refer to **Appendix 10-4 of** this ES **[EN010142/APP/6.2]**), which will be secured within the DCO, it is predicted there will be a negligible impact to receiving water features from surface water runoff or the risk of chemical spillages during routine operation and maintenance. In terms of potential polluted runoff associated with a fire event, the principles of this are outlined within the **FBSMP [EN010142/APP/7.13]**. The **FBSMP** confirms that a fire water management plan will be developed including the containment, monitoring, and disposal of contaminated fire water where the runoff will be

Activity	Description	Screening Outcomes	Justification
			contained, and tested/treated before being discharged to local watercourses. Good practice measures, as outlined in the **Framework CEMP** submitted with the DCO Application **[EN010142/APP/7.8]** (and subsequently in WMP, which will be produced post consent) and **Framework OEMP** submitted with the DCO Application **[EN010142/APP/7.9]**, would minimise adverse water quality impacts to these ditches. Given this mitigation, it is considered that the water bodies can be screened out of further assessment. Decommissioning impacts are likely to be similar to those during construction and would be mitigated by measures set out within the **Framework DEMP [EN010142/APP/7.10]** submitted with the DCO Application.

3.1.4 Per the assessment outlined in detail above, the following components are deemed to not present a risk to the WFD status of any water bodies that interacts with the Scheme and therefore are screened out:

a. Solar PV infrastructure consisting of solar PV panels and mounting structures;
b. Solar Stations (invertor, transformer and switchgear);
c. Battery Energy Storage System (BESS) and Battery DC/DC convertor;
d. On-site substations;
e. Solar farm control centre;
f. Equipment storage;
g. Surface Water Drainage; and
h. Fencing, security and lighting.

3.1.5 Three components were deemed to present a risk to the WFD status of some water bodies that interact with the Scheme and require scoping.

a. Cable Route Corridor cabling;
b. On-site cabling; and
c. Site access and access tracks, specifically relating to culverts.

3.1.6 The Cable Route Corridor cabling is screened in for the following water bodies:

d. Fillingham Beck (GB105030062490);
e. Marton Drain Catchment (tributary of Trent) (GB104028057840);
f. River Till (GB105030062411);
g. Seymour Drain Catchment (tributary of Trent) (GB104028058340);
h. Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); and
i. Tributary of Till (GB105030062480).

3.1.7 On-site cabling is screened in for the following water bodies:

a. Eau from Source to Northorpe Beck (GB104028057970);
b. Fillingham Beck (GB105030062490); and
c. River Till (GB105030062411).

3.1.8 Site access and access tracks are screened in for the following water bodies:

d. Eau from Source to Northorpe Beck (GB104028057970);
e. Fillingham Beck (GB105030062490); and
f. River Till (GB105030062411).

3.2 WFD Scoping

3.2.1 The WFD scoping stage defines the level of detail required for further WFD assessment. This includes identifying risks to the WFD receptors from the Scheme's components that were screened in, in **Table 3-2**. The scoping stage assessment is presented in **Table 3-3**.

Table 3-3: Scoping of the Scheme's activities against WFD quality elements.

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Justification	Scoping Outcome (In/Out)
Biological Quality Elements			
Fish	Yes	Trenchless crossings of water bodies, and watercourse crossings required for Site access may result in a spillage of drilling fluids or pollutants, which have the potential to impact fish populations during the construction phase. Temporary blockages in longitudinal connectivity from trenched crossing methods of water bodies, and watercourse crossings required for Site access. Potential for loss of biological continuity resulting in interference with fish population movements and blocking the exchange of individuals among populations, reducing gene flow and disrupting the ability of 'source' populations to support declining populations nearby. Potential direct impact on fish populations from disturbance of the bed and / or release of contaminated construction Site runoff, including the risk of 'break out' during directional drilling operations.	In
Invertebrates	Yes	Trenchless crossings of water bodies may result in a spillage of drilling fluids or pollutants, which have the potential to impact invertebrate populations during the construction phase. Trenched crossings of water bodies, and watercourse crossings required for Site access may cause direct mortality of invertebrates or the smothering of habitat with fine sediment.	In
Macrophytes and Phytobenthos Combined	Yes	Trenchless crossings may result in a spillage of drilling fluids or pollutants, which have the potential to impact macrophyte populations during the construction phase. Trenched crossings of water bodies, and watercourse crossings required for Site access may cause the removal of macrophytes, and removal of the bed or macrophytes supporting phytobenthos.	In

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Justification	Scoping Outcome (In/Out)
Physico-Chemical Quality Elements			
Thermal conditions	No	Trenchless crossings could alter the level of shading to water bodies following potential riparian vegetation removal, however this is very unlikely given launch and receive pits will be located at least 10m from the water body. Watercourse crossings for Site access may result in riparian vegetation removal, yet this will only be at a very local scale and would not alter the water body temperature.	Out
Oxygenation conditions	Yes	Possible increase in fine sediment and organic material delivered to water body from excavation activities for trenchless crossings (e.g. launch and receiving pits) and site access, as well as chemical spillage risk, could lead to temporary changes in dissolved oxygen levels.	In
Salinity	No	No materials that may alter the salinity of the watercourses are proposed for use in the Scheme.	Out
Acidification status	No	No materials that may alter the pH of water bodies are known to be proposed for use in the Scheme, with only relatively small amounts of concrete needed. The **Framework CEMP** submitted with the DCO Application **[EN010142/APP/7.8]** requires measures to be implemented to manage the spillage risk of chemicals used in construction.	Out
Nutrient conditions	Yes	Trenchless crossings of water bodies, and watercourse crossings for Site access may increase sediment and organic material entry into watercourses may increase sediment loads to watercourses and organic material from Site clearance works. However, the impact will be localised, short term and temporary. In the long term there will be a benefit because will be less need for organic/inorganic fertiliser applications as fields will not be in active agricultural production. Construction risks can also be effectively managed using standard mitigation measures set out within the **Framework CEMP** submitted with the DCO Application	In

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Justification	Scoping Outcome (In/Out)
		[EN010142/APP/7.8]. Overall, the Scheme will likely reduce the flux of agricultural diffuse pollutants (sediment and excess nutrients) into watercourses.	
Hydromorphological Quality Elements			
Quantity and dynamics of water flow	No	There is no mechanism for either cable crossing method, and watercourse crossings for Site access to impact this element. Trenched crossings, and watercourse crossings for Site access will preferably be carried out during dry periods or maintain water body flow by installation of a pipe or flume or by over-pumping the flow for the relatively short duration of the works.	Out
Connection to groundwater bodies	No	Cables will cross beneath water bodies and water crossings for Site access may present a barrier to connection with groundwater bodies, but this would not impact connectivity to groundwater bodies due to the small scale of activity compared to water body size.	Out
River continuity	Yes	Trenched crossings will present a temporary blockage to continuity whilst excavation takes place. Watercourse crossings for Site access will also interrupt river continuity. There is no mechanism for non-trenched crossings to affect this quality element.	In
River depth and width variation	Yes	Trenched crossings may lead to local changes in channel profile to impact this element. Watercourse crossings for Site access would also impact this element locally by their uniform, unchangeable nature.	In
Structure and substrate of the river bed	Yes	Trenched crossings and watercourse crossings for Site access may lead to local changes in bed substrate to impact this element.	In
Structure of the riparian zone	Yes	Trenched crossings will involve digging below the watercourse bed, which will inevitably involve disruption of the watercourse banks and the riparian zone as they will be temporarily removed before being reinstated. Non-trenched crossings will also involve excavations each side of riverbanks, but these will be set back by a minimum of 10m	In

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Justification	Scoping Outcome (In/Out)
		from the normal flow channel/ water's edge. Watercourse crossings for Site access can locally disconnect the river channel from the riparian zone.	
Groundwater Quality Elements			
Quantitative Elements	Yes	There are potential temporary impacts from groundwater ingress to excavations for trenchless crossings.	In
Chemical Elements	Yes	There are potential impacts from groundwater ingress to excavations for trenchless crossings.	In

4. Baseline

4.1 Topography and Land Use

4.1.1 The topography of the Study Area is generally flat. The elevation ranges from 30m above ordnance datum (AOD) to <10m AOD. The topographical highs (~30m AOD) are found within the north of the Study Area (north of Glentworth) and the topographical lows are associated with the River Trent waterbody and its floodplain, resulting in a gentle slope from north-east to south-west across the Order limits. Land rises very gently away from the River Trent on its western bank along the Cable Route Corridor, with the majority of the Study Area on this western side of the river being <10m AOD.

4.1.2 The land use within the Study Area is generally a mosaic of arable farmland, with patches of woodland, drains and ponds scattered across the area. There is no potential impact on any ponds (refer to **Chapter 9: Ecology and Nature Conservation** of this ES **[EN010142/APP/6.1]**). There is a large, decommissioned power station (Cottam Power Station) adjacent to the southern extent of the Cable Route Corridor. The Study Area is adjacent to several small villages including Marton, Willingham by Stow, Heapham, and Glentworth.

4.2 Hydrogeology and Soils, and Groundwater

Cable Route Corridor

4.2.1 The BGS Geoindex indicates that the bedrock underlying the Cable Route Corridor comprises of (Ref. 8) (refer to **Figure 10-3: Bedrock Geology and Aquifer Status** of the ES **[EN010142/APP/6.3]**):

a. Charmouth Mudstone Formation – Mudstone. Sedimentary bedrock formed between 199.3 and 182.7 million years ago during the Jurassic period.

b. Scunthorpe Mudstone Formation – Mudstone and limestone, interbedded. Sedimentary bedrock formed between 209.5 and 190.8 million years ago during the Triassic and Jurassic periods.

c. Mercia Mudstone Group – Mudstone. Sedimentary bedrock formed between 252.2 and 201.3 million years ago during the Triassic period.

d. Triassic Rock Penarth Group – Mudstone. Sedimentary bedrock formed between 209.5 and 201.3 million years ago during the Triassic period.

4.2.2 The Cable Route Corridor is underlain by various superficial deposits (Ref. 8) which are detailed below:

a. Till, Mid Pleistocene – Diamicton. Sedimentary superficial deposit formed between 860 and 116 thousand years ago during the Quaternary period.

b. Alluvium – Clay, silt, sand and gravel. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.

c. Glaciofluvial Deposits, Mid Pleistocene – Sand and gravel. Sedimentary superficial deposit formed between 860 and 116 thousand years ago during the Quaternary period.

d. River Terrace Deposits – Sand and gravel. Sedimentary superficial deposit formed between 2.588 million years ago and the present during the Quaternary period.

e. Holme Pierrepont Sand and Gravel Member – Sand and gravel. Sedimentary superficial deposit formed between 2.588 million and 11.8 thousand years ago during the Quaternary period.

4.2.3 The Scunthorpe Mudstone Formation and the Mercia Mudstone beneath the Cable Route Corridor is generally classified as a Secondary B aquifer. Secondary B aquifers are predominantly lower permeability layers, which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

4.2.4 The Penarth Group and the Charmouth Mudstone Formation have been designated as a Secondary (undifferentiated) aquifer, as it is not possible to apply either a Secondary A or B definition. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

4.2.5 The Till deposits underlying the Cable Route Corridor in the north-east are classified as Secondary (undifferentiated) aquifer, with the exception of alluvium deposits, which are Secondary A aquifer. The deposits of the Holme Pierrepont Sand and Gravel Member and alluvium deposits southwest of the study area are also classified as a Secondary A aquifer. Secondary A aquifers comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers.

4.2.6 There are six borehole scans available online on the BGS Geoindex (Ref. 8) website across the Study Area which supply groundwater level information. The list of boreholes follows as:

a. Upton Gainsborough 2 (reference SK88NE13, NGR 486422, 386705) – groundwater level 1 mbgl (described as ‘seepage’) – north-west of Study Area;

b. Dog Kennel Farm Glentworth (reference SK98NE3) – groundwater 9 mbgl – north-east of Study Area;

c. Hill Top Farm Kexby (reference SK88NE10) – groundwater level 3 mbgl – north-east of Study Area;

d. Tidal Trent (reference SK87NW150, NGR 483704, 378117) – groundwater level 6.5 mbgl – south of the Study Area;

e. Torksey (SK87NW48, NGR 483920, 378440) – groundwater level 3.7 mbgl – south of Study Area; and

f. C.E.G.B Cottam Station C3 (reference SK87/22A, NGR 481370, 379400) – groundwater level 23.64 mbgl – south of the Study Area.

4.2.7 Although there is limited groundwater level data available in the vicinity of the Cable Route Corridor, it is likely that groundwater is shallow (~2m below ground level) within the Alluvium and River Terrace Deposits.

4.2.8 Data from two boreholes at Cottam Power Station on the Hydrology Data Explorer (Ref 8), at the southwestern edge of the Cable Route Corridor monitors shallow (Cottam Shallow) and deep (Cottam Deep) groundwater. The Cottam Shallow monitoring borehole indicates that in the last five years of monitoring, between January 2015 and January 2020, the groundwater was between 68m and 120m bgl based on datum of 7.8 to 8m AOD. For Cottam Deep from July 2017 to June 2022 the level varied between 15.9m and 38m below ground level (bgl). Soil composition (Ref. 9) indicates that the natural, undisturbed soils in the Study Area should be generally a mix of:

a. Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils that are naturally characterised by seasonally wet pastures and some woodlands;

b. Naturally wet very acid sandy and loamy soils that are naturally characterised by mixed dry and wet lowland heath communities;

c. Loamy and clayey floodplain soils with naturally high groundwater which are naturally characterised by wet flood meadows with wet carr woodlands in old river meanders; and

d. Shallow lime-rich soils over chalk or limestone which are naturally characterised by herb-rich downland and limestone pastures; limestone pavements in the uplands; Beech hangers and other lime-rich woodlands.

4.2.9 More detail regarding soils can be found in **Chapter 15: Soils and Agriculture** of this ES **[EN010142/APP/6.1]**.

Principal Site

4.2.10 The Principal Site is primarily underlain by two bedrock geologies comprising mudstone formations (Ref. 10-57). **Figure 10-3** of this ES **[EN010142/APP/6.3]** displays the Bedrock and superficial geology and includes the following formations:

a. Charmouth Mudstone Formation – Mudstone. Sedimentary bedrock formed between 199.3 and 182.7 million years ago during the Jurassic period.

b. Scunthorpe Mudstone Formation – Mudstone and limestone, interbedded. Sedimentary bedrock formed between 209.5 and 190.8 million years ago during the Triassic and Jurassic periods.

4.2.11 The Principal Site is underlain by various superficial deposits (Ref. 8) which are detailed below:

a. Alluvium – Clay, silt, sand, and gravel. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the

b. Glaciofluvial Deposits, Mid Pleistocene – Sand and gravel. Sedimentary superficial deposit formed between 860 and 116 thousand years ago during the Quaternary period.

c. Quaternary period Till, Mid Pleistocene – Diamicton. Sedimentary superficial deposit formed between 860 and 116 thousand years ago during the Quaternary period.

4.2.12 The Scunthorpe Mudstone Formation beneath the Principal Site is generally classified as a Secondary B aquifer. Secondary B aquifers are predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons, and weathering. These are generally the water-bearing parts of the former non-aquifers.

4.2.13 There is a strip of Secondary (undifferentiated) aquifer, which is associated with the eastern area the Principal Site. Secondary (undifferentiated) aquifer is where it is not possible to apply either a Secondary A or B definition. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

4.2.14 The superficial deposits within the Principal Site are classified as a Secondary (undifferentiated) aquifer, except for alluvium deposits which are classified as a Secondary A aquifer. Secondary A aquifers comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers. **Figure 10-3** of this ES **[EN010142/APP/6.3]** shows the groundwater features and their attributes.

4.2.15 There are three borehole scans available online on the BGS Geoindex website across the Study Area, which supply groundwater level information. These are shown on **Figure 10-3** of this ES **[EN010142/APP/6.3]**. These boreholes include:

a. Upton Gainsborough 2 (reference SK88NE13, NGR 486422, 386705) – groundwater level 1m bgl (described as ‘seepage’);

b. Aisby (reference SK89SE117, NGR 486409, 392693) – groundwater level 27m bgl; and

c. Dog Kennel Farm Glentworth (reference SK98NE3) – groundwater level 9m bgl.

4.2.16 Although there is limited groundwater level data available in the vicinity of the Principal Site, based on the available borehole scans it is considered likely that groundwater is shallow (approximately 2m bgl) within the Alluvium and River Terrace Deposits.

4.2.17 Soil composition (Ref 9) indicates that the natural, undisturbed soils in the Study Area should be generally a mix of:

a. Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils. These have moderate fertility and are most at risk from overland flow from compacted or poached fields.

b. Loamy and clayey floodplain soils with naturally high groundwater. These have moderate fertility and are most at risk from pollution from floodwater scouring.

4.2.18 More detail regarding soils can be found in **Chapter 15: Soils and Agriculture** of this ES **[EN010142/APP/6.1]**.

4.3 Hydrology

4.3.1 There are no National River Flow Archive (NRFA) river monitoring stations located within the Study Area (Ref. 11). The closest monitoring site for flow is located over 20km south, and upstream, of the Cottam area on the River Trent at North Muskan. This shows a Q95[1] flow of 28.79m^3/s (data 1968-2022). The flow of the River Trent, the ultimate receptor for this assessment, in the area of the Scheme will therefore be higher.

4.3.2 There are no Met Office monitoring locations within the Study Area or within any of the waterbody catchments (Ref. 12). The nearest weather station is located at Scampton (SK 95080 79300), approximately 11km south-east from the Principal Site. Using data from this weather station for the period 1991-2020, it is estimated that the Study Area experiences approximately 619mm of rainfall per year, with it raining more than 1mm on approximately 118 days per year, which are both low in the UK context. Rainfall is highest from mid-winter to mid-spring and generally peaks in November, with the least rainfall falling in May on average.

4.4 Historical Channel Change

4.4.1 Analysis of historic mapping from the late 19th century shows that there have been only minor adjustments to channel planform of WFD monitored watercourses over the past century (Ref. 7). However, this is thought to be a result of significant modification prior to the advent of available mapping rather than a reflection of a natural and unmodified area as the watercourses in question are straightened, and artificial in places. During the second half of the 20th century, a lot of agricultural drains have been created throughout the Study Area.

4.5 WFD Water Bodies

WFD Status

Surface Water

4.5.1 The Study Area falls within eight WFD surface water body catchments, of which seven are screened in. There are also several tributaries of these water bodies present within the Study Area; these are predominantly unnamed agricultural ditches, drains, and springs.

4.5.2 In the 2019 assessment of chemical status, the EA introduced new methods and expanded their evidence base, leading to all water bodies failing chemical status. These changes rendered the assessment incomparable to previous years' evaluations. The failures are attributed to four groups of global pollutants (uPBTs): polybrominated diphenyl ethers (PBDEs), which are a group of brominated flame retardants; Mercury; certain Polycyclic aromatic hydrocarbons (PAHs); and Perfluorooctane sulfonate (PFOS), a type of per- and polyfluoroalkyl substance (PFAS). These pollutants resulted in a failing classification, as there is no available technical solution for improvement,

[1] Q95 (the 5-percentile flow): The flow in cubic metres per second which was equalled or exceeded for 95% of the flow record. The Q 95 flow is a significant low flow parameter particularly relevant in the assessment of river water quality consent conditions.

rendering it technically infeasible. Consequently, the EA has determined that, in cycle 3, the Chemical classification item does not require assessment. Further details regarding the WFD classifications of the screened in water bodies are given in **Table 4-1** (Ref. 1).

Table 4-1: Summary of the WFD status of the screened-in WFD surface water bodies.

WFD Parameter	Status / Summary						
Water Body ID	GB104028057970	GB105030062490	GB104028057840	GB105030062411	GB104028058340	GB104028058480	GB105030062480
Water Body Name	Eau from Source to Northorpe Beck Water Body	Fillingham Beck Water Body	Marton Drain Catchment (tributary of Trent) Water Body	River Till Water Body	Seymour Drain Catchment (tributary of Trent) Water Body	Trent from Carlton-on-Trent to Laughton Drain Water Body	Tributary of Till Water Body
Water Body Type	River	River	River	River	River	River	River
Water Body Area (km^2)	49.54	24.35	5.04	86.03	19.60	58.56	17.14
Water Body Length (km)	14.07	2.50	3.15	25.09	6.48	153.22	4.91
Hydromorphological Designation	Not designated artificial or heavily modified	Heavily modified	Heavily modified	Heavily modified	Heavily modified	Artificial	Not designated artificial or heavily modified
Overall Ecological Status	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Poor
Current Overall Status	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Poor
Status Objective	Good by 2027	Good by 2027	Good by 2027	Moderate by 2015	Good by 2027	Good by 2027	Good by 2027
Biological Quality Elements	Moderate	Bad	Good	Poor	Moderate	Bad	Poor

WFD Parameter	Status / Summary						
Physico-chemical Quality Elements	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Hydromorphological Quality Elements	Supports Good	Supports Good	Supports Good	Supports Good	Supports Good	Supports Good	Supports Good
Chemical	Does not require assessment	Does not require assessment	Does not require assessment	Does not require assessment	Does not require assessment	Does not require assessment	Does not require assessment

Groundwater

4.5.3 The Scheme is underlain by two groundwater bodies which are screened in (Ref. 1). A summary of the WFD status of the water body is given in **Table 4-2**.

Table 4-2: Summary of the WFD status of the screened -in WFD groundwater bodies.

WFD Parameter	Status / Summary	
Water Body ID	GB40402G990300	GB40502G401400
Water Body Name	Lower Trent Erewash – Secondary Combined Water Body	Witham Lias Water Body
Water Body Type	Groundwater	Groundwater
Chemical (GW)	Good	Good
Chemical Dependent Surface Water Body Status	Good	Good
Chemical Drinking Water Protected Area	Good	Good
Chemical GWDTEs test	Good	Good
Chemical Saline Intrusion	Good	Good
Chemical Status element	Good	Good
General Chemical Test	Good	Good
Overall Water Body	Good	Good
Prevent and Limit Objective	Active	Active
Quantitative	Good	Good
Quantitative Dependent Surface Water Body Status	Good	Good
Quantitative GWDTEs test	Good	Good
Quantitative Saline Intrusion	Good	Good
Quantitative Status element	Good	Good
Quantitative Water Balance	Good	Good

4.6 Baseline Characteristics Against WFD Quality Elements

Biological Quality Elements

4.6.1 There has been no EA freshwater fish, invertebrates, diatoms or macrophytes surveying within the Study Area in the past 10 years (Ref. 15).

4.6.2 AECOM carried out surveys to provide an investigation into the ecological quality of watercourses and ponds within the proximity of the SchemeAquatic macroinvertebrate survey results indicated all watercourses are subject to low habitat diversity and water quality pressures which decrease further in autumn. Average Score Per Taxon (ASPT) (Whalley, Hawkes, Paisley & Trigg (WHPT)) scores indicate that all watercourses suffer from Very Poor, Polluted water quality. The aquatic macroinvertebrate communities present were of Low to Moderate conservation value at all survey Reaches, except for one site in the north of the Principal Site in spring, where a Nationally Scarce aquatic beetle was identified. The presence of the nonnative, non-invasive New Zealand mud snail and Freshwater Amphipod were also confirmed, as found within the desk study. Impacts of low flow and sedimentation were evident in all watercourses, demonstrated by Proportion of Sediment-Sensitive Invertebrates (PSI) and Lotic-invertebrate Index for Flow Evaluation (LIFE) scores, reflecting heavily sedimented to sedimented conditions and low to moderate sensitivity to reduced flows throughout.

4.6.3 Macrophyte assessments demonstrated low diversity with WFD classifications across all survey Reaches of Unclassified to Moderate. Assemblages were highly suppressed due to shading from hedgerows and terrestrial herbs, with high levels of eutrophication, sedimentation, prolonged periods of channel drying and channel modification. No protected macrophyte species were identified within the watercourses.

4.6.4 More detail can be found in **Appendix 9-2: Aquatic Ecology Baseline Report** of the ES **[EN010142/APP/6.2]**.

Physico-chemical Quality Elements

4.6.5 There is one water quality sampling point within the Study Area:

a. Marton Drain at A156 bridge at Brampton Grange (Sampling ID: MD-40719020) at 484160 380980 in Marton Drain Catchment (trib of Trent) Water Body (Ref. 16).

4.6.6 Analysis has been conducted on samples that originate from March 2021 to December 2021. Summary statistics are displayed in **Table 4-3**. Dissolved oxygen is classified as Poor within the water body which suggests the water body is limited by dissolved oxygen.

Table 4-3: Summary of physico-chemical parameters for Marton Drain at A156 bridge at Brampton Grange (Sampling ID: MD-40719020).

Physio-chemical quality element	Minimum	Maximum	Average	WFD Classification
pH	7.41	7.97	7.64	High
Temperate (°C)	4.3	19.3	13.05	High
Ammonia un-ionised as N (mg/l)	0.00038	0.00183	0.00093	High
Oxygen, Dissolved as O_2 (mg/l)	7.43	15.5	10.71	Poor

Hydromorphological Quality Elements

4.6.7 A Site walkover was conducted on the 30 of March 2023 in dry, overcast conditions, in part to assess the hydromorphological condition and quality of watercourses set to be crossed by the Scheme. The findings of this are summarised in **Table 4-4**.

Table 4-4: Summary of the hydromorphological characteristic of watercourses

Photo	National Grid Reference	Hydromorphological description
	SK 8325 8036 Unnamed watercourse	Flow within this straightened channel is likely to be ephemeral, as indicated by the shallow depth of flow and the grassy substrate. The modified banks may allow water to spill onto the floodplain during particularly wet periods of the year.
	SK 8410 8100 Marton Drain	Marton Drain is a straight and trapezoidal channel, with imperceptible flow and little variation. Channel banks are covered in shortly cropped grass which will confer few of the benefits usually associated with a functioning riparian zone. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so

Photo	National Grid Reference	Hydromorphological description
		there is expected to be limited connection between the channel and the floodplain.
	SK 8207 8072 Seymour Drain	Seymour Drain exhibits a small degree of sinuosity, albeit in a sharply defined and over deep channel. There is a limited riparian buffer which has minimal scrubs and no trees. The flow is of reduced turbidity relative to many of the other watercourses, revealing the presence of some in-channel macrophytes.
	SK 8261 8090 Carr Drain	The channel here is straight and artificial. Along the left bank there is no riparian buffer zone between the channel and the agricultural field, which appears to slope upwards slightly towards the channel. The right bank in contrast is heavily vegetated, which should confer some benefit in terms of protection from pollution.
	SK 8064 7861 Unnamed watercourse	The channel has an artificially straight course between two agricultural fields. It is unlikely during even very high flood events that the channel would flood onto these fields due to the steep and deep nature of the banks. At the bottom of the picture, the channel has what appears to be an unnatural confluence with another straightened and artificial channel.
	SK 8556 8151 Unnamed watercourse	The channel has an artificially straight course between an agricultural field and a road. It is unlikely during even very high flood events that the channel would flood onto these fields due to the steep and deep nature of the banks. The left bank has a limited riparian buffer that consist of grass which limits the ingress of fines and nutrients from the agricultural field.

Photo	National Grid Reference	Hydromorphological description
	SK 8566 8269 Unnamed watercourse	The channel has a straight course between two agricultural fields. The left bank has limit buffer zone with no scrub or trees. The flow is of reduced turbidity relative to many of the other watercourses, revealing the presence of some in-channel macrophytes. It is unlikely during even very high flood events that the channel would flood onto these fields due to the steep and deep nature of the banks.
	SK 8771 8167 Unnamed watercourse	The agricultural ditch features a straightened channel with an approximate width of 0.3m and a water depth ranging from approximately 1 to 2cm, indicating its likely ephemeral nature. Situated at the edge of an agricultural field and a road, the ditch is likely subject to the ingress of fine sediment and nutrients.
	SK 8809 8317 Tributary of the River Till	The Tributary of the River Till exhibits a small degree of sinuosity, albeit in a sharply defined and over deep channel. The flow is of reduced turbidity relative to many of the other watercourses, revealing the presence of some in-channel macrophytes. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so there is expected to be limited connection between the channel and the floodplain.
	SK 8935 8293 River Till	The River Till exhibits a small degree of sinuosity, albeit in a sharply defined and over deep channel. The riparian zone has limited presence of trees and dense shrubs meaning that ingress of fines from agricultural fields is likely. The channel demonstrates a high turbidity, which means that the bed substrate is not visible due to high sediment loads. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so

Photo	National Grid Reference	Hydromorphological description
		there is expected to be limited connection between the channel and the floodplain.
	SK 8982 8304 Fillingham Beck	Fillingham Beck exhibits a small degree of sinuosity in places, albeit in a sharply defined and over deep channel. The riparian zone of both banks demonstrates a lack of trees or dense shrubs meaning that the ingress of fines from the surrounding agricultural fields is likely high. This is demonstrated by the water having a high turbidity, which means that the bed substrate is not visible due to high sediment loads. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so there is expected to be limited connection between the channel and the floodplain.
	SK 9031 8516 Tributary of Fillingham Beck	The channel demonstrates a small degree of sinuosity between two agricultural fields. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so there is expected to be limited connection between the channel and the floodplain.
	SK 9038 8653 Unnamed watercourse	The agricultural ditch features an artificially straightened channel with an approximate width of 0.3m and a water depth ranging from approximately 1 to 2cm, indicating its likely ephemeral nature. Situated at the edge of an agricultural field, the ditch is likely subject to the ingress of fine sediment and nutrients. The land on the right side of the channel is characterised by a woodland for approximately 150m before becoming an agricultural field.

Photo	National Grid Reference	Hydromorphological description
	SK 9015 8680 Unnamed watercourse	The agricultural ditch features an artificially straightened channel with an approximate width of 0.3m and a water depth ranging from approximately 1 to 2cm, indicating its likely ephemeral nature. Situated at the edge of an agricultural field and a road, the ditch is likely subject to the ingress of fine sediment and nutrients.
	SK 8940 8739 Unnamed watercourse	The watercourse exhibits a small degree of sinuosity, albeit in a sharply defined and over deep channel. The riparian zone of both banks demonstrates a lack of trees or dense shrubs meaning that the ingress of fines from the surrounding agricultural fields is likely high. This is demonstrated by the water having a high turbidity, which means that the bed substrate is not visible due to high sediment loads. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so there is expected to be limited connection between the channel and the floodplain.
	SK 8895 8838 Unnamed watercourse	The agricultural ditch features an artificially straightened channel with an approximate width of 0.3m and a water depth ranging from approximately 1 to 2cm. The channel was dry in sections, indicating its likely ephemeral nature. Situated at the edge of an agricultural field and a road, the ditch is likely subject to the ingress of fine sediment and nutrients.
	SK 9053 8825 Unnamed watercourse	The agricultural ditch features an artificially straightened channel with an approximate width of 0.5m and a water depth ranging from approximately 10cm. Situated between two agricultural fields, the ditch is likely subject to the ingress of fine sediment and nutrients. Some in-channel macrophytes are present.

Photo	National Grid Reference	Hydromorphological description
	SK 9214 8709 Unnamed watercourse	Flow within this straightened channel is likely to be ephemeral, as indicated by the shallow depth of flow and the grassy substrate. The banks may allow water to spill onto the floodplain during particularly wet periods of the year, although this is unlikely apart from in extreme events.
	SK 9283 8719 Unnamed watercourse	The straightened channel has limited presence of trees or dense shrubs within the right bank riparian zone meaning that the ingress of fines from the surrounding agricultural fields is likely. The channel has lower turbidity relative to many of the other watercourses, revealing the presence of some in-channel macrophytes. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so there is expected to be limited connection between the channel and the floodplain.
	SK 9336 8733 Unnamed watercourse	Flow within this straightened channel is likely to be ephemeral, as indicated by the shallow water depth of flow and dry sections of channel. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so there is expected to be limited connection between the channel and the floodplain.
	SK 9320 8810 Unnamed watercourse	The straightened channel has limited trees or dense shrub within the right riparian zone meaning that the ingress of fines from the surrounding agricultural fields is likely. The channel has low turbidity relative to many of the other watercourses, revealing the presence of some in-channel macrophytes. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so there is expected to be limited

Photo	National Grid Reference	Hydromorphological description
		connection between the channel and the floodplain. The channel continues to what appears to be an unnatural confluence with multiple straightened and artificial channel.
	SK 9144 8863 Unnamed watercourse	Flow within this straightened channel is likely to be ephemeral, as indicated by the shallow depth of flow and the grassy substrate. The banks may allow water to spill onto the floodplain during particularly wet periods of the year, although this is unlikely apart from in extreme events.
	SK 9216 8900 Unnamed watercourse	Flow within this straightened channel is likely to be ephemeral, as indicated by the shallow water depth of flow and dry sections of channel. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so there is expected to be limited connection between the channel and the floodplain.
	SK 9252 8934 Unnamed watercourse	Flow within this straightened channel is likely to be ephemeral, as indicated by the shallow water depth of flow and dry sections of channel. It is unlikely that the modified banks will allow water to spill onto the floodplain even during particularly wet periods of the year, so there is expected to be limited connection between the channel and the floodplain.
	SK 8993 9106 Yawthrope Beck	Yawthrope Beck has a straightened channel that has a narrow riparian zone on the either bank. The channel has low turbidity relative to many of the other watercourses, revealing the presence of some in-channel macrophytes. The banks may allow water to spill onto the floodplain during particularly wet periods of the year, although this is unlikely apart from In extreme events.

5. WFD Impact Assessment

5.1 Site Specific Assessment of the Scheme Against WFD Quality Elements

5.1.1 Components of the Scheme and their potential impacts have been introduced along with mitigation measures in **Table 5-1**. The purpose of this table is to introduce the key sources of potential impacts and associated mitigation; the compliance assessment which follows considers impacts on WFD quality elements of each water body.

5.1.2 There is a range of mitigation for the water environment within the Scheme, including (but not limited to) watercourse buffers, **Outline Drainage Strategy** (**Appendix 10-4** of this ES **[EN010142/APP/6.2]**) and measures set out within the **Framework CEMP [EN010142/APP/7.8]**. Where relevant, these were referred to in the screening of the Scheme's activities and components (**Table 3-2**) and within the impact assessment presented within **Table 5-1**. Details can also be found in **Chapter 10: Water Environment** of this ES **[EN010142/APP/6.1]**.

Table 5-1: Scheme components, potential impacts, and associated mitigation measures for proposed works to water bodies scoped into this assessment.

Scheme Component	Potential Impacts	Mitigation Measures
Trenchless crossing of water body – excavation of launch and receive pits to facilitate directional drilling beneath watercourse bed.	Impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body. Impacts to biological and physico-chemical quality elements from spillages of drill fluids or pollutants. Potential impacts from groundwater ingress to excavations.	The **Framework CEMP** submitted with the DCO Application **[EN010142/APP/7.8]** will be followed which outlines measures that will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse. Topsoil will be moved to the edge of the working area and stored such that the spoil heap does not encroach outside the fenced area. Topsoil storage will be managed to maintain the nature of the soils and measures taken to prevent compaction, soil loss due to erosion, excessive weed growth, etc.

Scheme Component	Potential Impacts	Mitigation Measures
		The **Framework CEMP [EN010142/APP/7.8]** also outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. A Site specific Hydraulic Fracture Risk Assessment will be carried out, with Site specific mitigation included appropriate to the local ground conditions. The WMP will describe measures for implementation in the event of a 'break-out' under a watercourse to minimise the risk of pollution. The **Framework CEMP [EN010142/APP/7.8]** outlines that launch and receive pits will be located at least 10m from the edge of water/channel for normal flows to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. The cable will be installed at least 3m below riverbed level. With the proposed mitigation in place, it is not expected that there would be a significant impact from Trenchless crossings.
Trenched open-cut crossing of water body – short-term disturbance of watercourses during the construction phase.	Localised but short-term loss of riparian habitat. Short-term impediment to fish passage and ecological connectivity from impact to river continuity. Potential removal of macrophytes and mortality of invertebrates.	Where possible trenched crossings will be avoided with preference for trenchless crossings. The **Framework CEMP [EN010142/APP/7.8]** outlines that trenched crossings will be carried out in dry weather at low-flow conditions. If flow is present, this will be flumed or culverted through the works to maintain flow downstream and maintain a dry working area.

Scheme Component	Potential Impacts	Mitigation Measures
	Short-term adverse impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body, and chemical spillage risk. Loss of morphological diversity; change in structure of riverbed. Impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body from the newly reinstated, bare earth banks.	The **Framework CEMP [EN010142/APP/7.8]** describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse. Topsoil will be moved to the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. Topsoil storage will be managed to maintain the nature of the soils and measures taken to prevent compaction, soil loss due to erosion, excessive weed growth, etc. The WMP (which will be produced post consent) will describe all other pollution prevention measures and proposed water quality monitoring. A pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will return in-stream vegetation and the banks of the watercourse replanted and reseeded in accordance with the reinstatement measures contained within the **Framework Landscape and Ecological Management Plan (LEMP)** submitted with the DCO Application **[EN010142/APP/7.17]**. Reinstatement will aim to provide an improved channel form with enhancement works to be carried out between 5 and 10m upstream and downstream of the trenched open-cut crossing to ensure the reinstated improved channel form merges into the existing channel form. The area of bank reinstatement will be covered with hessian to

Scheme Component	Potential Impacts	Mitigation Measures
		encourage plant establishment and reduce the risk of soil erosion. The hessian will naturally degrade in-situ as the vegetation grows back. With the proposed mitigation in place, it is not expected that there would be a significant impact from Trenched crossings.
Site access and access tracks – long-term disturbance of watercourses within the Principal Site from watercourse crossings.	Localised loss of riparian habitat. Impediment to fish passage and ecological connectivity from impact to river continuity. Potential removal of macrophytes and mortality of invertebrates. Impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered to water body, and chemical spillage risk. Loss of morphological diversity; change in structure of riverbed.	Culverts will maintain connectivity along watercourses for aquatic species and riparian mammals, where present. Mammal ledges with sufficient room will be utilised. Perched inverts that create a drop from the structure to the downstream bed level will be avoided. Culverts will ensure capacity for the peak flow rate of the watercourse, preventing any impact on flow. The base of a culvert will be buried at least 0.3m below bed level to limit the impact on aquatic species migration and sediment transport. The natural bed within the culvert will be maintained. The culvert will cross the channel perpendicularly and be of an appropriate width to contain the entire channel width. The culvert will be of an appropriate height to allow for environmental mitigation and flood flows. A pre-works condition survey will be carried out to inform reinstatement of the channel. Length-for-length equivalent watercourse enhancements are

Scheme Component	Potential Impacts	Mitigation Measures
		required for each new culvert extension to ensure compliance with WFD objectives. Reinstatement will bring the watercourse as close as possible to its original state once the works are completed. This includes vegetation planting and replacement of bed and bank features. Reinstatement measures will be in accordance with the **Framework LEMP [EN010142/APP/7.17]**. The **Framework CEMP [EN010142/APP/7.8]**, **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** submitted with the DCO Application will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse.With the proposed mitigation in place, it is not expected that there would be a significant impact from Trenchless crossings.

5.1.3 Site-specific impacts of the Scheme on the biological, physico-chemical and hydromorphological quality elements of the screened-in water bodies are provided in **Table 5-2**. The mitigation referred to in this table forms the basis of this assessment, and the outcomes of the assessment are subject to the appropriate implementation of the mitigation measures provided.

Table 5-2: Impact assessment on the WFD quality elements of the surface water bodies screened-in for this assessment.

Scheme Component	Potential Impacts	Mitigation Measures
Biological Quality Elements		
Fish	**Cable Crossings and Watercourse crossings for Site access** Potential for loss of biological continuity resulting in interference with fish population movements and blocking the exchange of individuals among populations, reducing gene flow, and disrupting the ability of "source" populations to support declining populations nearby, resulting from short-term blockages in longitudinal connectivity from the trenched crossing method and long-term blockages in longitudinal connectivity from watercourse crossings for Site access.	The **Framework CEMP** submitted with the DCO Application **[EN010142/APP/7.8]** will be followed for the installation of cables and watercourse crossings for Site access. It outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This includes storage of excavated material at the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. The **Framework CEMP [EN010142/APP/7.8]** outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. It is proposed to carry out the works for trenched crossings in relatively dry weather, wherein it is expected that the smaller watercourses proposed to be crossed by trenched methods may be expected to be dry, and it is unlikely fish will be present. If flow is present within the watercourse, this will be over-pumped which will reduce impact to flow dynamics. Fish surveys and rescues, if required at the time of construction, will be carried out prior to works; this will be detailed in the CEMP. Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (edge of normal flow) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. For sensitive water crossings, the Working Width will be reduced to 10 m; this will be detailed in the CEMP. The flume bed level will be set below the existing bed level to allow for the natural excavated bed to be placed over the flume base. The channel gradient will not be disrupted; there will be a smooth transition through the channel bed to the flume bed. Flume capacity will be designed to ensure flow velocities are not impacted, and the flume will be appropriately sized. All of these will mean that fish access is not impeded.

Scheme Component	Potential Impacts	Mitigation Measures
	Possible harm to fish from spillages or pollution from fine sediment, drilling fluids (water based) and chemicals used during construction and decommissioning (e.g. fuel and hydraulic oil), and through disturbance when trenched techniques and watercourse crossings for Site access are used.	Impacts to biological continuity are not considered to be significant given the localised, small scale, and short-term nature of the works, and the small nature of most of the watercourses at the crossing location that is unlikely to provide preferable habitat for fish. The **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** submitted with the DCO Application will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would be a significant impact to this quality element.
Invertebrates	**Cable Crossings and Watercourse crossings for Site access** Harm or direct mortality to invertebrates through excavation of the channel bed and bank. Possible harm to invertebrates from spillages or pollution from fine sediment, drilling fluids (water based) and chemicals used during construction (e.g. fuel and	The **Framework CEMP [EN010142/APP/7.8]** will be followed for the installation of cables and watercourse crossings for Site access. It outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This includes storage of excavated material at the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. The **Framework CEMP [EN010142/APP/7.8]** outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (edge of normal flow) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. For sensitive water crossings, the Working Width will be reduced to 10m. These will be detailed in the CEMP. A **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** are submitted with the Application. The DCO requires that OEMP and DEMP will be submitted for approval wand thereafter will be implemented. These

Scheme Component	Potential Impacts	Mitigation Measures
	hydraulic oil), and through disturbance when trenched techniques and watercourse crossings for site access are used.	documents describe measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. Impacts to invertebrates from works are not considered to be a significant impact given the localised, small scale nature of the works. With the proposed mitigation in place, it is not expected that there would be a significant impact to this quality element.
Macrophytes and Phytobenthos	**Cable Crossings and Watercourse crossings for Site access** Possible smothering of macrophytes and phytobenthos from excessive fine sediment from construction runoff or drilling fluids, or toxic effects from chemical pollutants that may be spilt on the Draft Order limits, and through disturbance when trenched techniques are used. Possible removal of macrophytes and phytobenthos from	The **Framework CEMP [EN010142/APP/7.8]** will be followed for the installation of cables and watercourse crossings for Site access. It outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This includes storage of excavated material at the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. The **Framework CEMP [EN010142/APP/7.8]** outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (edge of normal flow) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. For sensitive water crossings, the working width will be reduced to 10m. Before installation of the cable by the trenched crossing method and watercourse crossings for Site access, a pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will aim to provide an improved channel. Macrophytes will be retained on site for reinstatement to the watercourse. Where macrophytes cannot be retained, they will be replaced like for like. Enhancement works will be carried out between 5 and 10m upstream and downstream of the trenched crossing and watercourse crossings for Site access to ensure the reinstated improved

Scheme Component	Potential Impacts	Mitigation Measures
	excavation of the channel bed and bank.	macrophytes and phytobenthos form merges into the existing macrophytes and phytobenthos form. The **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** will be followed which describe measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. Impacts to macrophytes and phytobenthos are not considered to be significant given the localised, small scale nature of the works and the artificial nature of the majority of watercourses subject to this activity. With the proposed mitigation in place, it is not expected that there would be a significant impact to this quality element.
Physico-chemical Quality Elements		
Oxygenation conditions	**Cable Crossings and Watercourse crossings for Site access** Possible reduction in levels of dissolved oxygen from excavation activities for launch and receive pits, and trenched crossing excavation activities which may create a source and pathway for the delivery of fine	The **Framework CEMP [EN010142/APP/7.8]** will be followed for the installation of cables and watercourse crossings for Site access. It outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This includes storage of excavated material at the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. The **Framework CEMP [EN010142/APP/7.8]** outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. Trenched crossings and watercourse crossings for Site access will be carried out in dry weather when flow is at its lowest. Reinstated banks will be covered with biodegradable matting and seeded as soon as practicable to reduce risk of bank erosion and delivery of fine sediment and organic material to water bodies.

Scheme Component	Potential Impacts	Mitigation Measures
	sediments and organic material to the water body.	Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (edge of normal flow) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. For sensitive water crossings, the Working Width will be reduced to 10m. The **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would not be a significant impact to oxygenation conditions.
Nutrient conditions	**Cable Crossings and Watercourse crossings for Site access** Possible increase in nutrient levels from excavation activities for launch and receive pits, and trenched crossing excavation activities which may create a source and pathway for delivery of nutrients to the water body.	The **Framework CEMP [EN010142/APP/7.8]** will be followed for the installation of cables and watercourse crossings for Site access. It outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This includes storage of excavated material at the edge of the working area and heaped such that the spoil heap does not encroach outside the fenced area. Trenched crossings and watercourse crossings for Site access will be carried out in dry weather when flow is at its lowest. Reinstated banks will be covered with biodegradable matting and seeded as soon as practicable to reduce risk of bank erosion and delivery of fine sediment and organic material to water bodies. Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (edge of normal flow) to reduce the risk of pathways being created for runoff or pollutants to enter water bodies. For sensitive water crossings, the Working Width will be reduced to 10m.

Scheme Component	Potential Impacts	Mitigation Measures
		The **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would not be a significant impact to nutrient conditions.
Hydromorphological Quality Elements		
River continuity	**Cable Crossings and Watercourse crossings for Site access** There will be some unavoidable short-term interruption to river continuity during the construction phase from trenched crossings. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches.	The **Framework CEMP [EN010142/APP/7.8]** will be followed for the installation of cables and watercourse crossings for Site access Trenched crossings will be carried out in dry weather when flow is at its lowest. At trenched crossings, flow will be maintained if required by flumes. Flume pipes will be sized to reflect the span width and the estimated flow characteristics of the watercourse under peak flow conditions. The flume bed level will be set below the existing bed level to allow for the natural excavated bed to be placed over the flume base. The channel gradient will not be disrupted; there will be a smooth transition through the channel bed to the flume bed. Before installation of the cable by the trenched crossing method and watercourse crossings for Site access, a pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will aim to provide an improved channel form. Enhancement works will be carried out between 5 and 10m upstream and downstream of the trenched crossing and watercourse crossings for Site access to ensure the reinstated improved channel form merges into the existing channel form. The **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** will be followed which describes measures which will be taken to

Scheme Component	Potential Impacts	Mitigation Measures
		prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would be a significant impact to river continuity given the small scale of the barrier and the ephemeral or artificial nature of the majority of water bodies subject to this activity.
River depth and width variation	**Cable Crossings and Watercourse crossings for Site access** There will be some unavoidable short-term disturbance during the construction phase of cable crossings. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches.	The **Framework CEMP [EN010142/APP/7.8]** will be followed for the installation of cables and watercourse crossings for Site access. Before installation of the cable by the trenched crossing method and watercourse crossings for Site access, a pre-works condition survey will be carried out to inform reinstatement of the channel for watercourse crossings. The flume bed level will be set below the existing bed level to allow for the natural excavated bed to be placed over the flume base. The channel gradient will not be disrupted; there will be a smooth transition through the channel bed to the flume bed. Reinstatement would aim to provide an improved channel form. Bed material, including any gravels will be retained on site for reinstatement to the watercourse. Material will be cleaned of fine sediment where appropriate prior to reinstatement. Enhancement works will be carried out between 5 and 10m upstream and downstream of the trenched crossing and watercourse crossings for Site access to ensure the reinstated river depth and width variation merges into the existing river depth and width variation. The **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would be a significant impact to river depth and width variation.

Scheme Component	Potential Impacts	Mitigation Measures
Structure and substrate of the river bed	**Cable Crossings and Watercourse crossings for Site access** There will be some unavoidable short-term disturbance during the construction phase. There are possible changes to bed substrate upon reinstatement of the channel from trenched crossings. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches.	The **Framework CEMP [EN010142/APP/7.8]** will be followed for the installation of cables and watercourse crossings for Site access. The flume bed level will be set below the existing bed level to allow for the natural excavated bed to be placed over the flume base. The channel gradient will not be disrupted; there will be a smooth transition through the channel bed to the flume bed. Before installation of the cable by the trenched crossing method, a pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement would aim to provide an improved river bed. Bed material, including any gravels will be retained on site for reinstatement to the watercourse. Material will be cleaned of fine sediment where appropriate prior to reinstatement. Enhancement works will be carried out between 5 and 10m upstream and downstream of the trenched crossing to ensure the reinstated improved structure and substrate of the river bed merges into the existing structure and substrate of the river bed. For sensitive water crossings, the working width will be reduced to 10m. The **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would be a significant impact to the structure and substrate of the river bed.
Structure of the riparian zone	**Cable Crossings and Watercourse crossings for Site access**	The **Framework CEMP [EN010142/APP/7.8]** will be followed for the installation of cables and watercourse crossings for Site access. Before installation of the cable and watercourse crossings for Site access, a pre-works condition survey will be carried out to inform reinstatement of the riparian zone. Reinstatement would aim to provide an improved the riparian zone form. The area of bank reinstatement will be covered with

Scheme Component	Potential Impacts	Mitigation Measures
	There will be some unavoidable short-term disturbance during the construction phase. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches. Loss of riparian habitat at the location of the excavation for the cable. Crossings would present a local removal and disconnection of the channel from the riparian zone.	hessian to encourage plant establishment and reduce the risk of soil erosion. The hessian will naturally degrade in-situ as the vegetation grows back. Enhancement works will be carried out between 5 and 10m upstream and downstream of the trenched crossing and watercourse crossings for Site access to ensure the reinstated riparian zone merges into the existing riparian zone. Launch and receive pits for trenchless crossings will be located at least 10m away from the watercourse (edge of normal flow), which will help to minimise disturbance of the bank and riparian vegetation. For sensitive water crossings, the Working Width will be reduced to 10m. The **Framework OEMP [EN010142/APP/7.9]** and **Framework DEMP [EN010142/APP/7.10]** will be followed which describes measures which will be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing watercourse during operation and decommissioning. With the proposed mitigation in place, it is not expected that there would be a significant impact to the structure of the riparian zone.

6. Construction, Operation and Decommissioning Impacts

6.1 Potential Construction Impacts

6.1.1 There are a number of general adverse impacts to the water environment which may occur from construction activity, including:

a. Pollution of surface water (and any designated ecology sites that are water dependent) due to deposition or spillage of soils, sediments, oils, fuels, or other construction chemicals, or through uncontrolled site run-off including dewatering of excavations;

b. Temporary impacts on the hydromorphology of watercourses from open-cut watercourse crossings or temporary vehicle access as may be required;

c. Potential impacts on groundwater resources, local water supplies (licenced and unlicenced abstractions) and potentially the baseflow to watercourses from temporary dewatering of excavations or changes in hydrology; and

d. Temporary changes in flood risk from changes in surface water runoff (e.g. disruption of stream flows during any potential culvert construction works) and exacerbation of localised flooding, due to deposition of silt, sediment in drains, ditches; and Changes in flood risk due to the construction of PV panels, which may alter runoff from the Site.

6.1.2 Further details are provided in **Chapter 10: Water Environment** of the ES **[EN010142/APP/6.1]**.

6.2 Construction Mitigation

6.2.1 The construction will take place in accordance with the **Framework CEMP [EN010142/APP/7.8]** submitted withe the DCO Application, which details the measures that would be undertaken during construction to mitigate the temporary effects on the water environment.

6.2.2 The **Framework CEMP [EN010142/APP/7.8]** sets out good practice methods that are established and effective measures to which the development will be committed through the DCO – the detailed CEMP to be produced by the Contractor will need to be substantially in accordance with the **Framework CEMP [EN010142/APP/7.8]**. The measures within the document will focus on managing the risk of pollution to surface waters and the groundwater environment. It will 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).

6.2.3 The CEMP will be supported by a WMP (which will be produced post consent) that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction.

6.2.4 It is anticipated that all WFD construction risks detailed in **Section 3** and **Section 5** could be adequately mitigated with the above measures. Therefore there would be detrimental impact to WFD water bodies during construction.

6.3 Potential Operational Impacts

6.3.1 There are a number of general adverse impacts to the water environment which may occur from operation activity, including:

a. Impacts on surface or groundwater quality from site run-off and the potential for accidental spillages during maintenance activities;

b. Impacts surface or groundwater quality as a result of the use of firewater in the event of a fire in the battery storage areas (BESS);

c. Impacts on hydrology including subsequent impacts on aquatic habitats and water-dependent nature conservation sites;

d. Permanent hydromorphological impacts to watercourses;

e. Impact on local water supplies from water usage in a 'water stressed' area;

f. Impacts on groundwater resources (flows and level); and

g. Impacts on the rate and volumes of surface water run-off entering local watercourses and subsequent increase in flood risk.

6.3.2 Further details are provided in **Chapter 10: Water Environment** of the ES **[EN010142/APP/6.1]**.

6.4 Operational Mitigation

6.4.1 The operation will take place in accordance with the **Framework OEMP [EN010142/APP/7.9]** submitted with the DCO Application. The aim of the **Framework OEMP** is to provide a clear and consistent approach to the control of operational and maintenance activities within the Order limits.

6.4.2 The **Framework OEMP [EN010142/APP/7.9]** outlines how the operational mitigation measures included within the ES will be implemented and sets out the monitoring and auditing activities designed to ensure that such mitigation measures are carried out, and that they are effective.

6.4.3 The key elements of the **Framework OEMP [EN010142/APP/7.9]** include:

a. An overview of the Scheme and associated operation programme;

b. Prior assessment of environmental impacts (through the EIA);

c. Reduction of potential adverse impacts through design and other mitigation measures;

d. Monitoring of effectiveness of mitigation measures;

e. Corrective action procedure; and

f. Links to other complementary plans and procedures.

6.4.4 It is anticipated that all WFD operation risks detailed in **Section 3** and **Section 5** could be adequately mitigated with the above measures. Therefore there would be detrimental impact to WFD water bodies during operation.

6.5 Potential Decommissioning Impacts

6.5.1 Potential impacts from the decommissioning of the Scheme are similar in nature to those during construction, as some ground works will be required to remove infrastructure installed. Cabling in the Cable Route Corridor may remain in-situ. The mode of cable decommissioning for the Cable Route Corridor and interconnecting cables will be dependent upon government policy and good practice at that time. Currently, the most environmentally acceptable option is leaving the cables in situ, as this avoids disturbance to overlying land and habitats and to neighbouring communities. The cabling can be removed by opening the ground at regular intervals and pulling the cable through to the extraction point, avoiding the need to open up the entire length of the cable route. As such, decommissioning impacts would be less than those during construction and would be mitigated by measures set out within the **Framework DEMP** submitted with the DCO Application **[EN010142/APP/7.10]**.

6.5.2 As a result, it is considered the decommissioning impacts and effects will be no worse than those of the construction phase.

6.5.3 Further details are provided in **Chapter 10: Water Environment** of the ES **[EN010142/APP/6.1]**.

6.6 Decommissioning Mitigation

6.6.1 The decommissioning will take place in accordance with the with a **Framework DEMP [EN010142/APP/7.10]** submitted with the DCO Application. It has been prepared and is submitted with the DCO Application, which details the measures that would be undertaken during decommissioning to mitigate the temporary effects on the water environment.

7. Assessment of the Scheme Against WFD

7.1.1 The EA identifies mitigation measures for water bodies, which are actions that can be implemented to protect and improve the water environment and help achieve the objectives for each RBMP. This section of the assessment considers the nature of the measures identified by the EA for each water body and assesses whether the Scheme may prevent such measures being implemented.

7.1.2 The EA was consulted on water body objectives and HMWB mitigation measures which are actions that can be implemented by activities to protect and improve the water environment and help achieve the objectives set for each RBMP. However, the data provided by the EA only covered the following water bodies:

a. River Till (GB105030062411); and

b. Skellingthorpe Main Drain (GB105030062390).

7.1.3 Therefore, **Section 7** (this section) only assesses whether the Scheme aligns with the measures outlined for these water bodies to be implemented. However, due to the outlined activity and construction mitigation measures being undertaken by the Scheme as set out in **Sections 3**, **5** and **6** above, it is unlikely that the Scheme would not align with HMWB mitigation measures.

7.1.4 The Scheme has been appraised against measures identified for River Till (GB105030062411), which is the only screened-in water body that the EA provided data on. This appraisal is presented in **Table 7-1**.

Table 7-1: Appraisal of the Scheme against the delivery of measures identified for the waterbodies scoped into this assessment.

Measure Theme	Further Detail on Measure	Appraisal of the Scheme
Ensure good practice	Ensure good practice is applied when undertaking maintenance works to minimise impacts to the habitat.	The construction will take place in accordance with the **Framework CEMP** submitted with the DCO Application **[EN010142/APP/7.8]**. The CEMP details the measures that would be undertaken during construction to mitigate the temporary effects on the water environment. The CEMP will be supported by a WMP (which will be produced post consent) that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction.
	Good practice management of in channel and riparian vegetation works carried out in a manner that considers the impacts of the activity upon	

Measure Theme	Further Detail on Measure	Appraisal of the Scheme
	ecology and hydromorphology.	Management and maintenance will be line with the **Framework OEMP** submitted with the DCO Application **[EN010142/APP/7.9]** and decommissioning impacts will be mitigated through good practice measures set out within the **Framework DEMP** submitted with the DCO Application **[EN010142/APP/7.10]**. The management of habitats during operation will take place in accordance with a **Framework LEMP** submitted with the DCO Application **[EN010142/APP/7.17].** The above mitigation means there would be no deterioration impact to the water bodies.
	Action(s) to reduce the extent and spread of invasive non-native species.	
To improve modified habitat	Remove or ease barriers to fish migration to enable fish passage.	There will be some unavoidable temporary disturbance during the construction phase of open-cut crossings, but this will be over a relatively short timeframe. The watercourses in question are of low hydromorphological quality as they are artificial, trapezoidal drainage ditches and not thought to be sensitive to such works. Therefore, the Scheme would not impact the implementation of these measures. The management of habitats during operation will take place in accordance with a **Framework LEMP** submitted with the DCO Application **[EN010142/APP/7.17].** The above mitigation means there would be no deterioration impact to the water bodies.
	Preserve and/or restore existing in stream and riparian/shoreline habitats.	
	Restore or increase in-channel morphological diversity e.g. riffle and pool creation and bar creation etc.	
	Bed of culvert altered to allow decreased flow conditions and to allow longitudinal connectivity of both biota and sediments.	
	Leaving habitat or parts of natural habitat while	

Measure Theme	Further Detail on Measure	Appraisal of the Scheme
	undertaking operations or maintenance in a water body.	

7.1 Assessment Against WFD Objectives

7.1.1 The compliance of the Scheme is determined based upon an assessment against the following objectives relating to WFD quality elements, including biological, physico-chemical and hydromorphological quality elements:

a. Whether the Scheme will cause deterioration in the Ecological Potential or Status of a water body;

b. Whether the Scheme will compromise the ability of a water body to achieve Good Ecological Status or Potential;

c. Whether the Scheme will cause a permanent exclusion or compromise achievement of the WFD objectives (e.g., mitigation measures) in other water bodies within the same RBD; and

d. Whether the Scheme will contribute to the delivery of the WFD objectives (e.g., mitigation measures).

7.1.2 The WFD compliance assessment for the Scheme is summarised in **Table 7-2**; the Scheme is expected to be compliant with the objectives of the WFD.

Table 7-2: Compliance assessment of the Scheme.

Compliance Elements	Water Body Assessment	Groundwater Body Assessment
Water body name and ID	Eau from Source to Northorpe Beck (GB104028057970); Fillingham Beck (GB105030062490); Marton Drain Catchment (trib of Trent) (GB104028057840); River Till (GB105030062411); Seymour Drain Catchment (trib of Trent) (GB104028058340); Skellingthorpe Main Drain (GB105030062390); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); and	Lower Trent Erewash - Secondary Combined (GB40402G990300); and Witham Lias (GB40502G401400).

Compliance Elements	Water Body Assessment	Groundwater Body Assessment
	Tributary of Till (GB105030062480).	
Deterioration in the status/potential of the water body	The Scheme is not anticipated to cause a deterioration in potential due to the embedded environmental mitigation.	The Scheme is not anticipated to cause a deterioration in status due to the embedded environmental mitigation.
Ability of the water body to achieve Good Ecological Potential/Status	The Scheme and associated mitigation would not cause deterioration in status of the water bodies and would not prevent the water bodies achieving Good Ecological Potential due to the embedded environmental mitigation.	The Scheme and associated mitigation would not prevent the water body reaching Good Status due to the embedded environmental mitigation.
Impact on the WFD objectives of other water bodies within the same RBD	No downstream or upstream impacts are anticipated associated with the Scheme and the mitigation measures proposed due to the embedded environmental mitigation.	No wider impacts are anticipated associated with the Scheme and the mitigation measures proposed due to the embedded environmental mitigation.
Ability to contribute to the delivery of the WFD objectives	The Scheme does contribute to the delivery of WFD objectives within the Order limits through enhancements at the re-establishment stage.	The Scheme does contribute to the delivery of WFD objectives.

8. Conclusion

8.1.1 This assessment has considered the potential impacts and associated mitigation of the Scheme in relation to the WFD quality elements of the following surface and groundwater water bodies:

a. Eau from Source to Northorpe Beck (GB104028057970);
b. Fillingham Beck (GB105030062490);
c. Marton Drain Catchment (trib of Trent) (GB104028057840);
d. River Till (GB105030062411);
e. Seymour Drain Catchment (trib of Trent) (GB104028058340);
f. Skellingthorpe Main Drain (GB105030062390);
g. Trent from Carlton-on-Trent to Laughton Drain (GB104028058480);
h. Tributary of Till (GB105030062480);
i. Lower Trent Erewash - Secondary Combined (GB40402G990300); and
j. Witham Lias (GB40502G401400).

8.1.2 The assessment demonstrates that the Scheme is compliant with the objectives of the WFD: it would not cause deterioration in status of the water bodies and would not prevent the water bodies achieving Good Ecological Status and Good Ecological Potential.

8.1.3 Some local impacts to aquatic habitat networks are unavoidable during the construction and operation phase, but impacts would not be deleterious with suitable environmental construction management and operational mitigation.

8.1.4 Some culverts / culvert extensions and outfalls would impact habitat continuity in minor tributaries to monitored watercourses. However, with embedded environmental design mitigation, and local and proportionate restoration and enhancement of watercourse habitats, there would be no net deterioration or cumulative impact on any water body.

9. References

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