Gate Burton Energy Park Environmental Statement

Volume 3, Appendix 9-A: Water Framework Directive Assessment
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1. Introduction

1.1 Background

1.1.1 This Water Framework Directive (WFD) Assessment has been prepared in support of the Environmental Statement (ES) for Gate Burton Energy Park (hereafter referred to as 'the Scheme').

1.1.2 The Order limits comprises the Solar and Energy Storage Park and the Grid Connection Corridor. Refer to **ES Volume 2: Figure 9-1 [EN010131/APP/3.2]** which shows the Order limits in relation to water environment attributes.

1.1.3 Full details of the various Scheme components are provided in **ES Volume 1, Chapter 2: The Scheme [EN010131/APP/3.1]**.

1.1.4 The Scheme interacts with eight Water Framework Directive (WFD) water bodies (six surface water and two groundwater bodies, see **ES Volume 2: Figure 9-1 [EN010131/APP/3.2]**) and thus it is necessary to consider the activities and constituent parts of the Scheme to determine compliance with WFD objectives. This includes assessing the impact of new solar PV Panels, supporting infrastructure, site drainage and cable crossings of water bodies on the biological, physico-chemical and hydromorphological quality elements that comprise the WFD to ensure no deterioration and no prevention of future improvement in water body status. Both surface and groundwater bodies are considered.

1.1.5 In accordance with the Planning Inspectorate's Advice Note Eighteen (Ref 1), a three-stage approach may be adopted:

- **Stage 1: WFD Screening** - Identification of the proposed work activities that are to be assessed and determination of which WFD water bodies could potentially be affected through identification of a Zone of Influence. This step also provides a rationale for any water bodies screened out of the assessment.
- **Stage 2: WFD Scoping** - For each water body identified in Stage 1, an assessment is carried out to identify the effects and potential risks to receptors (within the Zone of Influence) based on the relevant water bodies and their water quality elements from all activities. The assessment is made taking into consideration embedded mitigation (measures that can reasonably be incorporated into the design of the proposed works) and good practice mitigation (measures that would occur with or without input from the WFD assessment process).
- **Stage 3: WFD Impact Assessment** - A detailed assessment of the water bodies and activities carried forward from the WFD screening and scoping stages. This includes an explanation of any mitigation required and how its delivery is secured.

1.2 Study Area

1.2.1 The Scheme is located approximately 4 km south of Gainsborough, within the administrative areas of West Lindsey District Council and Lincolnshire County Council. The Order limits is shown in **ES Volume 2: Figure 9-1 [EN010131/APP/3.2]**.

1.2.2 For the purposes of this assessment, and consistent with **ES Volume 1, Chapter 9: Water Environment [EN010131/APP/3.1]**, a general study area (Zone of Influence) of approximately 1km from the Order limits boundary has been considered in order to identify water bodies that are hydrologically connected to the Scheme, and potential works associated with the Scheme, that could cause direct impacts. However, given that impacts may propagate downstream, where relevant the assessment also considers a wider study area to account for any impacts that may be transmitted downstream that may influence WFD quality element receptors (which in this case is typically for a few kilometres). Professional judgement has been applied to identify the extent to which such features are considered.

1.2.3 The study area falls within the following surface water body catchments:

- Trent from Carlton-on-Trent to Laughton Drain (WFD ID: GB104028058480);
- River Till (WFD ID: GB105030062411);
- Tributary of the Till (WFD ID: GB105030062480);
- Marton Drain Catchment (Trib of Trent) (WFD ID: GB104028057840);
- Seymour Drain Catchment (WFD ID: GB104028058340); and
- Skellingthorpe Main Drain water body (WFD ID: GB105030062390).

1.2.4 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.

1.2.5 The study area is also underlain by two WFD groundwater bodies: Lower Trent Erewash – Secondary Combined (WFD ID: GB40402G990300); and Witham Lias (WFD ID: GB40502G401400).

1.2.6 A full summary of the baseline conditions for the study area is provided later in this report (Section 4).

2. Methodology

2.1 Introduction to the Water Framework Directive

2.1.1 The WFD, EC Directive 2000/60/EC (Ref 1), commonly referred to as the Water Framework Directive (WFD), aims to protect and enhance the quality of the water environment across all European Union (EU) member states. England and Wales have adopted the WFD as national law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Following the departure of the United Kingdom from the EU these regulations continue to apply until they are revoked or superseded by new legislation.

2.1.2 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 quality is evaluated according to interactions between biological, physico-chemical and hydromorphological elements (or 'Quality Elements').

2.1.3 Under the WFD, 'Water bodies' are the basic management units and are defined as all or part of a river system or aquifer. Water bodies form part of larger River Basin Districts (RBD), for which River Basin Management Plans (RBMPs) are developed and environmental objectives are set. The Site is located between the Witham Management Catchment within the Anglian RBMP and the Lower Trent and Erewash Management Catchment within the Humber RBMP.

2.1.4 RBMPs are produced every six years, in accordance with the river basin management planning cycle. Cycle 2 plans were published in February 2016, and the most recent RBMP data available on the online Catchment Data Explorer is from 2019, which are due to be updated to Cycle 3 plans in 2021 (not yet published at time of writing in November 2022).

2.1.5 The WFD requires water bodies to be classified according to their current condition (i.e. the 'Status' or 'Potential,' depending on whether they are heavily modified or artificial water bodies) and to set a series of objectives for maintaining or improving conditions so that water bodies maintain or reach Good Status or Potential.

2.1.6 The Environment Agency is under a duty to exercise its relevant functions so as to best secure that the requirements of WFD for the achievement of environmental objectives are co-ordinated. The Planning Inspectorate's Advice Note 18 (Ref 1) summarises the overall aims and objectives of the WFD as to:

- Enhance the status and prevent further deterioration of surface water bodies, groundwater bodies and their ecosystems;
- Ensure progressive reduction of groundwater pollution;
- Reduce pollution of water, especially by Priority Substances and Certain Other Pollutants;
- Contribute to mitigating the effects of floods and droughts;

- Promote sustainable water use; and
- Achieve at least good surface water status for all surface water bodies and good chemical status in groundwater bodies by 2015 (or good ecological potential in the case of artificial or heavily modified water bodies).

2.1.7 As a result, new developments that have the potential to impact on current or predicted WFD status are required to assess their compliance against the WFD objectives of the potentially affected water bodies. It must be demonstrated that there is no deterioration or prevention of future improvement against any WFD element for a designated waterbody.

2.1.8 Regulation 33 of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (i.e. the WFD) states that, like other public bodies, local authorities have a statutory duty to "have regard to the River Basin Management Plan" and "any supplementary plans" covering proposed activities when exercising its functions. Local authorities must therefore reflect water body improvement priorities as outlined in RBMPs.

2.1.9 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 (i.e. sites within the national site network or water dependent Sites of Special Scientific Interest) and adjacent WFD water bodies, where relevant.

2.2 WFD Methodology

2.2.1 Guidance on how to undertake WFD assessments can be found in 'The Water Framework Directive - Advice Note 18: The Water Framework Directive' (Ref 2), the 'Water Framework Directive risk assessment - How to assess the risk of your activity' (Ref 3) and on the You.Gov website. These guidance documents have informed the approach taken in this assessment.

2.2.2 In accordance with best practice guidance, a stepwise approach consisting of screening, scoping and detailed impact assessment phases is generally followed to meet the requirements of the WFD:

Stage 1: Screening

2.2.3 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

2.2.4 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.

Stage 3: Impact Assessment

2.2.5 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

2.2.6 Proposed mitigation activities relied upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and sufficiently secured.

Regulation 19 Derogation

2.2.7 Where the potential for deterioration of water bodies is identified, and it is not possible to mitigate the impacts to a level where deterioration or failure to improve can be avoided, the project would need to be assessed in the context of Regulation 19 of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Where a derogation is necessary, Applicants will need to provide the necessary information to justify their case, bearing in mind that Applicants must always seek to avoid deterioration of the water environment. It is a matter for the Secretary of State to consider whether derogation under Regulation 19 is justified in relation to a proposed development. At this stage, a derogation under Regulation 19 is not considered necessary.

Desk Study

2.2.8 A desk-based study was carried out to capture information pertaining to the Scheme to support the understanding of baseline conditions. Review of relevant information relating to the study area was undertaken to develop a baseline overview for WFD catchments, watercourses and surrounding areas. The following data sources were used for the desk study:

- WFD status and objectives from the appropriate River Basin Management Plan for Cycle 2 data, available from the Catchment Data Explorer (Ref 4);
- Defra's Multi-agency geographical information for the countryside website (MAGIC), including contemporary Ordnance Survey (OS) maps (Ref 5);
- Historical maps (Ref 6);
- British Geological Survey maps (Ref 7);
- Soilscapes website (Ref 8);
- Aerial photography (Ref 9);
- Hydrological information (Ref 10);

- Climate information (Ref 11);
- Environment Agency Fish and Ecology Data Viewer (Ref 12); and
- Environment Agency Water Quality Archive website (Ref 13).

2.3 Field Survey

2.3.1 An initial site walkover survey was undertaken by a water scientist and hydromorphologist on 22 September 2021 in fair conditions to assess watercourse connectivity, quality, and condition. An additional walkover of the Grid Connection Corridor was undertaken on 8 February 2022 in overcast, dry conditions. A further site walkover was undertaken on 17 May 2022.

2.4 Assumptions and Limitations

2.4.1 This WFD assessment is based on baseline and Scheme design information available at the time of writing in November 2022. It is based on the Scheme design set out in **ES Volume 1, Chapter 2: The Scheme [EN010131/APP/3.1]** and further information provided in **ES Volume 1, Chapter 9: Water Environment [EN010131/APP/3.1]**.

2.4.2 A request for water resources data (e.g. licensed abstractions, Water Activity Permit locations, pollution incident locations), WFD information (including water body mitigation measures) and water quality and flow data was requested from the Environment Agency to inform the desk study in March 2022. A response had not been received at the time of writing in November 2022 despite a further request in July 2022. As such, this assessment was carried out using freely accessible data sources, as listed in 2.2 WFD Methodology: Desk Study. Information regarding WFD mitigation measures is not freely obtainable, and so instead Reasons for Not Achieving Good status (RNAG) data was used, which is seen as a reasonable alternative.

2.4.3 With regard to the Grid Connection Corridor, it has been confirmed that the River Trent and the majority of smaller watercourses (those within the allocated avoidance areas) will be crossed using underground techniques (e.g. horizontal directional drilling techniques that would not disturb the watercourse), with the depth of the cable below the bed to be greater than 2m in accordance with Trent Valley IDB requirements.

2.4.4 There are six watercourse crossings that are outside of the avoidance areas could require open cut installation techniques. For these crossings it is assumed that water flow would be maintained by damming and over pumping. These watercourses are generally ephemeral ditches and if works could be carried out in the drier months this would reduce the risk of pollution propagating downstream, although this cannot be guaranteed and thus no weight has been attributed to this in the impact assessment.

2.4.5 The access track for the Grid Connection Corridor is assumed to require culverting of all watercourses that are crossed for cable installation (with the exception of the River Trent) for a five year period as a worst case. The culvert design will aim to minimise changes in alignment and length as much as is feasible. Oversized pipes would be used to allow a naturalised substrate to form. Given that culverts are to be installed for five years, length for length

watercourse enhancements have been committed to within the DCO in order to provide for overall benefits once the culverts have been removed. As with open cut cable installation, it is assumed that during installation works flow would be maintained during the works by damming and over pumping.

2.4.6 The PV Panels in the Solar and Energy Storage Park will be offset from watercourses by 10m, as set out in the **Outline Design Principles [EN010131/APP/2.3]**, which will be secured by a requirement of the draft DCO. This exceeds the requirements of the IDB, which details a 9m buffer. For all watercourses other than the River Trent this buffer is measured from the centre line of the watercourse as determined from Ordnance Survey mapping. This avoids issues related to determining the watercourse edge in situations where this varies considerably as flow rate changes. This buffer will ensure all construction activities for the installation of PV Panels would be offset from surface watercourses, other than where there is a need for crossing of a watercourse (for cabling installation or possible temporary access) of temporary discharge of treated construction site runoff. Any works to enhance watercourses would require direct works to the channel and banks, although given the aim of these works and their small-scale and 'soft-engineering' nature, construction impacts would be minimal. Overall, the purpose of this buffer reduces the risk of any pollutants entering the watercourse directly, whilst also providing space for mitigation measures (e.g. fabric silt fences and riparian habitat) should they be required.

2.4.7 Access tracks will be required across the Solar and Energy Park site. These are expected to require 17 watercourse crossings, 10 of which are new crossings and seven are existing culverted crossings. It should be noted that the crossing locations will be fixed at detailed design and so the number required may change. Open span crossings may be used in some instances and the number of crossings required will be reduced where possible. Nonetheless, the assessment presents the worst case of 10 new culverted crossings. Where works are required to the seven existing culverts, this is assumed to be a maximum extension of up to 2m in each case. As with the Grid Connection Corridor access track's culverts, length for length watercourse enhancement has been committed to within the DCO in order to mitigate for culvert installation.

2.4.8 The risk from surface water runoff to surface or groundwater bodies has been assessed qualitatively on the basis of **ES Volume 3, Appendix 9-C: Surface Water Drainage Strategy [EN010131/APP/3.3]**. A detailed surface water drainage design is a DCO requirement. The risk from surface water runoff from new hard standing to surface or groundwater bodies has been assessed according to the Simple Index Approach presented in the C753 The SuDS Manual.

2.4.9 Should there be a fire in the BESS Compound, then water would be obtained from a mains connection at the A4156. It has been determined that a supply of 1,900 litres per minute of water would be required. Given that this supply would be for an emergency event for which the probability of occurrence would be low given best practice management of the Scheme, it is assumed that this would not have a significant impact on Anglian Water's potable water resource. At the time of writing (November 2022), a Point of Connection (PoC)

application is being progressed with Anglian Water for this connection and to confirm the availability of supply. Should this approach not be suitable, then tanks of water would be located within the Solar and Energy Storage Park to store the necessary volume needed for firefighting purposes within the BESS Compound.

2.4.10 Removal of productive arable farmland within the Order limits to accommodate the Scheme will reduce water quality risk to watercourses associated with diffuse agricultural chemicals and possibly reduce soil erosion and need for local abstractions for irrigation, thereby providing a beneficial impact. However, there is limited data on the existing conditions and activities, therefore no further consideration has been given to this potential benefit.

2.4.11 During construction it is assumed that an estimated 2,200m^3 of water (1,700m^3 for welfare and 500m^3 for wheel washes) will be required during construction to support welfare facilities onsite and other uses. The water will either be transported to the Order limits by road from an existing nearby licenced water abstraction source and stored on site in tanks of up to 10m^3 capacity (10,000 litres) or connected through a mains connection located on the A156.

2.4.12 During operation, there will be welfare facilities associated with the Scheme for up to 14 permanent full time equivalent (FTE) members of staff during operation. Given the low daily occupancy only small volumes of foul drainage will be generated. Wastewater from permanent welfare facilities will consist of a self-contained independent non-mains domestic storage and/or treatment system. An alternative where this is not possible, would be for a self-contained foul drainage system to a septic tank or similar. These tanks would be regularly emptied under contract with a registered recycling and waste management contractor.

3. WFD Screening and Scoping

3.1 WFD Screening

3.1.1 The purpose of the WFD screening stage as outlined in PINS Advice Note 18 (Ref 1) 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; this approach has been taken in this assessment and is outlined in this section.

3.1.2 A study area of generally 1km from the Order limits has been considered in order to identify water bodies that are potentially hydrologically connected to the Scheme and potential works associated with the Scheme that could cause direct impacts.

3.1.3 The screening stage also identifies specific activities of the Scheme that could affect receptor water bodies' WFD status and which should be carried forward to subsequent stages of the assessment. Justification is provided where water body receptors are screened out and are not carried forward through the assessment. Water bodies or activities screened 'out' of the assessment are not considered further at the impact assessment stage.

Screening of WFD Water Bodies

3.1.4 The Scheme interacts with eight WFD water bodies (Ref 4). WFD Screening of these water bodies is provided in Table 1. Watercourses such as smaller tributaries within each of the WFD water body catchments that may be impacted by the Scheme have been included in this assessment. Any other remaining downstream water bodies not mentioned below are considered sufficiently far downstream to avoid impacts of the Scheme and are therefore screened out of further assessment.

Table 1 Screening of WFD water bodies potentially impacted by the Scheme

Water body (ID)	Screening Outcome	Justification
Trent from Carlton-on-Trent to Laughton Drain (GB104028058480)	In	WFD water bodies may be directly impacted by the Scheme due to a range of activities that would interact with the local watercourse network during construction, operation and decommissioning phases of the Scheme.
Tributary of the Till (GB105030062480)		
Marton Drain Catchment (Trib of Trent) (GB104028057840)		
Seymour Drain Catchment (WFD ID: GB104028058340)		
River Till (GB105030062411)	Out	The River Till is located at the far eastern extent of the study area, and would not be directly impacted by the Scheme. However, it is hydrologically connected to the Scheme via the 'Tributary of the Till' WFD water body. The Tributary of the Till's confluence with the River
Skellingthorpe Main Drain water body (WFD ID: GB105030062390)		

Water body (ID)	Screening Outcome	Justification
		Till is 1.4km downstream of the Scheme boundary. The Skellingthorpe Main Drain is approximately 10km south of the Order limits and flows south-east from near Saxilby towards Lincoln. Given its distance from the Scheme there would be no direct physical interaction between Scheme activities and the drain. The wider WFD water body covers much of the Solar and Energy Storage Park and so there is potential for hydrological connectivity to the watercourse via the drains and tributaries that extend into the Solar and Energy Storage Park. It should be noted that WFD requirements apply equally to all watercourses regardless of whether they are Environment Agency reportable reaches. Despite hydrological connectivity to these WFD designated watercourses it is anticipated that any water quality impacts related to construction runoff, spillages, or sediment mobilisation related to in-channel structure installation that have potential to enter these tributaries will be adequately mitigated by the **Framework Construction Environmental Management Plan (CEMP) [EN010131/APP/7.3]**, which will be secured under the DCO. The final CEMP will be supported by a Water Management Plan (WMP) technical appendix. The CEMP will be standard procedure for the Scheme and will describe the principles for the protection of the water environment during construction. The WMP will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction including requirements for water quality monitoring. A **Framework CEMP** accompanies the DCO Application **[EN010131/APP/7.3]**. Given this mitigation and the lack of any direct works to these waterbodies, it is considered that they can be screened out of further assessment.
Lower Trent Erewash – Secondary Combined (GB40402G990300) Witham Lias (GB40502G401400)	In	Activities relating to the construction and operation of the Scheme have been assessed in terms of their potential impact upon this groundwater water body. There are potential anticipated impacts at the water body scale, therefore assessment of impacts to groundwater is scoped in.

Screening of Activities

3.1.5 As described in Section 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 2 together with a screening assessment.

Table 2 Screening of the Scheme's activities against WFD quality elements

Activity	Description	Screening Outcome	Justification
Solar PV Panels and PV Mounting Structures which combine to form PV tables	Solar PV Panels will be mounted 0.8m above ground level on PV Mounting Structures (except in higher flood risk areas where they will be 1.1m above ground level). This will avoid creation of an impermeable surface on the ground or the need for extensive earthworks. PV Panels will also not be located within close proximity of watercourses within the Solar and Energy Storage Park. Mounting poles will generally be driven or screwed into the ground to an indicative depth of 2m. Concrete pad foundations will be used in areas identified for no beneath ground intrusion. (**ES Volume 1, Chapter 2: The Scheme [EN010131/APP/3.1]**).	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340) – due to location west of the Trent and not related to the Solar and Energy Storage Park.	There are no direct hydromorphological impacts to watercourses given the buffer from panel tables. An Outline Surface Water Drainage Strategy (**ES Volume 3: Appendix 9-C [EN010131/APP/3.3]**) provides for the attenuation of surface water runoff from the operational Solar and Energy Storage Park, all of which will be discharged to ground and so no surface watercourses would be impacted. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park would be attenuated to provide water quality treatment of runoff water. This will be secured through a detailed drainage strategy which would be a requirement of the DCO. Use of mounting structures for PV Panels will avoid sealing the ground with impermeable surfaces. As a result, it is assumed that the Order limits impermeable area will remain largely consistent with its pre-development state. However, runoff from the PV Panels will alter the existing routing of runoff. To prevent ponding occurring around the PV Panels, a series of boundary and routing swales will be constructed within the solar PV panel fields in identified low spots to collect and store runoff, allowing it to infiltrate to ground. The indicative locations of the proposed swales and detention basins are outlined within **ES Volume 3 Appendix 9-C [EN010131/APP/3.3]**. Detailed drainage designs and SuDS feature locations will be developed post consent at detailed design stage. Attenuation will be required to temporarily store any excess peak surface water runoff generated within the Solar and Energy Storage Park before it is infiltrated to ground. Attenuation will be provided in the form of swales and infiltration basins. These features will be strategically located based on existing overland flow routes to capture

Activity	Description	Screening Outcome	Justification
			runoff. The swales/infiltration basins will be 600 mm deep with no steeper than 1 in 3 side slopes. Check dams will be placed strategically within swales to optimise their storage potential on steeper slopes. Where the attenuation lies within the solar field, the legs of the solar panel will be extended so that the solar panel lies above any potential flooding. The outline strategy presents indicative locations for attenuation, which will be refined during detail design, post DCO consent. The attenuation features have been sized to accommodate the 1 in 100 year event plus a 40% allowance for climate change. Given the change in land use across the Order limits, the risk of agricultural diffuse pollution would be reduced from the change in land use as the application of agro-chemicals, inorganic and organic fertilisers to crops. On the basis of existing borehole scans available on the Geoindex website (Ref 8), groundwater levels are variable across the area, with some groundwater encountered at relatively shallow levels less than 2m below the ground, for instance towards Kexby and Cottam. Alluvium deposits may also carry water at relatively shallow depths, although these are predominantly around watercourses where there will be no construction aside from the crossings for access tracks and cable routes. As no continuous foundations are in the design and given that groundwater is anticipated to be largely below 2m across the majority of the Order limits, the shallow, regularly spaced discrete strut PV Panel foundations are considered to have a negligible impact on groundwater flow. The Order limits 1km study area is not known to have a significant history of potentially contaminating land uses such as landfill, although there are areas of infilled land and made ground associated with historic quarries and pits. The installation of the module structures to a maximum depth of 2m below ground, are not considered to create a significant risk of mobilising contaminants,

Activity	Description	Screening Outcome	Justification
Power Conversion Station (for transformers, switchgear and metering equipment), also known as Solar Station	The Power Conversion Station will comprise of inverters, transformers, and switchgear, which can be grouped together or distributed throughout the Solar and Energy Storage Park. The Solar Station can sometimes be enclosed in a single container. Indicative foundation details suggest that they will consist of compacted gravel and reinforced concrete with a thickness of up to 1m and a maximum depth of 2m.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340) – due to location west of the Trent and not related to the Solar and Energy Storage Park.	Infrastructure will not be located within close proximity of a watercourse and so there is no mechanism for direct hydromorphological impacts to surface water bodies. An Outline Surface Water Drainage Strategy (**ES Volume 3: Appendix 9-C [EN010131/APP/3.3]**) provides for the attenuation of surface water runoff from the operational Solar and Energy Storage Park including areas of hardstanding associated with on-site substations. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water prior to discharge to ground. 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. These pollution controls will be secured through a detailed drainage strategy which would be a requirement of the DCO. Given the above mitigation, there are considered no mechanisms for impacts to surface or groundwater bodies at the WFD waterbody scale. Indicative foundations for the Solar and Energy Storage Park specify that it will have a maximum depth of 2m, which will likely be above the water table across the majority of the site, based on groundwater data available on the Geoindex website (Ref 8). As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies.
Battery Energy Storage Systems (BESS) Compound(s)	The compound will include battery storage containers, battery inverters, transformers and switchgear and access tracks. Access tracks are considered separately below.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Trent from Carlton-on-Trent to	Infrastructure will not be located within close proximity of a watercourse, and so there are no mechanisms for impacts to surface water bodies.

Activity	Description	Screening Outcome	Justification
	The BESS compound has a footprint up to 210m x 290m. It will have a concrete base or monolith plinth. Maximum depth of 2m.	Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340); Witham Lias (GB40502G401400).	An Outline Surface Water Drainage Strategy (**ES Volume 3: Appendix 9-C [EN010131/APP/3.3]**) for the attenuation of surface water runoff from areas of hardstanding associated with the BESS Compound. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park would be attenuated to ensure no increase in surface water discharge rates and to provide water quality treatment of runoff water prior to discharge to ground. This will be secured through a detailed drainage strategy 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. The BESS Compound will require fire water to supress a fire, in the unlikely event that one break out in the BESS containers. This will be obtained by a mains connection from the A4156 (subject to a Point of Connection agreement with Anglian Water) or otherwise stored in tanks on site. Fire water runoff may contain particles from a fire. In the unlikely event of fire water being discharged, the runoff must be contained and tested/treated before being allowed to discharge to the proposed SuDS and then infiltrating to ground. It is proposed to contain the fire water runoff within a bunded lagoon structure where it can be held and tested before either being released into the SuDS system or taken off site by a tanker for treatment elsewhere. The lagoon will then be cleaned of all contaminants. The lagoon will be controlled by a penstock valve that can be automatically closed during a fire, i.e. under normal circumstances rainfall will be allowed to drain through the lagoon into the SuDS system Further details regarding management of firewater is outlined in the Outline Surface Water Drainage Strategy (**ES Volume 3: Appendix**

Activity	Description	Screening Outcome	Justification
			9-C [EN010131/APP/3.3]) and **Outline Battery Safety Management Plan (BSMP) [EN010131/APP/7.6]**. Given the above mitigation which will be secured through the DCO, there are considered no mechanisms for impacts to surface or ground water bodies. Indicative foundations for the BESS Compound specify that it will have a maximum depth of 2m, which should be above the water table, based on groundwater data available on the Geoindex website (Ref 7). As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies.
On-Site Cabling	Low voltage on-site electrical cabling is required to connect the PV modules and battery energy storage system(s) to inverters (typically via 1.5/1.8kV cables), and the inverters to the transformers on-site (typically via 0.4/1 kV cables). The dimension of the trenches will vary depending on the number of ducts they contain but could typically be up to 1.2m in width and 0.8m to 1.2m in depth. Medium voltage cables (around 33kV) are then required between the transformers and the switchgear and from switchgear to the on-site electrical infrastructure. The dimension of the trenches will vary depending on the number of circuits they contain but could be typically up to 1.2m in width and up to 1.2m in depth. Where possible, the higher voltage cables will share trenches with the lower voltage cables on the same route.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340).	Indicative trench depths for the On-Site cabling specify that it will have a maximum depth of 1.2m, which should be above the water table, based on groundwater data available on the Geoindex website (Ref 7). As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. No watercourse crossings are required for on-site cabling. Water quality impacts related to construction runoff or spillages that have potential to enter watercourses will be adequately mitigated by the CEMP, which will be secured under the DCO, and Water Management Plan (WMP). A **Framework CEMP** accompanies the DCO Application **[EN010131/APP/7.3]**.

Activity	Description	Screening Outcome	Justification
On-Site Substation	On-site substation will consist of electrical infrastructure such as the transformers, switchgear and metering equipment required to facilitate the export of electricity from the Site to the National Grid. A single on-site substation with a footprint of up to 250m x 160m in plan is proposed. Foundation depths are not expected to be greater than a maximum of 2m, consistent with foundation depths across the Solar and Energy Storage Park Site.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340); Witham Lias (GB40502G401400).	Infrastructure will not be located within close proximity of a watercourse, and so there are no mechanisms for impacts to surface water bodies. An Outline Surface Water Drainage Strategy (**ES Volume 3: Appendix 9-C [EN010131/APP/3.3]**) provides for the attenuation of surface water runoff from areas of hardstanding associated with the On-Site Substation, and this runoff will be discharged to ground. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park 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 a detailed drainage strategy 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. It is anticipated that foundations for the On-Site Substation will not exceed 2m, which should be above the water table, based on groundwater data available on the Geoindex website (Ref 7). As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. Given the above mitigation which will be secured through the DCO, there are considered no mechanisms for impacts to surface or ground water bodies.
New buildings – Control building and office building, warehouse and storage building	Electrical compound control building has maximum parameters of 20m by 20m footprint and 6m in height, adjacent to the BESS Compound. The warehouse and storage building has maximum parameters of 36m x 15m and 7.2m in height.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to	Infrastructure will not be located within close proximity of a watercourse, and so there are no mechanisms for impacts to surface water bodies. An Outline Surface Water Drainage Strategy (**ES Volume 3: Appendix 9-C [EN010131/APP/3.3]**) provides for the attenuation of surface water runoff from areas of hardstanding associated with new

Activity	Description	Screening Outcome	Justification
	The office/warehouse building has maximum parameters of 36m by 15m and 7.2m in height.	Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340).	buildings, with the runoff water then being discharged to ground. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park 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 a detailed drainage strategy which would be a requirement of the DCO. It is anticipated that foundations for the new buildings will not exceed 2m, which should be above the water table, based on groundwater data available on the Geoindex website (Ref 7). As such, there would be negligible or no impact to the groundwater body, particularly given the large scale of the WFD groundwater bodies. Given the above mitigation, there are considered no mechanisms for impacts to surface or groundwater bodies.
Foul Drainage	It is proposed that given the low volumes of foul drainage generated (related to 14 operational staff) that wastewater treatment will be self-contained in independent non-mains domestic storage and / or a treatment system. These would be regularly emptied under contract with a registered recycling and waste management contractor. Should a connection to a foul sewer be required as an alternative option, Anglian Water would be consulted at the appropriate time.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840); Seymour Drain Catchment (WFD ID: GB104028058340).	As there would be no discharge of foul water to a water body, and only small volumes would either be discharged to a foul sewer indirectly via a suitable waste management contractor, or directly with Anglian Water consent, no further WFD assessment of foul waste from the Scheme is proposed. No deterioration or prevention of future improvement in WFD waterbody status would be predicted.
Access Tracks	Access tracks will be constructed across the Solar and Energy Storage Park which will typically be 3.5m to 6m wide compacted	**In** -Trent from Carlton-on-Trent to Laughton Drain (GB104028058480);	Where culverts are used to form access tracks on the Grid Connection Corridor and within the Solar and Energy Storage Park, there is potential for direct impact to the WFD status of crossed watercourses

Activity	Description	Screening Outcome	Justification
	stone tracks with 1:2 gradient slopes on either side. They will adhere to the appropriate 10m buffer from watercourses and ponds, except where watercourse crossings are required. Tracks should be permeable, and localised SuDS, such as swales and infiltration trenches, should be used to control runoff. There are currently 17 watercourse crossings for access tracks indicated within the Solar and Energy Storage Park. These are all to agricultural ditches with a heavily modified and artificial character. Seven of these are existing culverted crossings that may require minor widening so as to strengthen them. For the 10 locations where a new drainage ditch crossing is required, culverted crossings will also be used (assumed as a worst case for purposes of the assessment). The addition of culverts will as a minimum require length for length watercourse enhancement as mitigation, and this will be described in a WFD Mitigation and Enhancement Strategy (to be developed post consent). This also applies to any culvert extensions. All culverts to convey watercourses will be set 150mm below bed level to allow sedimentation and a naturalised bed form, which will maintain longitudinal connectivity for aquatic fauna as much as possible. These crossings are not, however, fixed within the DCO and so the final number of crossings may be subject to change and could be reduced, yet all are included at this point to provide a worst-case assessment. The culvert design requirements will be secured within the DCO	Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). Seymour Drain Catchment (WFD ID: GB104028058340). **Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400)	(e.g. Seymour Drain and Marton Drain) or tributaries of those that are not directly crossed, due to possible effects to biological, physico-chemical, and hydromorphological quality elements. There is no anticipated mechanism for impacts to the groundwater body, as no significant changes in runoff patterns compared to existing are expected from the internal access tracks.

Activity	Description	Screening Outcome	Justification
	through the **Outline Design Principles [EN010131/APP/2.3]**. With regard to the Grid Connection Corridor, a temporary construction access track will be required, and this will be designed to minimise disturbance to the ground and to drainage lines and watercourses and adhere to the appropriate watercourse buffer of 10m, except where crossings are required. Where practicable, a temporary aluminium trackway will be used. In sections that are steep or particularly wet, a permeable access track will be installed. Where access tracks are required for the Grid Connection Corridor's crossing of watercourses, it is assumed culverts will be used. Culverts will be in place for a five year period as a worst case scenario. The culvert design will follow those for the Solar and Energy Storage Park by aiming to minimise changes in alignment and length as much as feasible. Oversized pipes would be used to allow a naturalised substrate to form. Given that culverts are to be installed for five years, length for length watercourse enhancements have been committed to within the DCO in order to provide for overall benefits once the culverts have been removed. A WFD Mitigation and Enhancement Strategy would be developed post DCO submission providing detail as to the proposed watercourse enhancements.		

Activity	Description	Screening Outcome	Justification
Drainage design	An Outline Surface Water Drainage Strategy is included in **ES Volume 3: Appendix 9-C [EN010131/APP/3.3]**. The strategy aims to mimic the natural drainage conditions of the site as much as possible. It is considered that under existing conditions rainfall will mostly permeate into the ground where it falls and that any runoff generated within arable fields collects in local low spots where it infiltrates to ground or enters a watercourse as appropriate where the site drainage interacts with one. The proposed solar PV panels with be held above ground individually on narrow diameter piled legs. This prevents sealing the ground with an impermeable surface beneath solar panels, thereby allowing rainfall/runoff to infiltrate to ground across the Solar and Energy Storage Park. As a result, it is considered that the site's impermeable area will remain largely consistent with its pre-development state, except for where areas of hardstanding are required for other infrastructure such as the BESS Compound. To prevent ponding occurring around the solar panels or overland flow routes directing runoff off site, a series of swales and infiltration basins will be constructed within the solar PV panel fields in identified low spots to collect and store runoff, allowing it to infiltrate to ground. The indicative locations of the proposed swales and detention basins are outlined within **ES Volume 3 Appendix 9-C**	**In** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Witham Lias (GB40502G401400). **Out** - Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain Catchment (Trib of Trent) (GB104028057840). **Not applicable** - Seymour Drain Catchment (WFD ID: GB104028058340).	There are no direct hydromorphological impacts to watercourses given the 10m buffer from watercourses outlined in the **Framework CEMP [EN010131/APP/7.3]**. An Outline Surface Water Drainage Strategy has been included within the DCO Application (**ES Volume 3: Appendix 9-C [EN010131/APP/3.3)** which provides for the attenuation of surface water runoff from the operational Solar and Energy Storage Park, with runoff ultimately being discharged to the ground. In accordance with planning policy guidance, runoff from the Solar and Energy Storage Park 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 a detailed drainage strategy, which would be a requirement of the DCO. Use of mounting structures for PV Panels will avoid sealing the ground with impermeable surfaces. As a result, it is assumed that the Site's impermeable area will remain largely consistent with its pre-development state. As such, there should be no impacts to WFD surface or ground water bodies.

Activity	Description	Screening Outcome	Justification
	[EN010131/APP/3.3]. Detailed drainage designs and SuDS feature locations will be developed post consent at detailed design stage. The Outline Surface Water Drainage Strategy (**ES Volume 3 Appendix 9-C [EN010131/APP/3.3]**) has been developed with a conservative infiltration rate estimate across the Solar and Energy Storage Park Site of 1 x 10^{-5}m/s, based on underlying geology. This will be reviewed at the detailed design phase following further ground investigation. The percentage of impermeable area for compound areas, the BESS Compound and on-site substations has not yet been confirmed; detailed layouts will be re-assessed post DCO consent to ensure the required attenuation is provided. Taking a conservative approach, at present it is assumed that the BESS Compound, site compounds and sub-stations are 100% impermeable. Increases to existing contributing area are to be balanced by infiltration techniques, with exceedance flows captured by surrounding swales and detention basins. Attenuation will be required to temporarily store any excess peak surface water runoff generated within the Solar and Energy Storage Park Site before it is infiltrated to ground. Attenuation will be provided in the form of swales and infiltration basins. These features will be strategically located based on existing overland flow routes to capture runoff. The swales/infiltration basins will be		

Activity	Description	Screening Outcome	Justification
	600 mm deep with no steeper than 1 in 3 side slopes. Check dams will be placed strategically within swales to optimise their storage potential on steeper slopes. Where the attenuation lies within the solar field, the legs of the solar panel will be extended so that the solar panel lies above any potential flooding. The outline strategy presents indicative locations for attenuation, which will be refined during detail design, post DCO consent. The attenuation features have been sized to accommodate the 1 in 100 year event plus a 40% allowance for climate change. 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. The BESS Compound will require fire water to supress a fire (sourced from a Point of Connection on the A4156 in agreement with Anglian Water or otherwise stored on site), in the unlikely event that one breaks out in the BESS containers. Fire water runoff may contain particles from a fire. In the unlikely event of fire water being discharged, the		

Activity	Description	Screening Outcome	Justification
	runoff must be contained and tested/treated before being allowed to discharge to the proposed SuDS and then infiltrating to ground. It is proposed to contain the fire water runoff within a bunded lagoon structure where it can be held and tested before either being released into the SuDS system or taken off site by a tanker for treatment elsewhere. The lagoon will then be cleaned of all contaminants. The lagoon will be controlled by a penstock valve that can be automatically closed during a fire, i.e. under normal circumstances rainfall will be allowed to drain through the lagoon into the SuDS system		
Grid Connection Corridor - the below ground Grid Connection Cables – Horizontal Directional Drill (or similar)	The electricity generated by the Scheme will be exported to the National Grid via a single 400kV circuit comprised of three buried cables from the onsite substation to Cottam SS. The total length of the Grid Connection Corridor is approximately 7.5km. A set of avoidance areas (as shown on **ES Volume 2: Figure 3-4 [EN010131/APP/3.2]**) have been assigned along within the Grid Connection Corridor where watercourses would be crossed by a HDD methodology rather than intrusive, open-cut techniques. This will include the crossing of the WFD designated River Trent (approximate NGR SK 83100 80985), Marton Drain (approximate NGR SK 83693	**In** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Marton Drain Catchment (Trib of Trent) (GB104028057840); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Seymour Drain Catchment (WFD ID: GB104028058340. **Not applicable** - Tributary of the Till (GB105030062480);	Potential direct impacts to the channel and riparian zone will be avoided when non-intrusive techniques such as HDD are used. There is potential for indirect impacts 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. There is also potential impact from groundwater ingress to excavations needed for the launch and receive pits, and the risk of 'break out' of drilling muds into watercourses.

Activity	Description	Screening Outcome	Justification
	81149) and Seymour Drain (approximate NGR SK 82087 80693). The sections of the cables that will be installed via HDD will require launch and reception pits to be installed at distances between 200m and 500m (750m in one or two exceptional circumstances) along the HDD section of the route. Launch and exit pits will be sited outside the avoidance areas, and a minimum of 10m from watercourses (measured from the centre line of the watercourse with the exception of the River Trent) and a minimum of 16m from the toe of flood defences. For the purposes of assessment, up to a maximum of forty (40) launch and reception pit working areas for HDD are assumed within the Grid Connection Corridor. Each pit would be a maximum of 5m length x 5m width x 3m depth. A shoring system appropriate to the ground conditions would be used as appropriate to minimise water ingress into the pits. This may be timbers, sheet piling, or a modular system and would be chosen based on suitability for the site conditions. The ingress of any groundwater will be carefully managed through design of the send or receive pit, shoring method, and a pumping and treatment system. Excessive ingress of water would make the pit unsafe and thus it is important that ingress is minimised and that a suitable system of managing that water is implemented. The maximum depth of drilling will be under the River Trent and would be up to a	Witham Lias (GB40502G401400).	

Activity	Description	Screening Outcome	Justification
	maximum of 25m beneath the bed. For all watercourses the depth of drilling beneath the watercourse bed would be a minimum of 2m, in keeping with IDB requirements. A maximum depth would be finalised based on site specific risk assessment at each crossing location in order to minimise groundwater interactions where possible. In addition to the control and management measures for site runoff and spillage risk noted above, the methodology of the drilling, or other trenchless techniques, would include measures to minimise the risk to the environment. There are risks associated with the use of drilling muds and plant close to the channel. For example, although rare, without due care there is a risk that drilling muds can 'break out' into watercourses leading to pollution (known as 'hydraulic fracture' or 'frac-out'). A site-specific hydraulic fracture (frac-out) risk assessment would be developed prior to construction following further investigation of specific ground conditions at the crossing locations, and appropriate mitigation developed in line with best construction practice. There is also a need to manage drilling muds and wastewater so that this would not be spilt into the channel when working close to the banks of a watercourse. A frac-out risk assessment is secured as a DCO requirement (via the **Framework CEMP [EN010131/APP/7.3]**). Once the cable is installed beneath the watercourse the pits and any cable trenches		

Activity	Description	Screening Outcome	Justification
	will be backfilled to the original ground level and seeded to reduce the risk of runoff and fine sediments entering the watercourse. The drill fluids used within the drilling machine would be water based, such as naturally occurring bentonite clay. The fluid component of the drilling mud would be mains water, obtained from a nearby supply and tankered to site when required. There would be some recycling of drilling muds by the drilling plant used. The bentonite within the drilling fluid is a naturally occurring mineral and enables the fluid to have sufficient viscosity to carry the cutting chips back to the surface machine whilst lubricating and keeping cool the drilling bit. Directional drilling, or other trenchless techniques, would be undertaken by a specialist contractor and the water column above the drill path would be continuously monitored during drilling. It is acknowledged that drill fluid leakage into a watercourse is not a common problem, particularly given the proposed depths. However, where there is an increased perceived risk (i.e. lack of drilling mud returns) the drilling/boring operation would be suspended, remediation action implemented, and subsequently the methodology for that crossing re-evaluated.		
Grid Connection Corridor - the below ground Grid Connection Cables – Open Cut Crossings	There are currently six watercourse crossings that fall outside of the avoidance areas and here open-cut trenching will be required through the watercourse in order to install the cables. These are all small,	**In** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Seymour Drain Catchment	Where intrusive crossings of drainage ditches outside of the avoidance zones are required, there is the potential for direct impacts to the riparian zone and channel and increased fine sediment delivery to water bodies and pollution of water bodies during construction works. Although construction works will be completed in a matter of

Activity	Description	Screening Outcome	Justification
	unnamed ditches, with crossings at the following approximate locations: NGRs SK 84909 81957, SK 83355 81043, SK 82515 80888, SK 82228 80728, SK 81072 80170 and SK 80528 79272. For the open cut sections of the Grid Connection Corridor, a maximum 25m wide construction corridor will include a single trench within which the 400kV connection will be installed. The trench will be a maximum of 1.1m wide and up to maximum 2.5m depth. The 25m construction corridor will also include a running track along which vehicles and plant will be located as well as an area for temporary storage of excavated spoil (taking into account the necessary 10m buffer from watercourses and other requirements outlined in the **Framework CEMP [EN010131/APP/7.3]**, as discussed above). A pre-works morphology survey of the channel of each watercourse to be crossed will be undertaken prior to construction. The pre-works survey is to ensure that there is a formal record of the condition of each watercourse prior to commencement of works to install cables beneath the channel. The survey is a precautionary measure so that should there be any unforeseen adverse impacts there is a record against which any remedial action can be determined. At this stage it is assumed that where open-cut crossings are required that water flow would be maintained by damming and over	(WFD ID: GB104028058340. **Not applicable** - Tributary of the Till (GB105030062480); Witham Lias (GB40502G401400); Marton Drain Catchment (Trib of Trent) (GB104028057840); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480);	days to few weeks, the impact on riparian habitat will persist until vegetation re-establishes.

Activity	Description	Screening Outcome	Justification
	pumping. Works should be carried out in the drier months where possible as this would reduce the risk of pollution propagating downstream, particularly given that these watercourses are considered ephemeral. Once the watercourses are reinstated, silt fences, geotextile matting or straw bales should be used initially to capture mobilised 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.		
Grid Connection Corridor – Cottam Substation Modification	The Cottam Substation Site is located to the south west of the Site. The Scheme includes upgrade and modification works to the Cottam Substation which will be carried out within the existing operational site.	**Out** - Lower Trent Erewash – Secondary Combined (GB40402G990300); Seymour Drain Catchment (WFD ID: GB104028058340. **Not applicable** - Tributary of the Till (GB105030062480); Witham Lias (GB40502G401400); Marton Drain Catchment (Trib of Trent)	The proposed modifications are within the existing operational site and so will not interact with any surface waterbodies. As such, there is no mechanism for impact to surface water bodies. Any works that may generate runoff or spillages during construction of the modifications are anticipated to be adequately addressed through measures to be outlined in the **Framework CEMP [EN010131/APP/7.3]** and WMP in order to avoid adverse impacts on water quality to watercourses receiving drainage from the site (assumed to be Seymour Drain Catchment). No infrastructure is anticipated to be below the water table, and so there is expected to be negligible or no impact to the groundwater body.

Activity	Description	Screening Outcome	Justification
		(GB104028057840); Trent from Carlton-on-Trent to Laughton Drain (GB104028058480).	

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 activities. The scoping stage assessment is presented in Table 3.

Table 3 WFD 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	It is possible that non-intrusive crossings of water bodies result in a spillage of drilling fluids or pollutants, which have the potential to impact fish populations during the construction phase. Intrusive crossings may result in temporary blockages in longitudinal connectivity, which may affect biological continuity resulting in interference with fish populations. Access tracks created through culverting may create long-term (due to their five-year lifetime) barriers to the longitudinal connectivity of watercourses which will affect the biological continuity of fish populations and disrupt present habitat conditions.	In
Invertebrates	Yes	It is possible that non-intrusive crossings of water bodies result in a spillage of drilling fluids or pollutants, which have the potential to impact invertebrate populations during the construction phase. Intrusive crossings may cause direct mortality of invertebrates or the smothering of habitat with fine sediment. Access tracks created through culverting may cause long-term (due to their five-year lifetime) loss of invertebrate habitat, as well as direct harm and mortality to invertebrate populations during the installation of the culverts.	In
Macrophytes and Phytobenthos Combined	Yes	It is possible that non-intrusive crossings of water bodies result in a spillage of drilling fluids or pollutants, which have the potential to impact macrophyte populations during the construction phase. Intrusive crossings may cause removal of macrophytes, and removal of the bed or macrophytes supporting phytobenthos. Access tracks created through culverting may cause long-term (due to their five-year lifetime) loss of	In

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Justification	Scoping Outcome (In/Out)
		macrophyte habitat, as well as direct harm and mortality to macrophyte populations during the installation of the culverts.	
Physico-Chemical Quality Elements			
Thermal conditions	No	Non-intrusive 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. Intrusive open-cut crossings may alter shading to watercourses during the construction phase, however this would be a fairly temporary impact, and any vegetation removed would be reinstated. Access tracks created through culverting would cause localised shading of the watercourse for the duration of their lifetime (five years). This would be sufficient to be viewed as a long-term impact, though due to the relatively short length of the culverts, effects would be negligible across the WFD waterbody as a whole and would not affect the WFD status.	Out
Oxygenation conditions	Yes	Possible increase in fine sediment and organic material delivered to water bodies from excavation activities for non-intrusive crossings may affect oxygen levels, e.g. launch and receiving pits, as well as general earthwork activities from across the site. It is also possible for intrusive crossings and culverts to affect this element due to the potential for in-channel spills and sediment mobilisation during the works, though **the Framework CEMP [EN010131/APP/7.3]** and WMP will specify measures to be taken to manage spillage risks. Culverts may also influence oxygenation by alteration of flow conditions and pathways, though this is unlikely to have a significant effect on the WFD status of this quality element due its localised nature.	In
Salinity	No	No materials that may alter the salinity of the watercourses are known to be proposed for use in the Scheme. The **Framework CEMP [EN010131/APP/7.3]** and WMP will specify measures to manage the spillage risk of chemicals used in construction.	Out
Acidification status	No	No materials that may alter the pH of water bodies are known to be proposed for use in the Scheme. The **Framework CEMP [EN010131/APP/7.3]** and WMP will specify measures to manage the spillage risk of chemicals used in construction.	Out
Nutrient conditions	Yes	Non-intrusive crossings of water bodies may increase sediment loads to watercourses and organic material from site clearance works. However, the impact will be localised,	In

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Justification	Scoping Outcome (In/Out)
		short term and temporary. It is also possible for intrusive crossings and culvert installation to affect this element due to the potential for in-channel spills and sediment mobilisation during the works. Construction risks can also be effectively managed using standard mitigation measures. 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	Non-intrusive crossings will not affect this element. Intrusive crossings and culvert installation 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 this relatively short duration of works. Culverting may have a small impact on dynamics of flow, but this would be over a very localised extent and so would have a negligible effect on the wider waterbody scale.	Out
Connection to groundwater bodies	No	Cables will cross beneath waterbodies, but this should not impact connectivity to groundwater bodies due to the small scale of activity compared to the size of the WFD waterbody. Intrusive crossings and culverts for access tracks on the Grid Connection Corridor and within the Solar and Energy Storage Park should not affect this quality element.	Out
River continuity	Yes	There is no mechanism for non-intrusive crossings to affect this quality element. Intrusive crossings will present a temporary blockage to continuity whilst excavation takes place. Culverts for access tracks on the Grid Connection Corridor and within the Solar and Energy Storage Park will pose a barrier to river continuity throughout the duration of their use (five years).	In
River depth and width variation	Yes	There is no mechanism for non-intrusive crossings to affect this quality element. Intrusive crossings and culverts for access tracks may lead to local changes in channel profile to impact this element. Culverts for access tracks on the Grid Connection Corridor and within the Solar and Energy Storage Park will cause alterations to the depth and width variation throughout the duration of their use (five years).	In

WFD Quality Element	Potential Risk to Receptor (Yes/No)	Justification	Scoping Outcome (In/Out)
Structure and substrate of the river bed	Yes	There is no mechanism for non-intrusive crossings to affect this quality element. Intrusive crossings may lead to local changes in bed substrate to impact this element. Culverts for access tracks on the Grid Connection Corridor and within the Solar and Energy Storage Park will cause alterations to the structure and substrate of the river bed throughout the duration of their use (five years).	In
Structure of the riparian zone	Yes	Non-intrusive crossings will involve excavations each side of river banks but these will be set back by a minimum of 10m from the normal flow channel/ water's edge and so should not impact the riparian zone. Intrusive crossings may lead to local changes in the riparian zone to impact this element. Culverts for access tracks on the Grid Connection Corridor and within the Solar and Energy Storage Park will cause alterations to the structure of the riparian zone throughout the duration of their use (five years).	In
Groundwater Quality Elements			
Quantitative Elements	Yes	There are potential temporary impacts from groundwater ingress to excavations for non-intrusive crossings. There are potential impacts to groundwater as elements of the Scheme's drainage strategy discharge to ground, yet these should be resolved through an appropriate SuDS design to be finalised at the detailed design stage, and appropriate strategies to deal with any spillages on site and any contaminated firefighting water.	In
Chemical Elements	Yes	There are potential impacts from groundwater ingress to excavations for non-intrusive crossings. There are potential impacts to groundwater as elements of the Scheme's drainage strategy discharge to ground, yet these should be resolved through an appropriate SuDS design to be finalised at the detailed design stage, and appropriate strategies to deal with any spillages on site and any contaminated firefighting water.	In

4. Baseline Conditions and Desk Study

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 Knaith Park) and the topographical lows are associated with the River Trent water body and its floodplain, resulting in a gentle slope from north-east to south-west across the Site (Ref 5). Land rises very gently away from the River Trent on its western bank along the Grid Connection 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 and patches of woodland, with drains and ponds scattered across the area (Ref 5). The River Trent bisects the study area, with the Solar and Energy Storage Park located east of the river. There is a large, decommissioned power station (Cottam Power Station) adjacent to the southern extent of the Grid Connection Corridor, next to Cottam Substation, which is the proposed connection point to the National Grid. The study area also includes several small villages such as Gate Burton, Willingham by Stow, and Knaith Park. The A156 (Gainsborough Road) runs almost parallel to the River Trent water body through the study area, and a railway line passes across the Solar and Energy Storage Park in an approximately north-south orientation (Ref 5). Lincoln Golf Course lies within the study area to the southeast of the Site.

4.2 Geology, Groundwater and Soils

4.2.1 Bedrock geology within the study area consists of three formations. To the western side, underlying much of the Grid Connection Corridor is sedimentary mudstone from the Triassic from the Mercia Mudstone Group, and to the east there is interbedded mudstone and limestone from the Triassic and Jurassic periods, forming the Scunthorpe Mudstone formation (Ref 7). Separating the Mercia Mudstone Group and Scunthorpe Mudstone Formation just to the east of the A156 is a thin band of mudstone from the Penarth Group, sedimentary mudstone from the Triassic (209.5 to 201.3 Mya) (Ref 7).

4.2.2 There are superficial deposits of limited extent comprising alluvium deposits within the River Trent corridor from the Quaternary period, as well as areas of sand and gravel to the east and west of the Trent from the Holme Pierrepont Sand and Gravel Member, also from the Quaternary (Ref 7). There are limited outcrops of glaciofluvial deposits from the Mid-Pleistocene – sand and gravel deposited by glacial activity.

4.2.3 The study area falls within two WFD groundwater bodies (Ref 4). The far north and east extents of the study area fall within the Witham Lias groundwater body (GB40502G401400) within the Anglian RBMP, while the remainder of the Scheme is covered by the Lower Trent Erewash – Secondary Combined

groundwater body (GB40402G990300) within the Humber RBMP (see **ES Volume 2: Figure 9-1 [EN010131/APP/3.2]**).

4.2.4 The Witham Lias groundwater body (WFD ID: GB40502G401400) covers a total area of 683.57 km^2 and under the WFD Cycle 2 classifications (2019), was classified as being at Good Status, overall, quantitatively and chemically. The Lower Trent Erewash – Secondary Combined groundwater body (WFD ID: GB40402G990300) covers a total area of 1924.4 km^2 and during 2019 Cycle 2, was given Good Status, overall, quantitatively and chemically (Ref 4).

4.2.5 Soils across the study area vary. Within the Trent corridor, they are loamy and clayey floodplain soils that are naturally wet and of moderate fertility. To the east and west of this are acid sandy and loamy soils that are also naturally wet, yet of very low fertility (Ref 8). To the east however this area is relatively thin and cedes to a wider area occupied by the solar farm of slowly permeable loamy and clayey soils that are only slightly acidic and of much greater agricultural potential (Ref 8).

4.3 Hydrology

4.3.1 There are no NRFA gauging stations in any of the screened-in waterbodies (Ref 10).

4.3.2 The closest Met Office monitoring location to the Scheme is Scampton (Lincolnshire), approximately 8 miles southeast of Gate Burton. Average annual maximum temperature is 13.84°C, with the warmest months June, July, and August and the coolest December, January, and February, as typical of a northern hemisphere temperate climate (Ref 11). Total annual rainfall is 619.4mm, which is below the national average of 1163.04mm, likely a result of the areas positioning on the east side of England which is typically dry (Ref 11).

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 watercourses over the past century (Ref 6). 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 clearly straightened, over deep, and artificial in places.

4.4.2 The most notable realignments is to Seymour Drain as it passes through Cottam Power Station (SK 8187 7928) and a 100m culvert added to the Tributary of the Till from Kexby Lane (SK 8669 8568) (Ref 6).

4.5 WFD Surface Waterbodies

4.5.1 Baseline WFD classifications of the four screened-in waterbodies are given in Table 4 (Ref 4).

Table 4 Summary of the WFD status of the screened-in WFD surface water bodies (Cycle 3)

WFD Parameter	Trent from Carlton-on-Trent to Laughton Drain (GB104028058480)	Tributary of the Till (GB1050300 62480)	Marton Drain Catchment (trib of Trent) (GB104028057840)	Seymour Drain Catchment (trib of Trent) (GB104028058340)
Ecological	**Moderate**	**Poor**	**Moderate**	**Moderate**
Biological Quality Elements	**Bad**	**Poor**	**Good**	**Moderate**
Invertebrates	*Bad*	*Moderate*	*Good*	*Moderate*
Macrophytes and Phytobenthos Combined	*Good*	*Poor*	-	*Moderate (2015)*
Hydromorphological Supporting Elements	**Supports good**	**Supports good**	**Supports good**	**Supports good**
Hydrological Regime	*Supports good*	*High*	*Supports good*	*Supports good*
Physico-chemical Quality Elements	**Moderate**	**High**	**Moderate**	**Moderate**
Ammonia (Phys-Chem)	*High*	*High*	*High*	*High*
Dissolved oxygen	*High*	*High*	*Moderate*	*Poor*
pH	*High*	*High*	*High*	*High*
Phosphate	*Poor*	*High*	*Good*	*Poor*
Temperature	*High*	*High*	*High*	*High*
Specific pollutants	**High**	**High (2014)**	**High (2014)**	**High**
Chemical	**Fail**	**Fail**	**Fail**	**Fail**
Priority hazardous substances	**Fail**	**Fail**	**Fail**	**Fail**
Priority substances	**Good**	**Good**	**Good**	**Good**

4.6 WFD Groundwater Bodies

4.6.1 The scheme is underlain by two ground waterbodies, with activities were only screened in for one ground water body: Lower Trent Erewash – Secondary Combined (GB40402G990300). A summary of the WFD status of both waterbodies is given in Table 5 (Ref 4).

Table 5 Summary of the WFD status of the screened-in groundwater bodies (Cycle 3)

WFD Parameter	Lower Trent Erewash – Secondary Combined	Witham Lias
Water body ID	GB40402G990300	GB40502G401400
Water body Type	Groundwater Body	Groundwater Body
Water body Area	1924.402 km^2	683.567 km^2
Overall Status	**Good**	**Good**
Quantitative	**Good**	**Good**
Quantitative Status Elements	***Good***	***Good***

WFD Parameter	Lower Trent Erewash – Secondary Combined	Witham Lias
Quantitative Saline Intrusion	*Good*	*Good*
Quantitative Water Balance	*Good*	*Good*
Quantitative GWDTEs test	*Good*	*Good*
Quantitative Dependent Surface Water body Status	*Good*	*Good*
Chemical	**Good**	**Good**
Chemical Status Elements	***Good***	***Good***
Chemical Drinking Water Protected Area	*Good*	*Good*
General Chemical Test	*Good*	*Good*
Chemical GWDTEs test	*Good*	*Good*
Chemical Dependent Surface Water body Status	*Good*	*Good*
Chemical Saline Intrusion	*Good*	*Good*

4.6.2 Both groundwater bodies have Good Status, with Good Quantitative and Chemical Status Elements.

4.6.3 As mentioned above, superficial deposits through the study area are a mixture of alluvium (clay, silt, sand, and gravel), Holme Pierreont Sand and Gravel Member, and glaciofluvial deposits (sand and gravel). Deposits are predominantly Secondary A aquifers within the study area, with small areas of Secondary undifferentiated aquifers (Ref 5). Secondary A aquifers can support local water supplies and act as a baseflow source for rivers as they consist of permeable layers.

4.7 Hydromorphological Quality Elements

4.7.1 A site walkover was conducted on the 8 February 2022 in overcast, dry conditions, to assess the hydromorphological condition and quality of watercourses set to be crossed by the Grid Connection Corridor. The findings of this are summarised in Table 6.

Table 6 Summary of the hydromorphological characteristic of watercourses within the study area

Photo	GRF	Hydromorphological description
	SK 8325 8036	Flow within this straightened channel is likely to be ephemeral, as indicated by the shallow depth of flow and the grassy substrate. The banks are not too deep for the channel and so water may spill onto the floodplain during particularly wet periods of the year.

Photo	GRF	Hydromorphological description
	SK 8410 8100	Marton Drain is a straight and trapezoidal channel, with imperceptible flow and little variation. Channel banks are covered in well-maintained grass which will confer few of the benefits usually associated with a functioning riparian zone. The channel is grossly over-deep so there is expected to be limited connection between the channel and the floodplain.
	SK 8165 7872	Seymour Drain is straight, trapezoidal, and artificial channel. The channel is grossly over-deep which limits lateral connectivity. Furthermore, the absence of any riparian vegetation exposes the channel to fine sediment and agricultural pollution.
	SK 8207 8072	Seymour Drain exhibits a small degree of sinuosity, albeit in an over deep channel. There is no significant riparian zone, yet the flow is of reduced turbidity relative to many of the other watercourses, revealing the presence of some in-channel macrophytes.
	SK 8261 8090	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 provide some habitat variety and a buffer from ingress of pollutants.
	SK 8064 7861	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 joins another straightened and artificial channel.

4.8 Biological Quality Elements

4.8.1 There has been no EA freshwater fish surveying within the study area in the past 10 years (Ref 12).

4.8.2 Invertebrates have been sampled at 9 sites across the study area since 2012, with 15 surveys conducted across these. The BWMP ASPT (Biological Monitoring Working Party Average Score Per Taxon) ranged from 4.92 to 3.67, with an average of 4.00 (Ref 12).

4.8.3 Five macrophyte surveys have been conducted in the same time frame across three sites, which found a mix of flowering plants, algae, chromists and mosses, of which two were non-native (*Elodea nuttallii* and *Elodea canadensis*) (Ref 12). No protected taxa were found.

4.8.4 As part of the Environmental Statement, AECOM have conducted their own macrophyte and macroinvertebrate samples, centring on seven crossings identified as being of high sensitivity during surveying.

4.8.5 Regarding invertebrates, three crossings were deemed to be of moderate conservation value, and one crossing of fairly high conservation value due to the presence of *Scarodytes halensis*, a nationally scarce beetle.

4.8.6 Macrophyte surveys showed one crossing to be of Poor WFD status and two as Moderate, with scoring for another not possible due to a lack of scoring species. There was one notable macrophyte species, *Potomogeton friesii*, listed as near threatened on the GB Red List and vulnerable on the England Red List. Further details are available in **Appendix 8-E: Aquatic Ecology Report [EN010131/APP/3.3].**

4.9 Physico-chemical Quality Elements

4.9.1 Water quality data for the River Trent (at Dunham), Seymour Drain, Marton Drain (at Brampton Grange) and the Tributary of the Till (Carr Drain) at Kexby Lane has been obtained from the Environment Agency's Water Quality Archive website (Ref 13) and is summarised in Table 9-6a and 9-6b for the period 2017-2021, with relevant WFD standards provided for comparison in Table 9-7, all within **ES Chapter 9: Water Environment [EN010131/APP/3.1]**. Monitoring locations are shown on **ES Volume 2: Figure 9-1 [EN010131/APP/3.2]**.

4.9.2 Table 9-6a indicates that the River Trent is slightly alkaline in nature, with an average pH of 8.09 and falls into the WFD classification of High. A 10th percentile dissolved oxygen saturation of 88.66% is over the High classification threshold which suggests the waterbody is well oxygenated. Ammonia concentrations are classified as High which suggests pollution from organics such as sewage materials are not having a detrimental effect on the waterbody. Nitrates and orthophosphate concentrations are elevated, and is not surprising given the agricultural landscape surrounding the River Trent in this stretch of the river.

4.9.3 Table 9-6a also indicates the water quality at Seymour Drain at Cottam is circum-neutral with a mean pH of 7.68 and this falls within the WFD High classification, based on the 44 samples considered here (2017-2021). A 10th percentile dissolved oxygen saturation of 50.24% falls within the Poor WFD classification (with a 10th percentile of 54% being Moderate). Biochemical Oxygen Demand (BOD) is within the High WFD classification with a concentration of 1.419mg/l, suggesting low levels of organic pollution.

Ammonia levels fall within the WFD classification for High at a 90th percentile value of 0.17mg/l (90th percentile lower than 0.3 mg/l is High) which similarly suggests pollution from organics is limited. Nitrate values are elevated (mean of 8.009mg/l N), as are orthophosphate concentrations (mean 0.68 mg/l) and again indicate probable pressure from the surrounding agricultural land uses through use of fertilisers and other products which may runoff to the watercourse.

4.9.4 Table 9-6b indicates that Marton Drain at Brampton Grange is circum-neutral with a mean pH of 7.62 and falls within the WFD high classification, based on the 28 samples considered here. A 10th percentile dissolved oxygen saturation of 65.88% is Good (with a 10th percentile of 70% being High under the WFD EQS) which suggests the waterbody is well oxygenated. BOD falls within the Moderate WFD classification with a 90th percentile value of 6.68mg/l, suggesting moderate levels of organic pollution. However, the maximum value recorded is 19 mg/l, which indicates periodic episodes of worsened organic pollution. Ammonia concentrations fall within the WFD classification for Good at a 90th percentile value of 0.6mg/l. Nitrate values are high (mean of 10.33mg/l N) and indicate probable pressure from the surrounding agricultural land uses. Orthophosphate values have a mean of 0.1mg/l.

4.9.5 Table 9-6b indicates that the tributary of the River Till at Kexby Lane is circumneutral with a mean pH of 7.75 (within the WFD EQS, see Table 9-7), based on the 15 samples considered here. Dissolved oxygen saturation is within the WFD High classification range, BOD and ammonia meet the High EQS indicating low organic pollution. Nitrate values are elevated (mean of 7.31mg/l N) similarly to the other monitoring sites relating to the study area and indicate agricultural pressure. However, orthophosphate values are lower than at the other nearby monitoring sites with a mean of 0.038mg/l.

5. WFD Impact Assessment

5.1 Site Specific Assessment of the Scheme Against WFD Quality Elements

5.1.1 Potential pressures and impacts of the Scheme have been described along with mitigation measures in Table 7. Although the Drainage Design was screened into the assessment under Screening of Activities, subsequent scoping of WFD quality elements found it unlikely that this activity would impact the WFD status of the waterbodies in question because of SuDS and appropriate strategies to deal with spillages and any contaminated firefighting water. As such, impacts and mitigation measures are given only for the one remaining activity, the Grid Connection Corridor, with intrusive and non-intrusive crossings addressed separately.

Table 7 Scheme components, potential impacts, and associated mitigation measures for proposed works to water bodies scoped into this assessment

Scheme component	Potential impacts	Mitigation measures
Grid Connection Corridor: Non-intrusive 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.	The **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which outlines 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. This will include storage of excavated material a minimum of 20m away from the watercourse on flat land, or where this is not practicable, and it is to be stockpiled for longer than a two-week period, the material would either be covered with geotextile mats, seeded to promote vegetation growth, or runoff prevented from draining to a watercourse without prior treatment.
	Impacts to biological and physico-chemical quality elements from spillages of drill fluids or pollutants.	The CEMP will be followed which outlines measures to reduce the risk of spillages. Water-based drilling fluids will be used. A frac-out 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.
	Potential impacts from groundwater ingress to excavations.	Excavations for watercourse crossings and programmed so that works are completed in the most efficient and timely manner possible. This will be detailed in the **Framework CEMP [EN010131/APP/7.3]**.
		Installation works for the cables will be short term, temporary, transient and phased.

Scheme component	Potential impacts	Mitigation measures
		The launch and receive pits required for this technique will be located at least 10m from the watercourse (measured from the centre line of the channel).
Grid Connection Corridor: Intrusive crossing of water body – temporary disturbance of non-WFD designated watercourses during the construction phase.	Localised but temporary loss of riparian habitat. Temporary impediment to fish passage and ecological connectivity from impact to river continuity. Potential removal of macrophytes and mortality of invertebrates. Temporary and 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 river bed. Impacts to physico-chemical quality elements from potential increase in fine sediment load and organic matter delivered	Where possible, intrusive crossings should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area. A **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which will 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. This will include storage of excavated material a minimum of 20m away from the watercourse on flat land, or where this is not practicable, and it is to be stockpiled for longer than a two week period, the material would either be covered with geotextile mats, seeded to promote vegetation growth, or runoff prevented from draining to a watercourse without prior treatment. The WMP will also 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 include further enhancements for a longer length of the watercourse than the length disturbed. Reinstatement will aim to provide an improved channel form with enhancement works to be carried out (where relevant and appropriate to do so) between 5 and 10 m upstream and downstream of the open trench. It is anticipated that enhancements will consist of soft engineering techniques and improvements to the riparian corridor to improve channel diversity and biodiversity. These measures would be defined post DCO consent within a WFD Mitigation and Enhancement Strategy. Reinstated banks will be covered with biodegradable geotextile/matting and seeded/planted as soon as practicable to reduce risk of bank erosion and fine sediment delivery to water bodies.

Scheme component	Potential impacts	Mitigation measures
	to water body from the newly reinstated, bare earth banks.	
Access Tracks for the Grid Connection Corridor and the Solar and Energy Storage Park.	Localised and non-temporary loss of riparian habitat due to five-year lifetime of culverts. Non-temporary barrier to fish passage and ecological connectivity from impact to river continuity due to five-year lifetime of culverts. Potential removal of macrophytes and mortality of invertebrates during culvert installation and long-term loss of habitat due to five-year lifetime of culverts. Long-term loss of morphological diversity; change in structure of river bed due to five-year lifetime of culverts. Temporary and short-term adverse impacts to physico-chemical quality elements from potential increase in fine	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area, with the channel reconnected once the structure has been installed. A **Framework CEMP [EN010131/APP/7.3]** will be produced which will 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. Post-DCO consent, a final CEMP will be produced, with a WMP added as a technical appendix. This WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Reinstated banks will be covered with biodegradable geotextile/matting and seeded/planted as soon as practicable to reduce risk of bank erosion and fine sediment delivery to water bodies. Length for length watercourse enhancement will be required as a form of mitigation for the use of culverts in both the Grid Connection Corridor and the Solar and Energy Storage Park (including for extensions of existing culverts), and this will be defined in a WFD Mitigation and Enhancement Strategy to be developed post DCO submission (and which is a requirement of the DCO). A pre-works condition survey will also be carried out prior to any works to inform reinstatement of the channel once culverts are no longer required. Reinstatement will include further enhancements for a longer length of watercourse than the length disturbed. Reinstatement will aim to provide an improved channel form with enhancement works to be carried out (where relevant and appropriate to do so) between 5 and 10 m upstream and downstream of the culvert location. It is noted that this would be in addition to length for length enhancement elsewhere in the waterbody. It is anticipated that enhancements will consist of soft engineering techniques and improvements to the riparian corridor to improve channel diversity and biodiversity. These measures would be defined post DCO consent (within the WFD Mitigation and Enhancement Strategy).

Scheme component	Potential impacts	Mitigation measures
	sediment load and organic matter delivered to water body, chemical spillage risk during the installation of culverts.	

5.1.2 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 8. The impact assessment on the Lower Trent Erewash – Secondary Combined groundwater body is provided in Table 9. The mitigation referred to in these tables forms the basis of this assessment, and the outcomes of the assessment are subject to the appropriate implementation of the mitigation measures provided.

Table 8 Impact assessment on the WFD quality elements of the surface water bodies screened-in for this assessment

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
Biological Quality Elements			
Fish	Grid Connection Corridor	The **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which 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 will include storage of excavated material a minimum of 20m away from the watercourse on flat land. The CEMP and WMP will outline measures to reduce the risk of spillages. Water-based drilling fluids will be used. Where possible, it is proposed to carry out the works for intrusive crossings in relatively dry weather, wherein it is expected that the	Possible harm to fish from spillages or pollution from fine sediment, drilling fluids (water based) and chemicals used during construction (e.g. fuel and hydraulic oil), and through disturbance when intrusive techniques are used. With the proposed mitigation in place, it is not expected that there would be an impact to this quality element.

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
		smaller water bodies proposed to be crossed by intrusive 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 **Framework CEMP [EN010131/APP/7.3]**.	
	Access Tracks	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area. A **Framework CEMP [EN010131/APP/7.3]** and WMP (to be produced as an appendix to the final CEMP) will be followed which will 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. The WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Length for length watercourse enhancement will be necessary, which will require the development of a WFD Mitigation and Enhancement Strategy post DCO submission. A pre-works condition survey will also be carried out to ensure the channel can be returned to, and indeed improved from, its current quality. These enhancements will be created by use of soft engineering and river restoration techniques to increase flow diversity, sinuosity, and the number of bedform features and habitat.	The mitigation listed should ensure that any deleterious impacts to this quality element are negated. There will inevitably be localised impacts, but when considered at a waterbody scale, these impacts should be negligible and compensated for by watercourse improvements and length for length enhancement to be detailed in the WFD Mitigation and Enhancement Strategy.
Invertebrates	Grid Connection Corridor	The **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any	Possible harm to invertebrates from spillages or pollution from fine sediment, drilling fluids (water based) and chemicals used during construction (e.g. fuel and hydraulic oil), and through

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
		existing watercourse. This will include storage of excavated material a minimum of 20m away from the watercourse on flat land. The CEMP and WMP will outline measures to reduce the risk of spillages. Water-based drilling fluids will be used. Harm or direct mortality to invertebrates through excavation of the channel bed and bank. It is not considered to be a significant impact given the localised, small scale, and temporary nature of the works	disturbance when intrusive techniques are used. With the proposed mitigation in place, it is not expected that there would be an impact to this quality element.
	Access Tracks	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area. A **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which will 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. The WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Length for length watercourse enhancement will be necessary, which will require the development of a WFD Mitigation and Enhancement Strategy post DCO submission. A pre-works condition survey will also be carried out to ensure the channel can be returned to, and indeed improved from, its current quality. These enhancements will be created by use of soft engineering techniques.	The mitigation listed should ensure that any deleterious impacts to this quality element are negated. There will inevitably be localised impacts, but when considered at a waterbody scale, these impacts should be negligible and compensated for by watercourse improvements to be detailed in the WFD Mitigation and Enhancement Strategy.
Macrophytes and Phytobenthos	Grid Connection Corridor	The **Framework CEMP [EN010131/APP/7.3]**and WMP will be followed which outlines measures which will be taken to prevent the ingress of fine sediment or other material to, and the pollution by sediment of, any	Possible smothering of macrophytes and phytobenthos from excessive fine sediment on construction runoff or drilling fluids or toxic effects

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
		existing watercourse. This will include storage of excavated material a minimum of 20m away from the watercourse on flat land. The CEMP and WMP will outline measures to reduce the risk of spillages. Water-based drilling fluids will be used. Possible removal of macrophytes and phytobenthos from excavation of the channel bed and bank. It is not considered to be a significant impact given the localised, small scale, and temporary nature of the works and the ephemeral or artificial nature of the water bodies subject to this activity.	from chemical pollutants that may be spilt on the Site, and through disturbance when intrusive techniques are used. With the proposed mitigation in place, it is not expected that there would be an impact to this quality element.
	Access Tracks	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area. A **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which will 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. The WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Length for length watercourse enhancement will be necessary, which will require the development of a WFD Mitigation and Enhancement Strategy post DCO submission. A pre-works condition survey will also be carried out to ensure the channel can be returned to, and indeed improved from, its current quality. These enhancements will be created by use of soft engineering techniques.	The mitigation listed should ensure that any deleterious impacts to this quality element are negated. There will inevitably be localised impacts, but when considered at a waterbody scale, these impacts should be negligible and compensated for by watercourse improvements to be detailed in the WFD Mitigation and Enhancement Strategy.
Physico-chemical Quality Elements			

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
Oxygenation conditions	Grid Connection Corridor	The **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which 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 will include storage of excavated material a minimum of 20m away from the watercourse on flat land, other measures will be applied if this is not practicable.	Possible reduction in levels of dissolved oxygen from excavation activities for launch and receive pits, which may create a source and pathway for the delivery of fine sediments and organic material to the water body. With the proposed mitigation in place, it is not expected that there would be an impact to this quality element.
	Access Tracks	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area. A **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which will 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. The WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Length for length watercourse enhancement will be necessary, which will require the development of a WFD Mitigation and Enhancement Strategy post DCO submission. A pre-works condition survey will also be carried out to ensure the channel can be returned to, and indeed improved from, its current quality. These enhancements will be created by use of soft engineering techniques.	The mitigation listed should ensure that any deleterious impacts to this quality element are negated. There will inevitably be localised impacts, but when considered at a waterbody scale, these impacts should be negligible and compensated for by watercourse improvements to be detailed in the WFD Mitigation and Enhancement Strategy.
Nutrient conditions	Grid Connection Corridor	The **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which outlines measures which will be taken to prevent the ingress of	Possible increase in nutrient levels from excavation activities for launch and receive pits, which may create a source and pathway for

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
		fine sediment or other material to, and the pollution by sediment of, any existing watercourse. This will include storage of excavated material a minimum of 20m away from the watercourse on flat land, other measures will be applied if this is not practicable.	delivery of nutrients to the water body. With the proposed mitigation in place, it is not expected that there would be an impact to this quality element.
	Access Tracks	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area. A **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which will 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. The WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Length for length watercourse enhancement will be necessary, which will require the development of a WFD Mitigation and Enhancement Strategy post DCO submission. A pre-works condition survey will also be carried out to ensure the channel can be returned to, and indeed improved from, its current quality. These enhancements will be created by use of soft engineering techniques.	The mitigation listed should ensure that any deleterious impacts to this quality element are negated. There will inevitably be localised impacts, but when considered at a waterbody scale, these impacts should be negligible and compensated for by watercourse improvements to be detailed in the WFD Mitigation and Enhancement Strategy.
Hydromorphological Quality Elements			
River continuity	Grid Connection Corridor	Intrusive crossings will be carried out in dry weather when flow is at its lowest, where possible. Flow will be maintained if required by over-pumping, pipes, or flumes. A pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will aim to provide an improved channel form with enhancement works to be	There will be some unavoidable temporary disturbance during the construction phase, but this will be over a relatively short timeframe of days to weeks. 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. With the

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
		carried out between 5 and 10 m upstream and downstream of the open trench.	proposed mitigation in place, it is not expected that there would be an impact to this quality element.
	Access Tracks	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area. A **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which will 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. The WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Length for length watercourse enhancement will be necessary, which will require the development of a WFD Mitigation and Enhancement Strategy post DCO submission. A pre-works condition survey will also be carried out to ensure the channel can be returned to, and indeed improved from, its current quality. These enhancements will be created by use of soft engineering techniques.	The mitigation listed should ensure that any deleterious impacts to this quality element are negated. There will inevitably be localised impacts, but when considered at a waterbody scale, these impacts should be negligible and compensated for by watercourse improvements to be detailed in the WFD Mitigation and Enhancement Strategy.
River depth and width variation	Grid Connection Corridor	A pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will aim to provide an improved channel form with enhancement works to be carried out between 5 and 10 m upstream and downstream of the open trench.	There will be some unavoidable temporary disturbance during the construction phase, but this will be over a relatively short timeframe of days to weeks. 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. With the proposed mitigation in place, it is not expected that there would be an impact to this quality element.

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
	Access Tracks	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area. A **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which will 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. The WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Length for length watercourse enhancement will be necessary, which will require the development of a WFD Mitigation and Enhancement Strategy post DCO submission. A pre-works condition survey will also be carried out to ensure the channel can be returned to, and indeed improved from, its current quality. These enhancements will be created by use of soft engineering techniques.	The mitigation listed should ensure that any deleterious impacts to this quality element are negated. There will inevitably be localised impacts, but when considered at a waterbody scale, these impacts should be negligible and compensated for by watercourse improvements to be detailed in the WFD Mitigation and Enhancement Strategy.
Structure and substrate of the river bed	Grid Connection Corridor	A pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will aim to provide an improved channel form with enhancement works to be carried out between 5 and 10 m upstream and downstream of the open trench.	There will be some unavoidable temporary disturbance during the construction phase, but this will be over a relatively short timeframe of days to weeks. 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. With the proposed mitigation in place, it is not expected that there would be an impact to this quality element.
	Access Tracks	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-	The mitigation listed should ensure that any deleterious impacts to this quality element are negated. There will inevitably be localised

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
		pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area. A **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which will 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. The WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Length for length watercourse enhancement will be necessary, which will require the development of a WFD Mitigation and Enhancement Strategy post DCO submission. A pre-works condition survey will also be carried out to ensure the channel can be returned to, and indeed improved from, its current quality. These enhancements will be created by use of soft engineering techniques.	impacts, but when considered at a waterbody scale, these impacts should be negligible and compensated for by watercourse improvements to be detailed in the WFD Mitigation and Enhancement Strategy.
Structure of the riparian zone	Grid Connection Corridor	A pre-works condition survey will be carried out to inform reinstatement of the channel. Reinstatement will aim to provide an improved channel form with enhancement works to be carried out between 5 and 10 m upstream and downstream of the open trench. Reinstated banks will be covered with biodegradable geotextile/matting and seeded/planted as soon as possible to reduce risk of bank erosion and fine sediment delivery.	There will be some unavoidable temporary disturbance during the construction phase, but this will be over a relatively short timeframe of days to weeks. 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. With the proposed mitigation in place, it is not expected that there would be an impact to this quality element.
	Access Tracks	Where possible, installation of the culverts should be carried out in dry weather at low-flow conditions. If flow is present, this will be over-pumped, piped, or flumed through the works to maintain flow downstream and maintain a dry working area.	The mitigation listed should ensure that any deleterious impacts to this quality element are negated. There will inevitably be localised impacts, but when considered at a waterbody scale, these impacts should be negligible and compensated for by watercourse improvements

WFD Quality Element	Source of Potential Impact	Mitigation	Compliance Assessment
		A **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which will 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. The WMP will also describe all other pollution prevention measures and proposed water quality monitoring. Length for length watercourse enhancement will be necessary, which will require the development of a WFD Mitigation and Enhancement Strategy post DCO submission. A pre-works condition survey will also be carried out to ensure the channel can be returned to, and indeed improved from, its current quality. These enhancements will be created by use of soft engineering techniques.	to be detailed in the WFD Mitigation and Enhancement Strategy.

Table 9 Impact assessment of the non-intrusive water body crossings on the WFD quality elements of the groundwater body screened into this assessment

WFD Quality Element	Mitigation	Compliance Assessment
Quantitative Status Elements		
Quantitative Saline Intrusion	No mitigation required	No anticipated impact
Quantitative Water Balance	Excavations for watercourse crossings and programmed so that works are completed in the most efficient and timely manner possible. This will be detailed in the **Framework CEMP [EN010131/APP/7.3]**. Installation of the cables will be short term, temporary, transient and phased. Sides of excavations will be shored, the nature of which will depend on ground conditions, size, depth and purpose of excavation, which will further minimise groundwater ingress.	Potential for groundwater ingress to excavations to facilitate the cable crossing. Launch and receive pits will be dug within the superficial sand and gravel deposits within Secondary A aquifers, where it is likely groundwater will be similar to river water level, so relatively shallow. The level of ingress would depend upon the depth of the pit, and very local geological conditions; pits dug in mostly sand and gravel could potentially have higher levels of ingress in which

WFD Quality Element	Mitigation	Compliance Assessment
		water levels may equalise with river level, whereas pits in more of a clayey area would have a lower level of ingress. With the proposed mitigation in place, impacts would be very localised and temporary, and would not be considered significant at the water body scale.
Quantitative GWDTEs test	No mitigation required	NO GWDTEs are known to be present in the study area.
Quantitative Dependent Surface Water Body Status	Excavations for watercourse crossings and programmed so that works are completed in the most efficient and timely manner possible. This will be detailed in the **Framework CEMP [EN010131/APP/7.3]**. Installation of the cables will be short term, temporary, transient and phased. Sides of excavations will be shored, the nature of which will depend on ground conditions, size, depth and purpose of excavation, which will further minimise groundwater ingress. If required, water could be returned to the watercourse following treatment to maintain flows.	Potential for groundwater ingress to excavations to facilitate the cable crossing. Launch and receive pits will be dug within the superficial sand and gravel deposits within Secondary A aquifers, where it is likely groundwater will be similar to river water level, so relatively shallow. The level of ingress would depend upon the depth of the pit, and very local geological conditions; pits dug in mostly sand and gravel could potentially have higher levels of ingress in which water levels may equalise with river level, whereas pits in more of a clayey area would have a lower level of ingress. With the proposed mitigation in place, impacts would be very localised and temporary, and would not be considered significant at the water body scale.
Chemical Status Elements		
Chemical Drinking Water Protected Area	The **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which outlines measures which will be taken to prevent leaks and spills and clean up procedures in case of leaks/spills.	The Trent from Carlton-on-Trent to Laughton Drain Drinking Water Protected Area (GB104028058480) is located within the centre and west of the study area. Excavations for installation of cable crossings may introduce pollutants to groundwater from equipment leaks/spills. With the proposed mitigation in place, the risk of impacts are low, and would be temporary and localised, therefore there is not expected to be an impact to the Drinking Water Protected Area.

WFD Quality Element	Mitigation	Compliance Assessment
General Chemical test	The **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which outlines measures which will be taken to prevent leaks and spills and clean up procedures in case of leaks/spills. Installation of the cables will be transient and phased. Sides of excavations will be shored, the nature of which will depend on ground conditions, size, depth and purpose of excavation, which will minimise groundwater ingress. Groundwater will be removed and treated.	Excavations for installation of cable crossings may introduce pollutants to groundwater from equipment leaks/spills. Potential for groundwater ingress to excavations to facilitate the cable crossing. Launch and receive pits will be dug within the superficial sand and gravel deposits within Secondary A aquifers, where it is likely groundwater will be similar to river water level, so relatively shallow. The level of ingress would depend upon the depth of the pit, and very local geological conditions; pits dug in mostly sand and gravel could potentially have higher levels of ingress in which water levels may equalise with river level, whereas pits in more of a clayey area would have a lower level of ingress.
Chemical GWDTEs test	No mitigation required.	NO GWDTEs are known to be present in the study area.
Chemical Dependent Surface Water Body Status	The **Framework CEMP [EN010131/APP/7.3]** and WMP will be followed which outlines measures which will be taken to prevent leaks and spills and clean up procedures in case of leaks/spills.	Excavations for installation of cable crossings may introduce pollutants to groundwater from equipment leaks/spills. Potential for groundwater ingress to excavations to facilitate the cable crossing. Launch and receive pits will be dug within the superficial sand and gravel deposits within Secondary A aquifers, where it is likely groundwater will be similar to river water level, so relatively shallow. The level of ingress would depend upon the depth of the pit, and very local geological conditions; pits dug in mostly sand and gravel could potentially have higher levels of ingress in which water levels may equalise with river level, whereas pits in more of a clayey area would have a lower level of ingress. Given the proposed mitigation will follow best practice, and any impacts to the water quality of groundwater would be temporary and minimal, no anticipated impacts to this quality element are expected.
Chemical Saline Intrusion	No mitigation required.	No anticipated impact.

6. Construction Impacts

6.1 Potential Construction Phase Impacts

6.1.1 During construction the following adverse impacts may occur:

- Impacts on surface water quality due to deposition or spillage of soils, sediments, oils, fuels, or other construction chemicals, or through mobilisation of contamination following disturbance of contaminated ground or groundwater, or through uncontrolled site run-off.
- Potential changes in on-site and off-site flood risk due to changes in the volume, rate and flow of surface water runoff from the construction site, which could mobilise pollutants into water bodies.
- Construction activities such as earth works, excavations, site preparation, levelling and grading operations result in the disturbance of soils. Exposed soil is more vulnerable to erosion during rainfall events due to loosening and removal of vegetation to bind it, compaction and increased runoff rates. Surface runoff from such areas can contain excessive quantities of fine sediment, which may eventually be transported to watercourses where it can result in adverse impacts on water quality, flora and fauna. Construction works within, along the banks and across watercourses can also be a direct source of fine sediment mobilisation.
- Contamination of surface waters, groundwater and soil could result from leakage and spills of fuels, oils, chemicals and concrete during construction affecting watercourses indirectly via site runoff or directly where works are close to and within a water body. Contamination may reduce water quality and impact aquatic fauna and flora.
- Any construction works that impede on the floodplain have the potential to increase rate and volume of runoff and increase risk of blockages in watercourses that could lead to flow being impeded, and a potential rise in flood risk. Earthworks may also alter flow pathways and the compaction of the ground and vegetation clearance will also increase the rate and volume of runoff.

6.2 Construction Mitigation

6.2.1 The construction of the Scheme will take place in accordance with a CEMP. The CEMP details the measures that would be undertaken during construction to mitigate the temporary effects on the water environment. A **Framework CEMP** is included in in the DCO application **[EN010131/APP/7.3]** and is secured through a requirement of the DCO. The Framework CEMP provides the structure and content for the detailed CEMP, which will be completed once a contractor is appointed, following submission of the DCO Application.

6.2.2 The Framework CEMP comprises good practice methods that are established and effective measures to which the development will be committed through

the development consent. The measures within the Framework CEMP focus on managing the risk of pollution to surface waters and the groundwater environment. It also considers the management of activities within floodplain areas.

6.2.3 The CEMP will be reviewed, revised and updated as the project progresses to ensure all potential impacts and residual effects are considered and addressed as far as practicable, in keeping with available good practice at that point in time.

6.2.4 The Framework CEMP is a standard procedure for the Scheme and describes the principles for the protection of the water environment during construction. The final CEMP will be supported by a Water Management Plan (WMP), that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction. The potential for adverse impacts would be minimised by the adoption of the general mitigation measures which will be described in the WMP and CEMP.

6.2.5 It is anticipated that all WFD construction risks could be adequately mitigated with appropriate CEMP planning and management.

6.2.6 It is also recommended that a Geomorphological Clerk of Works attend site throughout the construction phase to ensure the designs are followed, and detail which is difficult to outline in design but are important for environmental functioning such as bank shape, or cross-sectional variation are appropriately created. A contractor with prior experience in river restoration works should be used.

7. Assessment of the Scheme Against WFD

7.1 Assessment of the Scheme Against Water Body Mitigation Measures

7.1.1 Details on EA mitigation measures were requested in March 2022 but had yet to be received at the time of writing (November 2022), despite a further request in July 2022.

7.1.2 The Reasons for Not Achieving Good (RNAG) status for the screened-in water bodies has been reviewed. These detail the sources of impact, where known, that have prevented individual quality elements from being classified as 'Good' and so include factors such as point sources of pollution and land management practices. For Marton Drain and Seymour Drain, physical modification is listed as one of the RNAG, and so the use of culverts for access tracks is likely to exacerbate this and prevent the water bodies in question obtaining a score of 'Good' in the future. However, some of the other RNAG relate to issues around the agricultural and arable nature of the surrounding land-use, and so the Scheme would potentially help to alleviate these issues by reducing the quantity of agricultural pollutants delivered to watercourses.

7.2 Assessment against WFD objectives

7.2.1 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) Enhance the status and prevent further deterioration of surface water bodies, groundwater bodies and their ecosystems;

b) Ensure progressive reduction of groundwater pollution;

c) Reduce pollution of water, especially by Priority Substances and Certain Other Pollutants (Annex II, Environmental Quality Standards (EQS) Directive (2008/105/EC) as amended);

d) Contribute to mitigating the effects of floods and droughts;

e) Achieve at least good surface water status for all surface water bodies and good chemical status in groundwater bodies by 2015 (Article 4, Water Framework Directive (WFD) (2000/60/EC)) (or good ecological potential in the case of artificial or heavily modified waterbodies); and

f) Promote sustainable water use.

7.2.2 The WFD compliance assessment for the proposed Scheme is summarised in Table 10; the Scheme is expected to be compliant with the objectives of the WFD.

Table 10 Compliance assessment of the Scheme

Compliance Elements	Water body assessment	Groundwater body assessment
Water body name and ID	*Trent from Carlton-on-Trent to Laughton Drain (GB104028058480); Tributary of the Till (GB105030062480); Marton Drain (GB104028057840); Seymour Drain (GB104028058340)*	*Lower Trent Erewash – Secondary Combined (GB40402G990300)*
Enhance the status and prevent further deterioration of surface water bodies, groundwater bodies and their ecosystems	The Scheme is not anticipated to cause a deterioration in status.	The Scheme is not anticipated to cause a deterioration in status.
Ensure progressive reduction of groundwater pollution	The Scheme and associated mitigation includes a number of measures to minimise the risk of pollution to water bodies, and therefore will not present a barrier to meeting this objective.	The Scheme and associated mitigation includes a number of measures to minimise the risk of pollution to water bodies, and therefore will not present a barrier to meeting this objective.
Reduce pollution of water, especially by Priority Substances and Certain Other Pollutants	The Scheme and associated mitigation includes a number of measures to minimise the risk of pollution to water bodies, and therefore will not present a barrier to meeting this objective.	The Scheme and associated mitigation includes a number of measures to minimise the risk of pollution to water bodies, and therefore will not present a barrier to meeting this objective.
Contribute to mitigating the effects of floods and droughts	Flood risk is not increased to the development or elsewhere, refer to **Appendix 9-D: Flood Risk Assessment [EN010131/APP/3.3]**. The Scheme will not require a formal water supply or water abstractions.	Flood risk is not increased to the development or elsewhere, refer to **Appendix 9-D: Flood Risk Assessment [EN010131/APP/3.3]**. The Scheme will not require a formal water supply or water abstractions.
Achieve at least good surface water status for all surface water bodies and good chemical status in groundwater bodies by 2015 (or good	The Scheme and associated mitigation would contribute to the water body achieving Good Ecological Status and would not impede delivery of objectives.	The Scheme and associated mitigation would not prevent the water body reaching Good Status.

ecological potential in the case of artificial or heavily modified water bodies)		
Promote sustainable water use	The Scheme does not require a formal water supply or abstractions and includes buffers to development around watercourses to enable natural processes to continue.	The Scheme does not require a formal water supply or abstractions and includes buffers to development around watercourses to enable natural processes to continue.

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 Trent from Carlton-on-Trent to Laughton Drain, Tributary of the Till, Marton Drain, and Seymour Drain surface water bodies and the Lower Trent Erewash groundwater body.

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 future Good Ecological Status.

8.1.3 Further to this, a WFD Mitigation and Enhancement Strategy will be produced post consent, which will outline watercourse improvement works required as mitigation to ensure the Scheme's compliance with WFD requirements. This will be progressed with EA and IDB consultation throughout.

References

Ref 1. The Planning Inspectorate (2017) The Water Framework Directive – Advice Note Eighteen: The Water Framework Directive
Ref 2. The Water Environment (Water Framework Directive) (England and Wales) Regulations (2016), available online at: https://www.legislation.gov.uk/UKSI/2017/407/CONTENTS/MADE
Ref 3. Environment Agency (2016) Water Framework Directive Risk Assessment: how to assess the risk of your activity.
Ref 4. Environment Agency Catchment Data Explorer website (https://environment.data.gov.uk/catchment-planning)
Ref 5. DEFRA'S Multi Agency Geographical Information for the Countryside website https://magic.defra.gov.uk/MAGICMAP.ASPX
Ref 6. Historic mapping: National Library of Scotland
Ref 7. British Geological Survey borehole and online mapping (Geoindex)
Ref 8. Soilscapes website
Ref 9. Bing Maps
Ref 10. National River Flow Archive website
Ref 11. Met Office website (https://www.metoffice.gov.uk/)
Ref 12. Environment Agency Fish and Ecology Data Explorer. https://environment.data.gov.uk/ecology/explorer/)
Ref 13. Environment Agency Water Quality Archive website. Available at https://environment.data.gov.uk/water-quality/view/landing