Dean Moor
Solar Farm

Environmental Statement: Appendix 2.3 – Water Framework Directive Assessment

on behalf of **FVS Dean Moor Limited**

March 2025
Prepared by: Stantec UK Ltd
PINS Ref: EN010155
Document Ref: 6.3
Revision: 1

Firma Energy

ib vogt

DEAN MOOR SOLAR FARM

ENVIRONMENTAL STATEMENT

APPENDIX 2.3 – WATER FRAMEWORK DIRECTIVE ASSESSMENT

PLANNING INSPECTORATE REFERENCE EN010155

PREPARED ON BEHALF OF FVS DEAN MOOR LIMITED

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

Project Ref:	**EN010155/ES/Appendix 2.3: WFD Assessment**
Status:	Final
Issue/ Rev:	1
Date:	March 2025

Contents

Figures

Abbreviations

ALC	Agricultural Land Classification
BGS	British Geological Society
CDE	Catchment Data Explorer
CEMP	Construction Environmental Management Plan
DCO	Development Consent Order
DEFRA	Department for Environment, Food and Rural Affairs
DNO	District Network Operator
DWPA	Drinking Water Protected Area
EA	Environment Agency
FDMP	Framework Decommissioning Manegemtn Plan
FRA	Flood Risk Assessment
GMP	Grazing Management Plan
INNS	Invasive Non-Native Species
LEMP	Landscape and Environmental Management Plan
LLFA	Lead Local Flood Authority
NVZ	Nitrate Vulnerable Zone
OCEMP	Outline Construction Environmental Management Plan
OLEMP	Outline Landscape and Environmental Management Plan
OSMP	Outline Soil Management Plan
PBDE	Polybrominated diphenyl ethers
PCS	Power Conversion System
PEA	Preliminary Ecological Appraisal
PEIR	Preliminary Environmental Information Report
PFRA	Preliminary Flood Risk Assessment
PV	Photovoltaic
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SFRA	Strategic Flood Risk Assessment
SPA	Special Protection Areas
SPZ	Source Protection Zone
SMP	Soil Management Plan
SuDS	Sustainable Drainage Systems
WFD	Water Framework Directive

1 Introduction

1.1 Background

1.1.1 This Water Framework Directive ('WFD') Assessment has been prepared on behalf of FVS Dean Moor Ltd (the Applicant). The WFD Assessment is prepared to support an application for the Dean Moor Solar Farm (the Proposed Development) on land located between the villages of Gilgarran and Branthwaite in West Cumbria (the 'Site').

1.1.2 This WFD Assessment will detail the potential impacts that the Proposed Development could have on the watercourses' ability to meet the WFD requirements.

1.1.3 Relevant reports are summarised within the document.

1.2 The Water Framework Directive

1.2.1 The WFD was transposed into law in England and Wales by the Water Environment Regulations 2003, these were amended in 2017 to the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[1] (WFD Regulations) and were updated in 2019[2]. These WFD implement a holistic approach to the management, protection, and monitoring of the water environment. The aim of the WFD is to prevent further deterioration in water resources (volume and quality); protect and enhance the status of aquatic ecosystems and associated wetlands; promote sustainable water consumption; and contribute to mitigating the effects of floods and droughts.

1.2.2 The key objectives of the WFD are to prevent deterioration in the status of water bodies and aim to achieve good ecological and chemical status (including quantitative status in groundwater bodies) by 2027. Water bodies must also comply with standards and objectives of Protected Areas (i.e., an area designated under another European Directive, such as a SAC or SPA), where these apply.

[1] HM Government (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 No. 407

[2] HM Government (2019). The Floods and Water (Amendment etc.) (EU Exit) Regulations 2019 No. 558.

1.2.3 In addition, discharges, emissions, and losses of priority substances to surface water bodies must be progressively reduced and emissions of priority hazardous substances prevented. Finally, action must be taken to reverse any identified sustained upward trend in pollution concentrations in groundwater bodies.

1.2.4 The North West River Basin Management Plan ('RBMP')[3] is the applicable management plan for the Site and has been used to assess the impacts of the Proposed Development.

1.3 Methodology

1.3.1 The assessment involved a desk-based review of a wide range of information provided for this study. In addition, other sources openly available through the internet (LiDAR, historical maps, geology and soils, WFD) have also been utilised. This component is essential to gain understanding of the wider context of the Site, to appreciate the local and catchment-wide controls that are influencing geomorphology and ecology.

1.3.2 No site visit was undertaken for this assessment; however, site knowledge was shared from the project team and was utilised to better ascertain certain impacts and characteristics of the Site water bodies.

1.3.3 The Environment Agency ('EA') recommended methodology for WFD assessment is shown in Figure 1.1 below and was followed for this assessment. This is summarised into a six-step programme which is detailed throughout section 3 and 4 of this document.

1.3.4 The six-step programme is as follows:

- Step 1 – identification of potential generic operational impacts of the Development on hydromorphological quality elements;
- Step 2 – site specific assessment of the Development against biological, physico-chemical and hydromorphological quality elements;
- Step 3 – assessment of the Development against WFD Mitigation Measures;

[3] Environment Agency (2022). River Basin Management Plan for the North West River Basin District. Habitats Regulations Assessment.

- Step 4 – cumulative impact assessment of the Development in conjunction with other proposed developments planned or in place on the Water Body;
- Step 5 – assessment of the Development against WFD status objectives; and
- Step 6 – assessment of the Development against other legislation (Protected Areas).

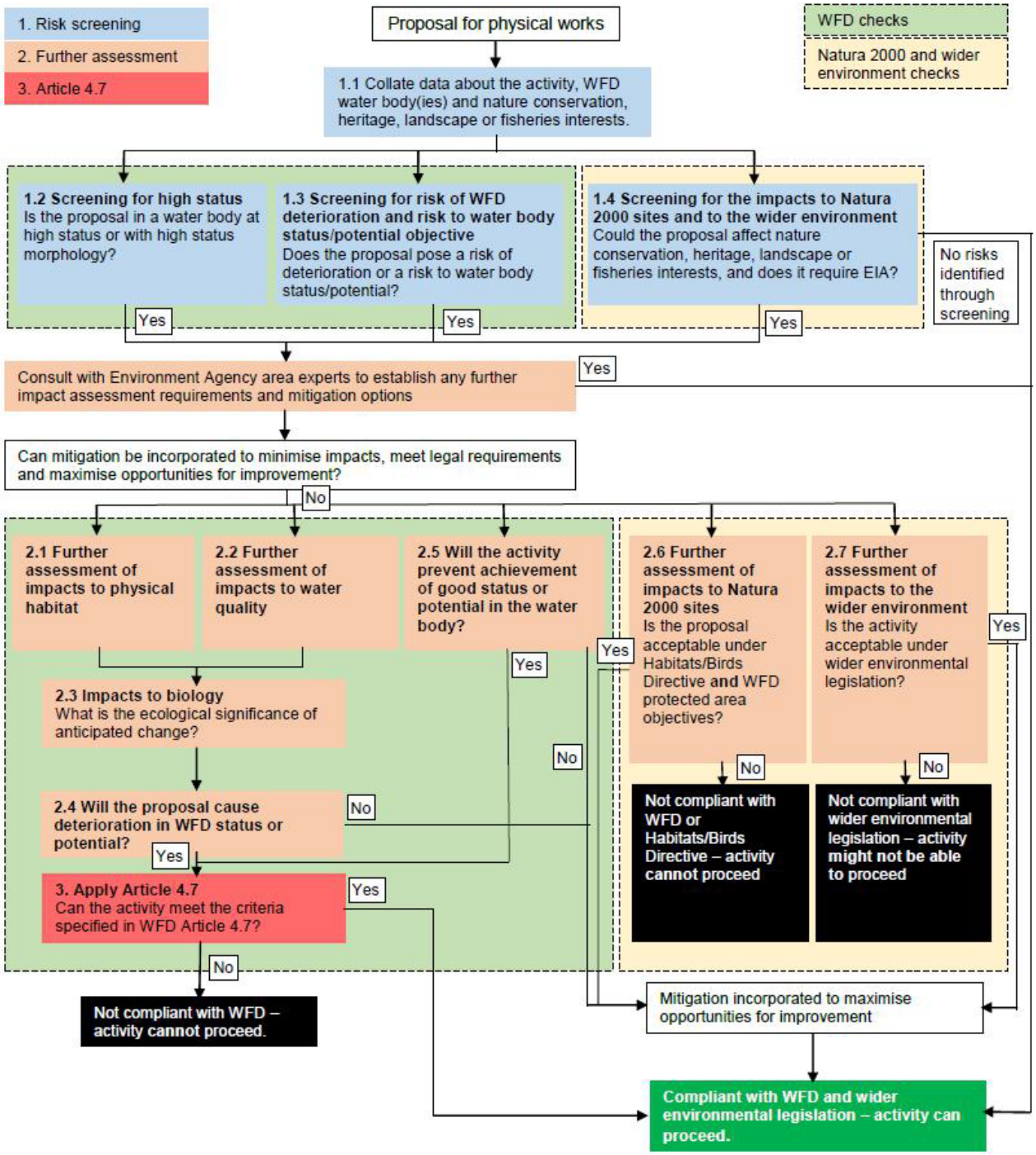
Consultation

1.3.5 Consultation with the EA was undertaken in November 2023 to discuss the PEIR ahead of the DCO application. This highlighted the EA's position on elements which should be addressed within the WFD, as follows: measures taken to protect the river, such as Biodiversity Net Gain enhancements, and nutrient neutrality (particularly the issue of phosphates in the River Marron, improvement of ecology and chemistry of on-Site waterbodies, such as the creation of riparian buffer zones.

1.3.6 Further consultation following submission of the PEIR was undertaken in March 2024, and statutory consultation in April/May 2024 occurred highlighting the need to address European Eels and Brown Trout in the mitigation and enhancement works, as well as improving the riparian vegetation and highlighting the Lead Local Flood Authority's (LLFA) emphasis on providing detailed drainage design up-front, such as information about impermeable area size and location of existing land to avoid creating flow routes to different catchment areas.

1.3.7 European Eels and Brown Trout are considered throughout this WFD under the Biological element: 'Fish', these species are not explicitly named as all fish and aquatic animals need to be considered under this assessment to ensure no impact or detriment occurs to any species. This WFD report assesses the Proposed Development as whole, which includes the riparian improvements, drainage strategy, and changes to flow routes.

Figure 1.1: EA WFD Methodology (2016)[4]



[4] sourced from EA Doc No 488_10

2 Proposed Development Overview

2.1 Site Description and Location

2.1.1 The Proposed Development will be located on approximately 276.5ha of land located between the villages of Gilgarran and Branthwaite in West Cumbria (the Site) (ES Figure 1.1) [**REF: 6.2**], which is situated within the administrative area of Cumberland Council (the Council).

2.1.2 The Site (ES Figure 1.1) is located approximately 1.1km east of the Lillyhall Industrial Estate, 600m east of the small village of Gilgarran, approximately 900m west of Branthwaite, and approximately 5km southeast of Workington town centre on the west Cumbrian coast. The hamlet of Branthwaite Edge is directly adjacent to the east of the Site.

2.1.3 The Site lies within an area characterised by undulating agricultural land punctuated with individual farmsteads, small settlements, blocks of woodland, wind farms and energy infrastructure.

2.1.4 Land within the Site is typical of the surrounding area; undulating mainly pastoral land with woodland blocks, electricity pylons with overhead cables and development associated with the nearby Rigg House Farm. The Site is predominantly greenfield agricultural land, in intensive pastoral (sheep grazing) use.

2.1.5 A series of Ordinary Watercourses cross the Site, which drain generally to the north into Lostrigg Beck.

2.1.6 Four watercourses are located in the vicinity of the Site:

- The Marron;
- The Lowca Beck;
- The Lostrigg Beck (Also known as Thief Gill); and
- The upper portion of the Keekle.

2.1.7 The Lostrigg Beck is the only WFD watercourse which is located within the Order Limits (ES Figure 1.1) and flows from the south of the Site to the northeast.

2.1.8 The above watercourses cross two Operational Catchments and two Management Catchments: the Derwent Operational Catchment, the Ehen Calder Operational Catchment, the Derwent North West Management Catchment and the South West Lakes Management Catchment.

2.1.9 The EA[5] provides a definition for these terms:

- An Operational Catchment is *'an amalgamation of a small number of river water body catchments',* which is *'used in economic analysis process to identify packages of measures that can be applied to improve the ecological status of water bodies within it'.*
- A Management Catchment is a *'hydrological management area'* that groups water body catchments into a scale that *'suits management and planning from an Environment Agency perspective'.*

2.2 Geology and Groundwater

2.2.1 A comprehensive description of the ground conditions at the Site can be found in the Phase 1 Ground Condition Assessment (ES Appendix 10.1) [**REF: 6.3**].

2.2.2 The local bedrock geology is comprised of Whitehaven Sandstone Formation underlain by Middle and Lower Coal Measures.

2.2.3 The British Geological Survey ('BGS') online viewer indicates that superficial deposits consist of Glacial Till, Alluvium, Peat, Landslide deposits, and Alluvial Fan deposits.

2.2.4 Moreover, there are significant areas of Infilled Deposits, likely from the backfilling of a former opencast coal mine.

2.2.5 Cranfield Soilscapes online viewer indicates that the soil is either loamy or loamy and clayey.

2.2.6 The Cumbria County Council's (as it then was, now Cumberland Council) Preliminary Flood Risk Assessment ('PFRA')[6], gives reference to the occurrence of groundwater flooding within the County. However, the EA Historic Flood Map, does not identify any occurrences on or near the Site.

[5] Environment Agency Glossary | Catchment Data Explorer | Catchment Data Explorer: Available at: https://environment.data.gov.uk/catchment-planning/help/glossary. Accessed January 2024

[6] Cumbria County Council. Flood Risk Regulations 2009 – Preliminary Flood Risk Assessment. Preliminary Assessment Report

2.2.7 It is assumed that groundwater levels at the Site are largely in continuity with river levels in the Lostrigg Beck. Additionally, published BGS data (ES Appendix 10.1) also shows that the risk of groundwater flooding at the Site are shown to be negligible to low.

2.2.8 According to the EA's online Aquifer Designation Map, the bedrock strata are classified as Secondary A Aquifers. The EA defines a Secondary A Aquifer as '*permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of baseflow to rivers.'*

2.2.9 Defra published mapping indicates that the Site is not located within a Groundwater Source Protection Zone ('SPZ') meaning human activities do not damage/pollute groundwater on the Site.

Groundwater WFD Water Body – Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers Water Body

2.2.10 The Site is situated on the Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers WFD Groundwater Water Body (GB41202G103700). The location in relation to the Site can be seen in Figure 2.1.

2.2.11 This groundwater WFD Water Body has a surface area of 1281km^2, upon which the towns of Workington, Cockermouth and Cleator Moor lie.

2.3 Surface Water Features

2.3.1 Five WFD water body catchments lie within the Site, four of which are surface water. This includes the Lostrigg Beck watercourse which runs through the Site. The location of each surface water WFD water body and corresponding watercourses can be found in Figure 2.2.

Lostrigg Beck

2.3.2 The Lostrigg Beck Water Body (GB112075070550), also known as Thief Gill, originates from its source south of the Site within the Dean Moor Motocross Park and flows downstream to its confluence with the River Marron. The Lostrigg Beck watercourse is approximately 10.6km long.

2.3.3 The Lostrigg Beck running through the Site in a northerly direction from the southern boundary and leaving the Site in the northwest.

2.3.4 The Lostrigg Beck follows a natural course and is not designated as an artificial or heavily modified waterbody.

2.3.5 Vegetation along the Lostrigg Beck is particularly limited, and close cropped within the Site due to intensive grazing.

Lowca Beck

2.3.6 The Lowca Beck Water Body (GB112074070040) originates from its source in the vicinity of Gilgarran, located to the west of the Site. It flows via Distington, Lowca and Howgate before joining the Solway Firth at Parton Bay. The watercourse is approximately 9.8km long and does not flow through the Site.

2.3.7 The Lowca Beck is not designated as an artificial or heavily modified water body.

The River Keekle (Upper)

2.3.8 The Keekle (Upper) Water Body (GB112074070030) originates near Gilgarran, to the southwest of the Site. This watercourse has previously been lined, straightened, and rerouted due to historical coal mining in the area. In 2020 the river was restored to a more natural state by West Cumbria Rivers Trust, after the cessation of coal mining in the early 1990s.

2.3.9 The River Keekle is 2.5km long and does not flow through the Site. This watercourse joins the River Ehen 10km to the south of the Site and is part of the Ehen Catchment. It is not designated as an artificial or heavily modified water body.

The River Marron

2.3.10 The Marron Water Body (GB112075070540) originates near the village of Asby, Copeland at the confluence of Colliergate Beck and Scallow Beck. It flows north past Ullock and Branthwaite, picking up the waters of Lostrigg Beck at Little Clifton / Bridgefoot shortly before joining the River Derwent

north of the Site. The watercourse is approximately 20.8km long and does not flow through the Site.

2.3.11 The River Marron is not designated as an artificial or heavily modified water body.

2.4 Proposed Development

2.4.1 The Proposed Development comprises the construction, operation, and decommissioning of a solar photovoltaic (PV) energy generating station with a total capacity exceeding 50 Megawatts (MW) comprising solar PV arrays, grid connection infrastructure, associated infrastructure, and green infrastructure.

2.4.2 The Proposed Development and its construction phase are detailed within ES Chapter 3 – Site and Proposed Development Description [**REF: 6.1**] and ES Chapter 5 – Construction and Decommissioning Methodology and Phasing [**REF:6.1**] and other associated documents such as the Flood Risk Assessment ('FRA') (ES Appendix 2.4) [**REF: 6.3**].

2.4.3 In summary, the Proposed Development will include the following key elements:

- Solar PV panels;
- Solar PV array mounting structures;
- Power Conversion System ('PCS') Units in the form of Inverters, Transformers;
- Grid Connection Infrastructure comprising Customer and DNO Substation buildings and external electrical equipment and ancillary infrastructure within a Security Fence;
- Perimeter Fencing, Gates, CCTV cameras, electrical cabling, and other associated infrastructure;
- Access from the highway and internal access tracks; and
- Green infrastructure and landscape planting and ecological enhancements.

2.4.4 The Proposed Development has an indirect positive impact on water quality and morphology as intense grazing will be reduced and livestock will be excluded from the watercourses within the Order Limits. A buffer

zone alongside the implementation of supplementary planting to reduce the erosion of banks and sediment input is also included.

2.5 Supporting Reports

2.5.1 A Flood Risk Assessment (FRA) has been completed as part of the ES (Appendix 2.4) which supports the hydrological elements assessed in this WFD.

2.5.2 ES Chapter 8 – Biodiversity [**REF: 6.1**] provides baseline information on the potential ecological interest of the Site, which supports the biological elements assessed in this WFD.

2.5.3 The ES provides a more detailed description of the Proposed Development on Site, with Chapter 3 – Site and Proposed Development, detailing the mitigation to be included during the operational phase of this Site, which aligns this WFD.

2.5.4 The Outline Construction Environmental Management Plan (OCEMP) (ES Appendix 5.1) [**REF: 6.3**] and Outline Soil Management Plan (OSMP) (ES Appendix 5.3) [**REF: 6.3**] outlines measures to be implemented during construction to mitigate environmental effects in relation to water resources and flood risk, and pollution control, such as additional mitigation, specifying erosion control and sediment management practices to protect watercourses. The CEMP will be secured by DCO Requirement.

2.5.5 Additionally, the Agricultural Land Classification (ES Appendix 2.8) [**REF: 6.3**] and OSMP (ES Appendix 5.3) aims to maintain or improve the quality and quantity of soil on-Site which can contribute to multiple WFD elements. A Soil Management Plan ('SMP') will be secured by DCO Requirement prior to the start of construction, and this will sit alongside a CEMP.

2.5.6 A Landscape and Environmental Management Plan ('LEMP') will be secured by DCO Requirement, with an Outline LEMP ('OLEMP') forming part of the ES (ES Appendix 7.7) [**REF: 6.3**], with objectives to improve watercourse habitats and water quality with reference to grazing regime.

2.5.7 An Outline Grazing Management Plan (OGMP) (forms of part of the OLEMP (ES Appendix 7.7)). This outlines measures to reduce grazing intensity, reducing nitrates entering water bodies, and minimising onward impacts.

3 Screening Assessment

3.1 Overview

3.1.1 The North West RBMP identifies the Management Catchments in the Site lies within as the Derwent North West Management Catchment and the South West Lakes Management Catchment. Within the Derwent North West Management Catchment, the top two significant water management issues are: nutrient enrichment of rivers and lakes; and legacies of historical metal mines. Whilst the South West Lakes Management Catchment's top two significant management issues consist of pollution from rural areas and abandoned mining, as well as changes to the natural flow and level of water.

3.1.2 Since 2009 the EA has completed annual assessments of the WFD water bodies with the view of updating the RBMP. The Cycle 3 data, accessed via the EA's Catchment Data Explorer ('CDE')[7], therefore provides the best available information, which was used to inform this assessment.

3.1.3 There are five WFD water bodies related to the Site:

- The Lostrigg Beck Water Body;
- The Lowca Beck Water Body;
- The Keekle (Upper) Water Body;
- The Marron Water Body; and
- The Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers Water Body.

3.2 WFD Water Body and Classifications: Lostrigg Beck

3.2.1 The Lostrigg Beck Water Body currently has a 'Moderate' classification. The water body is not designated as artificial or a heavily modified water body.

3.2.2 There are no protected areas identified for this water body.

[7] Environment Agency Catchment Data Explorer (CDE): Available at: https://environment.data.gov.uk/catchment-planning/ Accessed January 2024

3.2.3 The Lostrigg Beck Water Body catchment covers approximately 82% of the Site area, making it the dominant watercourse in relation to the Site.

3.2.4 The Lostrigg Beck flows through the Site and therefore all elements (detailed in Table 3.1-3.3) will be screened in.

Biological Elements

3.2.5 The biological elements classifications for the Lostrigg Beck WFD Water Body are shown in Table 3.1.

Table 3.1: Biological elements classifications – Lostrigg Beck

Element	Classification	Objective
Fish	Moderate	Good by 2027
Invertebrates	High	Good by 2015
Macrophytes and Phytobenthos Combined	High	Good by 2015
Overall	Moderate	Good by 2027

Physico-chemical Elements

3.2.6 The physico-chemical elements classifications for the Lostrigg Beck WFD Water Body are shown in Table 3.2.

Table 3.2: Physico-chemical elements classifications – Lostrigg Beck

Element	Classification	Objective
Ammonia	High	Good by 2015
Dissolved Oxygen	High	Good by 2015
Phosphate	Good	Good by 2015
Temperature	High	Good by 2015
PH	High	Good by 2015
Overall	Good	Good by 2015

Hydromorphological Supporting Elements

3.2.7 The hydromorphological supporting elements for the Lostrigg Beck WFD Water Body are shown in Table 3.3.

Table 3.3: Hydromorphological supporting elements – Lostrigg Beck

Element	Classification	Objective
Hydrological Regime	High	Supports Good by 2015
Morphology	Supports Good	Not Assessed
Overall	Supports Good	Supports Good by 2015

Chemical Elements

3.2.8 The chemical classification of this WFD water body is 'Fail.' The Lostrigg Beck is failing in this respect due to Mercury and Its Compounds and Polybrominated diphenyl ethers ('PBDE').

3.2.9 For both of these chemical elements, the conditions are natural, and recovery is being awaited under natural conditions and have been estimated to recover to 'Good' by 2063.

3.2.10 The Proposed Development will not impact chemical quality due to construction mitigation plans including the addition of an OCEMP and OSMP to be secured through DCO Requirement. The OCEMP is provided at ES Appendix 5.1. The Proposed Development are also not in channel and suitable SuDS arrangements have been made.

3.3 WFD Water Body and Classifications: Lowca Beck

3.3.1 The Lowca Beck currently has a 'Moderate' classification. The water body is not designated as an artificial or a heavily modified water body.

3.3.2 There are no identified protected areas within the water body.

3.3.3 The Lowca Beck WFD water body lies within the Order Limits and the catchment takes up approximately 18% of the Site area and therefore all elements (detailed in Table 3.4-Table 3.6) will be screened in.

Biological Elements

3.3.4 The biological elements classifications for the Lowca Beck WFD Water Body are shown in Table 3.4.

Table 3.4: Biological elements classifications – Lowca Beck

Element	Classification	Objective
Invertebrates	Moderate	Good by 2027
Macrophytes and Phytobenthos Combined	High	Good by 2015
Overall	Moderate	Good by 2027

Physico-chemical Elements

3.3.5 The physico-chemical elements classifications for the Lowca Beck WFD Water Body are shown in Table 3.5.

Table 3.5: Physico-chemical elements classifications – Lowca Beck

Element	Classification	Objective
Ammonia	High	Good by 2015
Dissolved Oxygen	High	Good by 2015
Phosphate	Good	Good by 2015
Temperature	High	Good by 2015
PH	High	Good by 2015
Overall	Good	Good by 2015

Hydromorphological Supporting Elements

3.3.6 The hydromorphological supporting elements for the Lowca Beck WFD Water Body are shown in Table 3.6.

Table 3.6: Hydromorphological supporting elements – Lowca Beck

Element	Classification	Objective
Hydrological Regime	Supports Good	Supports Good by 2015
Morphology	Supports Good	Not assessed
Overall	Supports Good	Supports Good by 2015

Chemical Elements

3.3.7 The chemical classification of this WFD water body is 'Fail.' The Lowca Beck is failing in this respect due to Mercury and its compounds and PBDE.

3.3.8 For both of these chemical elements the conditions are natural, and recovery is being awaited under natural conditions and have been estimated to recover to 'Good' by 2063.

3.3.9 The Proposed Development does not physically interact with the channel, as there is a buffer area along the watercourse, suitable SuDS arrangements have been made and included to reduce impact from surface water. The Proposed Development incorporates embedded mitigation, such as buffers which are secured through Work No. 6 [**REF: 2.3**] and shown on ES Figure 3.4 Parameter Plan [**REF: 6.2**]. With additional mitigation being secured through the implementation of an CEMP and OSMP to be secured by a DCO Requirement. Therefore, the Proposed Development will not impact chemical quality.

3.4 WFD Water Body and Classifications: Keekle (Upper)

3.4.1 The Keekle (Upper) Water Body currently has a 'Good' classification. This water body is not designated as artificial or a heavily modified water body.

3.4.2 There are no protected areas identified for the Keekle (Upper) Water Body.

3.4.3 This water body catchment covers 0.39% of the Site, with the majority of the Proposed Development located within a neighbouring WFD catchment, the Lostrigg Beck and the Lowca Beck. Within the Keekle (Upper) Water Body the Proposed Development will only be 'mitigation and enhancement,' such as landscaping. Therefore, there are no expected changes to the ecology, hydrology, and chemical status of this water body because of the Proposed Development, particularly as no work takes place within the channel itself. Therefore, all elements will be screened out.

3.5 WFD Water Body and Classifications: Marron

3.5.1 The Marron Water Body currently has a 'Good' classification. The water body is not designated as artificial or a heavily modified water body.

3.5.2 There is one protected area within this WFD water body:

- River Derwent and Bassenthwaite Lake SAC.

3.5.3 This water body catchment covers 1.28% of the Site and the majority of the Proposed Development will be located within different WFD catchments, the Lostrigg Beck and the Lowca Beck. Within the area of the Marron Water Body the Proposed Development will only include 'mitigation and enhancement' (Work No. 6), such as landscaping. Therefore, there are no expected changes to the ecology, hydrology, and chemical status of this water body because of the Proposed Development, particularly as no work takes place within the associated watercourse itself. Therefore, all elements will be screened out.

3.6 WFD Water Body and Classifications: Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers Water Body

3.6.1 The Site is underlain by Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers Water Body, as shown in Figure 2.1. This water body covers a total surface area of approximately 1,280ha.

3.6.2 The water body itself has a 'Poor' ecological status.

3.6.3 There are 13 protected areas within this WFD water body, these include:

- Seven Special Areas of Conservation ('SACs');
- One Special Protected Area ('SPA');
- One Drinking Water Protected Area ('DWPA'); and
- Four Nitrate Vulnerable Zones ('NVZs').

3.6.4 The most recent publicly available borehole information from the BGS online viewer dates from 1985[8]. This shows that the groundwater level varied across the Site between 0.83m and 6.8m below ground level.

[8] British Geological Survey (BGS): Available at: [redacted] October 2024

However, as climate change has lowered groundwater levels nationwide[9], this could now be lower.

3.6.5 Although some excavations are required for cable installations this will be done in a manner to limit the duration of subsoil exposure and manage soil stockpiles to prevent water pollution. Post-construction, the area will be rehabilitated, and original vegetation restored. Therefore, no changes to groundwater interaction of flow paths is expected as a result.

3.6.6 A CEMP will be agreed with the Council and secured by DCO Requirement. This will include measures to avoid any disturbance and pollution during the construction phase of the Proposed Development, alongside the SMP. In the interim, the OCEMP is included provided at ES Appendix 5.1. The CEMP will substantially be in accordance with the OCEMP.

3.6.7 Therefore, the Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers Water Body has been screened out for assessment. The groundwater connection at the Site will be assessed within the scoping assessment for both the Lostrigg Beck and the Lowca Beck WFD Water Bodies.

3.7 North West RBMP Objectives

3.7.1 The environmental objectives of the North West RBMP reflect those of the WFD:

- To prevent deterioration of the status of surface waters and groundwater;
- To achieve objectives and standards for protected areas;
- To aim to achieve good status for all water bodies or, for heavily modified water bodies and artificial water bodies, good ecological potential, and good surface water chemical status; and
- To reverse any significant and sustained upward trend in pollutant concentrations in groundwater.

3.7.2 The Site is located within both the South West Lakes Management Catchment and the Derwent North West Management Catchment. The

[9] British Geological Survey (2024). Hydrological Summary for the United Kingdom: Available at: [redacted] Accessed October 2024

priority issues identified within these catchments are pollution from rural areas and nutrient enrichments and water levels.

3.7.3 Additional measures identified include the following:

3.7.4 For the Derwent North West catchment:

- Reducing nutrient enrichment of rivers and lakes: This can be achieved by managing waste water discharges and controlling diffuse rural pollution;
- Addressing the legacy of historic metal mine activities: Efforts are being made to mitigate the environmental harm caused by these activities; and
- Managing storm overflows and drainage system incidents: The catchment suffers from flood risk due to the flashy nature of the rivers, and several flood defence schemes are in place.

3.7.5 For the South West Lakes catchment:

- Managing changes to the natural flow and level of water: This involves monitoring and managing factors that alter natural flow and levels; and
- Managing changes to the natural flow and level of water: This involves monitoring and managing factors that alter natural flow and levels.

3.8 Screening for High Status

3.8.1 There are five WFD watercourses located within the vicinity of the Site, as discussed above. Three water bodies have been screened out, as the Proposed Development will not cause any detriment or damage to them.

3.8.2 Regarding ecological status, both the Lostrigg Beck and the Lowca Beck WFD Water Bodies currently maintain a ‘Moderate’ ecological status, whereas the Keekle (Upper) and the Marron WFD Water Bodies currently maintain a ‘Good’ ecological status. In addition, the groundwater water body, Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers Water Body, currently maintains a ‘Poor’ ecological status.

3.8.3 As the water bodies are not designated ‘High’ status water bodies they do not display conditions close to undisturbed. Therefore, the Proposed Development will not pose a risk to an existing ‘High’ status or potential water body and is compliant with risk assessment step 1.2 of the EA’s process, ensuring that the Proposed Development meets legal requirements under WFD and under wider environmental legislation.

3.9 Screening Summary

3.9.1 The below WFD components and elements have been screened in for assessment. This assessment is discussed in section 3.2-3.8.

3.9.2 Lostrigg Beck WFD Water Body:

- Biological quality elements;
- Physico-chemical quality elements; and
- Hydromorphological Supporting elements.

3.9.3 Lowca Beck WFD Water Body:

- Biological quality elements;
- Physico-chemical quality elements; and
- Hydromorphological Supporting elements.

4 Scoping Assessment

4.1 Overview

4.1.1 This section includes Step 2 of the EA WFD assessment methodology outlined within Figure 1.1 for the construction and operational phases of the Proposed Development.

4.1.2 Any decommissioning works will be reassessed before commencement to ensure all works are still WFD compliant. As changes in legal requirements and WFD classifications may occur before decommissioning starts. Further information is available in the Framework Decommissioning Management Plan (ES Appendix 5.4) [**REF: 6.3**].

4.2 Step 2: Assessment of Potential Impacts – Lostrigg Beck Water Body

4.2.1 Section 3.2 summarises the WFD status of the Lostrigg Beck Water Body land the reasons for not achieving good status.

Biological Quality Elements

4.2.2 The biological elements could be impacted by the Proposed Development, which could impact the WFD classifications. Table 4.1 below explains any impacts from the temporary, construction, and operational phases of the Proposed Development and if mitigation measures will be required.

Table 4.1: Scoping assessment of the biological elements - Lostrigg Beck WFD Water Body

Element	Temporary development	Construction Phase	Operational Phase	Mitigation Measures Needed?
Fish	No changes to flow are expected as a result of the temporary development and a CEMP will be produced to	Construction of the Proposed Development will not alter the watercourse flow or sediment processes. Construction will be conducted in accordance with the	The operational phase of the Proposed Development will not result in a change to flow, sediment or chemical components within the watercourse and will	No
Invertebrates				

Element	Temporary development	Construction Phase	Operational Phase	Mitigation Measures Needed?
Macrophytes and Phytobenthos Combined	mitigate against any changes to the sediment processes. Therefore, no impact to fish, invertebrates, macrophytes or phytobenthos is expected.	CEMP will further mitigate the risk of a pollution incident occurring in the waterbody which may impact fish, invertebrates, macrophytes or phytobenthos.	therefore not impact the biological elements. The reduction in intense sheep grazing and use of SuDs and landscape planting will have a positive impact on water quality through sediment supply and physico-chemical composition.	

4.2.3 An Invasive Non-Native Species ('INNS') assessment will be considered under a biosecurity plan (outlined within the OLEMP) (ES Appendix 7.7), occurring during operation to prevent spread if present. The biosecurity plan will be secured, if required, through the implementation of the LEMP via DCO Requirement.

Physico-Chemical Quality Elements

4.2.4 The physico-chemical elements could be impacted by the Proposed Development, which could impact the WFD classifications. Table 4.2 below explains any impacts from the temporary, construction, and operational phases of the Proposed Development and if mitigation measures will be required.

Table 4.2: Scoping assessment of the physico-chemical elements – Lostrigg Beck WFD Water Body

Element	Temporary development	Construction Phase	Operational Phase	Mitigation Measures Needed?
Ammonia	Construction of the Proposed Development can cause sediment to be disturbed, and this has the potential to alter the levels of physico-chemical elements within the water body. However, construction will not take place within the watercourse and construction of the Proposed Development will		Surface runoff will enter the watercourse via SuDS, this will reduce any impact to water quality or sediment processes within the watercourse, as per the OLEMP (Appendix 7.7), and therefore, to these quality elements.	No
Dissolved Oxygen				

Element	Temporary development	Construction Phase	Operational Phase	Mitigation Measures Needed?
Phosphate	be conducted in accordance with the CEMP and SMP to further mitigate this issue across all phases of the construction.		The reduction in intense sheep grazing (see OGMP, part of the OLEMP (Appendix 7.7)) will have a positive impact on water quality through sediment supply and physico-chemical composition alongside the SuDS.	
Temperature				
PH				

Hydromorphological Supporting Elements

4.2.5 The hydromorphological supporting elements could be impacted by the Proposed Development, which could impact the WFD classifications. Table 4.3 below explains any impacts from the temporary, construction, and operational phases of the Proposed Development and if mitigation measures will be required.

Table 4.3: Scoping Assessment of the hydromorphological elements - Lostrigg Beck WFD Water Body

Element	Temporary Development	Construction Phase	Operational Phase	Mitigation Measures Needed?
Connection to groundwater water body	Ancillary buildings that could potentially create new hardstanding for central inverter-transformer units and substation/switchgear buildings are included in the Proposed Development. These will reduce permeability in the Site. However, as the area these buildings will occupy will be small, the impact to the catchment's functions and groundwater connection will be negligible. Planting of vegetation within the Lostrigg Beck may improve groundwater connection due to improved infiltration.			No

Element	Temporary Development	Construction Phase	Operational Phase	Mitigation Measures Needed?
Quantity and dynamics of flow	The Proposed Development does not include in-channel works and therefore, will not alter the dynamics of flow to this water body, for any of the construction or operational stages of the Proposed Development. SuDS will allow surface water to continue to drain into the watercourse and therefore the quantity of flow will not be altered. Planting of vegetation within the Lostrigg Beck may improve flow diversity.			No
River continuity	The Proposed Development includes SuDS which will prevent increase in sediment input to the watercourse. Therefore, the Proposed Development will not be altering the river continuity or sediment processes within this water body, for any of the construction/operation. Planting of vegetation within the Lostrigg Beck will reduce sediment quantity in the channel, alongside the SuDS. The reduction in intense sheep grazing will have a positive impact on water quality through sediment supply and physico-chemical composition alongside the SuDS.			No
River Depth and Width	The Proposed Development does not include in-channel works and therefore, will not be altering the watercourse width or depth. Therefore, the Proposed Development will not impact this element. Planting of vegetation within the Lostrigg Beck may improve the width of the watercourse to a more natural state through the promotion of diverse flow types.			No
Structure and substrate of the riverbed	The Proposed Development is in the vicinity of the Lostrigg Beck but not in channel, therefore a CEMP will be used to avoid disruption, and the inclusion of SuDS will not cause any changes to the structure and substrates of the riverbed. This will be supported by the SMP and LEMP. Planting of vegetation within the Lostrigg Beck may adapt the structure and substrate of the riverbed.			No

4.2.6 Aquatic vegetation is not included within the design at this stage; however, the inclusion would have limited impact on flow as long as it is localised planting of non-dense vegetation. This feature would encourage fine sediment deposition within the vegetation and therefore have positive water quality impacts. This feature should be assessed with the design to ensure WFD compliance.

4.3 Step 2: Assessment of Potential Impacts – Lowca Beck Water Body

4.3.1 Section 3.2 summarises the WFD status of the Lowca Beck Water Body and the reasons for not achieving good status.

Biological Quality Elements

4.3.2 The biological elements could be impacted by the Proposed Development, which could impact the WFD classifications. Table 4.4 below explains any impacts from the temporary, construction, and operational phases of the Proposed Development and if mitigation measures will be required.

Table 4.4: Scoping assessment of the biological elements - Lowca Beck WFD Water Body

Element	Temporary Development	Construction Phase	Operational Phase	Mitigation Measures Needed?
Invertebrates	No changes to flow are expected as a result of the temporary activities required for constructing the Proposed Development and an OCEMP (Appendix 5.1), OSMP (Appendix 5.3) have been produced to mitigate against any changes to the sediment processes. Therefore, no impact to invertebrates, macrophytes or phytobenthos is expected.	The construction of the Proposed Development will not affect the watercourse flow or sediment processes. Construction will be conducted substantially in accordance with the OCEMP (Appendix 5.1) and OSMP (Appendix 5.3) to further mitigate the risk of a pollution incident occurring in the waterbody which may impact to invertebrates, macrophytes or phytobenthos.	The operation of the Proposed Development will not result in a change to flow, sediment or chemical components and will therefore not impact invertebrates, macrophytes or phytobenthos. The reduction in intense sheep grazing will have a positive impact on water quality through sediment supply and physico-chemical composition.	No
Macrophytes and Phytobenthos Combined				

4.3.3 An INNS assessment will be considered under a biosecurity plan (included within the OLEMP) (ES Appendix 7.7), occurring during operation to prevent spread if present. The biosecurity plan will be secured, if required, through the implementation of the LEMP via DCO Requirement.

Physico-Chemical Quality Elements

4.3.4 The physico-chemical elements could be impacted by the Proposed Development, which could impact the WFD classifications. Table 4.5 below explains any impacts from the temporary, construction, and operational phases of the Proposed Development and if mitigation measures will be required.

Table 4.5: Scoping assessment of the physico-chemical elements - Lowca Beck WFD Water Body

Element	Temporary development	Construction Phase	Operational Phase	Mitigation Measures Needed?
Ammonia	The temporary works required for construction of the Proposed Development can cause sediment to be disturbed, and this has the potential to alter the levels of physico-chemical elements. However, construction of the Proposed Development will not take place within watercourses, and construction will be conducted substantially in accordance with the OCEMP (Appendix 5.1) and OSMP (Appendix 5.3) to further mitigate this issue across construction of the Proposed Development.		Surface runoff will enter the watercourse via SuDS, this will reduce any impact to water quality or sediment processes within the watercourse and therefore, to these quality elements. The reduction in intense sheep grazing will have a positive impact on water quality through sediment supply and physico-chemical composition.	No
Dissolved Oxygen				
Phosphate				
Temperature				
PH				

Hydromorphological Supporting Elements

4.3.5 The hydromorphological supporting elements could be impacted by the Proposed Development, which could impact the WFD classifications. Table 4.6 below explains any impacts from the temporary, construction, and operational phases of the Proposed Development and if mitigation measures will be required.

Table 4.6: Scoping assessment of the hydromorphological elements - Lowca Beck WFD Water Body

Element	Temporary development	Construction Phase	Operational Phase	Mitigation Measures Needed?
Connection to groundwater water body	Ancillary buildings that could potentially create new hardstanding for central inverter-transformer units and substation/switchgear buildings are included in the Proposed Development. These will reduce permeability in the Site. However, as the area these buildings will occupy will be small, the impact to the catchment's functions and groundwater connection will be negligible.			No
Quantity and dynamics of flow	The Proposed Development does not include in-channel works and therefore, will not alter the dynamics of flow to this water body, for any of the phases of works. SuDS will allow surface water to continue to drain into the watercourse and therefore the quantity of flow will not be altered.			No
River continuity	The Proposed Development includes SuDS which will prevent increase in sediment input to the watercourse. Therefore, the Proposed Development will not be altering the river continuity or sediment processes within this water body, for any of the phases of works. The reduction in intense sheep grazing (as per the GMP) will have a positive impact on water quality through sediment supply and physico-chemical composition alongside the SuDS.			No
River Depth and Width	The Proposed Development does not include in-channel works and therefore, will not be altering the watercourse width or depth. Therefore, the Proposed Development will not impact this element.			No
Structure and substrate of the riverbed	The Proposed Development is not in the vicinity of the Lowca Beck, and the inclusion of SuDS means there will not be any changes to the structure and substrates of the riverbed from surface runoff.			No
Structure of riparian planting	The Proposed Development will not be altering the riparian cover for this waterbody, for any of the phases of works as The Lowca Beck is located away from the Site and no vegetation is to be disturbed.			No

4.3.6 Aquatic vegetation is not included within the design at this stage; however, the inclusion would have limited impact on flow as long as it is localised planting of non-dense vegetation. This feature would encourage fine sediment deposition within the vegetation and therefore have positive water quality impacts. This feature should be assessed with the design to ensure WFD compliance.

4.4 Outcome

4.4.1 No detrimental impact to the WFD water bodies is expected because of the Proposed Development. The Proposed Development will not prevent future improvement to either the Lostrigg Beck WFD Water Body and the Lowca Beck WFD Water Body.

4.4.2 It is possible that there may have a positive impact on the water quality due to reduced grazing, SuDS and planting within Lostrigg Beck.

5 Summary and Conclusions

5.1 WFD quality elements

5.1.1 The Proposed Development lies within WFD Water Body catchments:

- The Keekle (Upper) Water Body;
- The Marron Water Body;
- The Lostrigg Beck Water Body;
- The Lowca Beck Water Body; and
- The Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers Water Body.

5.1.2 Three of these water bodies were screened out as part of this WFD Assessment because the Proposed Development is deemed to not have an impact on them. The two screened in water bodies are the Lostrigg Beck Water Body and the Lowca Beck Water Body.

5.1.3 None of the water body elements for either the Lostrigg Beck Water Body or the Lowca Beck Water Body will be altered by the Proposed Development as the proposed mitigation measures and legal restrictions will be followed for all WFD Water Bodies. The mitigation measures will be detailed in:

- The CEMP, LEMP (and GMP), and OSMP to be secured by DCO Requirement, the ALC Report (Appendix 2.8), the OSMP (Appendix 5.3) and the OCEMP in ES Appendix 5.1; and
- The inclusion of SuDS, detailed design of which will be secured by DCO Requirement.

5.2 Next Steps

5.2.1 Aquatic vegetation is not included within the design at this stage; however, the inclusion could have positive water quality impacts and only localised impacts to flow if strategic planting occurs. This feature should be assessed with the design to ensure WFD compliance.

5.2.2 When the design for this Proposed Development is updated, this WFD assessment will need to be reviewed and updated accordingly.

5.3 Conclusion

5.3.1 It has been demonstrated that the Proposed Development will not have any significant impacts on the WFD water bodies and no additional mitigation measures are required beyond those detailed in the reports highlighted above.

5.3.2 The Proposed Development does not result in any change away from baseline conditions for the overall WFD water bodies, and as demonstrated, will not result in deterioration of any WFD water bodies discussed in this report.

5.3.3 The Proposed Development will not affect the ability for the key actions identified in the North West RBMP to be implemented for the catchment.

5.3.4 It is possible that the Proposed Development may have a positive impact on the waterbodies through reduced contamination from polluted surface runoff due to the reduced grazing, the use of SuDS, and the planting within Lostrigg Beck.

5.3.5 As such, the Proposed Development is compliant with the WFD and will not prevent the water bodies from achieving ‘Good’ status in the future.

Figures

Legend

- Order Limits
- Derwent and West Cumbria Lower Palaeozoic and Carboniferous Aquifers Water Body
- English Lake District World Heritage Site

Project Title

Dean Moor Solar Farm

Client

FVS Dean Moor Limited

Title

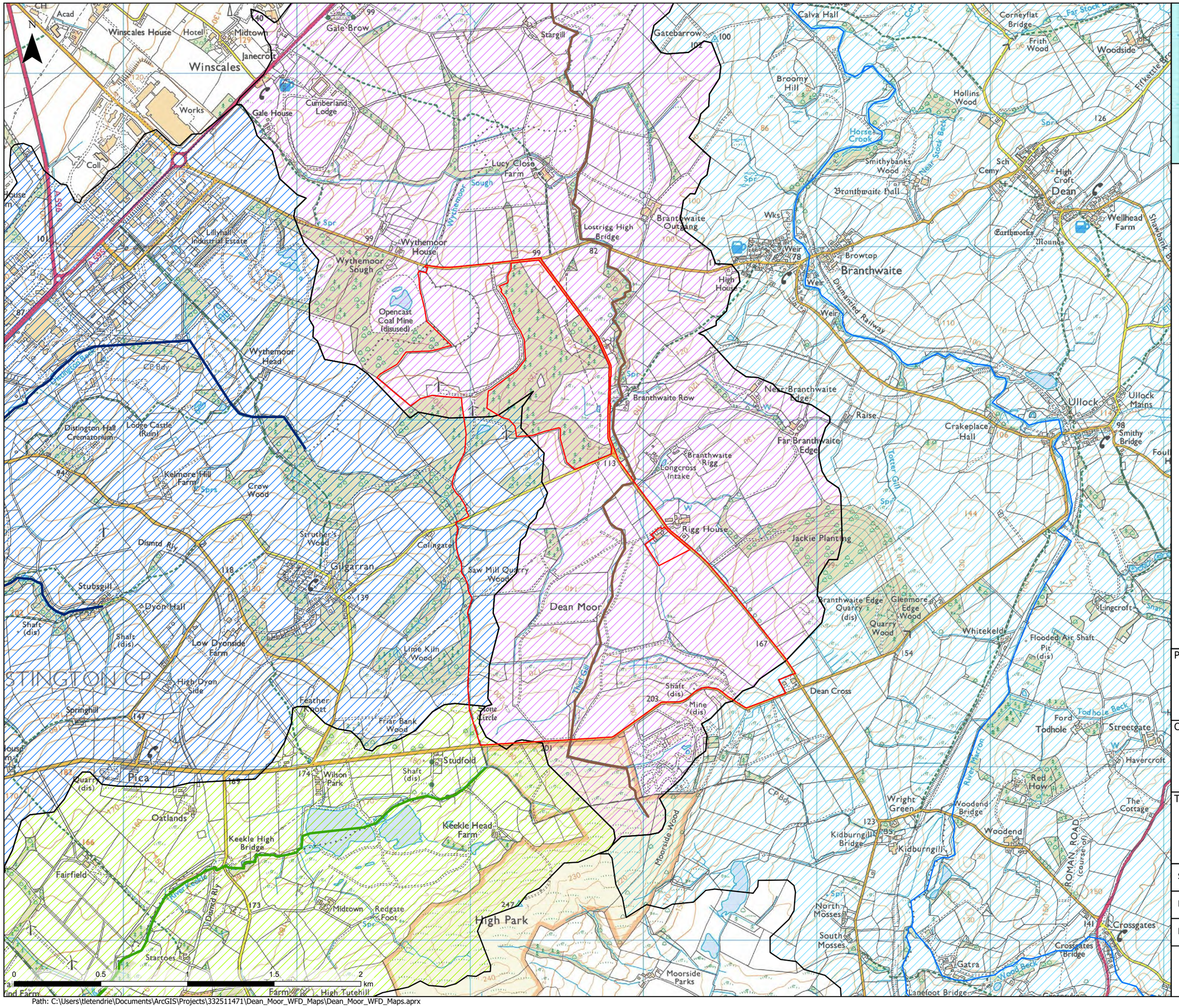
Water Framework Directive Groundwater Bodies

Scale: 1:250,000 @ A3	Date: 17/02/2025
Drawn: TL	Checked: GP
Figure: 2.1	Rev: A

Stantec

0 5 10 15 20 km

Path: C:\Users\tletendrie\Documents\ArcGIS\Projects\332511471\Dean_Moor_WFD_Maps\Dean_Moor_WFD_Maps.aprx



Legend

- Site Boundary

Watercourse

- Marron
- Lostrigg Beck
- Keekle Upper
- Lowca Beck

Catchment

- Marron
- Lowca Beck
- Keekle Upper
- Lostrigg Beck

Project Title

Dean Moor Solar Farm

Client

FVS Dean Moor Limited

Title

Water Framework Directive Waterbodies

Scale: 1:20,000 @ A3	Date: 17/02/2025
Drawn: TL	Checked: GP
Figure: 2.2	Rev: A

Stantec

Path: C:\Users\tletendrie\Documents\ArcGIS\Projects\332511471\Dean_Moor_WFD_Maps\Dean_Moor_WFD_Maps.aprx