Light Valley Solar

Environmental Statement Volume 3

Appendix 6.5: Fish Habitat Assessment and eDNA Survey (Aquatics Report)

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Light Valley Solar

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Light Valley Solar

DCO Submission

Appendix 6.5: Fish Habitat Assessment and eDNA Survey (Aquatics Report)

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1 Introduction

1.1 Site background

1.1.1 This fish habitat assessment and eDNA metabarcoding report has been produced by Ove Arup & Partners Ltd. (Arup) on behalf of Light Valley Solar Limited ('The Applicant'). The Proposed Development comprises a solar photovoltaic (PV) electricity generating station of over 100 megawatts (MW) and 'associated development' comprising a Battery Energy Storage System (BESS), grid connection infrastructure and other infrastructure integral to the construction, operation and maintenance, and decommissioning phases.

1.1.2 The Order Limits is made up of four broad areas, the Solar Development Sites (approximately 900 ha), Cable Route Corridor (approximately 328.5 ha), Site 8 Access Area (approximately 24.1 ha) and Highways Improvement Areas (17.1 ha).

1.1.3 The Solar Development Sites are split across a total of seven separate land parcels (Solar Development Sites 1-4 and 6-8) as presented in Figure 2.1: Illustrative Site Layout Plans (ES Volume 2) **[EN0110012/APP/LVS/06.02.02.01]** and in the Outline Environmental Masterplan (ES Volume 2) [**EN0110012/APP/LVS/02.12]**. The Solar Development Sites largely comprise agricultural fields bound by hedgerows, ditches, and mature trees, with smaller areas of woodland, grassland and scrub. The Cable Route Corridor is similarly comprised of agricultural fields and associated boundary features and crosses the River Ouse and Selby Dam.

1.1.4 The Cable Route Corridor is the area within which the export connection cables (hereafter referred to as the 'Grid Connection Cables') would be located to connect the Solar PV Sites to the National Grid at the existing Monk Fryston Substation (hereafter referred to as the 'Existing National Grid Monk Fryston Substation') and the area within which cables connecting the Solar Development Sites would be located (hereafter referred to as 'Interconnecting Cables') (refer to Figure 2.1: Illustrative Site Layout Plan (ES Volume 2) [**EN0110012/APP/LVS/06.02.02.01]**.

1.1.5 The entirety of the Order Limits is within the administrative area of North Yorkshire Council and falls within what was Selby district.

1.2 Report objectives

1.2.1 This survey report aims to assess fish habitat and suitability for fish species of conservation value within the Solar Development Sites and Cable Route Corridor. It provides a fisheries baseline that will inform the potential for construction and operations phase impacts.

1.2.2 This document does not include as assessment of the potential fisheries impacts resulting from construction and operation of the Proposed Development. This assessment in included in Chapter 6: Biodiversity (ES Volume 1)

[**EN0110012/APP/LVS/06.01.06.00**], Appendix 15.2: Water Environment Regulations (Water Framework Directive) Compliance Assessment (ES Volume 3) [**EN0110012/APP/LVS/06.03.15.02**] and the Shadow Habitats Regulations Assessment Report **[EN0110012/APP/LVS/05.11]**.

1.3 Legislation and policy framework

Legislation

1.3.1 A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. Legislation relevant to fish and discussed within this report are:

1) Salmon and Freshwater Fisheries Act 1975 (as amended) (Ref 1);
2) Natural Environment and Rural Communities (NERC) Act 2006 (Ref 2);
3) The Conservation of Habitats and Species Regulations 2017 (as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations, 2019) (Ref 3);
4) The Water Framework Directive (WFD) 2000/60/EC (Ref 4); and
5) Eels (England and Wales) Regulations 2009 (Ref 5).

1.3.2 Further information on relevant legislation and policy is contained within Chapter 6: Biodiversity (ES Volume 1) [**EN0110012/APP/LVS/06.01.06.00**].

Salmon and Freshwater Fisheries Act 1975

1.3.3 All species of freshwater fish are protected under the Salmon and Freshwater Fisheries Act (SaFFA) 1975 (as amended). SaFFA aims to protect freshwater fish and their habitats, with a particularly strong focus on salmonid species. The legislation covers a broad range of topics, but of particular relevance to development are those sections covering water pollution, habitat disturbance and fish migration routes. Under Section 2 (4) it is an offence to wilfully disturb spawn, spawning fish or spawning areas, and under Section 4 (1) it is an offence to knowingly permit the flow of poisonous matter and polluting effluents into river courses that are poisonous or injurious to fish or the spawning grounds, spawn or food of fish.

1.3.4 Sections 9 to 15 are concerned with fish passage and migration routes. It is the duty of the waterway owner that when constructing dams, screens or sluices to provide and maintain a facilitating fish pass for migrating salmon or trout.

Natural Environment and Rural Communities Act 2006

1.3.5 The NERC Act 2006 is designed to help achieve a rich and diverse natural environment and thriving rural communities. Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The S41 list

is used to guide decision-makers such as public bodies, including the Secretary of State, in implementing their duty under Section 40.

1.3.6 Under Section 40 there is a Duty to conserve biodiversity; specifically, Subsection (1) states *"Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity."*

1.3.7 The following freshwater fish are listed as Species of Principal Importance (SoPI) under S41: common sturgeon (*Acipenser sturio*), allis ahad (*Alosa alosa*), twaite shad (*Alosa fallax*), European eel (*Anguilla anguilla*), spined loach (*Cobitis taenia*), vendace (*Coregonus albula*), whitefish (*Coregonus lavaretus*), burbot (*Lota lota*), Atlantic salmon (*Salmo salar*), brown/sea trout (*Salmo trutta*), Arctic charr (*Salvelinus alpinus*), river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*).

The Conservation of Habitats and Species Regulations 2017 (as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations, 2019)

1.3.8 The European Council Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna, 1992, often referred to as the 'Habitats Directive', provides for the protection of key habitats and species considered of European importance. Annexes II and IV of the Directive list all species considered of community interest. The legal framework to protect the species covered by the Habitats Directive has been enacted under UK law through The Conservation of Habitats and Species Regulations 2017 (as amended). UK freshwater fish species listed on Annex II are: allis shad, brook lamprey (Lampetra planeri), twaite shad, sea lamprey, spined loach, river lamprey, European bullhead (Cottus gobio) and Atlantic salmon. These species and the habitats that support them are protected under the Habitats Directive when associated with Natura 2000 site. Outside of a Natura 2000 site, these species are still considered to be of conservation value. Annex IV species are afforded a strict protection across their entire natural range within the EU, both within and outside Natura 2000 sites; common sturgeon are listed on Annex IV.

1.3.9 This technical report provides the baseline data underpinning the Shadow Habitats Regulations Assessment Report **[EN0110012/APP/LVS/05.11]**.

The Water Framework Directive 2000/60/EC

1.3.10 The WFD is a legal framework for the protection and restoration of inland surface waters, transitional water, coastal waters and groundwater. The WFD introduced a comprehensive river basin management planning system to help protect and improve the ecological health of the water environment. This is underpinned by the use of environmental standards to help assess risks to the ecological quality of the water environment and to identify the scale of improvements that would be needed to bring waters under pressure back into a good condition.

1.3.11 The requirements of the WFD are implemented in the United Kingdom through the Water Environment (WFD) (England and Wales) Regulations 2017 (Ref 4). These regulations transpose the Directive's objectives into domestic law, providing the statutory basis for river basin management planning, environmental standards, and the assessment of activities that may affect water bodies.

1.3.12 Under WFD many activities need approval before they can go ahead. A WFD assessment is required to enable the public body that regulates and grants permissions for the proposed activity to provide consent.

1.3.13 The WFD aim is for all water bodies to be at good status. A WFD assessment must demonstrate that an activity will not:

1) Cause or contribute to deterioration of status; or

2) Jeopardise the water body achieving good status in future.

1.3.14 Fish are one of the biological quality elements (along with *"macroinvertebrates"* and *"macrophytes and phytobenthos combined"*) typically used to provide WFD status in rivers and form part of the WFD assessment.

Eels (England and Wales) Regulations 2009

1.3.15 The Eels (England and Wales) Regulations 2009 implement Council Regulation (EC) No 1100/2007 of the Council of the European Union (Ref 5), establishing measures for the recovery of the stock of European eel. The Regulations are focussed on the management of commercial eel fisheries (licences, catch returns and restocking) and the passage/migration of eels. The regulations afford powers to the regulators (Environment Agency and Natural Resources Wales) to implement recovery measures in all freshwater and estuarine waters in England and Wales.

1.3.16 Part 4 of the regulations is concerned with the passage of eels and makes it a legal requirement to notify the regulator of the construction, alteration or maintenance of any structure likely to affect the passage of eels. This includes water intakes and outfalls, dams and weirs, sluices or any other in-river obstruction. Where any such structure exists, the owner, occupier or person in charge of the land on which the dam, structure or obstruction lies may be required to construct and operate an eel pass to allow the free passage of eels.

Other relevant policy and guidance

1.3.17 In addition to compliance with the NPS and NPPF, this report has been written in accordance with professional standards and guidance. The standard and guidance which relates to the assessment are the Guidance for Ecological Impact Assessment in the United Kingdom Third Edition (Chartered Institute of Ecology and Environmental Management, 2018) (Ref 6).

2 Methodology

2.1 Desk study

Designated sites

2.1.1 A search for designated sites, where fish are a qualifying feature, was undertaken as part of the desk study. Potential sites were identified using Magic Map (Ref 7).

Environment Agency fisheries data

2.1.2 The Environment Agency Ecology and Fish Data Explorer (Ref 8) and GIS were used to identify Environment Agency fish survey (electric fishing) sites located within the Solar Development Sites and Cable Route Corridor plus a 2km buffer.

2.1.3 The search was also extended to include watercourses that intersect the Solar Development Sites and Cable Route Corridor. These sites were selected based on ecological relevance, hydrological connectivity, and their potential to inform understanding of fish distribution in relation to the Proposed Development. Data spanning the period from 2015 to 2025 was incorporated into the desk study. Where relevant, earlier survey records were also considered to provide additional context or to supplement gaps in recent monitoring data.

2.1.4 The Environment Agency survey species lists identified were screened for protected and/or notable fish species as defined in legislation (see Section 1.3).

Biological records search

2.1.5 Protected and notable species records within a 2 km radius surrounding the Solar Development Sites and Cable Route Corridor were obtained from the North and East Yorkshire Ecological Data Centre (NEYEDC).

2.1.6 Records dated within ten years of this assessment have been assessed within the context of the Solar Development Sites and Cable Route Corridor. Where relevant, earlier survey records were also considered to provide additional context or to supplement gaps in recent monitoring data.

2.1.7 To supplement the biological records search, commercially licensed data were obtained from the National Biodiversity Network (NBN) Atlas (Ref 9).

2.2 Field survey

Survey aims

2.2.1 A Fish Habitat Assessment was undertaken in spring 2025. The surveys were required:

1) To characterise the baseline habitat in rivers that interact with the scheme and identify suitable habitats for protected and notable aquatic species,

including the qualifying features of the Humber Estuary Special Area of Conservation (SAC) and the River Derwent SAC;

2) To define fish species assemblage at representative locations throughout the Solar Development Sites and Cable Route Corridor; and

3) To identify opportunities for mitigation and/or enhancement.

Screening

2.2.2 A total of 36 watercourses were identified and screened for inclusion in the Fish Habitat Assessment, based on the alignment of the Cable Route Corridor and Solar Development Sites at the time of survey, supplemented by desk-based data. The survey locations are presented in Table 2-2 and Figure 6.12: Fish Habitat Assessment, EA monitoring Locations and eDNA Survey Locations (Volume 2) [**EN0110012/APP/LVS/06.02.06.12**]. Where possible, a 100 m survey reach, extending 50 m upstream and 50 m downstream from the centre point of the Cable Route Corridor, was undertaken to assess habitat suitability.

Fish habitat assessment

2.2.3 An assessment of the fish habitat present within the vicinity of each watercourse crossing was undertaken.

2.2.4 Habitat descriptions (Table 2-1) were adapted from the Environment Agency Fisheries Technical Manual 4 – Restoration of riverine salmon habitats (Ref 10). Juvenile lamprey habitat definitions were based on descriptions in Conserving Natura 2000 Rivers: Monitoring the River, Brook and Sea Lamprey (Ref 11).

2.2.5 The main objective of the method is to obtain a detailed representation of the precise location, extent, condition and juxtaposition of habitats within the wetted width of the river. Crucially, the ‘habitat’ types for salmonids (e.g. fry, parr, mixed juvenile etc.), as opposed to ‘flow’ types, are recorded. Fish habitat types are defined by the interaction of the following variables: water depth; water velocity; substrate composition; and cover as described in Table 2-1.

Table 2-1 Fish Habitat Types Adapted From Hendry and Cragg-Hine (1997) and Harvey Cowx (2003)

Habitat Type	Definition
Spawning gravel	Ideally stable (but not compacted) gravel. Mean grain size ≤ 25mm for trout and up to 80mm for salmon. 'Fines' (< 2mm grain size) to be less than 20% by weight. Water depth 17–76cm. Velocity 25–90cm/s.
Fry habitat	Shallow fast flowing (50–65cm/s) water (predominantly run and riffle). Water depth ≤ 20cm. Substrate pebble and cobble dominated.
Parr habitat	Fast flowing water generally with a broken surface (predominantly run and riffle). Water depth 20–40cm. Substrate cobble and boulder dominated.
Mixed juvenile (parr/fry)	Sections of river with varied depth and substrate, with localised habitat areas meeting the definition of both fry and parr habitat.
Run (adult)	Fast flowing water with a broken surface that is deeper than 40cm. Water depth > 40cm. Substrate varied, often not visible.
Pools (adult)	No perceptible flow, smooth surface. Water depth usually > 0.6m. Substrate typically fine; often not visible.
Glides (adult)	Smooth surface with little turbulence. Water depth typically < 30cm. Substrate generally fine dominated by pebbles and fines.
Juvenile lamprey habitat	Optimal habitat: stable fine sediment or sand > 15cm deep, low water velocity and the presence of organic detritus. Sub-optimal habitat: shallow sediment, often patchy and interspersed among coarser substrates. Also includes areas of organic detritus overlying bedrock, submerged tree roots trapping organic material, submerged silt banks, silt-dominated cattle drinks, and submerged bankside vegetation rooted in sand/silt.

2.2.6 Further to in-stream habitat, additional features of the watercourse were recorded to provide a broader understanding of the watercourse, anthropogenic modifications and any pressures which may alter the suitability of the river for fish. Where present, this included:

1) In-stream and riparian habitat features such as width-depth measurements, exposed substrate, bars, macrophytes, redds and coarse woody debris;
2) In-stream obstacles to fish passage including natural obstacles, weirs, sluices, pumping stations, dams, flap gates, culverts and fords. These obstacles were observed for fish passability based on professional judgement;
3) Point and diffuse sources of catchment pollution including domestic and industrial discharges or runoff, arable fields, livestock fields and forestry plantations; and
4) River abstractions and details on fish screening facilities.

eDNA and metabarcoding

2.2.7 Environmental DNA (eDNA) was collected from five representative watercourses at each Cable Route Corridor crossing point to determine the presence of fish species and white-clawed crayfish (*Austropotamobius pallipes*) (Figure 6.12). The sampling procedure followed the NatureMetrics Aquatic eDNA manual filtration protocol. Samples were collected on a single occasion in May 2025 and sent to NatureMetrics Ltd. for laboratory analysis. These sites were selected to reflect the prevailing habitat characteristics and ecological conditions of the wider network of hydrologically connected watercourses. A targeted approach was adopted rather than sampling every crossing, as many of the watercourses are in close proximity, share similar flow regimes, or are directly connected. eDNA was collected from five representative river water samples.

2.2.8 DNA from each filter was extracted in the laboratory using a commercial DNA extraction kit with a protocol modified to increase DNA yields. An extraction blank was also processed for the extraction batch. DNA was purified to remove polymerase chain reaction (PCR) inhibitors using a commercial purification kit.

2.2.9 DNA yields were as expected, and the DNA was tested with a 16S bacterial PCR to determine the presence of PCR inhibitors and/or DNA degradation in the samples. The samples successfully amplified, indicating no inhibition or degradation.

2.2.10 Purified DNAs were amplified with PCR for a hypervariable region of the 12S rRNA gene to target vertebrates as part of the *"vertebrates"* eDNA metabarcoding analysis; this analysis is considered to be very effective in determining the presence of fish. NatureMetrics standard analysis includes 12 replicate PCRs per sample.

2.2.11 All PCRs were performed in the presence of both a negative control and a positive control sample (a mock community with a known composition). Amplification success was determined by gel electrophoresis.

2.3 Assumptions and limitations

2.3.1 Surveys could not be undertaken at certain sites, either as watercourses were dry, culverted or were classified as ditches and unsuitable for supporting fish and white-clawed crayfish. A summary of surveys undertaken at each site and limitations is denoted in Table 2-2.

2.3.2 A cross-section of indicative wet sites was selected for eDNA sampling to provide representative coverage across the Cable Route Corridor. Where sampling was not undertaken, ecological assumptions regarding species presence and habitat suitability were informed by the physical characteristics of the watercourse, its hydrological connectivity to eDNA sampling sites, and relevant desk-based datasets. This approach ensured that the assessment remained precautionary and ecologically robust, despite gaps in direct sampling coverage.

2.3.3 Analysis of eDNA samples collected from Selby Dam and Swinbank Dyke did not contain sufficient amplifiable DNA to generate a list of fish species. At Selby Dam, dense riparian vegetation, steep banks, and deep water restricted access for eDNA sampling. Consequently, sampling was limited to small, accessible margins, which may not accurately reflect the broader aquatic environment. This restricted coverage increases the likelihood of a false negative, where fish may be present but remain undetected due to constrained sampling access. In contrast, full access was achieved at Swinbank Dyke; however, the prevailing habitat throughout the watercourse was generally considered unsuitable for fish. Based on field observations, the eDNA result at Swinbank Dyke is assessed as representative of a confirmed absence of fish species. Where no amplifiable DNA was recorded at sampling locations, desk study data and habitat assessments were used to inform fish status. This approach ensures the overall validity of the assessment is maintained despite the absence of eDNA results.

2.3.4 eDNA sampling is only feasible in waterbodies that contain a minimum water depth of approximately 5–10 cm at the time of survey. Watercourses that were dry during the sampling period are excluded from the survey, even if they are known to hold water seasonally or intermittently. This temporal limitation means that potentially suitable habitats may be underrepresented in the dataset, particularly in systems with variable hydrology or ephemeral flow regimes.

2.3.5 The findings presented in this report represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of species, such as migration patterns and behaviour. The absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

2.3.6 Access restrictions at certain sites (Table 2-2) limited the ability to conduct eDNA sampling. However, the watercourses across the study area exhibited broadly similar physical and ecological characteristics. This consistency enabled the use of professional judgement and habitat assessments to reliably infer likely fish presence or absence. As a result, the absence of eDNA data at some locations is not considered to significantly compromise the overall validity of the findings.

2.3.7 An eDNA sample was not collected at the River Ouse due to depth, elevated turbidity levels and associated health and safety considerations. However, the River Ouse is a well-established migratory corridor for species of conservation value, including sea lamprey, river lamprey, and anadromous salmonids. Furthermore, EA monitoring data from a location approximately 15.7 km upstream of CRC 1-4 has recorded the presence of Atlantic salmon and *Lampetra* species, providing clear evidence that this section of the River Ouse supports migratory passage for these taxa. Accordingly, the absence of eDNA sampling at this location does not undermine the validity of the assessment, as the ecological importance of the watercourse for migratory species is well-documented through existing datasets.

2.3.8 Any grid references provided within this report are approximate (obtained through handheld GPS devices) and are to be used as a guide only.

Table 2-2 Summary of surveys completed at each site

Watercourse	Site Location	eDNA sampling site (y/n)	Fish habitat assessment site (y/n)	Limitations
Chatterton Dyke	Solar Development Site 1	n	y	
Pallion Dyke	Solar Development Site 1	n	y	
Whinchat Dyke	Solar Development Site 1	n	y	
Common Drain[1]	Solar Development Site 1	n	y	
Dam Dike	Solar Development Site 1, CRC 1-4	y	y	
Hopney Stable Dyke	CRC 1-4	n	y	
Swinbank Dike	CRC 1-4	y	y	For limitations refer to Section 2.3.3
Holmes Dyke	CRC 1-4	n	y	
Marsh Dyke	CRC 1-4	n	y	
West Field Dyke	CRC 1-4	n	y	Dry at time of survey
Angram Clough	CRC 1-4	n	y	
Old Ings Dyke	CRC 1-4	y	y	
River Ouse	CRC 1-4	n	y	
Ings drain	CRC 1-4	n	y	
Lordship Lane Drain	CRC 1-4	y	y	

[1] Located adjacent to Solar Development Site 1 and tributary of Pallion Dyke.

Watercourse	Site Location	eDNA sampling site (y/n)	Fish habitat assessment site (y/n)	Limitations
Gibbet Lane Drain	CRC 1-4	n	n	No access to land permitted
Black Fen Drain	CRC 1-4	y	n	No access to land permitted
Cockret Dyke	CRC 1-4	n	y	Dry at time of survey
Maspin Moor Drain	Solar Development Site 3, Solar Development Site 4	n	y	
Hagg Lane Drain	Solar Development Site 4	n	y	
Mearley Drain	Solar Development Site 4	n	y	
The Fleet	Solar Development Site 3, Solar Development Site 4	n	y	
Tributary of Maspin Moor Drain	Solar Development Site 3 and CRC 2-4	y	n	No access to land permitted
Hillam Common Drain	CRC 2-4	n	n	No access to land permitted
Breckswood Drain	CRC 2-4	n	n	No access to land permitted
Outwoods Drain	CRC 1-4	n	y	
Selby Dam	CRC 1-4	y	y	For limitations refer to Section 2.3.3
Town Dike	CRC 1-4	y	y	Dry at time of survey. No eDNA sample taken
Morton Drain	CRC 1-4	n	y	
Causeway Dike	Solar Development Site 2 and CRC 2-8	y	y	Dry at time of survey. No eDNA sample taken
Fleet Dike	Solar Development Site 2 and CRC 2-6	y	n	No access to land permitted
Common Drain	CRC 2-6	y	n	No access to land permitted
Habholme Dike	Solar Development Site 2, Solar Development Site 8 and CRC 2-6	n	y	

Watercourse	Site Location	eDNA sampling site (y/n)	Fish habitat assessment site (y/n)	Limitations
Unnamed tributary of Low Common Drain 1	Solar Development Site 6	n	y	
Unnamed tributary of Low Common Drain 2	Solar Development Site 7	n	y	
Lumbly / Low Common Drain	Solar Development Site 1	n	y	

3 Results

3.1 Desk study

Designated sites

3.1.1 The data search identified two European designated sites, where fish are a qualifying interest, within 20 km of the Solar Development Sites and Cable Route Corridor. Details of these European sites are provided in Table 3-1, with locations shown on Figure 6.1: Statutory Designated Sites - International Designations 20 km (ES Volume 2) **[EN0110012/APP/LVS/06.02.06.01]**.

Table 3-1 European statutory designated sites within 10 km of Solar Development Sites and Cable Route Corridor

Site name	Designation	Location	Reason for designation
River Derwent	SAC	3 km east of Solar Development Site 1	Designated for the following Annex I Habitat: 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachio*n vegetation Designated for the following Annex II Species: ▪ 1099 River lamprey (Primary reason for site selection). ▪ 1095 Sea lamprey ▪ 1163 Bullhead ▪ 1355 Otter
Humber Estuary	SAC	13.7 km east of Cable Route Corridor accesses. 24 km downstream of Cable Route Crossing on the River Ouse.	Designated for the following Annex I Habitat: ▪ 1130 Estuaries (Primary reason for site selection); ▪ 1140 Mudflats and sandflats not covered by seawater at low tide; ▪ 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae); ▪ 1310 *Salicornia* and other annuals colonising mud and sand; ▪ 1150 Coastal lagoons; ▪ 1110 Sandbanks slightly covered by sea water all the time; ▪ 2110 Embryonic shifting dunes; ▪ 2120 Shifting dunes with *Ammophila arenaria* ("white dunes"); ▪ 2130 Fixed dunes with herbaceous vegetation ("grey dunes"); and ▪ 2160 Dunes with Hippophae rhamnoides; Designated for the following Annex II Species:

Site name	Designation	Location	Reason for designation
			▪ 1095 Sea lamprey; ▪ 1099 River lamprey; and ▪ 1364 Grey seal (*Halichoerus grypus*).

EA fisheries data

3.1.2 The data search did not return any records of fish or EA monitoring locations within the Solar Development Sites or within the Cable Route Corridor. However, three EA monitoring locations were identified within 2 km of the Solar Development Sites and Cable Route Corridor. An additional four EA monitoring locations were identified in watercourses that intersect or are hydrologically connected to these areas, providing relevant context for assessing potential fish presence. These sites were selected based on ecological relevance, hydrological connectivity, and their potential to inform understanding of fish distribution in relation to the Proposed Development.

3.1.3 A total of six fish species of conservation value were identified within the desk study: Atlantic salmon, European eel, Bullhead (*Cottus gobio*), *lampetra* species, twaite shad, and allis shad. Although records for allis shad and twaite shad are over ten years old, they have been included due to the species' conservation importance and the relevance of historical distribution data. Full records from monitoring surveys are outlined below in Table 3-2.

Table 3-2 Records of fish species from EA annual fishing surveys

Fig ref	Site name	Site ID	National Grid Reference	Approximate Distance (at closest point)	Date(s)	Species	Designation[2]
1	Selby Dam at Low Rest Park Farm	76743	SE 54368 32835	10 m northeast Order Limits (3.6 km upstream of CRC 1-4	18/07/2022, 11/06/2024	10-spined stickleback (*Pungitius pungitius*)	
						3-spined stickleback (*Gasterosteus aculeatus*)	
						European eel / elvers	Critically Endangered (IUCN) (**Ref 12**). Eels Regulations (2009). NERC S.41.
						Roach (*Rutilus rutilus*)	
						Stone loach (*Barbatula barbatula*)	
2	Selby Dam at Meadway	45354	SE 58903 31820	1.3 km east (1.5 km downstream of CRC 1-4)	14/06/2016	European eel / elvers	Critically Endangered (IUCN). Eels Regulations (2009). NERC S.41.
						Perch (*Perca fluviatilis*)	
						Pike (*Esox lucius*)	
						Roach	
						Rudd (*Scardinius erythrophthalmus*)	
3	Chapel Haddelsey - Fry Survey	42078	SE 57584 26282	3 km east of Solar Development Site 4	28/08/2015, 19/08/2016, 06/09/2017, 07/10/2019, 15/08/2024	3-spined stickleback	
						Bleak (*Alburnus alburnus*)	
						Chub (*Squalius cephalus*)	
						Dace (*Leuciscus leuciscus*)	
						Gudgeon (*Gobio gobio*)	

[2] Note all freshwater fish are afforded protection under the Salmon and Freshwater Fisheries Act 1975 (as amended).

Fig ref	Site name	Site ID	National Grid Reference	Approximate Distance (at closest point)	Date(s)	Species	Designation[2]
						Minnow (*Phoxinus phoxinus*)	
						Perch	
						Roach	
4	Stillingfleet eel survey	44701	SE 59284 40898	4.45 km northwest of CRC 1-4	30/06/2016, 05/08/2024	3-spined stickleback	
						Bleak	
						Chub	
						Dace	
						European eel / elvers	Critically Endangered (IUCN). Eels Regulations (2009). NERC S.41.
						Flounder (*Platichthys flesus*)	
						Golden rudd (*Scardinius erythrophthalmus*)	
						Minnow	
						Roach	
						Rudd	
						Stone loach	
5	Naburn Weir (River Ouse)	3751	SE 59370 44485	5 km northwest (15.7km upstream of CRC 1-4)	21/07/2000[3], 28/07/2008[3], 10/07/2015, 11/07/2016, 21/06/2018, 28/06/2019,	Atlantic salmon	GB Endangered (IUCN) (**Ref 13**). NERC S.41.
						Barbel (*Barbus barbus*)	
						Bleak	
						European eel / elvers	Critically Endangered (IUCN). Eels

[3] Most recent record of shad species at monitoring location within the River Ouse

Fig ref	Site name	Site ID	National Grid Reference	Approximate Distance (at closest point)	Date(s)	Species	Designation[2]
					06/08/2025		Regulations (2009). NERC S.41.
						Lampetra sp. (ammocoete)	Habitats Directive (Annex 2), NERC S.41.
						Pike	
						Roach	
						Allis shad	Vulnerable (IUCN). Habitats Directive (Annexes 2 & 5). Bern Convention (Appendix III). NERC S.41. Wildlife and Countryside Act 1981 (Schedule 5)
						Twaite shad	Habitats Directive (Annexes 2 & 5). Bern Convention (Appendix III). NERC S.41. Wildlife and Countryside Act 1981 (Schedule 5).
6	Bubwith - Fry Survey (River Derwent)	42076	SE 70795 36275	6.6 km southeast of Solar Development Site 1	28/08/2015, 19/08/2016, 06/09/2017, 07/09/2018, 07/10/2019, 19/08/2024	3-spined stickleback	
						Bleak	
						Bullhead	Habitats Directive (Annex 2).
						Chub	
						Common bream (*Abramis brama*)	
						Dace	
						Gudgeon	
						Minnow	

Fig ref	Site name	Site ID	National Grid Reference	Approximate Distance (at closest point)	Date(s)	Species	Designation[2]
						Perch	
						Pike	
						Roach	
						Silver bream (*Blicca bjoerkna*)	
						Stone loach	
7	Holme Green	55285	SE 55488 41651	7.5 km west of CRC 1-4	22/06/2015	10-spined stickleback	
						3-spined stickleback	
						Minnow	

Biological records search

3.1.4 Eight individual records of European eel were identified within 2 km of the Solar Development Sites and Cable Route Corridor as summarised in Table 3-3. The most recent record dates to 2014, located at Selby Dam at Meadway. Two records were recorded downstream of the A19 road bridge at Riccall Dam (Dam Dike), both dating back to 1990. Additional records were found at Chapel Haddlesey on the River Aire, and Beal Carrs, with dates ranging from 2000 to 2009. Although all records are over ten years old, they have been included due to the species' conservation importance and the relevance of historical distribution data.

Table 3-3 Summary of North-East and Yorkshire ecological data centre data

Species	Date	Approximate distance (at closest point)	Grid Reference	Site name
European eel	Unknown, 2000	500m south of Solar Development Site 4	SE543262	River Aire
European eel	06/08/2000	1.3km south of Solar Development Site 4	SE544254	Beal Carrs
European eel	27/06/1990	1km southeast of CRC 1-4	SE612378	Ricall Dam (Dam Dike)
European eel	05/06/2014	1.25km east of CRC 1-4	SE589318	Selby Dam at Meadway
European eel	27/06/1990	1.1km southeast of CRC 1-4	SE625387	Ricall Dam downstream of A19
Brown/Sea trout	01/09/1998	1.3km south of CRC 4-POC	SE534255	Beal, River Aire
European eel	25/06/2009	3 km east of Solar Development Site 4	SE575262	Chappel Haddlesey, River Aire upstream of A19
European eel	14/09/2004	3 km east of Solar Development Site 4	SE576263	Chappel Haddlesey, River Aire upstream of A19
European eel	09/08/2011	2.7km east of CRC 1-4	SE614325	Selby Dam at pumping station

3.1.5 No white-clawed crayfish records were returned from NEYDC during the desk study. However, a single commercially available (undated) record of white-clawed crayfish was recorded approximately 3.5 km east of Solar Development Site 1, within Wheldrake Ings Nature Reserve.

3.2 Field study

Fish habitat assessment

3.2.1 The Fish Habitat Assessment Survey locations are illustrated in Figure 6.12: Fish Habitat Assessment, EA monitoring and eDNA Survey Locations [**EN0110012/APP/LVS/06.02.06.12**].

Solar Development Site 1

Chatterton Dyke

3.2.2 Chatterton Dyke was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

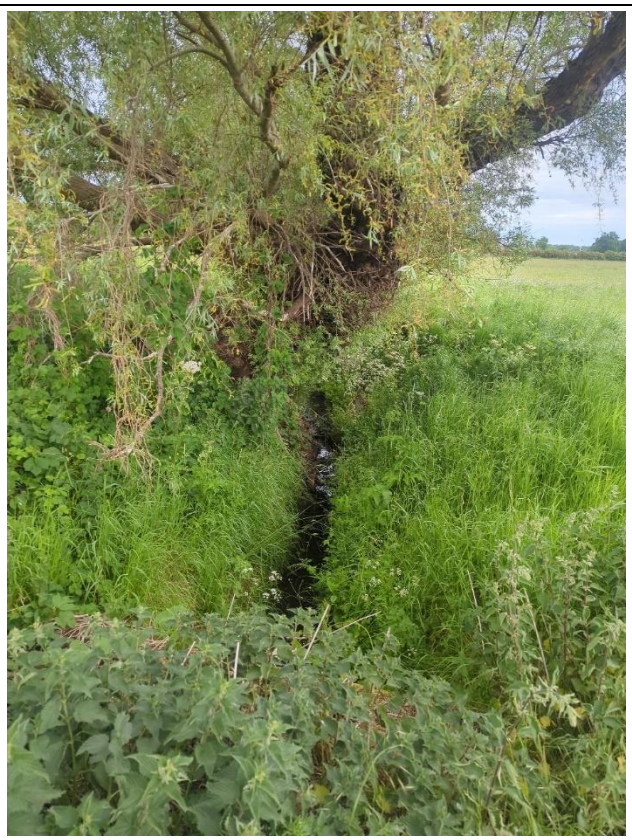
3.2.3 The watercourse was predominantly bordered by agricultural land use. Instream habitat was typically degraded with substrate comprising silt, fine particulate matter, and organic debris. Chatterton Dyke was predominantly dry throughout the reach, with isolated pools of shallow water present (depth <10 cm).

3.2.4 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only one minor fish species; nine-spined stickleback (See Table 3-4), was recorded downstream at the sampling location on Dam Dike.

3.2.5 No physical barriers to fish passage were identified at the time of survey.

Plate 1 Chatterton Dyke

Downstream of Chatterton Dyke taken from culverted track section.



Upstream of Chatterton Dyke taken from culverted track section.

Whinchat Dyke

3.2.6 Whinchat Dyke was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.7 Similar to Chatterton Dyke, the watercourse was predominantly bordered by agricultural land use. Instream habitat was typically degraded with substrate comprising silt, fine particulate matter, and organic debris. Small areas of localised gravels were also present; however, these areas were heavily compacted. Water depth throughout Whinchat Dyke was approximately 10 cm and no perceptible flow was observed within the channel.

3.2.8 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only one minor fish species; nine-spined stickleback (See Table 3-4), was recorded downstream at the sampling location on Dam Dike.

3.2.9 No physical barriers to fish passage were identified at the time of survey.

Plate 2 Whinchat Dyke

Downstream view of Whinchat Dyke. Photo taken from culverted track.

Pallion Dyke

3.2.10 Pallion Dyke was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.11 Similar to Chatterton Dyke and Whinchat Dyke, the watercourse was predominantly bordered by agricultural land use. Instream habitat was typically degraded with substrate comprising silt, fine particulate matter, and organic debris. Water depth was uniformly ~15 cm throughout the survey reach, and no perceptible flow was present. Localised areas of bankside cover for fish was provided by overhanging vegetation, although bankside and instream cover were limited throughout the majority of the reach.

3.2.12 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only one minor fish species; nine-spined stickleback (See Table 3-4), was recorded downstream at the sampling location on Dam Dike.

3.2.13 No physical barriers to fish passage were identified at the time of survey.

Plate 3 Pallion Dyke

Upstream view of Pallion Dyke. Photo taken from culverted track.

Upstream view of Pallion Dyke. Taken from Left Hand Bank (LHB)

Common Drain

3.2.14 Common Drain was predominantly bordered by agricultural land use and was mainly dry at the time of survey. Therefore, the watercourse is considered to be unsuitable for fish.

3.2.15 At the survey location, the observed gradient and flow direction of the watercourse were oriented towards Pallion Dyke, which is opposite to the direction of the River Derwent and its associated SAC. Under higher flow conditions, water is likely to travel downstream towards Dam Dyke rather than the River Derwent based on the observed topography of Common Drain. Given that Common Drain also has a confluence with the River Derwent, the ditch may exhibit bidirectional flow.

Plate 4 Common Drain

Downstream view of Common Drain. Photo taken from channel.

In-channel view of Common Drain. Taken from Right Hand Bank (RHB)

Solar Development Site 3

Maspin Moor Drain

3.2.16 Maspin Moor Drain was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.17 The watercourse was predominantly bordered by agricultural land and was fed by multiple inflows from adjacent drainage ditches. The channel featured deeply cut, vegetated banks throughout the survey stretch.

3.2.18 Instream habitat was typically degraded with substrate comprising silt, fine particulate matter, and organic debris. Water levels were low at the time of assessment (less than 5 cm), exposing lower muddy banks. No perceptible flow was observed throughout the channel. Draped vegetation provided minimal bankside cover for fish, although instream cover was absent due to the absence of suitable substrate types.

3.2.19 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. In addition, the physical barrier located downstream at Mearley Drain (NGR SE 54551 26829), is likely to impede fish movements into upstream reaches including Maspin Moor Drain (See Paragraph 3.2.26).

Plate 5 Maspin Moor Drain

Downstream of Maspin Moor Drain taken from RHB.

In-channel of Maspin Moor Drain taken from RHB.

Solar Development Site 4

Hagg Lane Drain

3.2.20 Hagg Lane Drain was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

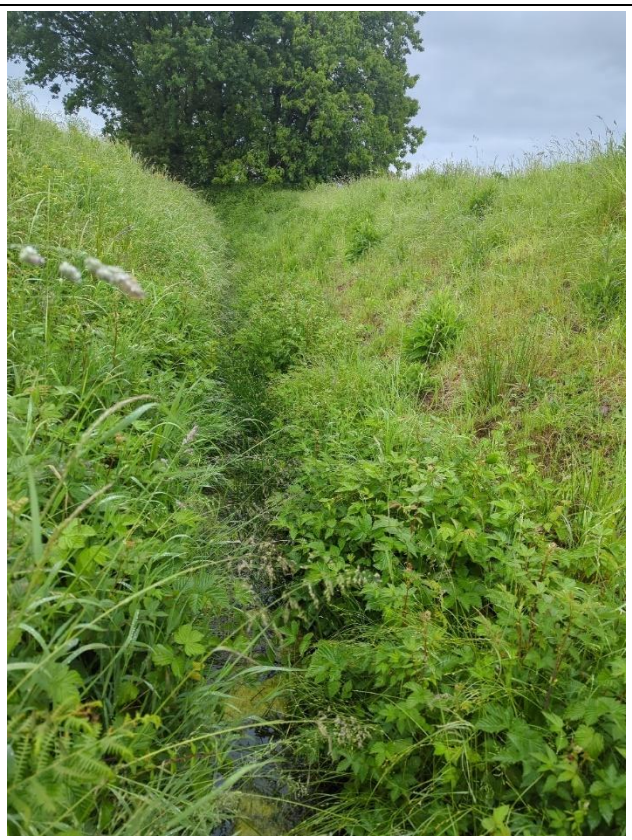
3.2.21 The watercourse was predominantly bordered by agricultural land use. The channel featured deeply cut, vegetated banksides. Bankside vegetation obscured much of the wetted channel and in visible wetted sections, extensive algal growth was noted.

3.2.22 Substrate was not directly observed due to dense vegetation and algal growth, but was likely composed of silt, fine particulates, and organic matter, consistent with adjacent or connected watercourses.

3.2.23 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. In addition, the physical barrier located downstream at Mearley Drain (NGR SE 54551 26829), is likely to impede fish movements into upstream reaches including Hagg Lane Drain (See Paragraph 3.2.26).

Plate 6 Hagg Lane Drain

Downstream view of Hagg Lane Drain taken from in-channel.



Downstream view of Hagg Lane Drain taken from in-channel.

Mearley Drain

3.2.24 Mearley Drain was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.25 The watercourse was predominantly bordered by agricultural land use. Substrate was not visible due to an abundance of submerged and floating aquatic vegetation within the wetted channel, though it was likely composed of silt, fine particulates, and organic matter, consistent with adjacent watercourses. No perceptible flow was observed during the survey. Fish cover was provided both instream and along the banks via draped and submerged vegetation although other suitable features to support fish of conservation value were absent.

3.2.26 While habitat conditions may support minor fish species, based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. In addition, a sluice gate was present at the culvert beneath Haddlesey Road, associated with an adjacent pumping station (NGR SE 54551 26829). The sluice feature present at the culvert face was considered a significant barrier to fish movement.

Plate 7 Mearley Drain

Downstream view of Mearley Drain towards sluice (NGR SE 54551 26829). Photo taken from culverted track.

View of pumping station on Mearley Drain (NRG SE 54551 26829). Taken from culverted track section.

Solar Development Site 6 and 7

Lumbly/Low Common Drain and Unnamed Tributary of Low Common Drain 1 & 2

3.2.27 Lumbly/Low Common Drain was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.28 The watercourse was predominantly bordered by agricultural land use and was fed by two unnamed tributaries (Unnamed Tributary of Low Common Drain 1 & 2). Water depth throughout Lumbly/Low Common Drain was approximately 40 cm, with an average channel width of 1 m. Similar depth and average channel width were recorded at both unnamed tributaries.

3.2.29 Instream habitat throughout Lumbly/Low Common Drain and both unnamed tributaries was typically degraded with substrate comprising organic matter, silt, and fine particulates. No perceptible flow was observed during the assessment at each of the watercourses. Banksides were typically heavily vegetated, and marginal vegetation was present throughout the channel.

3.2.30 Based on the habitat assessment, Lumbly/Low Common Drain and its associated tributaries are considered unlikely to support fish of conservation value. Lumbly/Low Common Drain is culverted beneath Common Lane, where a build-up of organic debris and marginal vegetation at the culvert entrance may obstruct fish passage to upstream sections within Solar Development Site 6, including both Lumbly/Low Common Drain and Unnamed Tributary of Lumbly/Low Common Drain 1.

3.2.31 The confluence of Unnamed Tributary of Lumbly/Low Common Drain 2 lies downstream of this culvert. However, a substantial portion of the watercourse flows underground between Solar Development Site 7 and the confluence, presenting a significant barrier to fish accessing potential habitat within Solar Development Site 7.

Plate 8 Lumbly/Low Common Drain and Unnamed Tributary of Low Common Drain 1 & 2

Upstream view of Lumbly/Low Common Drain. Photo taken from RHB

Confluence with unnamed tributary of Low Common Drain 1. Photo taken from RHB.

Cable Route Corridor

Dam Dyke (Riccall Dam)

3.2.32 Dam Dyke (Riccall Dam) was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.33 The watercourse was predominantly bordered by agricultural land use and had with naturalised banks and gentle sinuosity. Historic modifications for agricultural drainage were evident, including over deepening and inflows from smaller drainage ditches. Dam Dyke has a number of tributaries throughout its length between Solar Development Site 1 and the confluence with the River Ouse including; Chatterton Dyke (See Section 3.2.2), Whinchat Dyke (See Section 3.2.6), Pallion Dyke (See Section 3.2.10), Hopney Stable Dyke (See Section 3.2.37), Holmes Dyke (See Section 3.2.41), and Swinbank Dyke (See Section 3.2.41).

3.2.34 Instream habitat was generally degraded, with the substrate obscured by siltation. However, based on comparable observations upstream at Chatterton Dyke, Whinchat Dyke, and Pallion Dyke (See Section 3.2.2, 3.2.6, and 3.2.10), the substrate is likely composed of silt, fine particulate matter, and organic material. During site surveys, flow conditions were homogenous across the survey reach, with the majority of the area exhibiting no perceptible flow.

3.2.35 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only one minor fish species; nine-spined stickleback (See Table 3-4) was recorded at this location.

3.2.36 While no physical barriers to fish movement were identified on site during the survey, a number of potential barriers to migration were recorded downstream of the survey location via aerial imagery; a dam feature was recorded at the confluence of Dam Dyke with the River Ouse (NGR: SE 60978 37812) and a pumping station was recorded northeast of Riccall, Yorkshire, adjacent to the road bridge at York Road (NGR: SE 62616 38685).

Plate 9 Dam Dyke

Downstream view of Dam Dyke. Photo taken from RHB

Upstream view of Dam Dyke. Taken from RHB

Hopney Stable Dyke

3.2.37 Hopney Stable Dyke was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.38 The watercourse is a short drainage channel that flows into Dam Dike, bordered primarily by agricultural land and plantation forestry. Instream habitat was typically degraded with substrate comprising of silt, fine particulate matter and organic debris. During the site survey, flow conditions were homogenous across the survey reach, with the majority of the area exhibiting no perceptible flow. Both in-stream and bankside cover were limited throughout the surveyed area with bare earthy banks present throughout the majority of the reach.

3.2.39 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only one minor fish species; nine-spined stickleback (See Table 3-4), was recorded upstream at the sampling location on Dam Dike.

3.2.40 While no physical barriers to fish movement were identified on site during the survey, a number of potential barriers to migration were recorded downstream of the survey location via aerial imagery including a potential impoundment at the River Ouse confluence (See Section 3.2.36).

Plate 10 Hopney Stable Dyke

Downstream of Hopney Stable Dyke taken from culverted track section.

Upstream of Hopney Stable Dyke taken from culverted track section.

Swinbank Dike and Holmes Dyke

3.2.41 Swinbank Dike and Holmes Dyke were considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.42 Both watercourses are tributaries of Dam Dike and are bordered primarily by agricultural land. Substrate throughout both watercourses was not visible due to heavy siltation, though it was likely composed of silt, organic matter, and fines, consistent with adjacent or connected watercourses. During the site survey, flow conditions were homogenous across the survey reach, with the majority of the areas exhibiting no perceptible flow.

3.2.43 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where no fish species were recorded at this location.

3.2.44 While no physical barriers to fish movement were identified on site during the survey, a number of potential barriers to migration were recorded downstream of the survey location via aerial imagery including a potential impoundment at the River Ouse confluence (See Section 3.2.34).

Plate 11 Swinbank Dike and Holmes Dyke

Downstream view of Swinbank Dyke. Photo taken from LHB

View of Swinbank Dyke Channel. Taken from RHB

View of Holmes Dyke Channel. Taken at confluence with Swinbank Dyke.

Marsh Dyke

3.2.45 Marsh Dyke was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.46 The watercourse throughout was predominantly bordered by agricultural land use. Instream habitat was typically degraded with substrate comprising silt, fine particulate matter, and organic debris. The water depth in the channel ranged from < 5 cm to approximately 20 cm. During the site surveys, flow conditions were homogenous across the survey reach, with the majority of the area exhibiting no perceptible flow. Channel margins were heavily vegetated with emergent species in some sections, while floating vegetation within the water column provided localised instream cover for fish. Bankside vegetation contributed additional refuge through overhanging and trailing growth. However, other habitat features suitable for supporting fish of conservation value were generally absent.

3.2.47 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only two minor fish species were recorded; three-spined stickleback and nine-spined stickleback (See Table 3-4). These species were identified at Old Ings Dike, a tributary of Marsh Dyke (See Section 3.2.54)

3.2.48 No physical barriers to fish passage were observed at the time of survey.

Plate 12 Marsh Dyke

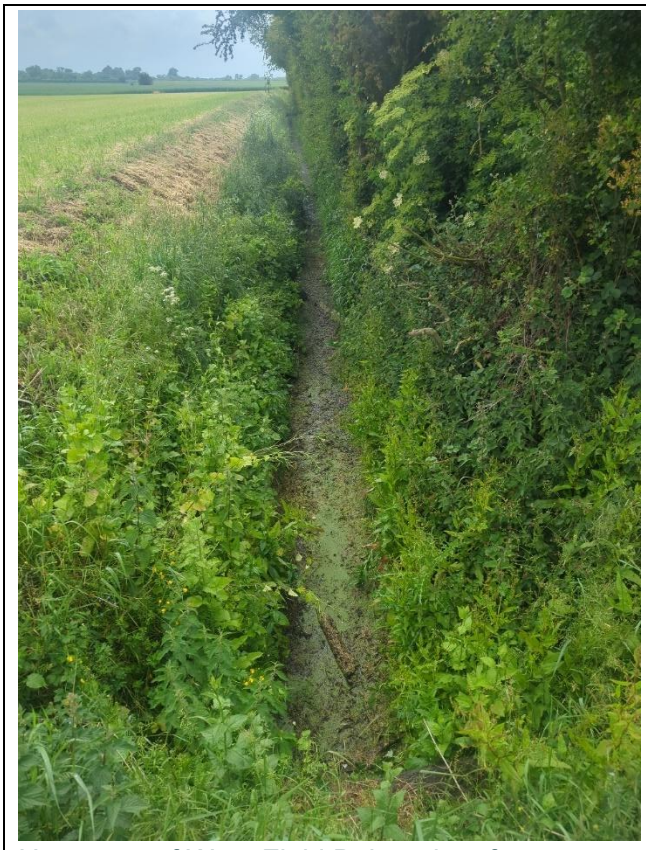
Upstream of Marsh Dyke taken from culverted track section.

Downstream of Marsh Dyke taken from culverted track section.

West Field Dyke

3.2.49 West Field Dyke was predominantly bordered by agricultural land use and was dry at the time of survey. Therefore, the watercourse is considered to be unsuitable for fish due to it being ephemeral.

Plate 13 West Field Dyke



Upstream of West Field Dyke taken from culverted track section.

Downstream of West Field Dyke taken from RHB.

Dry channel bed and small culverted track section on West Field Dyke

Angram Clough

3.2.50 Angram Clough was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.51 The watercourse throughout was predominantly bordered by agricultural land use. Instream habitat was typically degraded with substrate comprising silt, fine particulate matter, and organic debris. The channel supported extensive draped vegetation along its length, resembling the structural conditions observed in Old Ings Dyke (See Section 3.2.54).

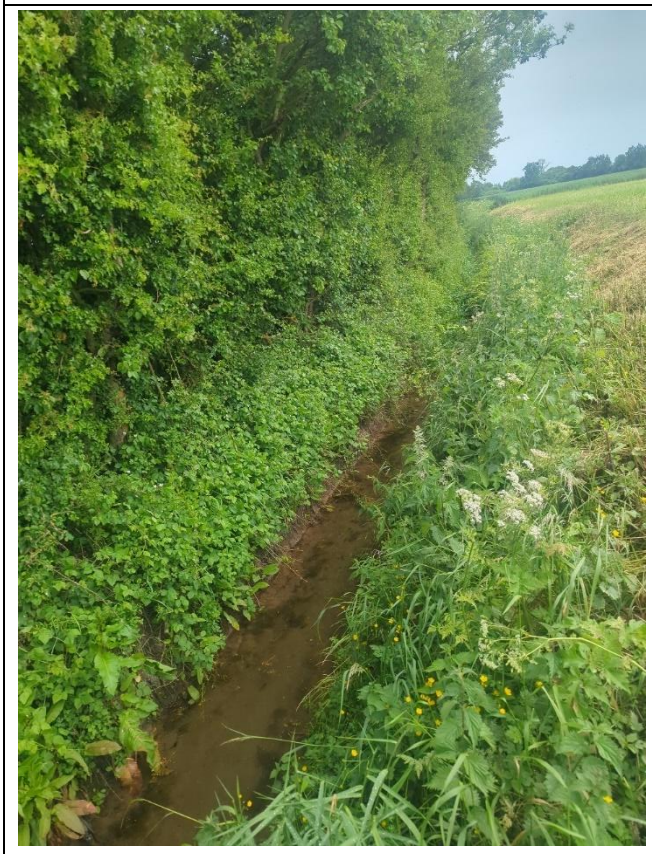
3.2.52 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only two minor fish species were recorded; three-spined stickleback and nine-spined stickleback (See Table 3-4). These species were identified at Old Ings Dike, a tributary of Angram Clough (See Section 3.2.54).

3.2.53 No physical barriers to fish passage were observed at the time of survey.

Plate 14 Angram Clough

Upstream view of Angram Clough. Photo taken from RHB

Channel view of showing substrate of Angram Clough. Taken from RHB.



Downstream view of Angram Clough. Taken from RHB

Old Ings Dyke

3.2.54 Old Ings Dyke was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.55 The watercourse throughout was predominantly bordered by agricultural land use. Instream habitat was typically degraded with substrate comprising silt, fine particulate matter, and organic debris. Submerged floating weeds were present throughout the channel, offering in-stream fish cover. Additionally, bankside fish cover including draped vegetation, and undercut bank features were present. However, other suitable features to support fish of conservation value were largely absent. Flow type was largely classified as having no perceptible flow, with localised areas of shallow glide.

3.2.56 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only two minor fish species; three-spined stickleback and nine-spined stickleback (See Table 3-4), were recorded at this site.

3.2.57 The watercourse was assessed in close proximity to a culverted section. However, the culvert (c.3 m in length) was level with the streambed and did not appear to pose an obstruction to fish movement. Otherwise, no physical barriers to fish passage were observed at the time of survey.

Plate 15 Old Ings Dyke

Upstream view of Old Ings Dyke. Photo taken from LHB

Downstream view of Old Ings Dyke. Taken from culverted track.

River Ouse

3.2.58 The River Ouse in the vicinity of the Proposed Development is representative of a large, lowland mainstem river. The watercourse at this point is tidally influenced with significant water level variation in response to the tide. However, the site has no saline influence; the daily changes in river level occur as a result of freshwater being impounded during/approaching high tide. The site is considered to be upstream of the saline intrusion zone, which is understood to occur near the M62 crossing, c. 24 km downstream.

3.2.59 The channel width at the survey location was approximately 45 m. Depth could not be accurately recorded due to high turbidity and suspended sediment within the water column. RHB land use comprised broadleaved woodland and scrub, while the LHB was dominated by cattle pasture and arable agriculture. The reach is likely subject to nutrient enrichment and pesticide inputs associated with adjacent land management practices.

3.2.60 The channel was heavily silted, preventing direct observation of in-channel features and underlying substrate. This is expected at tidally influenced reaches and is consistent with a depositional environment. The predominant flow type throughout the reach was deep glide with localised deep pools. The flow characteristics and velocities likely vary over a tidal cycle, based on the state of the tide and degree of freshwater impoundment. Mud banks were exposed at the time of survey, offering limited fish cover. However, occasional overhanging trees provided minimal canopy cover.

3.2.61 While some glide and pool habitat for adult salmonids were present, spawning gravels and mixed juvenile habitat was largely absent. The reach is likely used

by migratory fish species, including salmonids, lamprey species, as a passage/migration corridor to more suitable upstream spawning and nursery habitats. Atlantic salmon and *Lampetra* species have been recorded at upstream EA fish monitoring locations at Naburn Weir (See Table 3-2); the nearest record to the Cable Route Crossing. The presence of heavily silted zones may provide burrowing habitat for lamprey ammocoetes, although the area is likely of greater importance for migration than for long-term residence.

3.2.62 The River Ouse is also considered to support a coarse fish assemblage, European eel, Allis shad, twaite shad (See Table 3-2). Although shad species are known to utilise lowland rivers for spawning in the summer, the Joint Nature Conservation Committee (JNCC) (Ref 14 and Ref 15) identifies that there is no established population of shad in the River Ouse. As such shad are likely a vagrant species with the study area, if present.

Plate 16 River Ouse

Upstream view of the River Ouse. Photo taken from LHB

Downstream view of River Ouse. Taken from LHB

River Ouse Crossing Point (taken from LHB).

Ings Drain

3.2.63 Ings Drain was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.64 The watercourse throughout was predominantly bordered by agricultural land use. Substrate throughout the watercourse not visible due to extensive duckweed coverage, though it was likely composed of silt, organic matter, and fine, consistent with adjacent or connected watercourses. No perceptible flow was recorded. Banksides were typically overgrown, obscuring the majority of the wetted channel area.

3.2.65 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only one minor fish species; nine-spined stickleback (See Table 3-4), was recorded in an adjacent connected watercourse (Lordship Lane Drain).

Plate 17 Ings Drain

Upstream view of Ings Drain. Photo taken from LHB

Downstream view of Ings Drain. Taken from culverted track.

Lordship Lane Drain

3.2.66 Lordship Lane Drain was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.67 The watercourse throughout was predominantly bordered by agricultural land use. Substrate throughout the watercourse not visible due to water depth, though it was likely composed of silt, organic matter, and fine, consistent with adjacent or connected watercourses. No perceptible flow was recorded.

3.2.68 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value. This was confirmed through eDNA results where only one minor fish species; nine-spined stickleback (See Table 3-4), was recorded on location.

3.2.69 No physical barriers to fish passage were identified at the time of survey.

Plate 18 Lordship Lane Drain

Upstream of Lordship Lane Drain taken from culverted track section.

Downstream of Lordhship Lane Drain taken from culverted track section.

Cockret Dyke

3.2.70 Cockret Dyke was predominantly bordered by agricultural land use and was dry at the time of survey. Therefore, the watercourse is considered to be unsuitable for fish due to its ephemeral nature.

Plate 19 Cockret Dyke

Downstream view of Cockret Dyke. Photo taken from roadside

Upstream view of Cockret Dyke. Taken in-channel.

Outwoods Drain

3.2.71 Outwoods Drain was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.72 The watercourse throughout was predominantly bordered by agricultural land use. Substrate throughout the watercourse not visible due to duckweed (*Lemna* sp.*)* coverage, though it was likely composed of silt, organic matter, and fine, consistent with adjacent or connected watercourses. No perceptible flow was recorded at the time of survey. Banksides were heavily overgrown, obscuring most of the wetted channel width.

3.2.73 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value.

Plate 20 Outwoods Drain

Downstream of Outwoods Drain taken from roadside.

In-channel view of Outwoods Drain showing duckweed coverage.

Selby Dam

3.2.74 Selby Dam at the surveyed location is representative of a historically modified, but naturalised channel within agricultural land use. The channel width at the survey location was approximately 6 m and the depth throughout was ≥1 m. The reach is likely subject to nutrient enrichment and pesticide inputs associated with adjacent land management practices. The riparian zone was devoid of trees.

3.2.75 Substrate visibility was limited due to water depth; however, in observed areas, silt and organic matter predominated the channel bed. Flow conditions were homogenous, with deep glide present throughout the survey reach. Bankside cover for fish was provided by draped and marginal vegetation, with instream cover supported by submerged weeds. Phytophilic spawning opportunities were

present within vegetated margins. In addition, marginal silt deposits provided potential burrowing habitat for lamprey ammocoetes.

3.2.76 As discussed in Section 2.3.3, no amplifiable DNA was recorded at Selby Dam. However, records of fish of conservation value have been recorded as recent as 2024 at two EA monitoring locations (3.6 km upstream and 1.5 km downstream of CRC 1-4) on Selby Dam. Records include incidences of European eel (See Table 3-2).

3.2.77 No barriers to fish migration were recorded at the survey reach. However, a pumping station is present downstream near the confluence with the River Ouse (NGR: SE 61478 32599) which has the potential to act as partial barrier to fish migration. Despite this, recent ecological records as mentioned above, indicate that migratory species such as the European eel continue to access upstream habitats suggesting that while the infrastructure may present a degree of impediment, it does not constitute a complete barrier to eel migration.

3.2.78 Suitable habitat features for salmonid and lamprey species were identified within Selby Dam, although spawning habitat was not observed. Based on Environment Agency fish monitoring data from nearby locations, dating back to 2016, the presence of a partial obstruction to fish migration and likely lack of well-connected spawning grounds upstream, these species are considered likely absent from the site.

Plate 21 Selby Dam

Upstream view of Selby Dam. Photo taken from LHB.

Upstream view of Cockret Dyke. Photo taken from LHB.

Town Dyke

3.2.79 Town Dyke was predominantly bordered by agricultural land use and was characterised by very low water levels at the time of assessment, consistently below 10 cm across its length.

3.2.80 Overall, suitability for fish of conservation value was limited, owing to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.81 Town Dyke could not be sampled for eDNA due to insufficient water depth at time of survey.

Plate 22 Town Dyke

Upstream view of Town Dyke. Photo taken from RHB.

Downstream view of Town Dyke. Photo taken from RHB

Morton Drain

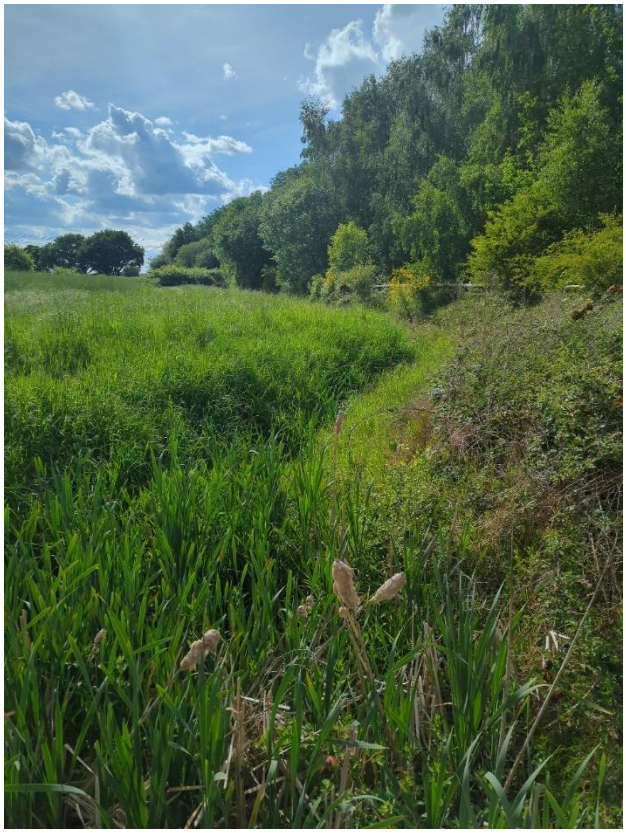
3.2.82 Morton Drain was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.83 The watercourse throughout the surveyed reach was predominantly bordered by agricultural land use. Substrate was not visible due to mid-channel emergent vegetation, though it was likely composed of silt, organic matter, and fines, consistent with adjacent or connected watercourses. No perceptible flow was recorded at the time of survey. Banksides were heavily overgrown, obscuring most of the wetted channel width.

3.2.84 A significant stretch of Morton Drain is culverted beneath the A63 for approximately 100 m, which presents a substantial barrier to the movement of migratory fish species. Culverts of this length and configuration are known to restrict fish passage due to altered hydraulic conditions, reduced light penetration, and physical confinement. Additionally, Morton Drain feeds into Town Dike and is located upstream of the survey location on Town Dike. Town Dike was assessed as unsuitable to support fish of conservation value, further limiting the ecological connectivity and potential for migratory species to utilise this watercourse. The upstream position of Morton Drain relative to Town Dike, combined with the culverted section and poor habitat quality, significantly reduces the likelihood of successful fish migration.

Plate 23 Morton Drain

In channel view showing culvert entrance on Morton Drain.



In-channel view of Causeway Dyke.

Causeway Dyke

3.2.85 Causeway Dyke was predominantly bordered by agricultural land use and was dry at the time of survey. Therefore, the watercourse is considered to be unsuitable for fish.

Plate 24 Causeway Dyke

In channel view showing downstream of Causeway Dyke

In-channel view of Causeway Dyke.

Habholme Dyke

3.2.86 Habholme Dyke was considered to be of limited value for fish of conservation value due to poor connectivity, absence of clean gravels for egg deposition, excessive silt/sediment and poor flow variability.

3.2.87 The watercourse within the survey reach was predominantly bordered by agricultural land use. Substrate throughout the watercourse not visible due to mid-channel vegetation coverage, though it was likely composed of silt, organic matter, and fine, consistent with adjacent or connected watercourses. No perceptible flow was recorded at the time of survey. Banksides were heavily overgrown, obscuring most of the wetted channel width.

3.2.88 Based on the habitat assessment, the watercourse was considered unlikely to support fish of conservation value.

Plate 25 Habholme Dyke

Channel view of Habholme Dyke. Photo taken from RHB.

Upstream view of Habholme Dyke. Photo taken from roadside.

eDNA & Fish Metabarcoding

3.2.89 Five eDNA samples were collected during the Fish Habitat Assessment. As described in Section 2.2, eDNA sampling focussed on watercourse crossed by the Cable Route Corridor. No protected or notable fish species were detected in any of the samples, although minor species such as three-spined stickleback and nine-spined stickleback were recorded at three locations (Table 3-4).

3.2.90 At all five locations, a negative result was returned for white-clawed crayfish.

3.2.91 No amplifiable eDNA was recovered from Selby Dam, likely due to access constraints limiting the ability to obtain a representative sample Similarly, no amplifiable DNA was recorded at Swinbank Dyke, which is likely attributable to the physical characteristics of the watercourse such as low flow, shallow depth, or limited fish habitat (See Section 2.3).

Table 3-4 Summary of recorded species from eDNA sampling and fish metabarcoding

Watercourse	Recorded species	White-clawed crayfish (y/n)
Dam Dyke (Ricall Dam)	Stickleback sp., nine-spined stickleback	n
Swinbank Dyke	No amplifiable DNA (see limitations)	n
Old Ings Dyke	Stickleback sp., nine-spined stickleback, three-spined stickleback	n
Lordship Lane Drain	Stickleback sp., nine-spined stickleback	n
Selby Dam	No amplifiable DNA (see limitations)	n

4 Conclusions

4.1.1 Based on the findings of the fish habitat assessment, the majority of watercourses within the Solar Development Sites and along the Cable Route Corridor were assessed as unlikely to support fish species of conservation value. This was later confirmed by eDNA results, with only minor fish species; three-spined and nine-spined stickleback recorded at representative eDNA survey locations. However, the River Ouse and Selby Dam, which are crossed by CRC 1–4, were identified as exceptions, with habitat features suitable for supporting migratory species such as salmonids, lamprey species, and European eel.

4.1.2 The River Ouse is a known migration route for sea-going salmonids (Atlantic salmon and sea trout) and sea-going lamprey species (river lamprey and sea lamprey). This includes both adult lamprey and salmonids returning from the marine environment to spawn in the upper catchment, and seaward migrating salmonid smolts and lamprey transformers. The River Ouse is also considered to support a coarse fish assemblage, European eel, Allis shad, and twaite shad. However, shad are considered a vagrant species with the study area, if present.

4.1.3 Whilst no amplifiable eDNA was recorded during monitoring of Selby Dam, EA data 3.6 km upstream and 1.5 km downstream of CRC 1-4 confirmed the presence of European eel. Suitable habitat features for salmonid and lamprey species were identified within Selby Dam, although based on the absence of salmonid or lamprey species during EA monitoring (2016, 2022 and 2024) these species are considered absent. The fish community of Selby Dam, particularly species migrating to and from the estuary, are also likely to be adversely affected by a pumping station, present downstream of the CRC 1-4, near the confluence with the River Ouse (NGR: SE 61478 32599). This asset has the potential to entrain/damage/kill fish and act as partial barrier to fish migration.

4.1.4 Based on the results of this study which entailed desk study, habitat assessment and eDNA monitoring, the River Ouse and Selby Dam are assumed to support species of conservation value.

4.1.5 No records of white-clawed crayfish were returned from NEYDC during the desk study. However, a single commercially available, undated record of white-clawed crayfish was recorded approximately 3.5 km east of Solar Development Site 1, within Wheldrake Ings Nature Reserve. This location lies within the River Derwent catchment, which is hydrologically separate from the River Ouse catchment in which the Proposed Development is situated. Additionally, five eDNA samples were collected during the Fish Habitat Assessment at representative locations along the Cable Route Corridor. All five samples returned negative results for white-clawed crayfish. Habitats were considered suboptimal for white-clawed crayfish throughout the Cable Route Corridor and Solar Development Sites. Based on these findings, white-clawed crayfish are considered likely absent from watercourses within the Order Limits

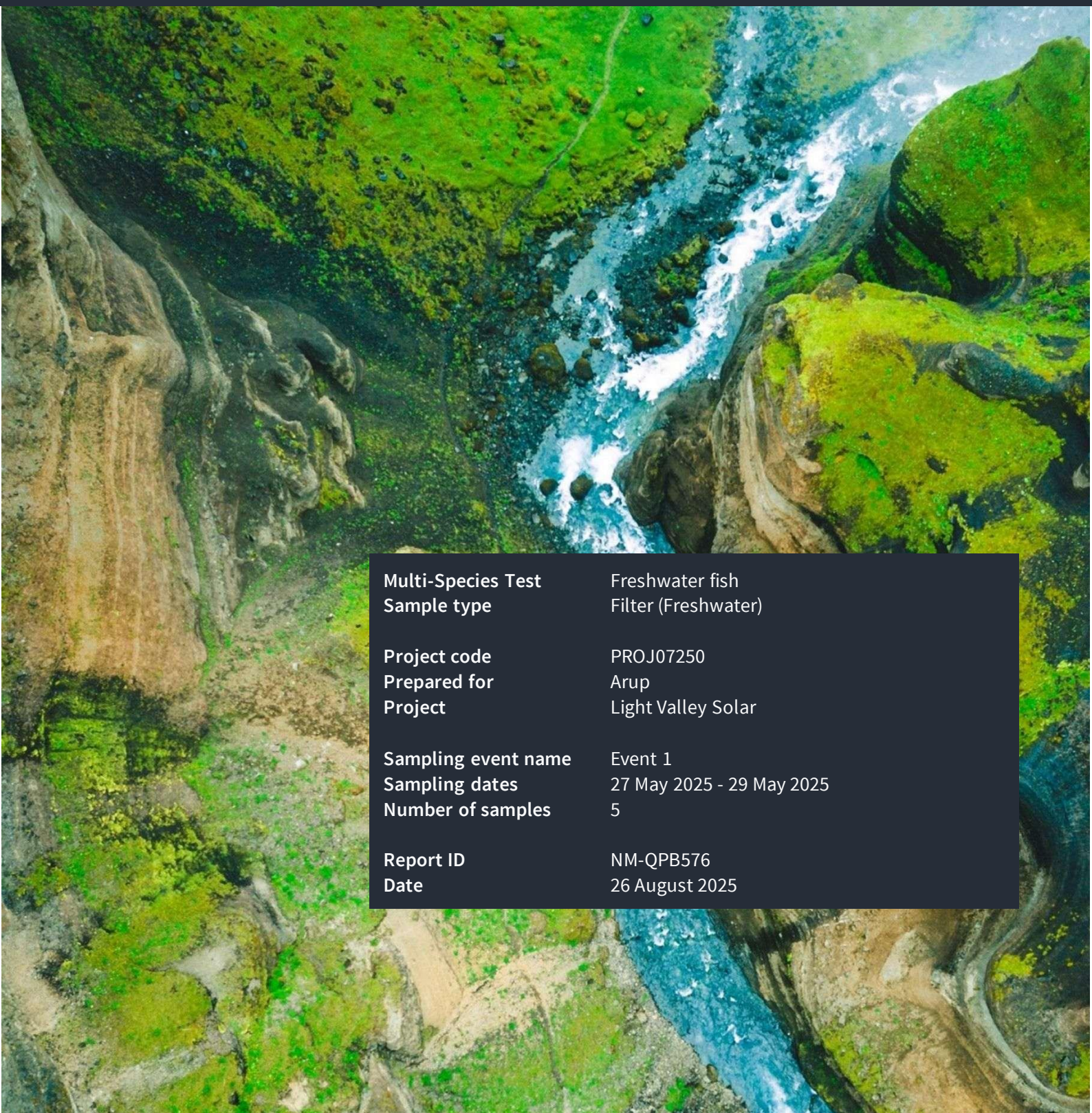
4.1.6 The potential for impacts to fish resulting from the construction and operations of the Solar Development Site and Cable Route Corridor should be assessed, in

light of any mitigation measures, in the respective assessments (i.e. Chapter 6: Biodiversity (ES Volume 1) [**EN0110012/APP/LVS/06.01.06.00**], Appendix 15.2: Water Environment Regulations (Water Framework Directive) Compliance Assessment (ES Volume 3) [**EN0110012/APP/LVS/06.03.15.02**] and the Habitats Regulations Assessment **[EN0110012/APP/LVS/05.11]**)

Annex A

A.1. Environmental DNA Report: Freshwater fish

Environmental DNA Report
Freshwater fish



Multi-Species Test	Freshwater fish
Sample type	Filter (Freshwater)
Project code	PROJ07250
Prepared for	Arup
Project	Light Valley Solar
Sampling event name	Event 1
Sampling dates	27 May 2025 - 29 May 2025
Number of samples	5
Report ID	NM-QPB576
Date	26 August 2025

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Welcome to your report

Your report consists of:

This document: Providing you with our world class insights and metrics.

Data Tables: Accompanying spreadsheet with results at the individual sample level: species detected, metrics and quality control: NM-QPB576 - PROJ07250 - Freshwater fish - Results.xlsx

- Data Description
- Species Data Table: Percentages
- Species Data Table: Read Counts
- Metrics by Sample Table
- Quality Control Table

If you have purchased metrics and they are not featured in this document, please see the 'Metrics by Sample Table' tab of the Data Tables spreadsheet.

OTU: Throughout the report you'll see reference to 'OTU'. This stands for Operational Taxonomic Unit; an OTU is broadly equivalent to a species in most cases.

Executive Summary

Field Samples submitted:	5
Field Samples reported:	3
Field Blanks submitted:	0
Species Richness:	6
Average Species Richness per sample:	4
Total number of IUCN Red List Species:	0
Total number of Invasive Species:	0

Reported samples are those that passed Quality Control and are included in the Species Data Table

Please be careful when sharing this report, it contains biodiversity information that may be sensitive, particularly with respect to endangered or protected species. Please share responsibly. If the report is shared, we kindly ask that the report is shared in its entirety - to limit the possibility of any information being taken out of context.

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www.naturemetrics.co.uk/report-interpretation-guide

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REPORT

Taxonomic Composition

This chart provides a view of the species detected in your samples and their taxonomic relationship, (names on the same branch are more similar than those on different branches). The chart is structured with the highest taxonomic rank at the centre (e.g., kingdom, phylum, class), moving through the ranks of order, family, genus, species as you move to the outer edge. Note that the centre and outer ranks will change depending on the test applied and the number of species detected. The legend in the bottom right of the chart indicates how to relate the colour in the branches to the number of species. The colour scale goes from grey - indicating very few species, to blue - indicating a lot of species.

This chart is not shown for this dataset as there were fewer than 10 target OTUs detected that had unique taxonomic lineages.

Taxonomic Resolution

This table provides the number of OTUs detected and the percentage of OTUs identified to each taxonomic level.

Depending on completeness of reference databases for the region where you sampled, some OTUs may not match to a reference at species level. Global DNA reference databases contain millions of barcodes, but gaps remain, particularly in regions and taxonomic groups that are more diverse and less studied. Coverage is expected to improve over time and data tables can be updated to include new information at a future date.

Number of OTUs	Phylum	Class	Order	Family	Genus	Species
6	100%	100%	100%	100%	66.67%	33.33%

Want to increase the number of species named to species level? If you have specimens of species you have identified, we can sequence the DNA and add the species to our reference databases. We will then be able to enhance the reference library and report if the species is detected. Please contact us about this service and we can send you our barcoding kits, but note that we only offer these kits for fish and amphibians.

IUCN Red List Species

These are the IUCN (International Union for Conservation of Nature) Red List species detected in your samples. These are detected species that are designated as one of the IUCN Red List Threatened Categories (Vulnerable, Endangered and Critically Endangered). An increase in the number of threatened species is generally associated with a positive trend in biodiversity or habitat condition. The Data Tables may also include designations for non-target species* (species that are not targeted by the selected test, but were detected in your samples). These do not appear in this table and do not contribute to summaries or counts in this report.

No species designated Vulnerable, Endangered or Critically Endangered were detected in the samples.

Invasive Species

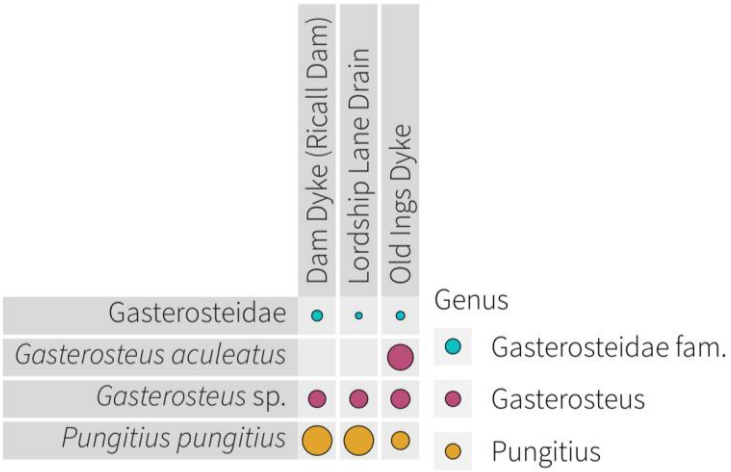
These are the Invasive species detected in your samples. These species are invasive according to the Global Register of Introduced and Invasive Species (GRIIS) in the country where sampling occurred. GRIIS is an IUCN Invasive Species Specialist Group initiative. The Convention on Biological Diversity defines an invasive species as one whose introduction and/or spread threatens biological diversity. An increase in the number of invasive species is generally associated with enhanced pressures at your site and reduced resilience of the native community. Please note: this label is only available for animals; and GRIIS lists marine species as invasive for a country, even if the species is known to be invasive in only one marine area bordering the country; GRIIS statuses are sourced from the country checklists available on griis.org, invasive species will not be flagged for countries missing from this page, or for territories and island groups. The Data Tables may also include designations for non-target species* (species that are not targeted by the selected test, but were detected in your samples). These do not appear in this table and do not contribute to summaries or counts in this report.

No invasive species were detected in the samples.

Community Composition

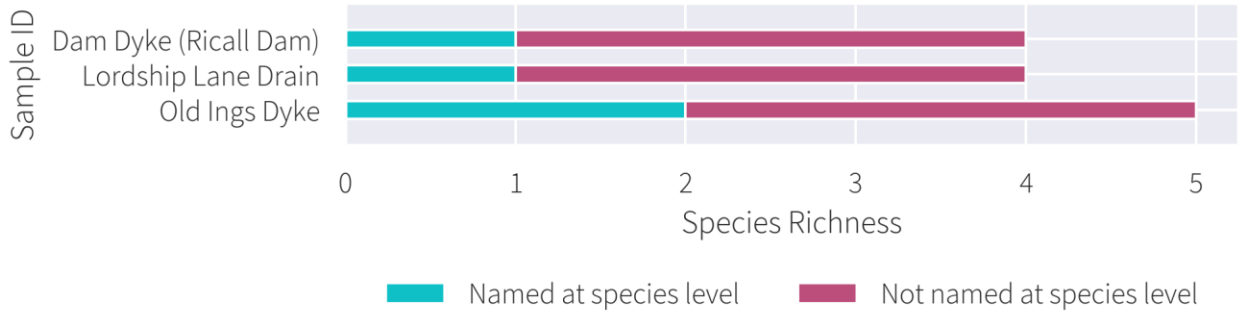
This chart lists the species found in each sample. The presence of a bubble means a species was detected in that sample. The chart displays at species level, unless the number of species detected is too great to display clearly in the document. In these cases, the chart displays at a higher taxonomic level. The full species level chart is provided as an appendix.

The size of the bubbles represents the proportion of DNA sequences within a sample. A larger bubble size can indicate a stronger eDNA signal. This signal may be linked to abundance of species in the environment but should be interpreted only as a coarse measure because the signal is also impacted by biological (e.g., biomass, life stage, activity, body condition), environmental (e.g., temperature, pH, salinity, conductivity), and technical factors (e.g., primer bias, PCR stochasticity).



Species Richness

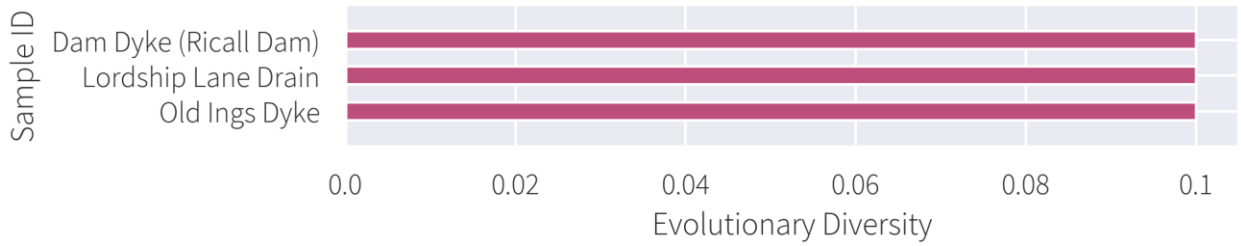
This is the total count of OTUs detected in each sample. The blue portion of each bar indicates the number of OTUs identified to a species.



High Species Richness generally indicates a healthier and functioning ecosystem and is the simplest biodiversity metric that is consistently reported in biodiversity monitoring.

Evolutionary Diversity

Evolutionary Diversity calculated for each sample. This is a measure of the variety of species types that occurred in your samples.



Evolutionary Diversity is a strong complementary indicator of biodiversity progress alongside Species Richness. Increasing Evolutionary Diversity can indicate an increasing resilience of the community.

Looking for something more?

We also offer comparative reporting. This includes statistical comparison of metrics and communities according to categories that you define. For instance, these might include waterbody, Site, Management Regime, or anything else that is a focus of your project. Please contact us for further details.

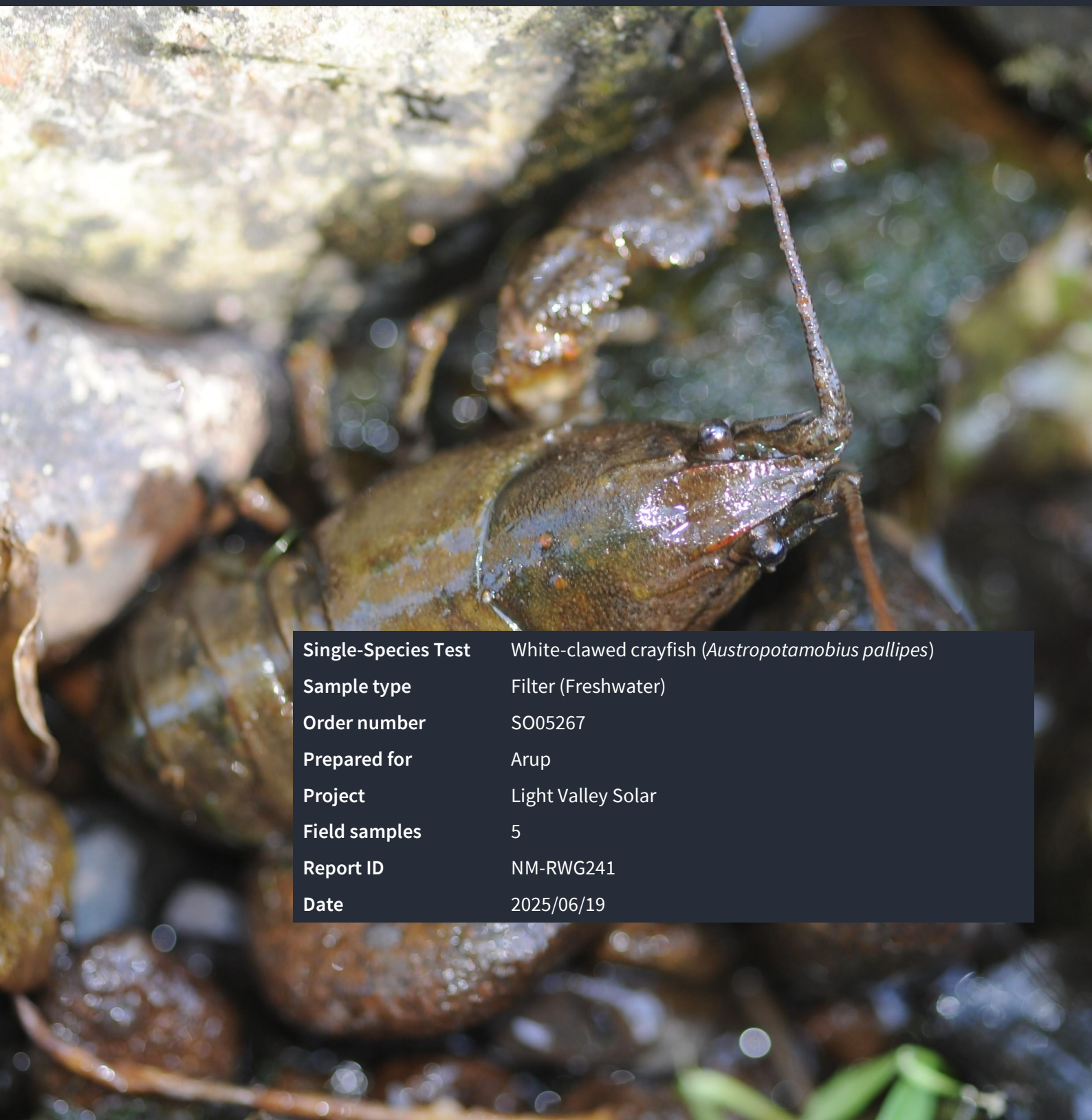
END OF REPORT

Contact: Customer Support Helpdesk
[redacted]

A.2. Environmental DNA Report: White clawed crayfish

Environmental DNA Report

White-clawed crayfish (*Austropotamobius pallipes*)



Single-Species Test	White-clawed crayfish (*Austropotamobius pallipes*)
Sample type	Filter (Freshwater)
Order number	SO05267
Prepared for	Arup
Project	Light Valley Solar
Field samples	5
Report ID	NM-RWG241
Date	2025/06/19

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Executive Summary

Field Samples submitted:	5
Field Samples in which White-clawed crayfish (*Austropotamobius pallipes*) detected:	0
Field Samples in which White-clawed crayfish (*Austropotamobius pallipes*) not detected:	5
Field Samples which returned inconclusive results:	0

A results interpretation guide and a glossary of terms highlighted throughout this report can be found at the end of the report.

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Something exciting or unexpected that you'd like to discuss further, our team of experts are looking forward to speaking with you: [redacted]

Results

Details of White-clawed crayfish (*Austropotamobius pallipes*) qPCR results for each sample.

Sample ID	Inhibition QC Passed	qPCR Score	Result
Dam Dyke (Ricall Dam)	Yes	0	Negative
Lordship Lane Drain	Yes	0	Negative
Old Ings Dyke	Yes	0	Negative
Selby Dam	Yes	0	Negative
Swinbank Dike	Yes	0	Negative

Sample ID Unique sample reference, as provided by the customer.

Inhibition QC An internal quality control test using Inhibition controls.

qPCR Score The number of qPCR lab replicates that returned a Positive result for the sample. This is a score out of 12.

Result The overall test result for the sample.

- **Positive** Target species was detected.
- **Negative** Target species was not detected.
- **Inconclusive** Target species was not detected, but this could be a false negative due to not passing QC.

Sample IDs and Date Information

Details of when each sample was taken in the field and when it arrived at a NatureMetrics lab.

Sample ID	Kit ID	Sampling Date	Date Received
Dam Dyke (Ricall Dam)	ASI-01-12824	2025/05/28	2025/06/05
Lordship Lane Drain	ASI-01-12825	2025/05/29	2025/06/05
Old Ings Dyke	ASI-01-12827	2025/05/27	2025/06/05
Selby Dam	ASI-01-12822	2025/05/27	2025/06/05
Swinbank Dike	ASI-01-12821	2025/05/28	2025/06/05

Sample ID Unique sample reference, as provided by the customer.

Kit ID Unique kit reference, as provided by NatureMetrics.

Sampling Date Date the sample was collected in the field, as provided by the customer (YYYY/MM/DD).

Date Received Date the sample was received at a NatureMetrics lab (YYYY/MM/DD).

Methods

eDNA was extracted using commercially available DNA extraction kits. qPCR for the target species was carried out in 12 qPCR lab replicates per sample, using species-specific Primers and Probes, in the presence of Positive controls, negative controls (Extraction blanks and PCR blanks) and inhibition controls. Reports are only issued where negative and positive controls perform as expected. If either positive or negative controls have unexpected results, all the samples are reprocessed.

END OF REPORT

Contact: Customer Support Helpdesk

Result Interpretation Guide

Positive Target species DNA was detected in this sample, meaning that at least one of the 12 qPCR lab replicates had target species DNA detected. Note that if the inhibition control fails but target species DNA was detected, then the sample Result is still Positive.

Negative No target species DNA was detected in this sample, and the inhibition controls, positive controls, extraction blanks and PCR blanks worked as expected. It is essential to note that not detecting a species does not always mean that the species was absent from the sampling location.

Inconclusive No target species DNA was detected in the sample, but the inhibition control failed to work as expected. This means we cannot assign the result as Negative.

Glossary

eDNA Short for 'environmental DNA'. Refers to DNA deposited in the environment through secretions and excretions, such as mucus, hair, scales, saliva, blood, etc. This can be collected in environmental samples (e.g. water, sediment) and used to identify the organisms that it originated from. eDNA in water is broken down by environmental processes over a period of days to weeks. It can travel some distance from the point at which it was released from the organism, particularly in moving water.

Extraction blank A DNA extraction with no sample added, to assess potential contamination during the DNA extraction process.

Inhibition controls Synthetic DNA (artificially created DNA strands) added to each qPCR lab replicate at a known concentration, used to monitor presence of potential inhibitors. Inhibitors are naturally occurring chemicals and compounds that reduce or stop DNA amplification, which can result in false negatives. Common inhibitors include tannins, humic acids, and other organic compounds. Get the best results from your samples and avoid inconclusive results by following our guidance here.

PCR Short for Polymerase Chain Reaction. A process by which DNA sequences are duplicated many times through a series of heating and cooling steps. Known as an 'amplification' process. One of the most common processes in molecular biology and a precursor to most sequencing-based analyses.

PCR blank A PCR with no sample added, to determine if contaminant DNA entered samples during PCR reactions.

Positive control A set of PCRs using synthetic DNA at a set of known concentrations, used to determine whether the PCR is working correctly. A total of 21 positive controls are included in each set of PCRs.

Primers	Short sections of synthesised DNA that bind to target species DNA from a sample, which is then amplified by PCR.
Probe	A short section of synthesised DNA that binds to a specific section of the target species' DNA within the section flanked by the primers. The probe is designed to be specific to the target species. The probe is labelled such that it fluoresces during amplification, which is used to infer the presence of the target species' DNA in the sample.
qPCR	Short for 'quantitative PCR', a PCR incorporating a coloured dye that fluoresces during amplification, allowing a machine to track the progress of the reaction.
qPCR lab replicate	An individual qPCR reaction. DNA from each sample is put into 12 separate qPCR reactions.
qPCR Score	The number of qPCR lab replicates that returned a positive result for the sample. This is a score out of 12, as each sample is subject to 12 qPCR lab replicates. Note that the score provides a very coarse indication of the amount of eDNA of the target species in the sample. A score of 1 or 2 means there is only a very limited amount of eDNA of the target species in the sample, while a score of 11 or 12 means there is ample eDNA of the target species in the sample. It is not possible to relate the score to higher population densities or abundances of the target species.
Target species	The species that the qPCR test is designed to detect.

References

Ref 1 UK Government, “Salmon and Freshwater Fisheries Act 1975,” 1975. [Online]. Available at: https://www.legislation.gov.uk/ukpga/1975/51/contents [Accessed October 2025]

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Ref 9 Government License (OGL), “Creative Commons No rights reserved license (CC0), and Creative Commons license with attribution (CC-BY),” 2025. NBN Trust. [Online]. Available at: [redacted][Accessed October 2025]

Ref 10 Hendry, K. & Cragg-Hine, D., “Restoration of Riverine Salmon Habitats: A Guidance Manual,” 1997. Environment Agency, Bristol

Ref 11 Harvey, J.P. & Cowx, I.G., 2003. Monitoring the River, Brook and Sea Lamprey, Lampetra fluviatilis, L. planeri and Petromyzon marinus. Conserving Natura 2000 Rivers Monitoring Series No. 5, English Nature, Peterborough.

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Ref 15 JNCC. “Allis shad (Alosa alosa) - Special Areas of Conservation,” (n.d.). [Online]. Available at: https://sac.jncc.gov.uk/species/S1102/ [Accessed October 2025]

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