Fosse Green Energy

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EN010154

6.3 Environmental Statement Appendices

Appendix 8-C: Aquatic Ecology

VOLUME

6

Planning Act 2008 (as amended)

Regulation 5(2)(a)

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

18 July 2025

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulation 2009 (as amended)

Fosse Green Energy

Development Consent Order 202[ ]

6.3 Environmental Statement Appendices

Appendix 8-C: Aquatic Ecology

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Planning Inspectorate Scheme Reference	EN010154
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Author	Fosse Green Energy Limited

Version	Date	Issue Purpose
Rev 1	18 July 2025	DCO Submission

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1. Introduction

1.1 Background

1.1.1 This report forms a technical appendix to the Environmental Statement (ES), specifically to accompany **Chapter 8: Ecology and Nature Conservation** of this ES **[EN010154/APP/6.1]**. It provides information on the aquatic ecology baseline for the Fosse Green Energy project, hereafter referred to as the Proposed Development and includes the results of relevant surveys undertaken within the DCO Site Boundary.

1.1.2 Further information on the Proposed Development is included within **Chapter 3: The Proposed Development** of this ES **[EN010154/APP/6.1]**.

1.2 Aims and Objectives

1.2.1 The aim of this appendix is to provide an assessment of the biodiversity importance of aquatic habitats and species (including macroinvertebrates, aquatic macrophytes and fish) within relevant areas of the DCO Site Boundary (see **Section 3.1**).

1.2.2 The objectives, therefore, are to:

a. Review existing aquatic ecological data to identify any records of aquatic macroinvertebrate, macrophyte, fish species and invasive non-native species (INNS) within the Study Area (see **Section 3.1**); and

b. Identify the presence of the above species within the DCO Site Boundary.

1.2.3 Combined, this is being used to determine:

a. The biodiversity importance of the DCO Site Boundary for aquatic habitats and species; and

b. Potential impacts of the Proposed Development on aquatic habitats and species and any required mitigation (as presented in **Chapter 8: Ecology and Nature Conservation** of this ES **[EN010154/APP/6.1]**).

2. Relevant Legislation, Policy and Guidance

2.1 Legislation

2.1.1 This assessment has been undertaken within the context of some or all of the following relevant legislative instruments and planning policies:

a. The Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) (Ref 1);

b. The Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species (Ref 2);

c. The Convention on Wetlands of International Importance ('Ramsar convention') (Ref 3);

d. The Conservation of Habitats and Species Regulations (Habitats Regulations) 2017 (as amended) (Ref 4);

e. Wildlife and Countryside Act 1981 (as amended) (the WCA) (Ref 5);

f. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 6);

g. The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (Ref 7);

h. Environment Act 2021 (Ref 8);

i. The Salmon and Freshwater Fisheries Act 1975 (Ref 9);

j. The Eels (England and Wales) Regulations 2009 (Ref 10); and

k. The Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref 11).

2.2 Species of Principal Importance

2.2.1 In addition to the above legislation, several aquatic species are listed as being Species of Principal Importance (SPI) for conservation in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (Ref 12). These species are of material consideration during the planning process.

2.2.2 The NERC list of SPI (Ref 12) is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act (in this context, the Secretary of State for Environment, Food and Rural Affairs). Under Section 40, every public authority (e.g., a local authority or local planning 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, including restoring or enhancing a population or a habitat.

2.2.3 The UK Biodiversity Action Plan (UKBAP) (Ref 13) was launched in 1994 and established a framework and criteria for identifying species (and habitat types) of conservation concern. From this list, action plans for Priority Species of conservation concern were published. The UKBAP was subsequently succeeded by the UK Post-2010 Biodiversity Framework (July 2012) (Ref 14), and then again by the UK Biodiversity Framework 2024 (Ref 15).

2.3 Local Priority Species

2.3.1 The Proposed Development is located within the county of Lincolnshire. Formerly, the Lincolnshire Biodiversity Action Plan (Lincolnshire BAP) (3rd edition) (Ref 16) provided context to inform identification of threatened or uncommon species of local relevance, alongside priorities for conservation and enhancement targeted at a local level. However, under the Environment Act 2021 (Ref 8), Biodiversity Action Plans are being replaced by Local Nature Recovery Strategies (LNRSs), which are a system of spatial strategies for nature which will support delivery of biodiversity net gain (BNG) and provide more focussed action for nature recovery. Whilst this is still being developed for Lincolnshire and with no specific habitat or species plans currently in place, this appendix references those species formerly included on the Lincolnshire BAP.

3. Methods

3.1 Characterising the Baseline

3.1.1 Within this appendix, the following terminology is used when referring to the geographic areas within which assessments were made:

a. Study Area – the area within which the Proposed Development will be located and a 2km radius which was subject to collection of background information e.g., Water Framework Directive (WFD) water bodies within and overlapping the DCO Site Boundary, a 10km radius from the DCO Site Boundary for sites statutorily designated for their biodiversity value (Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites) and 2km for nationally designated statutory sites (Sites of Special Scientific Interest (SSSIs) and Local Nature Reserves (LNRs)) and non-statutorily designated sites (Local Wildlife Sites (LWSs)). For species records, a Study Area with a 2km search radius was used. However, where relevant records of notable and, or invasive non-native aquatic species were available from connected water bodies, a wider search area was utilised due to connectivity for migratory species (e.g., fish);

b. Zone of Influence (ZoI) – the area over which aquatic species may be affected by the Proposed Development which, using professional judgement is typically no more than 2km around the DCO Site Boundary, but kept through review of likely impacts of the Proposed Development and results of the desk study, which was then used to define the scope of field surveys; and

c. Survey Area – the area within which field survey work was undertaken and is largely synonymous with the DCO Site Boundary.

3.2 Scoping exercise

3.2.1 A scoping exercise was completed to inform the selection of survey locations for aquatic ecological surveys, based on desk study and current knowledge of the Proposed Development. On this basis, the following aquatic features were scoped out of the assessment:

a. Environment Agency 'Main Rivers' within the DCO Site Boundary (River Witham and River Brant) were scoped out due to a commitment to cross these watercourses by Horizontal Directional Drilling (HDD) or other non-intrusive techniques and hence, impacts to these watercourses and their riparian zones will be avoided; and

b. Ponds within the DCO Site Boundary were scoped out of the assessment due to commitments to retain all ponds within the DCO Site Boundary and to maintain a buffer distance for all construction activities from these water bodies.

3.2.2 On this basis, remaining linear water bodies present within the DCO Site Boundary were scoped in due to the potential for impacts to these watercourses and ditches through pollution and runoff during construction, temporary or permanent watercourse crossings, cable crossings by intrusive techniques, or the installation or extension of culverts at crossings of these watercourses for access tracks.

3.2.3 The hierarchy of water bodies assessed is as follows:

a. Flowing watercourses (identified as 'Rivers and Streams' according to BNG nomenclature); and

b. Ditches – defined as artificially-created water conveying features, which hold water for more than four months of the year.

3.2.4 Following up on this, aquatic ecology walkover surveys of water bodies comprising watercourses and ditches within the DCO Site Boundary were completed to appraise the various habitats and hydromorphological characteristics, to inform the scoping of, if necessary, further detailed surveys for macroinvertebrates, aquatic macrophytes and fish.

3.2.5 Aquatic macroinvertebrate samples were collected to identify the conservation value of aquatic macroinvertebrate communities and record the presence of any protected, notable, or INNS. This supported a characterisation of overall water and habitat quality.

3.2.6 Macrophyte (aquatic plant) surveys were undertaken to characterise water and habitat quality and to record the presence of any protected or notable plant species, or INNS.

3.2.7 Due to the low scale of impact to watercourses, fish surveys were scoped out and the fisheries impact assessment was based on desk study data alone. Considering the nature of the watercourses within the boundary of the DCO Site Boundary, such desk-based approach was considered appropriate to inform the assessment.

3.3 Desk Study

3.3.1 As described above, watercourses and ditches that were scoped into the assessment were identified from desk study and analysis of Ordnance Survey mapping and aerial imagery. This resulted in a total of 18 water bodies being identified for survey, further details of which are provided below.

3.3.2 A desk study review (Ref 6) of WFD Ref 6 water body status and information was undertaken for the following WFD water bodies:

a. Boultham Catchwater Drain;

b. Witham (confluence of Cringle Brook to confluence with River Brant);

c. River Brant – Lower, and Fleet Lower Catchment (tributary of River Trent); and

d. Any other watercourses in the vicinity that have the potential to be affected by the Proposed Development are also listed in Table 1:.

3.3.3 The desk study included a review of:

a. Current WFD status using the Environment Agency's Catchment Data Explorer website (Ref 17) which was to inform the assessment of conservation value of water bodies in the Study Area;

b. Records of relevant sites statutorily designated for their biodiversity value sourced from the Multi-Agency Geographic Information for the Countryside (MAGIC) application (OBJ OBJ OBJ OBJ Ref 18 OBJ). Sites non-statutorily designated for their biodiversity value and records of legally protected and, or notable species were sourced from the Greater Lincolnshire Nature Partnership (GLNP.

c. Environment Agency ecological monitoring data from the last 20 years for fish (or a longer period in the case of records of notable species that may be under-recorded) and 10 years for aquatic macroinvertebrates, macrophytes, and invasive non-native species, using the Environment Agency Ecology and Fish Data Explorer (Ref 19);

d. Environment Agency crayfish records commercially available on the National Biodiversity Network (NBN) Atlas (Ref 20); and

e. Publications of the Lincolnshire Naturalists' Union, e.g., The Flora of Lincolnshire and the Lincolnshire Naturalist, the latter including an annual freshwater invertebrate report.

3.4 Field Surveys

Aquatic Habitat Walkover Surveys

3.4.1 Aquatic habitat walkover surveys were undertaken over three days between 31st May and 2nd June 2023 by two suitably qualified and experienced ecologists. The walkover survey encompassed walking throughout the DCO Site Boundary to identify watercourse and ditch characteristics and to identify suitable locations for taking samples of macroinvertebrates (refer to **Figure 8-C-1** in **Annex A [EN010154/APP/6.3]** of this appendix). Weather conditions during the surveys were sunny, with some cloud cover.

3.4.2 The water body naming system was based on the four WFD catchments within the Principal Site boundary: the Witham (confluence with Cringle Brook to confluence with River Brant), Boultham Catchwater Drain, River Brant – Lower, and Fleet Lower Catchment (tributary of the River Trent).

3.4.3 A total of 18 locations (as presented in **Table 1**:) were surveyed as described above, with further dry watercourses scoped out of further assessment during the walkover survey (refer to **Table 8** for details).

Table 1: Locations of aquatic walkover surveys for habitat appraisals

Site ID	WFD Catchment	National Grid Reference	Survey Completed
B2	Boultham Catchwater Drain	SK 90234 64503	31/05/2023
WC10	Witham - conf[1] Cringle Brook to conf Brant	SK 90463 62552	31/05/2023
WC3	Witham - conf Cringle Brook to conf Brant	SK 91461 61804	31/05/2023
WC6	Witham - conf Cringle Brook to conf Brant	SK 90572 61193	02/06/2023
WC11	Witham - conf Cringle Brook to conf Brant	SK 89720 61224	02/06/2023
WC9	Witham - conf Cringle Brook to conf Brant	SK 89875 61094	02/06/2023
WC8	Witham - conf Cringle Brook to conf Brant	SK 89727 60568	02/06/2023
WC7	Witham - conf Cringle Brook to conf Brant	SK 90269 59863	02/06/2023
BL5	Brant - Lower	SK 93905 60339	01/06/2023
BL6	Brant - Lower	SK 93557 60588	01/06/2023
BL4	Brant - Lower	SK 93980 60178	01/06/2023
BL8	Brant - Lower	SK 93742 60824	01/06/2023
FL1	The Fleet Lower Catchment (tributary of Trent)	SK 88309 64629	31/05/2023
B3	Boultham Catchwater Drain	SK 90114 64614	31/05/2023
WC4	Witham - conf Cringle Brook to conf Brant	SK 91257 62185	31/05/2023
WC1	Witham - conf Cringle Brook to conf Brant	SK 92114 61598	01/06/2023
BL7	Brant - Lower	SK 92623 60624	01/06/2023
WC2	Witham - conf Cringle Brook to conf Brant	SK 91859 61702	01/06/2023

[1] confluence

3.5 Aquatic Macroinvertebrate Surveys

3.5.1 Spring aquatic macroinvertebrate surveys were undertaken between 31st May and 2nd June 2023, in conjunction with habitat appraisals (refer to **Figure 8-C-1** in **Annex A [EN010154/APP/6.3]** of this appendix). Macroinvertebrate surveys were undertaken following habitat appraisals where water bodies were deemed suitable for sampling (**Table 2**). No surveys were undertaken during or immediately following periods of high flow in accordance with best practice guidance (Ref 21).

3.5.2 A total of 12 ditches were selected for macroinvertebrate sampling due to the identification of suitable habitat and flow conditions for aquatic macroinvertebrates during habitat appraisals. The remaining water bodies (ditches and watercourses) surveyed were excluded from macroinvertebrate sampling as they were either wholly or predominantly dry.

Table 2: Aquatic macroinvertebrate spring survey locations

Site ID	WFD Catchment	National Grid Reference	Survey Completed
B2	Boultham Catchwater Drain	SK 90235 64510	31/05/2023
WC10	Witham - conf Cringle Brook to conf Brant	SK 90553 62590	31/05/2023
WC3	Witham - conf Cringle Brook to conf Brant	SK 91359 61842	31/05/2023
WC6	Witham - conf Cringle Brook to conf Brant	SK 90534 61078	02/06/2023
WC11	Witham - conf Cringle Brook to conf Brant	SK 89835 61221	02/06/2023
WC9	Witham - conf Cringle Brook to conf Brant	SK 89893 61151	02/06/2023
WC8	Witham - conf Cringle Brook to conf Brant	SK 89760 60633	02/06/2023
WC7	Witham - conf Cringle Brook to conf Brant	SK 90270 59927	02/06/2023
BL5	Brant - Lower	SK 93887 60231	01/06/2023
BL6	Brant - Lower	SK 93547 60642	01/06/2023
BL4	Brant - Lower	SK 93725 60228	01/06/2023
BL8	Brant - Lower	SK 92556 60863	01/06/2023

3.5.3 The macroinvertebrate survey method followed aquatic macroinvertebrate sampling procedures standardised by the Environment Agency (Ref 21), which conforms to BS EN ISO 10870:2012 Water Quality – Guidelines for the Selection of Sampling Methods and Devices for Benthic Macroinvertebrates

in Fresh Waters. These methods allow characterisation of aquatic macroinvertebrate communities and can be used to determine whether rare or notable species or communities are present. Samples were collected using a standard FBA pattern pond net (mesh size: 1 mm). The habitats present were sampled through a combination of kick sampling and sweep sampling for three minutes followed by a one minute hand search of larger substrates in accordance with standard methods. Samples collected were subsequently preserved in Industrial Methylated Spirit (IMS) prior to laboratory processing.

3.5.4 Each of the samples collected was sorted and analysed in a laboratory by suitably trained and experienced aquatic ecologists. Lists of the aquatic macroinvertebrate taxa present were produced in line with Environment Agency guidance (Ref 22). Aquatic macroinvertebrate samples were identified to mixed-taxon level (MTL) using a stereo-microscope. Most groups were identified to species level (where practicable), with the exception of:

a. Worms (*Oligochaeta*) which were identified to sub-class;
b. Pea mussels, species of *Pisidium* which were identified to genus;
c. Marsh beetles (*Scirtidae*) which were identified to family;
d. True-fly larvae, which were identified to the maximum resolution possible; and
e. Immature or damaged specimens, which were identified to the maximum resolution possible on a case-by-case basis.

3.5.5 Macroinvertebrate taxa and abundances were then used to calculate the following metrics that can be used to inform an assessment of relative nature conservation value and general habitat degradation.

Community Conservation Index (CCI)

3.5.6 A Community Conservation Index (CCI) (Ref 23) was calculated for each Reach (survey location). The CCI classifies many groups of aquatic macroinvertebrates according to their scarcity and nature conservation value in England as understood at the time that the classification was developed. Species scores range from one to ten, with one being very common and ten being Endangered. Since its initial publication, in some cases the references used in the CCI classification to define scarcity and value have been superseded by more recent assessments. Due to this, the author has provided AECOM with updated species scores to take account of this new information (Richard Chadd, personal communication, 2018). These updated scores have been used within this assessment.

Lotic-invertebrate Index for Flow Evaluation (LIFE)

3.5.7 Lotic-invertebrate Index for Flow Evaluation (LIFE) scores were calculated (Ref 24). This is an index that links benthic macroinvertebrate data to flow regimes prevailing in UK waters. Flow scores have been allocated to various macroinvertebrates based on species / family abundance and ecological association with different flows. The overall LIFE score for a Reach is

calculated as the sum of the individual scores divided by the number of scoring species / families. LIFE scores increase with current velocity, scores <6.00 generally indicating sluggish or still water conditions and score >7.5 indicate fast flows. LIFE allows the mean flow preference of invertebrates colonising a Reach to be determined so that effect of habitat changes such as sediment accumulation can be monitored.

Proportion of Sediment-sensitive Invertebrates (PSI)

3.5.8 Calculations were undertaken to determine the proportion of sediment sensitive macroinvertebrates present using the Proportion of Sediment-sensitive Invertebrates (PSI) index (Ref 25). Using this approach, individual taxa of aquatic macroinvertebrate are assigned a Fine Sediment Sensitivity Rating (FSSR) ranging from A to D. The PSI score for each aquatic macroinvertebrate sample was derived from individual species scores and abundances. The derived PSI score corresponds to the percentage of fine sediment-sensitive taxa present in a sample and ranges from zero to one hundred, where low scores correspond to watercourses with high fine sediment cover. The PSI score therefore provides an indication of the extent to which watercourses are influenced by fine sediments, and therefore by inference the potential sensitivity of the associated aquatic macroinvertebrate community to changes in silt load and deposition.

Whalley, Hawkes, Paisley & Trigg (WHPT)

3.5.9 The aquatic macroinvertebrate data were analysed to generate the Whalley, Hawkes, Paisley & Trigg (WHPT) Average Score Per Taxon (ASPT), and Number of scoring taxa (NTAXA) values, which provide an indication of the ecological quality in the watercourse (Ref 26). This assigns numerical value to taxa according to their sensitivity to organic pollution. The average of the values for each taxon in a sample, known as ASPT is a stable and reliable index of organic pollution. These assessments can indicate to what extent an aquatic macroinvertebrate community is exposed to organic pollution. It is important to note that these indices can vary between geological regions and habitat types. Ditches for example are unable to support many of the high-scoring taxa associated with fast flowing habitats. Therefore, the resultant metrics should be reviewed with an awareness of their potential limitations, and the Reach-specific context, as described in this report.

3.5.10 The WHPT method has been primarily designed to respond to organic pollution, however it is suitable for monitoring other types of impact and is used for assessing the WFD classification parameter “General degradation” (Ref 27).

3.6 Aquatic Macrophyte Surveys

3.6.1 Macrophyte surveys were carried out on 29th, 30th and 31st August 2023.

3.6.2 Each water body was surveyed to record emergent, aquatic, and marginal flora, however all taxa present were recorded (including non-aquatic terrestrial

species) to help provide further context to the water body. The surveys were completed by an appropriately experienced aquatic ecologist supported by an experienced assistant.

3.6.3 The survey was completed by walking within the channel of the watercourses and ditches, where safely accessible and not obstructed by dense growth of emergent flora. These latter areas were bypassed as necessary before re-entering the channel at the next available access point.

3.6.4 A list of all emergent and aquatic plant species encountered was made for each drain and their relative abundance recorded using the 'DAFOR' scale as follows:

D = Dominant (greater than 75% total cover);

A = Abundant (51 to 75% total cover);

F = Frequent (26 to 50% total cover);

O = Occasional (11 to 25% total cover; and

R = Rare (1 to 10% total cover).

3.7 Biodiversity Importance

3.7.1 An essential prerequisite step to allow ecological impact assessment of the Proposed Development, as presented in **Chapter 8: Ecology and Nature Conservation** of this ES **[EN010154/APP/6.1]**), was an evaluation of the relative biodiversity importance of the DCO Site Boundary for terrestrial invertebrates. This is necessary to set the terms of reference for the subsequent ecological impact assessment (as presented in **Chapter 8: Ecology and Nature Conservation** of this ES **[EN010154/APP/6.1]**).

3.7.2 The method of evaluation that was utilised has been developed with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines (Ref 28). This gives guidance on scoping and carrying out environmental assessments in the context of relevant policies at a geographical scale for each feature (i.e., international, national, regional, county, district, local or site). Data received through desk study and field-based surveys were used to identify the importance of the species addressed in this appendix. Professional judgement was also applied, where necessary. Relevant published national and local guidance and criteria has been used, where available, to inform the assessment of biodiversity importance and to assist consistency in evaluation.

3.7.3 Aquatic macroinvertebrate / plant communities and individual species can be of nature conservation value for a variety of reasons, and their relative value should always be determined on a case-by-case basis to demonstrate a robust assessment process. Value may relate, for example, to the uniqueness of the assemblage, or to the extent to which species are threatened throughout their range, or to their rate of decline. The value of the species assemblages associated with the Proposed Development will be defined with reference to the geographical level at which it is considered notable. This assessment has

been made with reference to published guidance and criteria where available, e.g., criteria to assess relative value within the context of Lincolnshire are given in the Local Wildlife Site Guidelines for Lincolnshire (Ref 29) and nationally in Guidelines for the Selection of Biological SSSIs (Ref 30).

3.7.4 The identified guidance and criteria are not definitive, and other criteria have been applied as relevant and appropriate to reach a decision on relative nature conservation value. For example, the previously described CCI index (Ref 23) has been used to inform the assessment of nature conservation value for aquatic macroinvertebrates.

3.8 Limitations

Desk Study

3.8.1 The aim of the desk study was to help characterise the baseline context of the DCO Site Boundary and provide valuable background information that would not be captured by site surveys alone. Information obtained during the course of the desk study was dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for terrestrial invertebrates (as is the case here) does not necessarily mean that these do not occur in the study area. Likewise, the presence of records of species does not automatically mean that these still occur within the area of interest or are relevant in the context of the Proposed Development.

Field Survey

3.8.2 Access to some of the water bodies was limited due to steep-sided banks and consequently assessments were undertaken from the bank tops.

3.8.3 Spring aquatic macroinvertebrate surveys were undertaken on 31st May to 2nd June 2023. This is partially outside the optimal spring sampling season of March to May (inclusive) however, it is not considered to present a constraint to the assessment undertaken due to the nature of water bodies surveyed (heavily modified watercourses and ditches), and that surveys were undertaken at the very end of May (within the optimal survey window) and start of June.

3.8.4 Sites FL1, B3, WC4, WC1, BL7, and WC2 were dry at the time of survey and will therefore not be considered for further habitat or biological surveys. However, a description of these dry ditches is included in **Section 4.2** to inform the BNG assessment.

4. Results

4.1 Desk Study

Water Framework Directive Status

4.1.1 The following WFD water bodies are within the Study Area, with a summary of the Environment Agency Water Framework Directive classification described below. A summary of water body status and assessment criteria is provided in **Table 3**.

Witham – confluence with Cringle Brook to confluence with River Brant

4.1.2 The Witham from its confluence with Cringle Brook to its confluence with the River Brant (WFD: GB105030056780) is a heavily modified water body, monitored by the EA for the purpose of the WFD. This water body has a moderate ecological status overall, with good status for fish, high status for invertebrates, and poor status for macrophytes. The Reasons for Not Achieving Good status (RNAG) include point source and diffuse pollution attributed to poor nutrient and livestock management associated with agricultural and rural land, continuous sewages discharges, and physical modifications relating to agricultural and rural land management, and local and central government.

The Fleet Lower Catchment (a tributary of the River Trent)

4.1.3 The Fleet Lower Catchment, a tributary of the River Trent (WFD: GB104028058250) is monitored by the EA for the purpose of the WFD and is not designated as artificial or heavily modified. The catchment is currently classified by the EA as having poor ecological status overall, with high status for fish, moderate status for invertebrates, poor status for macrophytes, and moderate status for phytobenthos (plants, typically algae growing on the bed of the water body). RNAG include point source and diffuse pollution attributed to poor soil management associated with agriculture and rural land, continuous sewage discharges, physical modifications in relation to flood protection structures, and natural drought conditions.

Boultham Catchwater Drain Water Body

4.1.4 The Boultham Catchwater Drain (WFD: GB105030062380) is a heavily modified water body, monitored by the EA for the purpose of the WFD. The water body has a moderate ecological status overall, with moderate status for invertebrates and macrophytes. RNAG include point source and diffuse pollution attributed to urban development, sewage and trade/industry intermittent and continuous discharges, and physical modifications associated with urban development.

River Brant Lower Water Body

4.1.5 This water body (WFD: GB105030056770) is a heavily modified section of the River Brant, monitored by the EA for the purpose of the WFD. The water body has a moderate ecological status overall, with moderate status for fish, high status for invertebrates, bad status for macrophytes, and moderate status for phytobenthos. The water body suffers from various pressures, including chemical pollution from poor nutrient and livestock management in the surrounding area, sewage discharges, surface water abstraction, and physical modifications associated with land drainage in the areas surrounding the water body.

Table 3: Environment Agency Framework Directive classification of water bodies within the Study Area

(BK = Brook; Brant = River Brant; conf = confluence with; trib = tributary)

Water Body	Ecological status	Hydromorphological designation	Hydrological regime	Biological quality elements	Biological quality elements					Physico-chemical quality elements
					Fish	Invertebrates	Macrophytes and Phytobenthos Combined	Macrophytes Sub Element	Phytobenthos Sub Element	
Witham - conf Cringle Bk to conf Brant	Moderate	Heavily Modified	Supports good	Good	Good	High	-	Poor	-	Moderate
The Fleet Lower Catchment (trib of Trent)	Poor	Not designated artificial or heavily modified	Supports good	Poor	High	Moderate	Poor	Poor	Moderate	Moderate
Boultham Catchwater Drain Water Body	Moderate	Heavily Modified	Supports good	Moderate	-	Moderate	-	Moderate	-	Moderate
River Brant Lower Water Body	Moderate	Heavily Modified	Supports good	Moderate	Moderate	High	Moderate	Bad	Moderate	Moderate

Sites Statutorily or Non-statutorily Designated for their biodiversity value

4.1.6 There are no international statutory designated sites within 10km of the DCO Site Boundary. National statutory designated sites of interest to aquatic ecology and within 2km of the DCO Site Boundary are described in **Table 4** below.

Table 4: National statutory designated sites of interest to aquatic ecology within 2km of the DCO Site Boundary

Designated Site	Designation	Reason for Designation (of interest to aquatic ecology)	Approximate distance and direction from DCO Site Boundary
Whisby Nature Park	LNR	Flooded gravel pits and wetlands, including UK BAP priority and nationally scarce species Greater Water Parsnip (*Sium latifolium*).	413m north of the Principal Site.

4.1.7 A total of eight non-statutory designated sites of relevance to aquatic habitats and species were identified within 2km of the DCO Site Boundary with only those sites considered at potential risk of impact from the Proposed Development included in **Table 5**.. Other sites were scoped out due to distance from the Proposed Development, lack of hydrological connectivity, or a negligible risk of impact due to the low-scale of impacts to water bodies within the boundary of the Proposed Development.

Table 5: Non-statutory designated sites of interest to aquatic ecology within 2km of the DCO Site Boundary

Designated Site	Designation	Reason for Designation (of interest to aquatic ecology)	Location in relation to DCO Site Boundary
River Witham,	LWS	Twelve-kilometre section of the River Witham supporting several notable macrophyte species including River	Within the DCO Site Boundary for

Designated Site	Designation	Reason for Designation (of interest to aquatic ecology)	Location in relation to DCO Site Boundary
Aubourn to Beckingham		Water-crowfoot (*Ranunculus fluitans*). A large pond is also situated adjacent to the west bank near Thurlby, supporting a diverse macrophyte community.	approximately 1km, and within 1km of the DCO Site Boundary for a further 3.5 km
Tunman Wood North	LWS	Plantation containing small areas of standing water and rides supporting diverse aquatic flora and good habitat for invertebrates.	Adjacent to the west of the DCO Site Boundary to west of Thorpe on the Hill
Tunman Wood	LWS	Managed woodland with wet rides containing species such as Water-pepper (*Persicaria hydropiper*) and Floating Sweet-grass (*Glyceria fluitans*).	Adjacent to the north of the DCO Site Boundary to west of Thorpe on the Hill

Species

Notable species

4.1.8 Historic records of fish, macroinvertebrate and aquatic macrophyte species are available from the Environment Agency through their routine monitoring programme (from catchment monitoring sites within the Upper Witham catchment), as well as from the NBN Atlas (Ref 20) (commercially-available records only where licence conditions allow), and through the desk study from GLNP. Species records obtained are described below for each species group.

Fish

4.1.9 Several notable fish species were identified within the Study Area, one of which, Spined Loach was within the DCO Site Boundary (**Table 6**). Bullhead is also listed as a UKBAP Priority species but is not a SPI.

Table 6: Notable fish species identified within the Study Area

Species	Designation / Status	Total Number of Records	Most recent record	EA monitoring site(s)	Closest location in relation to DCO Site Boundary
European Bullhead (*Cottus gobio*)	Habitats Directive Annex II; UKBAP priority species	3	2017	5899	SK 91800 62800 600m downstream of the Principal Site on River Witham

Species	Designation / Status	Total Number of Records	Most recent record	EA monitoring site(s)	Closest location in relation to DCO Site Boundary
European Eel (*Anguilla anguilla*)	IUCN Red List Critically Endangered; Eels Regulations 2009; Section 41 NERC SPI	10	2017	5899	SK 91800 62800 600m downstream of the Principal Site on River Witham
Brown Trout (*Salmo trutta*)	Section 41 NERC SPI	1	1997	5887	SK 90800 60500 1.7km upstream of the Principal Site on River Witham
Spined Loach (*Cobitis taenia*)	Habitats Directive Annex II; Section 41 NERC SPI	4	2011	5899	SK 940 580 within the Principal Site on River Brant
Barbel (*Barbus barbus*)	Habitats Directive Annex V	3	2005	5899	SK 91800 62800 600m downstream of the Principal Site on River Witham

4.1.10 Within a 2km data search, Environment Agency ecological survey data notes the presence of a further 18 non-notable fish species in the last 10 years, including Perch (*Perca fluviatilis*), Three-spined Stickleback (*Gasterosteus aculeatus*) and Pike (*Esox Lucius*).

Aquatic macroinvertebrates

4.1.11 There were no records of notable macroinvertebrate species identified within the Study Area between 2013 and 2023.

Aquatic macrophytes

4.1.12 There were no records of notable aquatic macrophytes identified within the Study Area between 2013 and 2023. However, it is noted that notable macrophyte species are listed in the citations of designated sites, Whisby Nature Park LNR, River Witham, Aubourn to Beckingham LWS and Tunman Wood LWS (**Table 4** and **Table 5**).

Invasive Non-native Species (INNS)

4.1.13 Two INNS of macroinvertebrate and two invasive non-native plant species were identified in the desk study, none of which were within the DCO Site Boundary and all were found downstream of it (**Table 7**).

Table 7: Aquatic non-native species identified within the Study Area in the last ten years

Species	Designation / status	Total number of records	Most recent record	EA monitoring site(s)	Distance of closest record to DCO Site Boundary
New Zealand Mud-snail (*Potamopyrgus antipodarum*)	Non-native, naturalised	14	2022	55429, 202779	SK 94900 62500 250m downstream of the Principal Site on River Brant
Crangonyx pseudogracilis / floridanus	Non-native, naturalised	10	2022	55429	SK 94900 62500 250m downstream of the Principal Site on River Brant
Nuttall's Waterweed (*Elodea nuttallii*)	ISA (Enforcement and Permitting) Order 2019 Schedule 2	3	2022	143011, 202779	SK 92029 62870 750m downstream of the Principal Site on River Witham
Canadian Waterweed (*Elodea canadensis*)	Wildlife and Countryside Act 1981: Schedule 9	10	2019	N/A	SK 94900 62500 250m downstream of the Principal Site on River Brant

4.2 Aquatic Survey Results

Aquatic Habitat Walkover Surveys

4.2.1 All surveyed watercourses were heavily modified (straightened and adapted for land drainage) or agricultural drainage ditches.

4.2.2 Sites FL1, B3, WC4, WC1, BL7, and WC2 were dry at the time of survey and will therefore not be considered for further habitat or biological surveys. However, a description of these dry ditches is included to inform the BNG assessment.

4.2.3 Descriptions of surveyed water bodies within the Principal Site are provided below in **Table 8**. Within all of the surveyed water bodies presented in Table **8**, no suitable fish spawning habitat for notable species were present in any of them. Please refer to **Annex E [EN010154/APP/6.3]** of this appendix for photographs of each surveyed water body.

Table 8: Aquatic habitat walkover survey results

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
B2	SK 90210 64625 to SK 90256 64322	Linear agricultural drainage ditch positioned within tilled / arable land. Steep earth banks with a cover of grasses and herbs with 2m grass margins between ditch and arable fields.	Average depth of 15cm and average water width of 2.5 m	Soft substrate primarily consisting of sand with smaller amounts of silt.	N / A	Tall herb and rank vegetation
B3	SK 90054 64564 to SK 90154 64645	Channel dry at time of survey. Linear, narrow agricultural drainage ditch positioned within tilled / arable land. A 1m wide strip of tall grasses provides a buffer between the channel and arable field.	Width 0.5 m	Dominant earth substrate producing a solid bed.	High levels of terrestrial encroachment (grasses, rank vegetation, herbs, and scrub) were recorded, covering approximately 70% of the channel	Complex bank vegetation structure
BL4	SK 93739 60221 to SK 94288 60092	Section of West Brant Syke. Relatively wide linear agricultural	Average depth 40cm and average water width 1.5 m	Soft silt substrate	N / A	Complex vegetation structure one bank,

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
		drainage ditch positioned within tilled / arable land. Connecting to the River Brant. Very high and steep earth banks covered with grasses, herbs and scrub, with also deciduous trees along the south bank. Floating leaved (30-70% cover), emergent (30-70% cover) and submerged (10-30% cover) macrophytes present through survey stretch. A pumping station (Sand Syke Pumping Station) is located at the downstream end of the surveyed reach (SK 94277 60068) and an outfall is				simple on the opposite bank.

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
		positioned at SK 94173 60121.				
BL5	SK 93885 60212 to SK 93913 60405	Linear agricultural drainage ditch positioned within tilled / arable land. Steep earth banks covered with grasses and herbs. Vegetation cut on west bank, east bank less managed. Floating leaved (<3% cover), emergent (10-30% cover) and submerged (30-70% cover) macrophytes present through survey stretch.	Average depth 10cm and average water width 0.4 m	Unstable substrate consisting of predominantly sand with smaller contributions of silt and gravel	N / A	Uniform bank vegetation structure.
BL6	SK 93547 60761 to SK 93547 60384	Linear agricultural drainage ditch positioned within tilled/arable land. Steep earth banks covered with grasses and herbs. Vegetation cut on	Average depth 7cm and average water width 0.5 m	Soft silt / clay substrate	N / A	Uniform bank vegetation structure.

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
		west bank, east bank less managed, with 80% of the channel shaded by overhanging bank vegetation. Floating leaved (70-100% cover), emergent (10-30% cover) and submerged (30-70% cover) macrophytes present through survey stretch. Culvert under minor agricultural track noted.				
BL7	SK 92623 60736 to SK 92571 60482	Channel dry at time of survey. Linear agricultural drainage ditch positioned within tilled / arable land.	Width 0.5m	Dominant earth substrate producing a solid bed.	Channel largely colonised by tall herb / rank vegetation and a large stretch of hedgerow, covering approximately 80% of the channel	Complex bank vegetation structure

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
BL8	SK 93555 60870 to SK 93869 60816	Linear agricultural drainage ditch positioned within tilled / arable land. Very high and steep earth banks covered with grasses, herbs and scrub. Vegetation cut on banks. Floating leaved (<3% cover), emergent (30-70% cover) and submerged (30-70%% cover) macrophytes present through survey stretch. High algae cover (70-100%). A footbridge was located at SK 93743 60831.	Average depth 15cm and average water width 0.4 m	Soft silt substrate	N / A	Uniform bank vegetation structure.
FL1	SK 88110 64603 to SK8843064658	Channel dry at time of survey. Section of Mill Dam Syke. Linear drainage ditch positioned	Width 0.7 m	Dominant earth substrate producing a solid bed.	Encroaching scrub	Complex bank vegetation structure

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
		within tilled / arable land. Land use on the south bank is predominantly arable with a 2-3m buffer of grasses and scrub and on the north bank. woodland consisting of oak trees provides the channel with heavy shading. Rhododendron (*Rhododendron ponticum*) (an invasive non-native species scheduled in the WCA present in woodland (SK 88219 64704 and SK 88253 64624).				
WC1	SK 92180 61701 to SK 92046 61482	Channel dry at time of survey. Linear relatively narrow agricultural drainage ditch along hedgerow on edge of arable field.	Width 0.4m	Dominant earth substrate producing a solid bed.	Rush (*Juncus* sp.) And Willowherb (*Epilobium* sp.) were present within the channel, as well as some terrestrial tall herb / rank	Complex bank vegetation structure

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
					vegetation, covering approximately 70% of the channel	
WC10	SK 90549 62592 to SK 90288 62529	Linear and narrow agricultural drainage ditch along hedgerow (north bank) situated within arable fields, with a 1-2m wide grass buffer between the channel and surrounding arable land. Floating leaved (10-30% cover), emergent (10-30% cover) and submerged (3-10% cover) macrophytes present through survey stretch.	Average depth of 5cm and average water width of 1.2m	Soft substrate predominantly comprising clay/silt.	N / A	Complex bank vegetation on one bank, consisting of a hedgerow and some broadleaved trees. Simple structure on the opposite bank.
WC11	SK 89553 61228 to SK 89878 61219	Linear, relatively narrow agricultural drainage ditch positioned within tilled/arable land.	Average depth of 30cm and average water width of 1m.	Unstable substrate predominantly silt, with smaller contributions of	N/A	Complex vegetation structure one bank,

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
		Moderately steep earth banks covered with grasses and herbs, also with scrub on south bank. Channel overgrown with Bulrush (*Typha latifolia*), Nettles (*Urtica dioica*) and Meadowsweet (*Filipendula ulmaria*). Culvert under minor agricultural track noted.		sand, gravel, and pebbles		simple on the opposite bank.
WC2	SK 92054 61558 to SK 91656 61834	Channel dry at time of survey. Linear agricultural drainage ditch positioned within tilled / arable land, with area of deciduous woodland on north bank. Banks and channel unmanaged and	Width 0.5 m	Dominant earth substrate producing a solid bed.	The channel was colonised by a hedgerow and tall / herb rank vegetation, covering 100% of the channel.	Complex bank vegetation structure

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
		overgrown by bramble scrub. A footbridge was located at SK 91789 61753.				
WC3	SK 91320 61806 to SK 91578 61777	Agricultural drainage ditch positioned within tilled/arable land	Average depth of 30cm and average water width of 1m	Unstable substrate predominantly silt, with smaller contributions of sand, gravel, and pebbles	N / A	Predominantly uniform tall herb and rank vegetation with patches of intermittent hedgerow on one bank.
WC4	SK 91199 62183 to SK 91303 62164	Channel dry at time of survey. Linear agricultural drainage ditch positioned within tilled / arable land. Channel flows partially through a small area of deciduous woodland. Channel heavily shaded by hedgerow or overgrown with nettles and bramble scrub. A	Width 0.5 m	Dominant earth substrate producing a solid bed.	Channel was largely colonised by terrestrial tall herb / rank vegetation, covering approximately 50% of the channel	Complex bank vegetation structure

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
		footbridge was located at SK 91244 62190.				
WC6	SK 90572 61304 to SK 90537 61056	Linear relatively narrow agricultural drainage ditch positioned within tilled/arable land. Floating leaved (30-70% cover), emergent (10-30% cover) and submerged (70-100% cover) macrophytes present. A footbridge was located at SK9055961117.	Average depth of 25cm and average water width of 0.5m.	Soft silt substrate	N / A	Complex vegetation structure one bank, simple on the opposite bank.
WC7	SK 90237 59666 to SK 90257 59997	Linear agricultural drainage ditch positioned within tilled / arable land. Moderately steep earth banks covered with grasses, herbs and scrub. Floating leaved 30-70%	Average depth 30cm and average water width 1m.	Soft silt substrate	N / A	Uniform bank vegetation structure with few areas of intermittent scrub and small trees.

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
		cover), emergent (30-70% cover) and submerged (70-100% cover) macrophytes present through survey stretch. Culvert under minor agricultural track noted.				
WC8	SK 89635 60440 to SK 89771 60672	Linear agricultural drainage ditch positioned within tilled / arable land. Steep earth banks covered with grasses and herbs. Channel overgrown with Bulrush and Gypsywort (*Lycopus europaeus*). Floating leaved (<3% cover), emergent (3-10% cover) and submerged (<3% cover) macrophytes	Average depth 7cm and average water width 0.5m	Soft silt substrate	N / A	Uniform bank vegetation structure consisting of one dominant vegetation

Site	NGR	Habitat description	Channel dimensions	Substrate	Terrestrial encroachment (dry reaches)	Bank vegetation structure
		present through survey stretch. Culvert under minor agricultural track noted.				
WC9	SK8989461213 to SK 89842 60929	Linear agricultural drainage ditch positioned within tilled / arable land. Steep earth banks covered with grasses and herbs. Floating leaved (<3% cover), emergent (3-10% cover) and submerged (<3% cover) macrophytes present through survey stretch.	Average depth 30cm and average water width 0.7m	Soft substrate comprising an almost entirely silt substrate and smaller contributions of sand and gravel	N / A	Uniform bank vegetation structure consisting of one dominant vegetation type (tall herb / rank).

Aquatic Macroinvertebrate Surveys

4.2.4 No aquatic macroinvertebrate species were recorded that receive specific legal protection via Schedule 8 of the WCA (Ref 5), or are SPI (Ref 12). However, this does not remove the need to further assess the species assemblages recorded for their nature conservation importance e.g., including in the context of LWS selection criteria.

4.2.5 The full aquatic macroinvertebrate taxa list can be found in in **Annex C [EN010154/APP/6.3]** of this appendix and full results on the macroinvertebrate indices and WFD classification can be found in **Annex B [EN010154/APP/6.3]**. A description of the macroinvertebrate community at each site is provided below.

B2

4.2.6 The macroinvertebrate community at Site B2 was primarily comprised of water hoglouse (a species of *Asellus*) (26.53%), Oligochaeta worms (17.68%), beetle larvae of *Haiplidae* water beetles (16.63%) and larvae of non-biting chironomid midges (22.74%). The site had a relatively diverse aquatic beetle assemblage with diving water beetles – *Hydroporus palustris*, *Hydroporus pubescens*, Common Black Diving Beetle (*Agabus bipustulatus*); and scavenger beetles – *Helophorus brevipalpis*, *Helophorus grandis* and *Anaceana limbata* present. Other taxa included two species of molluscs, Dwarf Pond Snail (*Galba truncatula*) and Wandering Pond Snail (*Radix balthica*), water boatmen, water cricket (a species of *Velia*), nymphs of the darter dragonfly (a species of *Sympetrum*), oribatid water mites, a flatworm *Dendrocoelum lacteum*, the copepod crustaceans and mosquito larvae Culicidae.

4.2.7 Biological water quality was ‘poor, polluted or impacted’ (ASPT-WHPT score 3.10) with a ‘heavily sedimented’ PSI score (0.0). The community at this site had ‘low sensitivity’ to reduced flows and was of ‘low’ conservation value (CCI score 4.50).

4.2.8 A non-native crustacean shrimp (*Crangonyx pseudogracilis / floridanus*) was present in this sample. This species is considered naturalised.

4.2.9 No other notable taxa were recorded.

BL4

4.2.10 The most diverse macroinvertebrate community was identified at Site BL4, consisting of 45 taxa of which *Anisus vortex* (27.17%), *Asellus aquaticus* (25.49%), and *Ampullaceana balthica* (17.30%) dominated the community. Several other freshwater snails were present, including Common Bladder Snail (*Physa fontinalis*) and Rams Horn Snails *Gyraulus crista* and *Bathyomphalus contortus*. Amongst other taxa recorded at Site BL4 were freshwater Oligochaeta worms, one species of freshwater leech *Glossiphonia complanata*, freshwater shrimp *Gammarus pulex/fossarum* agg. and *Gammarus pulex*, the damselfly *Pyrrhosoma nymphula*, the mayfly *Baetis* sp., the alderfly *Sialis lutaria*, the water strider *Gerridae*, and several true fly taxa

including Crane Fly (*Tipula* sp.). In addition, seven water beetle taxa were identified which included the whirligig beetle *Orectochilus villosus* and the diving beetle *Agabus bipustulatus*.

4.2.11 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 3.95) with a 'heavily sedimented' PSI score (11.86). The community at this site had 'low sensitivity' to reduced flows and was of 'moderate' conservation value (CCI score 7.29).

4.2.12 The non-native but naturalised New Zealand Mud Snail and crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus* were identified in this sample. In addition, the 'locally notable' freshwater snail *Bithynia leachii* (conservation score 5) was present however, this species is not listed in the Red Data Book (RDB) (Ref 31 and Ref 32) and is therefore of Local conservation value.

4.2.13 No other notable taxa were recorded.

BL5

4.2.14 The pond snail *Ampullaceana balthica* heavily dominated the macroinvertebrate community at Site BL5, totalling 69.24% of all identified taxa. Non-biting midges Chironomidae, including four tribes and pupae, were also relatively abundant, contributing 10% of total abundance. A total of 35 taxa were present at this site, consisting of but not limited to dragonflies *Aeshna* sp. and *Sympetrum* sp., damselflies *Ischnura elegans* and *Coenagrion puella*, caddisflies *Limnephilus lunatus* and *Mystacides azurea*, three water beetle taxa including *Haliplus lineaticollis*, and four mayfly taxa including *Caenis horaria*.

4.2.15 Biological water quality was 'good, clean but slightly impacted' (ASPT-WHPT score 4.30) with a 'heavily sedimented' PSI score (0.00). The community at this site had 'low sensitivity' to reduced flows and was of 'moderate' conservation value (CCI score 7.50).

4.2.16 The non-native but naturalised crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus* and 'locally notable' water beetle *Laccobius colon* (conservation score 5) were identified from this sample however, this species is not listed in the RDB (Ref 31 and Ref 32) and is therefore of Local conservation value.

4.2.17 No other notable taxa were recorded.

BL6

4.2.18 As at Site BL5, the macroinvertebrate community at Site BL6 was heavily dominated by the pond snail *Ampullaceana balthica* which totalled 87% of all identified taxa. The community also comprised three other freshwater snail taxa including the rams horn snail *Bathyomphalus contortus*, freshwater *Oligochaeta* worms, one species of freshwater leech *Glossiphonia complanata*, the dragonfly *Libellulidae*, three tribes of the non-biting midge *Chironomidae*, and two additional true fly taxa: the mosquito *Culicidae* and the marsh fly *Sciomyzidae*. In addition, a relatively diverse water beetle community comprising nine taxa was identified which included *Hydraena gracilis* and diving beetle *Hydroporus palustris*.

4.2.19 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 3.80) with a 'heavily sedimented' PSI score (3.70). The community at this site had 'low sensitivity' to reduced flows and was of 'moderate' conservation value (CCI score 7.08).

4.2.20 The 'locally notable' water beetle *Anacaena bipustulata* (conservation score 5) was present at this site however, this species is not listed in the RDB (Ref 31 and Ref 32) and is therefore of Local conservation value.

4.2.21 No other notable taxa were recorded.

BL8

4.2.22 The community at Site BL8 was heavily dominated by the pond snail *Ampullaceana balthica*, which totalled 88.08% of all specimens identified. Amongst other taxa present at this site were pea mussels *Pisidium* sp., the leech *Erpobdellidae*, the dragonfly *Sympetrum* sp., four non-biting midge Chironomidae tribes, and the soldier fly Stratiomyidae. A relatively diverse beetle community of 11 taxa was also identified at this site, which included long-toed water beetle *Dryops* sp. and the diving beetle *Agabus didymus*.

4.2.23 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 3.65) with a 'heavily sedimented' PSI score (0.00). The community at this site had 'low sensitivity' to reduced flows and was of 'moderate' conservation value (CCI score 7.50).

4.2.24 The non-native but naturalised crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus*.and 'locally notable' diving beetle *Ilybius quadriguttatus* (conservation score 5) were present at this site however, this species is not listed in the RDB (Ref 31 and Ref 32) and is therefore of Local conservation value.

4.2.25 No other notable taxa were identified.

WC3

4.2.26 The community at this site was predominantly comprised of the non-native (but naturalised) crustacean 'shrimp' *Crangonyx floridanus / pseudogracilis* and the water hoglouse *Asellus aquaticus*, totalling 24.68% and 34.39% of specimens respectively. Freshwater Oligochaeta worms also contributed significantly to abundance within this sample, comprising 11.15% of identified specimens. The site had a relatively diverse beetle assemblage, consisting of Dytiscidae, *Hydroporus pubsecens*, *Agabus bipustulatus*, *Agabus guttatus*, Hydrophilidae, *Anacaena globulus*, and *Hydraena testacea*. The non-biting midge Chironomidae, the true fly *Psychodida*, and the moth *Parapoynx stratiotata* were also present, as well as the ramshorn snail *Anisus vortex* and flat worm *Polycelis nigra / tenuis*.

4.2.27 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 4.26) with a 'heavily sedimented' PSI score (7.41). The community at this site had 'low sensitivity' to reduced flows and was of 'moderate' conservation value (CCI score 9.09).

4.2.28 The non-native but naturalised New Zealand Mud Snail and crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus* were present. In addition, the regionally notable water beetle *Hydraena testacea* was recorded (conservation score 6). This species is listed in the RDB as being too widespread to qualify as Nationally Scarce, formerly classified as Nationally Notable (Ref 33) and is therefore considered of Local conservation value.

4.2.29 No other notable taxa were recorded.

WC6

4.2.30 Freshwater snails (namely *Ampullaceana balthica*; 27.64% and *Anisus vortex*; 15.80%), and trueflies (notably Chironomidae; 26.52%) dominated the community at Site WC6. Beetles, particularly *Haliplus* sp., and crustaceans including ostracoda and the freshwater hoglouse *Asellus aquaticus* were also relatively abundant at this site. Other taxa present included the flatworm *Dugesia lugubris / polychroa*, freshwater Oligochaeta worms, the leech *Erpobdella octoculata*, backswimmers *Notonecta* sp., and true flies such as Empididae and crane flies *Tipula* sp.

4.2.31 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 3.93) with a 'heavily sedimented' PSI score (3.45). The community at this site had 'low sensitivity' to reduced flows and was of 'low' conservation value (CCI score 3.33).

4.2.32 Present at this site were the non-native but naturalised New Zealand Mud Snail and crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus*.

4.2.33 No other notable taxa were recorded.

WC7

4.2.34 The macroinvertebrate community at Site WC7 was primarily comprised of the rams horn snail *Planorbis planorbis* (32.12%), with the pond snail *Ampullaceana balthica* (19.58%) and the crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus* (18.44%) also abundant. Amongst other taxa present were four additional freshwater snail taxa including Common Bladder Snail, one freshwater *Oligochaeta* worm, two leech species *Glossiphonia complanata* and *Erpobdella octoculata*, the dragonfly *Aeshna* sp., three true bug taxa including the Common Pond Skater (*Gerris lacustris*), five water beetle taxa such as *Haliplus lineaticollis*, and true flies including four non-miting midge Chironomidae tribes and *Dixella* sp.

4.2.35 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 3.82) with a 'heavily sedimented' PSI score (0.00). The community at this site had 'low sensitivity' to reduced flows and was of 'low' conservation value (CCI score 3.25).

4.2.36 The non-native but naturalised crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus* was identified in this sample.

4.2.37 No other notable taxa were recorded.

WC8

4.2.38 The macroinvertebrate community at Site WC8 was predominantly comprised of the water hoglouse *Asellus aquaticus* (17.25%) and the non-biting midge Chironomidae tribe Tanytarsini (30.35%). The pond snail *Ampullaceana balthica* (6.28%) the pea mussel *Pisidum* sp. (7.22%) and the non-biting midge Chironomidae tribes Tanypodinae (12.30%) and Orthocladiinae (10.70%) were also abundant. In addition, two flatworm taxa Planariidae and *Dugesia lugubris / polychroa*, two additional freshwater snails *Anisus vortex* and *Stagnicola palustris / fuscus*, freshwater Oligochaeta worms, mites Oribatei, the dragonfly *Aeshna* sp., five beetle taxa including *Anacaena limbata* and three additional true fly taxa including the mosquito Culicidae were present.

4.2.39 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 3.60) with a 'heavily sedimented' PSI score (0.00). The community at this site had 'low sensitivity' to reduced flows and was of 'low' conservation value (CCI score 1.33).

4.2.40 The non-native but naturalised crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus* was present at this site.

4.2.41 No other notable taxa were recorded.

WC9

4.2.42 The community at Site WC9 was heavily dominated by the wandering pond snail *Ampullaceana balthica* which totalled 77.68% of identified specimens. Amongst other taxa present were other freshwater snails such as the New Zealand Mud Snail and Common Bladder Snail, the leeches *Glossiphonia complanata*, *Erpobdella* sp. and *Piscicola geometra*, the mayfly *Cloeon dipterum*, the dragonflies *Sympetrum striolatum* and *Sympetrum vulgatum*, the caddisfly *Limnephilus lunatus*, the backswimmer *Notonecta* sp. and true flies including crane fly *Tipula* sp. and non-biting midges Chironomidae. One species of water beetle *Helophorus grandis* and flatworm taxa *Dugesia lugubris / polychroa* were also identified as well as the water hoglouse *Asellus aquaticus*.

4.2.43 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 3.69) with a 'heavily sedimented' PSI score (7.41). The community at this site had 'low sensitivity' to reduced flows and was of 'moderate' conservation value (CCI score 8.08).

4.2.44 Three non-native but naturalised taxa were present at this site; the New Zealand Mud Snail, the crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus* and a Bladder Snail *Physella acuta / gyrina*. In addition, the regionally notable dragonfly *Sympetrum vulgatum* was recorded (conservation score 6). As *Sympetrum vulgatum* is a vagrant species, it does not qualify for evaluation against IUCN red list criteria (Ref 34) and it is therefore considered of Local conservation value.

4.2.45 No other notable taxa were recorded.

WC10

4.2.46 The community at Site WC10 was dominated by the New Zealand Mud Snail (41.41%), pea mussel *Pisidium* sp. (23.11%) and water hoglouse *Asellus aquaticus* (19.51%). Species tolerant to organic enrichment were present such as aquatic snails (e.g., *Ampullaceana balthica*, *Physella* sp., *Succinea* sp., *Anisus vortex* and *Anisus leucostoma*), pea mussel *Pisidium* sp., freshwater Oligochaeta worms, and *Asellus aquaticus*. Additional taxa identified included the flatworm *Polycelis nigra / tenuis*, the dragonfly larvae *Sympetrum* sp., three non-biting midge Chironomidae tribes (Tanypodinae, Tanytarsini and Chironomini) and the true fly Sciomyzidae.

4.2.47 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 3.07) with a 'heavily sedimented' PSI score (0.0). The community at this site had 'low sensitivity' to reduced flows and was of 'low' conservation value (CCI score 4.50).

4.2.48 The non-native crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus* and New Zealand Mud Snail were present in this sample. These species are considered to be naturalised.

4.2.49 No other notable taxa were recorded.

WC11

4.2.50 The macroinvertebrate community at Site WC11 was predominantly comprised of freshwater snails (namely *Valvata piscinalis*; 10.94% and *Anisus vortex*; 12.12%), water hoglouse (*Asellus aquaticus*; 10.64% and *Proasellus* sp.; 7.68%) and true flies such as black fly larvae *Simulium* sp. (14.58%) and non-biting midges Chironomidae (26.01%). Also abundant at this site were pea mussels *Pisidium* sp. and crustacean 'shrimp' *Crangonyx floridanus / pseudogracilis*. The flatworm Planariidae, freshwater Oligochaeta worms, the leech Erpobdellidae, water mites Hydracarina, the mayflies Baetidae and *Baetis rhodani / atlanticus*, water strider Gerridae and two water beetle taxa *Anacaena limbata* and Dytiscidae were also identified within the sample.

4.2.51 Biological water quality was 'poor, polluted or impacted' (ASPT-WHPT score 3.62) with a 'heavily sedimented' PSI score (9.09). The community at this site had 'low sensitivity' to reduced flows and was of 'moderate' conservation value (CCI score 7.22).

4.2.52 The non-native but naturalised crustacean 'shrimp' *Crangonyx pseudogracilis / floridanus* was identified at this site as well as the locally notable freshwater snail *Bithynia leachii* (conservation score 5).

4.2.53 No other notable taxa were recorded.

Aquatic Macrophyte Surveys

4.2.54 No aquatic macrophyte species were recorded that receive specific legal protection via Schedule 8 of the WCA (Ref 5), or that are listed in Section 41 of the NERC Act (Ref 12) as being of principal importance for nature conservation in England. This does not remove the need to further assess the

species assemblages recorded for their nature conservation importance, including in the context of LWS selection criteria.

4.2.55 The full aquatic macrophyte taxa list can be found in in **Annex D** of this appendix **[EN010154/APP/6.3]**. A description of the macrophyte assemblage at each site is provided below.

B2

4.2.56 B2 supported four macrophyte species, dominated by common marginal species. Two emergent species were recorded: Reed Canary-grass (*Phalaris arundinacea*) and Bulrush. No rare, notable, or non-native plant species were found.

BL4

4.2.57 BL4 supported six aquatic plant species with the majority common marginal species. Submerged species included Canadian Waterweed with the only floating species being Common Duckweed (*Lemna minor*). No rare, notable, or non-native plant species were found.

4.2.58 Canadian Waterweed is an invasive non-native species and is scheduled on the WCA (Ref 5).

BL5

4.2.59 BL5 supported 15 aquatic plant species with the majority common marginal and emergent species. Submerged species included Small Pondweed (*Potamogeton berchtoldii*), Canadian Waterweed and Opposite-leaved Pondweed (*Groenlandia densa*) with floating species limited to Common Duckweed.

4.2.60 Oppositive-leaved Pondweed is listed as 'Vulnerable' based on IUCN criteria (Ref 35) and was present in high abundance along the ditch.

4.2.61 Canadian Waterweed is an invasive non-native species and is scheduled in the WCA (Ref 5).

BL6

4.2.62 BL6 supported 13 aquatic plant species with the majority common marginal and emergent species. Submerged species were limited to Opposite-leaved Pondweed with floating species of Common Duckweed and Amphibious Bistort (*Persicaria amphibia*).

4.2.63 Oppositive-leaved Pondweed is listed as 'Vulnerable' based on IUCN criteria (Ref 35) and was present in frequent abundance along the drain.

BL8

4.2.64 BL8 supported 15 aquatic plant species with the majority common marginal and emergent species. Submerged species were limited to Water-starwort (*Callitriche* sp.) and Common Stonewort (*Chara vulgaris*) with floating leaved species limited to Common Duckweed. No rare, notable, or non-native plant species were found.

WC3

4.2.65 WC3 supported two common marginal aquatic plant species and the emergent species Reed Canary-grass. No rare, notable, or non-native plant species were found.

WC6

4.2.66 WC6 supported 12 aquatic plant species dominated my common marginal species. The only submerged species recorded was a Water-starwort sp. and the only floating species was Common Duckweed. No rare, notable, or non-native plant species were found.

WC7

4.2.67 WC7 supported nine aquatic plant species with the majority common marginal and emergent species. The only submerged species recorded was Small Pondweed with floating taxa of Common Duckweed, Ivy-leaved Duckweed (*Lemna trisulca*) and Amphibious Bistort. No rare, notable, or non-native plant species were found.

WC8

4.2.68 WC8 supported 16 aquatic plant species with the majority common marginal and emergent species. The only submerged species recorded was Water-starwort sp., Various-leaved Water-starwort (*Callitriche platycarpa*), and Nuttall's Waterweed. The only floating species was Common Duckweed.

4.2.69 Nuttall's Waterweed is an invasive non-native species and is scheduled on the WCA (Ref 5) and the ISA Order (Ref 11).

WC9

4.2.70 WC9 supported 14 aquatic plant species with the majority common marginal and emergent species. The only submerged species were Water-starwort and Nuttall's Waterweed with the only floating species being Common Duckweed.

4.2.71 Nuttall's Waterweed is an invasive non-native species and is scheduled on the WCA (Ref 5) and the ISA Order (Ref 11).

WC10

4.2.72 WC10 supported 11 macrophyte species, which mainly consisted of common marginal and emergent species. Submerged species were limited to Common Water-starwort (*Callitriche stagnalis*). No rare, notable, or non-native plant species were found.

WC11

4.2.73 WC11 supported seven aquatic plant species, all consisting of common marginals and emergent. No rare, notable, or non-native plant species were found.

5. Evaluation

5.1 Watercourses and Drains

5.1.1 The desk study highlighted current factors impacting the catchments within the DCO Site Boundary including nutrient input from 'agricultural land use, water treatment, and industrial activity'. Heavy modification of watercourses for agricultural drainage and modifications associated with 'urban development' were also highlighted as impacting habitat quality for macroinvertebrates.

5.1.2 The Poor to Moderate ecological quality of all water bodies suggests that the Proposed Development is unlikely to cause lasting impacts to the wider WFD catchments compared to current impacts. On the contrary for a more normal drainage regime, no fertiliser application and no pesticide inputs, the expectation would be an improvement in ecological quality. Where negative impacts are identified, appropriate mitigation would be implemented. There are opportunities to identify and enhance ecological condition including biodiversity, for example through BNG assessment, to enhance habitat and water quality to meet BNG objectives for the Proposed Development.

5.2 Fish

5.2.1 The desk study identified ten records of the protected species European Eel within 2km of the Study Area within the last 20 years, with the closest record being 600m downstream of the DCO Site Boundary on the River Witham. This species is afforded protection under the Eels (England and Wales) Regulations 2009 (Ref 10), which places a requirement upon developers and abstracters to ensure continued eel passage and to prevent eel entrainment.

5.2.2 European Bullhead was also identified at the same EA monitoring station with the most recent record in 2017. This species is a Habitats Directive Annex II species (Ref 1).

5.2.3 The most recent record of Brown Trout identified during the desk study was in 1997, 1.7km upstream of the DCO Site Boundary on the River Witham. Brown Trout is listed as a SPI (Ref 12).

5.2.4 The desk study also revealed that Barbel was found 600m downstream of the DCO Site Boundary on the River Witham, with the latest record in 2005. This species is a Habitats Directive Annex V species (Ref 1).

5.2.5 In addition, Spined Loach was recorded in a section of the River Brant within the DCO Site Boundary, with the most recent record in 2011. This species is listed in Annex II of the Habitats Directive (Ref 1) and it is a SPI (Ref 12). It is restricted to central and eastern England.

5.2.6 Due to the presence of the above notable fish species in connected water bodies, there is the potential that they may occur within the watercourses and ditches to be impacted within the DCO Site Boundary. European Eel for

example may utilise all connected watercourses and ditches in a catchment and may cross land between them. Therefore, consideration will need to be given to maintaining passage along watercourses and ditches for transitory fish species and avoiding impacts to them during construction.

5.2.7 No suitable spawning habitat for fish was identified in any of the surveyed water bodies.

5.3 Aquatic Macroinvertebrates

5.3.1 There were two Regionally Notable macroinvertebrate species found in the DCO Site Boundary: a water beetle *Hydraena testacea* and a dragonfly *Sympetrum vulgatum* (larva found). Four Locally Notable species were also found: a freshwater snail, Leach's Bithynia (*Bithynia leachii*), three water beetle species, two water scavenger beetles, *Laccobius colon* and *Anacaena bipustulata* and a diving beetle *Ilybius quadriguttatus*. These notable species do not have legislative designations, and are therefore considered of Site conservation value, with the exception of *Sympetrum vulgatum*, which is considered of Local value as it is classified as a vagrant European species in the RDB (Ref 32).

5.3.2 Macroinvertebrate communities were typical of watercourses subject to significant human modification and man-made drainage ditches in lowland Lincolnshire, with most ditch communities including freshwater snails, water beetles, and Odonata (dragonflies and damselflies).

5.3.3 Aquatic macroinvertebrate surveys revealed that watercourses within the four WFD catchments within the Principal Site are all subject to habitat diversity and water quality pressures throughout. Current ASPT (WHPT) scores suggest that almost all surveyed water bodies suffer from Poor, Polluted or Impacted water quality. The exceptions to this are Site B2 which is suggested to have Moderate, Moderately impacted water quality and Site BL5 which is suggested to have Good, Clean but slightly impacted water quality. The macroinvertebrate communities in all surveyed water bodies were indicative of environments with high levels of siltation. In line with these results, the aquatic macroinvertebrate community of all surveyed watercourses had either a Low or Moderate conservation value.

5.4 Aquatic Macrophytes

5.4.1 The desk study indicated that the macrophyte sub-element for the four WFD water bodies within the Study Area was designated as Bad, Poor or Moderate.

5.4.2 A single notable plant species, Opposite-leaved Pondweed, was present in drains BL5 and BL6 only. This threatened species has a Vulnerable status on the England Red List of vascular plants (Ref 36) but does not receive specific legal protection. Online mapping indicates that this species has a patchy distribution across Lincolnshire, where it is mostly found in smaller water bodies such as streams, canals, ditches and ponds (Ref 37). As such, it is considered of Local conservation value. Water body BL6 supports a total of

12 qualifying freshwater macrophyte species listed in the Local Wildlife Site Guidelines for Greater Lincolnshire (Ref 29). This water body therefore meets the criteria for selection of LWS and is of County conservation value.

5.4.3 Most of the water bodies do not support a notably diverse aquatic plant assemblage, with the majority being fairly species poor. Although some (WC8, BL8 and Bl5) do support a moderate number of aquatic plant species (>15), these are comprised of common species typical of drainage ditches and / or slow flowing water bodies. It is highly likely that similar aquatic plants communities occur within suitable habitats across the wider landscape, and as such these plant species and assemblages are judged to be of Site conservation value.

5.5 Aquatic Invasive Non-Native Species

5.5.1 The presence of the non-native but non-invasive New Zealand Mud Snail and freshwater amphipod shrimp, either *Crangonyx pseudogracillis* or *Crangonyx floridanus*, constituted the only notable macroinvertebrate records. As these species are widespread and not currently listed in UK legislation, there are no statutory constraints to the spread of either species.

5.5.2 Two submerged plants, Canadian Waterweed and Nuttall's Waterweed, are listed on Schedule 9 of the WCA (Ref 5) and the latter also list on the ISA (Enforcement and Permitting) Order (Ref 11). As such it is an offence cause either species grow in the wild and in the case of Nuttall's Waterweed, there should be a plan for dealing with this species as under the (Enforcement and Permitting) Order. To this end, a Biosecurity Management Plan would be produced to ensure that neither species was spread outside the DCO Site Boundary during construction, operation, and decommissioning. Nuttall's waterweed was recorded in water bodies WC8 and WC9; Canadian pondweed was recorded in water bodies BL4 and BL5.

6. Conclusions

6.1.1 The watercourses within the DCO Site Boundary are subject to habitat and water quality pressures from existing industries, especially agriculture. This is exhibited in the results of the macroinvertebrate and macrophyte surveys. Current impacts on biological communities are resultant of watercourse habitat and channel modification indicated by aquatic habitat walkover surveys from adjacent land use and rural management practices, also as indicated in the desk study.

6.1.2 Due to the presence of European Eel, European Bullhead, Brown Trout, Spined Loach and Barbel recorded locally in connected water bodies, there is the potential for these species to be present within the DCO Site Boundary in the network of watercourses and ditches, although no suitable spawning habitat was identified in the water bodies on the DCO Site Boundary. An assessment of potential impacts (considering embedded mitigation), any additional mitigation and residual effects on these species has been undertaken and is included within **Chapter 8: Ecology and Nature Conservation** of this ES **[EN010154/APP/6.1]**.

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Annex A Figures

Figure 8-C-1: Aquatic Ecology Survey Locations

Revision: 0 Drawn: BF Checked: LL Approved: NS Date: 2025-07-16

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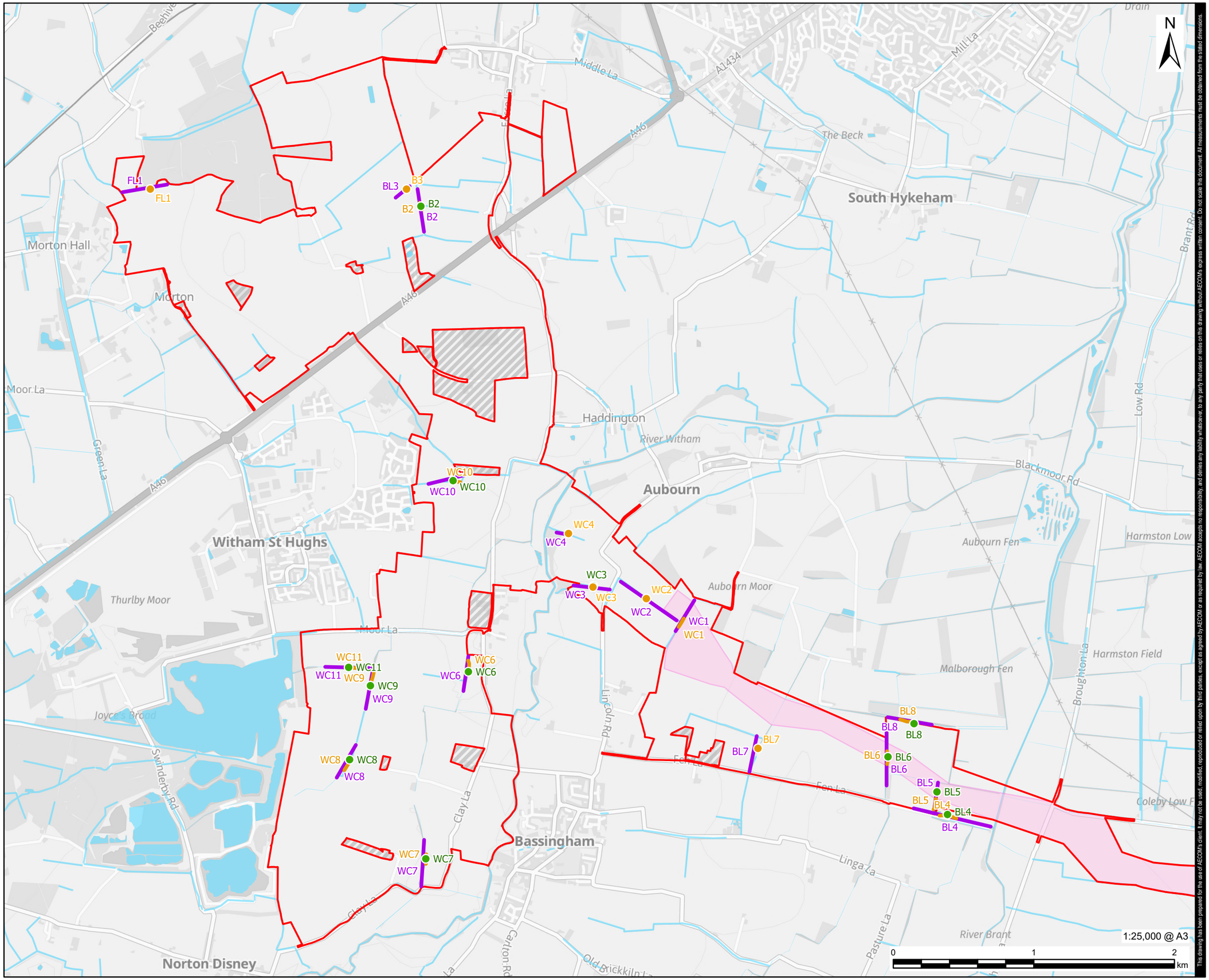

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LEGEND

- DCO Site Boundary
- Land not included in the DCO Site Boundary
- Grid Connection Corridor
- Macroinvertebrate Sampling Location
- Aquatic Habitat Appraisal
- Macrophyte Survey
- Macrophyte Survey Point
- Watercourse
- Waterbody

NOTES

LEGISLATION

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

ISSUE PURPOSE

DCO Submission

FIGURE TITLE

Aquatic Ecology Survey Locations

FIGURE NUMBER	REV.
Figure 8-C-1	01

DOCUMENT REFERENCE

EN010154/APP/6.3.

Annex B Aquatic Macroinvertebrate Indices and WFD Classification

B.1.1 Based on the criteria outlined in **Section 3.5** CCI, WHPT, ASPT, NTAXA, LIFE and PSI species values for each survey reach are detailed in **Table B-1**.

Table B-1: Aquatic macroinvertebrate indices and WFD classification

Index / Category	B2	WC10	WC3	WC6	WC11	WC9	WC8	WC7	BL5	BL6	BL4	BL8
NTAXA (WHPT)	12.0	12.0	14.0	19.0	18.0	19.0	16.0	19.0	22.0	15.0	26.0	19.0
ASPT (WHPT)	3.10	3.07	4.26	3.93	3.62	3.69	3.60	3.82	4.30	3.80	3.95	3.65
CCI Score	4.50	4.50	9.09	3.33	7.22	8.08	1.33	3.25	7.50	7.08	7.29	7.50
CCI Score – interpretation	Low conservation value	Low conservation value	Moderate conservation value	Low conservation value	Moderate conservation value	Moderate conservation value	Low conservation value	Low conservation value	Moderate conservation value	Moderate conservation value	Moderate conservation value	Moderate conservation value
LIFE score (species)	5.64	5.17	6.09	5.45	5.00	5.93	5.44	5.58	5.90	5.75	6.13	5.67
LIFE score (species) – interpretation	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows	Low sensitivity to reduced flows
PSI score (species)	0.00	0.00	7.41	3.45	9.09	7.41	0.00	0.00	0.00	3.70	11.86	0.00

PSI score (species)-interpretation	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented	Heavily Sedimented
Total number of taxa	25	17	21	26	28	23	26	28	35	24	45	35
Non-native / Notable Species	The non-native but naturalised crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.*	The non-native but naturalised New Zealand Mud Snail and crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.*	The non-native but naturalised New Zealand Mud Snail and crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.* Regionally notable water beetle *Hydraaena testacea* also present (conservation score 6).	The non-native but naturalised New Zealand Mud Snail and crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.*	The non-native but naturalised crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.* Locally notable freshwater snail *Bithynia leachii* also present (conservation score 5).	The non-native but naturalised New Zealand Mud Snail and crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.* and Bladder Snail *Physella acuta / gyrina.* Regionally notable dragonfly larvae *Sympetrum vulgatum* also present.	The non-native but naturalised crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.*	The non-native but naturalised crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.*	The non-native but naturalised crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.* Locally notable water beetle *Laccobius colon* also present (conservation score 5).	Locally notable water beetle *Anacaena bipustulata* present (conservation score 5).	The non-native but naturalised New Zealand Mud Snail and crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.* Locally notable freshwater snail *Bithynia leachii* also present (conservation score 5).	The non-native but naturalised crustacean shrimp *Crangonyx pseudogracilis* or *Crangonyx floridanus.* Locally notable diving beetle *Ilybius quadriguttatus* also present (conservation score 5).

Annex C Macroinvertebrate Taxa List

Table C-2: Aquatic macroinvertebrate data

Family	Taxa	Conservation Score	B2	WC10	WC3	WC6	WC11	WC9	WC8	WC7	BL5	BL6	BL4	BL8
Flatworms														
Dendrocoelidae	*Dendrocoelum lacteum*	2	1											
Planariidae	*Polycelis nigra / tenuis*	1		1	1		6		1	1			13	
Dugesiidae	*Dugesia lugubris / polychroa*	2				1		4	4					
Snails														
Lymnaeidae	*Galba truncatula*	3	2											
Lymnaeidae	*Stagnicola palustris / fuscus*	2							1	2				
Lymnaeidae	*Lymnaea stagnalis*	1								1			1	
Lymnaeidae	*Ampullaceana balthica*	1	2	19		196	16	595	47	103	430	1230	205	1817
Valvatidae	*Valvata piscinalis*	1					111						5	1
Hydrobiidae	*Potamopyrgus antipodarum*	1		586	4	2		20					3	
Bithyniidae	*Bithynia tentaculata*	1										2	9	1
Bithyniidae	*Bithynia leachii*	5					11						2	
Physidae	*Physa fontinalis*	1								13			2	
Physidae	*Physella acuta / gyrina*			8				5						

Family	Taxa	Conservation Score	B2	WC10	WC3	WC6	WC11	WC9	WC8	WC7	BL5	BL6	BL4	BL8
Succineidae	A species *Succinea*			1						2	1			
Planorbidae	*Planorbidae* (juvenile / damaged)			2			2							
Planorbidae	*Planorbis planorbis*	1								169			1	12
Planorbidae	*Anisus vortex*	1		10	34	112	123	37	1			30	322	2
Planorbidae	*Anisus leucostoma*	4		1										
Planorbidae	*Gyraulus albus*	1					1							
Planorbidae	*Gyraulus crista*	2											1	
Planorbidae	*Bathyomphalus contortus*	2										6	2	
Limpets and mussels														
Sphaeriidae	A species of *Pisidium*			327	40		50		54		6		11	1
Worms														
Oligochaeta	Oligochaeta		84	17	70	7	9		12	1	19	8	52	1
Leeches														
Glossiphoniidae	*Glossiphonia complanata*	1				1		1		1		2	1	
Erpobdellidae	Erpobdellidae (juvenile / damaged)						14							2
Erpobdellidae	A species of *Erpobdella*							1						
Erpobdellidae	*Erpobdella octoculata*	1				4				5				

Family	Taxa	Conservation Score	B2	WC10	WC3	WC6	WC11	WC9	WC8	WC7	BL5	BL6	BL4	BL8
Piscicolidae	*Piscicola geometra*	2						1						
Mites														
Hydracarina	Hydracarina						11						3	1
Oribatei	Oribatid water mites		8		1				4					1
Crustaceans														
Ostracoda	-								9		4			
Copepoda	-		37			30								35
Gammaridae	*Gammarus pulex / fossarum* aggregate	1					1	1			8		28	
Gammaridae	*Gammarus pulex*	1			2								14	
Crangonyctidae	*Crangonyx floridanus / pseudogracilis*		1	92	155	15	49	1	26	97	9		26	28
Asellidae	A species of *Proasellu*		114			21	78						10	
Asellidae	*Asellus aquaticus*	1	12	276	216	25	108	10	129	34	8	37	302	30
Mayflies														
Baetidae	Baetidae (juvenile / damaged)						2	2			2		2	
Baetidae	*Baetis* sp.												1	
Baetidae	*Baetis rhodani / atlanticus*						3							
Baetidae	*Cloeon dipterum*	1						2			1			

Family	Taxa	Conservation Score	B2	WC10	WC3	WC6	WC11	WC9	WC8	WC7	BL5	BL6	BL4	BL8
Caenidae	*Caenis horaria*	1									5			
Caenidae	*Caenis luctuosa / macura*										17			
Damselflies														
Coenagrionidae	*Pyrrhosoma nymphula*	3											1	
Coenagrionidae	*Ischnura elegans*	1									4			
Coenagrionidae	*Coenagrion puella*	2									1			
Dragonflies														
Aeshnidae	*Aeshna* sp.								3	2	1			
Libellulidae	Libellulidae (juvenile / damaged)							5				2		
Libellulidae	*Sympetrum* sp.		1	1							6			21
Libellulidae	*Sympetrum striolatum*	1						7						
Libellulidae	*Sympetrum vulgatum*	6						1						
True bugs														
Gerridae	Gerridae (nymph / damaged)						1				3		1	
Gerridae	*Gerris lacustris*	1								1	3			
Veliidae	Veliidae (nymph / damaged)										2		5	1
Veliidae	*Velia* sp.		3											

Family	Taxa	Conservation Score	B2	WC10	WC3	WC6	WC11	WC9	WC8	WC7	BL5	BL6	BL4	BL8
Corixidae	Corixidae (nymph / damaged)							4		5	3			
Corixidae	*Sigara dorsalis / striata*										1			
Notonectidae	Notonectidae (nymph / damaged)										1			
Notonectidae	*Notonecta* sp.					1		10		22		1		4
Beetles														
Haliplidae	*Haliplus* sp.		79			48			8			3	36	16
Haliplidae	*Haliplus lineaticollis*	1								1	1	1	1	3
Haliplidae	*Haliplus ruficollis* group													1
Gyrinidae	*Gyrinus* sp.					2								
Gyrinidae	*Orectochilus villosus*	2											1	
Dytiscidae	Dytiscidae (larvae / damaged)		8		1	5	1			17		9	9	6
Dytiscidae	*Hydroporus palustris*	1	2						2			2	1	3
Dytiscidae	*Hydroporus pubsecens*	2	1		1				2					1
Dytiscidae	*Graptodytes pictus*	3											1	
Dytiscidae	*Agabus bipustulatus*	1	1		1								1	
Dytiscidae	*Agabus didymus*	1												1
Dytiscidae	*Agabus guttatus*	4			1									
Dytiscidae	*Ilybius quadriguttatus*	5												1

Family	Taxa	Conservation Score	B2	WC10	WC3	WC6	WC11	WC9	WC8	WC7	BL5	BL6	BL4	BL8
Dytiscidae	*Dytiscus* sp.									3				
Hydrophilidae	Hydrophilidae (larvae / damaged)				6	2			5	2	5	5	8	5
Hydrophilidae	*Helophorus brevipalpis*	1	1			4							1	
Hydrophilidae	*Helophorus grandis*	2	1					2						2
Hydrophilidae	*Hydrobius fuscipes*	1										1		
Hydrophilidae	*Anacaena bipustulata*	5										6		
Hydrophilidae	*Anacaena globulus*	1			29							5		
Hydrophilidae	*Anacaena limbata*	1	3				1		5	3				
Hydrophilidae	*Laccobius colon*	5									1			
Hydraenidae	*Ochthebius minimus*	1				1								
Hydraenidae	*Hydraena gracilis*	1										1		
Hydraenidae	*Hydraena testacea*	6			3									
Dryopidae	*Dyops* sp.													1
Scirtidae	Scirtidae (larvae / damaged)										1			
Alderflies														
Sialidae	Sialidae (juvenile / damaged)												2	
Sialidae	Sialis lutaria	1											2	
Caddisflies														

Family	Taxa	Conservation Score	B2	WC10	WC3	WC6	WC11	WC9	WC8	WC7	BL5	BL6	BL4	BL8
Limnephilidae	*Limnephilus lunatus*	1			2			1			4			
Leptoceridae	*Mystacides azurea*	2									3			
Trueflies														
Chironomidae	Chironomidae (damaged / pupea)								6		3			1
Chironomidae	Tanypodinae		1	23		21	63		92	8	5	25	2	13
Chironomidae	Orthocladiinae		44		16	39	65	3	80	16	5	1	44	28
Chironomidae	Chironomini		63	1			1		6	6	30		12	2
Chironomidae	Tanytarsini			49	35	128	133	49	227	5	22	7	21	13
Chironomidae	Prodiamesinae						2							
Tipulidae	*Tipula* sp.					9		4					1	
Limoniidae	Limoniidae									2				
Simuliidae	Simuliidae (damaged / juvenile)						1							
Simuliidae	*Simulium* sp.						148							
Dixidae	*Dixella* sp.									1				
Psychodidae	-				1								2	
Empididae	-					7	4		12				6	
Ceratopogonidae	-										1			
Stratiomyidae	Stratiomyidae								1					1

Family	Taxa	Conservation Score	B2	WC10	WC3	WC6	WC11	WC9	WC8	WC7	BL5	BL6	BL4	BL8
Culicidae	Culicidae (pupae)					2			10			5		
Culicidae	*Culiseta* sp.		4											
Culicidae	*Coquillettidia richiardii*		1			3								
Sciomyzidae	-			1								11		3
Moths														
China-mark moth	*Parapoynx stratiotata*		1											
Other Taxa														
Collembola					9	23			1	3	5	9	11	4

Annex D Macrophyte Taxa List

Table D-3: Macrophyte data

Common Name	Latin Name	B2		WC10		WC3		WC6		WC11		WC9		WC8		WC7		BL5		BL6		BL4		BL8	
		Channel	Bank	Channel	Bank	Channel	Bank	Channel	Bank	Channel	Bank	Channel	Bank	Channel	Bank	Channel	Bank	Channel	Bank	Channel	Bank	Channel	Bank	Channel	Bank
		DAFOR (D = Dominant (greater than 75% total cover) A = Abundant (51 to 75% total cover) F = Frequent (26 to 50% total cover) O = Occasional (11 to 25% total cover R = Rare (1 to 10% total cover) L (used where species were noted as Local (patchy) in distribution)																							
Creeping Bent	*Agrostis stolonifera*																							R	
Narrow-leaved Water Plantain	*Alisma lanceloatum*																							R	
Common Water Plantain	***Alisma plantago aquatica***			R								R						O		O		O			
Wild Angelica	*Angelica sylvestris*								F																
Fools Watercress	***Helosciadium nodiflorum***							F				A		F				R				F			
Water-starwort	***Callitriche* agg.**							R				R								A					

Various-leaved Water-starwort	***Callitriche platycarpa***													R								A			
Pond Water-starwort	***Callitriche stagnalis***			R																					
False Fox-sedge	*Carex otrubae*			O	O				R									F		R					
Carnation Sedge	*Carex panicea*																								
Sedge	*Carex* sp.											R													
Fragile Stonewort	***Chara globularis***																			F					
Common Stonewort	***Chara vulgaris***																							A	
Thistle	*Cirsium* sp.		F						O				O				F								
Common Spike Rush	***Eleocharis palustris***																			O				A	
Canadian Waterweed	*Elodea canadensis*																	O				R			
Nuttall's Waterweed	*Elodea nuttallii*													R											
Willowherb	*Epilobium hirsutum*	O	F	F	A				O		O		O					A		O	O		A		O
Field Horsetail	*Equisetum arvense*				F																				F

Meadowsweet	*Filipendula ulmaria*	O	A						O		R		R		O										O
Marsh Bedstraw	*Galium palustre*																								O
Reed Sweet Grass	***Glyceria maxima***																					A			
Opposite-leaved pondweed	***Groenlandia densa***																	A		F					
Common Hogweed	*Heracleum sphondylium*								F		O				O		F								
Yellow Iris	***Iris pseudocarus***																			O					
Jointed Rush	*Juncus articulatus*																	O		R				O	
Compact Rush	*Juncus conglomeratus*																								
Common Rush	*Juncus effusus*																	F		O				F	O
Hard Rush	*Juncus inflexus*			O	O												O								
Common Duckweed	*Lemna minor*							O								F		R		D		D		O	
Ivy-leaved Duckweed	***Lemna trisulca***															O									
Gypsywort	***Lycopus europaeus***									O		O		F											

Creeping Jenny	*Lysimachia nummularia*																								
Water Mint	***Mentha aquatica***							R																	
Water Forget-me-not	***Myosotis scorpioides***							O																	
Amphibious Bistort	*Persicaria amphibia*																								
Reed Canary-grass	***Phalaris arundinacea***	F		F			O	D				F		F			A			O		A			F
Common Small Pondweed	***Potamogeton berchtoldii***															D		O							
Creeping Buttercup	*Ranunculus repens*				F							O			O			F							
Watercress	*Rorippa nasturtium* agg.			D					A			O		O								F			
Bramble	*Rubus fruticosus*										A				O		F								F
Dock	*Rumex* sp.		O	R	O				O		F	O		O	O		F								
Grey Club Rush	***Schoenoplectus tabernaemontani***																	R		O					
Water Figwort	***Scrophularia auriculata***														R			O	O		R			O	
Bittersweet	*Solanum dulcamara*			R						F	O			R											

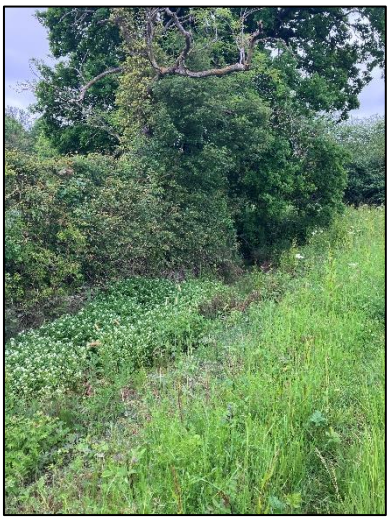
Branched Bur-reed	***Sparganium erectum***		R							F	O		O
Marsh Woundwort	***Stachys palustris***												
Bullrush	***Typha latifolia***					D		F	A	F	A		
Nettle	*Urtica dioica*	O F				O F						A	
Brooklime	***Veronica beccabunga***		D										
Pink Water Speedwell	***Veronica catenata***		R							O	O	O	
Number of LWS qualifying species[2] (**Bold**)		1	6	1	5	2	5	6	4	9	12	6	5

[2] Local Wildlife Site Guidelines for Greater Lincolnshire https://glnp.org.uk/images/uploads/services/5e84eae57f8a5_LWS%20guidelines%203rd%20ed.pdf

Annex E Aquatic Habitat Walkover Photographs

Table E-4: Aquatic habitat photographs

Aquatic habitat survey reach Site B2



Aquatic habitat survey reach Site WC10

Aquatic habitat survey reach Site WC3

Aquatic habitat survey reach Site WC6

Aquatic habitat survey reach Site WC11

Aquatic habitat survey reach Site WC9

Aquatic habitat survey reach Site WC8

Aquatic habitat survey reach Site WC7

Aquatic habitat survey reach Site BL5

Aquatic habitat survey reach Site BL6

Aquatic habitat survey reach Site BL8

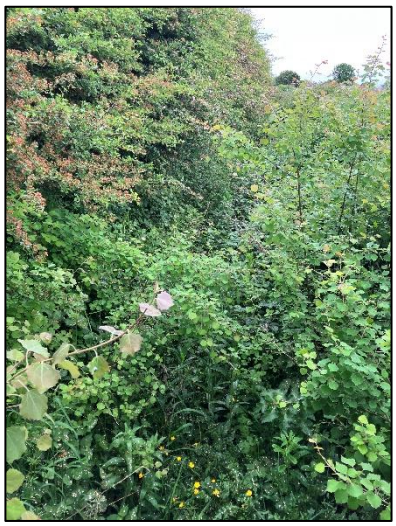
Aquatic habitat survey reach Site FL1

Aquatic habitat survey reach Site B3

Aquatic habitat survey reach Site WC4

Aquatic habitat survey reach WC1

Aquatic habitat survey reach Site BL7



Aquatic habitat survey reach Site WC2