ENVIRONMENTAL STATEMENT (VOLUME III)

Appendix 9.10 Aquatic Ecology (Ponds) Survey Report

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

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

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Approver Name and Sign	DC			
Document Owner	WSP			

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1.   INTRODUCTION

1.1.   PROJECT BACKGROUND

1.1.1.   This technical appendix provides information on the presence legally protected or otherwise notable aquatic species, and supports the assessment contained in **Chapter 9 – Biodiversity (Volume II)**.

1.1.2.   The Applicant intends to build and operate a new underground carbon dioxide (CO_2) pipeline from Cheshire, England to Flintshire, Wales with necessary Above Ground Installations (AGIs) and Block Valve Stations (BVSs). It is classed as a Nationally Significant Infrastructure Project (NSIP) and will require a Development Consent Order (DCO) under the Planning Act 2008 ('PA2008') granted by the Secretary of State for Business, Energy and Industrial Strategy (BEIS)

1.1.3.   The DCO Proposed Development will form part of HyNet North West ('the Project'), which is a hydrogen supply and Carbon Capture and Storage ('CCS') project. The goal of the Project is to reduce CO_2 emissions from industry, homes and transport and support economic growth in the North West of England and North Wales. The wider Project is based on the production of low carbon hydrogen from natural gas. It includes the development of a new hydrogen production plant, hydrogen distribution pipelines, hydrogen storage and the creation of CCS infrastructure. CCS prevents CO_2 entering the atmosphere by capturing it, compressing it and transporting it for safe, permanent storage.

1.1.4.   The DCO Proposed Development is a critical component of HyNet North West which, by facilitating the transportation of carbon, enables the rest of the Project to be low carbon. The hydrogen production, distribution and CO_2 capture and storage elements of the Project do not form part of the DCO Proposed Development and will be delivered under separate consenting processes.

1.1.5.   The DCO Application will seek consent for the construction, operation and maintenance of the following components which are part of the DCO Proposed Development, namely:

- **Ince Above Ground Installation (AGI) to Stanlow AGI Pipeline** – a section of new underground onshore pipeline (20" in diameter) to transport CO_2;

- **Stanlow AGI to Flint AGI Pipeline** – a section of new underground onshore pipeline (36" in diameter) to transport CO_2;

- **Flint AGI to Flint Connection Pipeline** – a section of new underground onshore pipeline (24" in diameter) to transport CO_2;

- **Flint Connection to Point of Ayr (PoA) Terminal Pipeline** – a section of existing Connah's Quay to Point of Ayr (PoA) underground onshore pipeline (24" in diameter) which currently transports natural gas but would be repurposed and reused to transport CO_2. The Flint Connection to PoA Terminal Pipeline is scoped out of the EIA, except for the areas adjacent to the three BVSs that are within the Newbuild Infrastructure Boundary;

- **Four AGIs** - Ince AGI, Stanlow AGI, Northop Hall AGI, and Flint AGI;

- Six Block Valve Stations (BVSs) - located along:

    - The new Stanlow AGI to Flint AGI Pipeline (three in total);

    - the existing Flint Connection to PoA Terminal Pipeline (three in total);

- Other above ground infrastructure, including Cathodic Protection (CP) transformer rectifier cabinets and pipeline marker posts;

- Utility Connection infrastructure, including power utilities and Fibre Optic Cable (FOC); and

- Temporary ancillary works integral to the construction of the Carbon Dioxide Pipeline, including Construction Compounds and temporary access tracks.

1.1.6.   Further details of each element of the DCO Proposed Development are set out in **Chapter 3 – Description of the DCO Proposed Development (Volume II).**

1.2.   ECOLOGICAL BACKGROUND

1.2.1.   A total of 28 ponds were identified within the Newbuild Infrastructure Boundary (**Figure 9.10.1**). Aquatic habitat scoping assessments were undertaken across 26 ponds within the Newbuild Infrastructure Boundary between July 2021 and June 2022 for the DCO Proposed Development. The remaining two ponds not considered for scoping, as land access was not agreed.

1.2.2.   Ponds within the Newbuild Infrastructure Boundary were assessed for their potential to support legally protected or otherwise notable aquatic species, with those ponds deemed to provide suitable aquatic habitat targeted for further Predictive System for Multimetrics (PSYM) surveys.

1.3.   AIMS AND OBJECTIVES

1.3.1.   Aquatic habitat scoping assessments and PSYM surveys were undertaken within the Newbuild Infrastructure Boundary for the DCO Proposed Development with the following objectives:

- Characterise the ecological quality of all ponds and determine whether further PSYM survey is required;

- Determine the presence of any ponds of Good ecological quality deemed to be Habitats of Principal Importance; and

- Determine the presence of any protected or notable aquatic macroinvertebrate and macrophyte species within the ponds.

- Determine the presence of any Invasive Non-Native Species (INSS) within the ponds.

1.3.2. The results of these surveys are presented within this report. The impact assessment and recommendations for compensation and mitigation are presented within **Chapter 9: Biodiversity** of the **Environmental Statement (ES) (Volume II) (Document Reference Number D.6.2.9)**.

1.4. RELEVANT LEGISLATION AND POLICY

NATURAL ENVIRONMENT AND RURAL COMMUNITIES (NERC) ACT 2006

1.4.1. The Natural Environment and Rural Communities (NERC) Act (2006) reinforces the duty upon all public authorities, including planning authorities, to have regard for the conservation of biodiversity when discharging their duties. The Act refines the definition of biodiversity conservation, stating that it includes restoring or enhancing a population or habitat. Section 41 of the Act requires the Secretary of State to list Habitats and Species of Principal Importance (HPIs and SPIs) for the conservation of biodiversity in England.

THE EELS (ENGLAND AND WALES) REGULATIONS 2009

1.4.2. The Eels (England and Wales) Regulations 2009 implement Council Regulation (EC) No 1100/2007 of the Council of the European Union, which required Member States to establish measures for the recovery of the stock of European eel. The regulations apply to England and Wales.

1.4.3. They give powers to the regulators (the Environment Agency and Natural Resources Wales) to implement recovery measures in all freshwater and estuarine waters in England and Wales. The aim of the regulations is to achieve 40 % escapement (returning to the sea to reproduce) of adult eels relative to escapement levels under pristine conditions. The measures, as set out in the legislation, by which this is to be achieved is to reduce fishing pressures, improve access and habitat quality and reduce the impact of impingement and entrainment.

1.4.4. Under the Regulations, the regulators can serve notice to companies detailing their legal obligation to screen intakes and outfalls for eel and/or to remove or modify obstructions to eel migration. However, it is possible for companies to be granted with exemptions if the costs of works greatly exceeds the benefits. In such a situation it is likely the regulator will seek a package of more cost-effective, "alternative measures".

2.   METHODS

2.1.   DESK STUDY

2.1.1.   Desk study data were sourced from statutory bodies in both England and Wales, comprising:

- Environment Agency Records, for fish, aquatic macroinvertebrate and macrophyte survey data were obtained from the Environment Agency's Ecology and Fish Data Explorer website (**Ref. 1**).

- National Biodiversity Network Records for fish, aquatic macroinvertebrate and macrophyte survey data were obtained from the National Biodiversity Network (NBN) Atlas and NBN Atlas Wales websites (**Ref. 2**).

2.2.   HABITAT SCOPING ASSESSMENTS

2.2.1.   Aquatic habitat scoping assessments were carried out at 26 ponds across the Newbuild Infrastructure Boundary for the DCO Proposed Development between July 2021 and June 2022 (**Figure 9.10.1**). Such assessments were carried out in order to identify the potential value of the aquatic habitat and species receptors within these ponds, with the results of these assessments used to inform the need for any further pond PSYM field surveys.

2.2.2.   The potential for each pond to support legally protected or otherwise notable aquatic species was assessed through field observations of various waterbody characteristics. The characteristics assessed included substrate type, water depth and clarity, presence and diversity of macrophytes, riparian vegetation, surrounding land use and artificial modifications.

2.3.   PSYM FIELD SURVEYS

2.3.1.   Ponds were assessed following the standard guidance for PSYM surveys (**Ref. 3**), which assesses both the plant and aquatic macroinvertebrate communities present in a waterbody. This is because, together, both groups span a complementary range of sensitivities to potential degradation factors.

2.3.2.   Aquatic macroinvertebrate sampling consisted of three-minute hand-net sampling methods. Sampling time was allocated according to the mesohabitat types (e.g. flooded marginal grasses or gravel bottomed shallows) present (i.e. sampling time is divided equally between the different mesohabitats).

2.3.3.   The sample was placed in a uniquely labelled, one-litre sample pot, preserved in Industrial Denatured Alcohol (IDA) on site and transported to the laboratory for sorting and identification to Taxonomic Level 2 (TL2).

2.3.4.   All wetland plants present within the outer edge of each pond were recorded. A hand net or grapnel was used to sample deeper areas. Plants were identified to

species in the field; where this was not possible, plants were photographed or bagged and identified ex situ.

2.3.5.   Plant species and aquatic macroinvertebrate family data were processed using the following PSYM indices:

Aquatic macroinvertebrates

- Average Score per Taxon (ASPT): indicates average pollution tolerance of macroinvertebrates within a community;

- Number of dragonfly (Odonata) and alderfly (Megaloptera) families (F_OM): indicates long term quality of a pond as larvae have a long aquatic life stage; and,

- Number of beetle (Coleoptera) families (F_COL): indicates the habitat quality and diversity of a pond.

Macrophytes

- Number of submerged and emergent plant species (SM_NTX): indicates species richness of a site;

- Trophic ranking score for aquatic and emergent plants (TRS_ALL): indicates nutrient tolerance on a scale of 1 to 10 (10 = very tolerant); and,

- Number of uncommon plant species (PL_NUS): measures conservation value of a community.

ASSESSMENT CRITERIA

2.3.6.   Observed data was compared with predicted values generated by the Freshwater Habitats Trust (FWHT) to calculate Ecological Quality Indices (EQI). EQI are expressed as a ratio which is calculated based on the observed value against a national value for ponds of this type under national reference conditions. EQI equal to/or greater than one denotes a pond is achieving or exceeding the expected value.

2.3.7.   EQI are used to inform the Index of Biological Integrity (IBI), which is interpreted as an overall percentage and quality class. The quality classes are outlined in **Table 1**.

2.3.8.   Ponds achieving a quality class of Good qualify as HPI in accordance with the requirements of the NERC Act 2006 (**Ref. 4**)

Table 1 - PSYM percentage class boundaries.

Status class boundary	Percentage (%)
Good	>75
Moderate	51 – 75
Poor	25 – 50
Very Poor	<25

2.4. FISH SURVEY

ENVIRONMENTAL DNA (EDNA)

2.4.1. The presence or likely presence or absence of fish in waterbodies can be determined through the collection and analysis of eDNA samples. eDNA is DNA that is collected from the environment in which an organism lives, rather than directly from the plants or animals themselves.

2.4.2. eDNA samples were taken by suitably trained staff in order to minimise the possibility of cross-contamination and ensure that representative samples were collected.

2.4.3. Each sample consisted of 2.5 litres of water collected from several points around the pond. The water was collected by a surveyor entering the margins of the waterbody. The sample was collected using nitrile gloves, and as little sediment collected as possible, to avoid contamination.

2.4.4. The sample was filtered until 2.5 litres of water was sampled or to the point where no more liquid could be pushed through the filter. The amount of liquid filtered was recorded. The filter was then removed, a preservative added and capped before being returned to the laboratory for analysis.

EDNA SAMPLE ANALYSIS

2.4.5. Each sample initially went through an extraction process where the filter was incubated to obtain any DNA within the sample.

2.4.6. The extracted sample was then tested in the laboratory via real time Polymerase Chain Reaction (PCR) for each of the species selected in the analysis. This process amplified a selected part of DNA allowing it to be detected and measured in real time as the analytical process developed.

2.4.7. Quality control measures which include: true positive controls, negatives and blanks, were implemented in every analysis.

2.5. NOTES AND LIMITATIONS

2.5.1.   A total of two ponds, Pond 9 (NGR SJ 25812 6794) and Pond 10 (NGR SJ 25792 67969) were screened out and not considered for scoping, as land access was not agreed.

2.5.2.   Land access for Pond 29 was originally agreed for the aquatic habitat scoping assessment. However, no land access was agreed for further eDNA surveys.

2.5.3.   Ecological survey data is typically valid for 12 – 18 months unless, otherwise specified, for example if conditions are likely to change more quickly due to ecological processes or anticipated changes in management (**Ref. 5**).

3. RESULTS

3.1. DESK STUDY

3.1.1. No fish, aquatic macroinvertebrate, nor any macrophyte survey data were returned from a search of the Environment Agency's Ecology and Fish Data Explorer or the NBN Atlas and NBN Atlas Wales, for ponds within the Newbuild Infrastructure Boundary.

3.2. HABITAT SCOPING ASSESSMENTS

3.2.1. The following ponds were visited for aquatic habitat scoping assessments, the results of which are summarised below in **Table 2**. These results highlight those ponds that were considered for further PSYM and/or fish surveys.

Table 2 - Summary of results from aquatic habitat scoping assessments of ponds within the Newbuild Infrastructure Boundary.

Pond Code	Pond Description	National Grid Reference	Survey Scoped	
			PSYM	Fish
1	Dry. Willow *Salix* sp. abundant in wetted area.	SJ 34676 66982	Out	Out
4	Dry.	SJ 36352 68923	Out	Out
5	Dry.	SJ 30039 66886	Out	Out
13	Pond on edge of field. Surrounded by margin of mature trees but providing little shade or overhang. Patch of broad-leaved pondweed *Potamogeton natans*. Common water-plantain *Alisma plantago-aquatica* present.	SJ 25270 69528	In	Out
19	Pond on edge of arable field. Dense duckweed coverage. Anoxic silt base.	SJ 38143 70487	In	Out
20	Within a residential garden. Dense duckweed coverage. Bank edge has widespread tree cover.	SJ 38509 71039	In	Out
25	Pond on edge of grazed field. Fenced off at time of survey. Dense bankside trees and vegetation surrounding the pond.	SJ 40342 71213	Out	Out
26	Inaccessible.	SJ 40548 71264	Out	Out
27	Dry.	SJ 40009 71183	Out	Out
29	Small farm reservoir with steep earth banks.	SJ 44585 74756	Out	In
32	Dry.	SJ 38040 69963	Out	Out

Pond Code	Pond Description	National Grid Reference	Survey Scoped	
			PSYM	Fish
36	Inaccessible.	SJ 45402 74422	Out	Out
37	Pond on edge of wheat field margin. Surrounded by overhanging trees and scrub vegetation.	SJ 45351 74655	In	Out
40	Dry.	SJ 36575 69039	Out	Out
41	Buffer of ~ 5m mostly terrestrial vegetation. Extensive areas of ivy-leaved duckweed *Lemna trisulca*.	SJ 36533 69187	In	In
42	Survey incomplete due to health and safety concern.	SJ 42734 71620	Out	Out
43	Survey incomplete due to health and safety concern.	SJ 42783 71537	Out	Out
44	Pond on edge of pasture field with cattle. Surrounded by a margin of mature trees. 95% shaded by trees. Extensive leaf litter on base of pond. No macrophytes present.	SJ 42534 71336	Out	Out
45	Dry.	SJ 42744 71850	Out	Out
48	Survey incomplete due to health and safety concern.	SJ 42710 71270	Out	Out
57	Dry.	SJ 44538 73850	Out	Out
58	Dry.	SJ 44611 73812	Out	Out
59	Located in grazed field with poaching evident. Surrounded by overhanging trees.	SJ 44620 73319	In	Out
60	Inaccessible.	SJ 44800 73500	Out	Out

Pond Code	Pond Description	National Grid Reference	Survey Scoped	
			PSYM	Fish
65	Pond on field boundary of improved grassland, part-grazed. Overhung by scrub vegetation. Inflow present, however dry when surveyed. Dense duckweed coverage.	SJ 37080 69507	In	Out
68	Inaccessible.	SJ 46269 74736	Out	Out

3.3. PSYM SURVEY

3.3.1. Following the aquatic habitat scoping assessments, a total of seven ponds were identified for further PSYM field surveys. A PSYM survey was conducted at Pond 37 in July 2021. Ponds 19, 20, 41, 59 and 65 were surveyed in August 2021, with Pond 13 surveyed in June 2022.

3.3.2. The data obtained from the aquatic macroinvertebrate samples and macrophyte surveys from the PSYM field surveys are summarised in **Table 3**. The PSYM results and overall classification of each waterbody is presented in **Table 4** and **Table 5**.

3.3.3. Pond 41 supported the highest number of PSYM scoring macroinvertebrate taxa, followed by Pond 59 and Pond 20, respectively. The macrophyte communities differed between ponds, with Pond 20 and Pond 41 supporting the greatest number of macrophyte species. A full list of aquatic macroinvertebrate and macrophyte taxa for all seven ponds is presented in **Annex B**.

3.3.4. None of the ponds assessed were identified as HPI. No aquatic macroinvertebrate or macrophyte species of conservation importance were identified.

3.3.5. The parameters outlined in **Table 3** were used to produce predicted values for the metrics described in **Table 4**. These metrics allowed the classification of each pond as presented in **Table 5**.

Table 3 - PSYM field data and parameter summary.

Site Details	Pond 13	Pond 19	Pond 20	Pond 37	Pond 41	Pond 59	Pond 65
Area (m^2)	80	75	681	482	600	700	420
Emergent plant cover (%)	25	35	20	1	5	2	5
No. of submerged & marginal plant species	3	4	10	2	10	3	9
No. of uncommon plant species	1	1	0	0	3	1	2
Trophic Ranking Score (TRS)	9.50	8.75	9.25	10.00	9.42	10.00	9.30
Invertebrate ASPT	3.73	3.33	4.09	2.50	4.46	4.33	3.56
Odonata & Megaloptera (OM) families	1	0	1	0	1	0	1
Coleoptera families (COL)	2	0	1	0	2	1	2
pH	8.00	8.84	8.88	9.36	10.74	8.39	7.91

Table 4 - PSYM Results; Predicted (P), Actual (A), Ecological Quality Index (EQI), and Index of Biological Integrity (IBI).

Pond Code	Submerged & marginal plant species (SM)				Uncommon plant species (NUS)				Trophic Ranking Score (TRS)				Invertebrate ASPT				Odonata & Megaloptera families (OM)				Coleoptera families (COL)			
	P	A	EQI	IBI	P	A	EQI	IBI	P	A	EQI	IBI	P	A	EQI	IBI	P	A	EQI	IBI	P	A	EQI	IBI
Pond 13	16.2	3.00	0.20	0.00	3.10	1.00	0.30	1.00	7.14	9.50	1.33	0.00	5.02	3.73	0.74	2.00	2.93	1.00	0.34	1.00	3.68	2.00	0.54	2.00
Pond 19	14.0	4.00	0.30	1.00	2.30	1.00	0.40	1.00	8.32	8.75	1.05	2.00	5.09	3.33	0.65	1.00	3.27	0.00	0.00	0.00	3.73	0.00	0.00	0.00
Pond 20	19.5	10.0	0.50	2.00	3.20	0.00	0.00	0.00	8.28	9.25	1.12	1.00	5.10	4.09	0.80	2.00	3.18	1.00	0.31	1.00	3.76	1.00	0.27	1.00
Pond 37	18.7	2.00	0.10	0.00	3.20	0.00	0.00	0.00	8.47	10.0	1.18	1.00	5.11	2.50	0.49	0.00	3.44	0.00	0.00	0.00	3.76	0.00	0.00	0.00
Pond 41	18.7	10.0	0.50	2.00	3.00	3.00	1.00	3.00	8.60	9.42	1.10	2.00	5.11	4.46	0.87	3.00	3.09	1.00	0.32	1.00	3.77	2.00	0.53	2.00
Pond 59	20.0	3.00	0.20	0.00	3.40	1.00	0.30	1.00	8.52	10.0	1.17	1.00	5.11	4.33	0.85	2.00	3.41	0.00	0.00	0.00	3.77	1.00	0.27	1.00
Pond 65	18.2	9.00	0.50	1.00	3.10	2.00	0.60	2.00	8.18	9.30	1.14	1.00	5.17	3.56	0.69	1.00	3.30	1.00	0.30	1.00	3.83	2.00	0.52	2.00

Table 5 - PSYM Metric Quality Categories.

Pond Code	Sum of individual metric IBI scores	Index of Biotic Integrity (%)*	PSYM Quality Category
Pond 13	6	33	Poor
Pond 19	5	28	Poor
Pond 20	7	39	Poor
Pond 37	1	6	Very Poor
Pond 41	13	72	Moderate
Pond 59	5	28	Poor
Pond 65	8	44	Poor

*calculated based on the observed EQI value against a national value for ponds of this type under national reference conditions

3.4. EDNA SURVEY

3.4.1.   European eel *Anguilla anguilla* has been recorded within many of the watercourses within the Newbuild Infrastructure Boundary (detailed within **Appendix 9.9 Aquatic Ecology (Watercourses) Survey Report, Volume III**). The species is known to be able to traverse across land, moving between watercourses and waterbodies. eDNA surveys were scoped in for two ponds identified as being within close proximity of a watercourse (< 50m) to identify the potential presence of fish species, particularly European eel, within the ponds.

3.4.2.   The following information details the results from the fish eDNA field surveys conducted at each pond scoped in for further survey.

POND 29

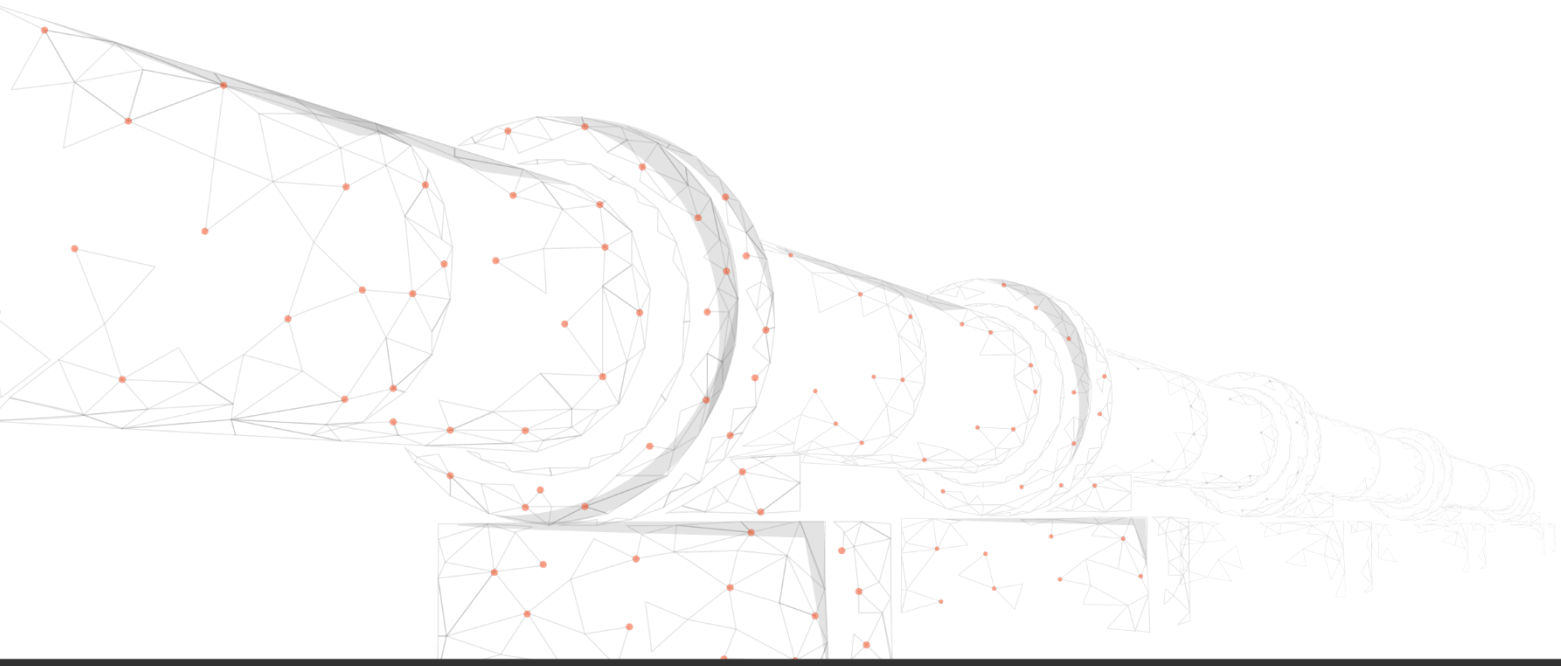3.4.3.   No land access was agreed, and therefore no eDNA sample could be collected.
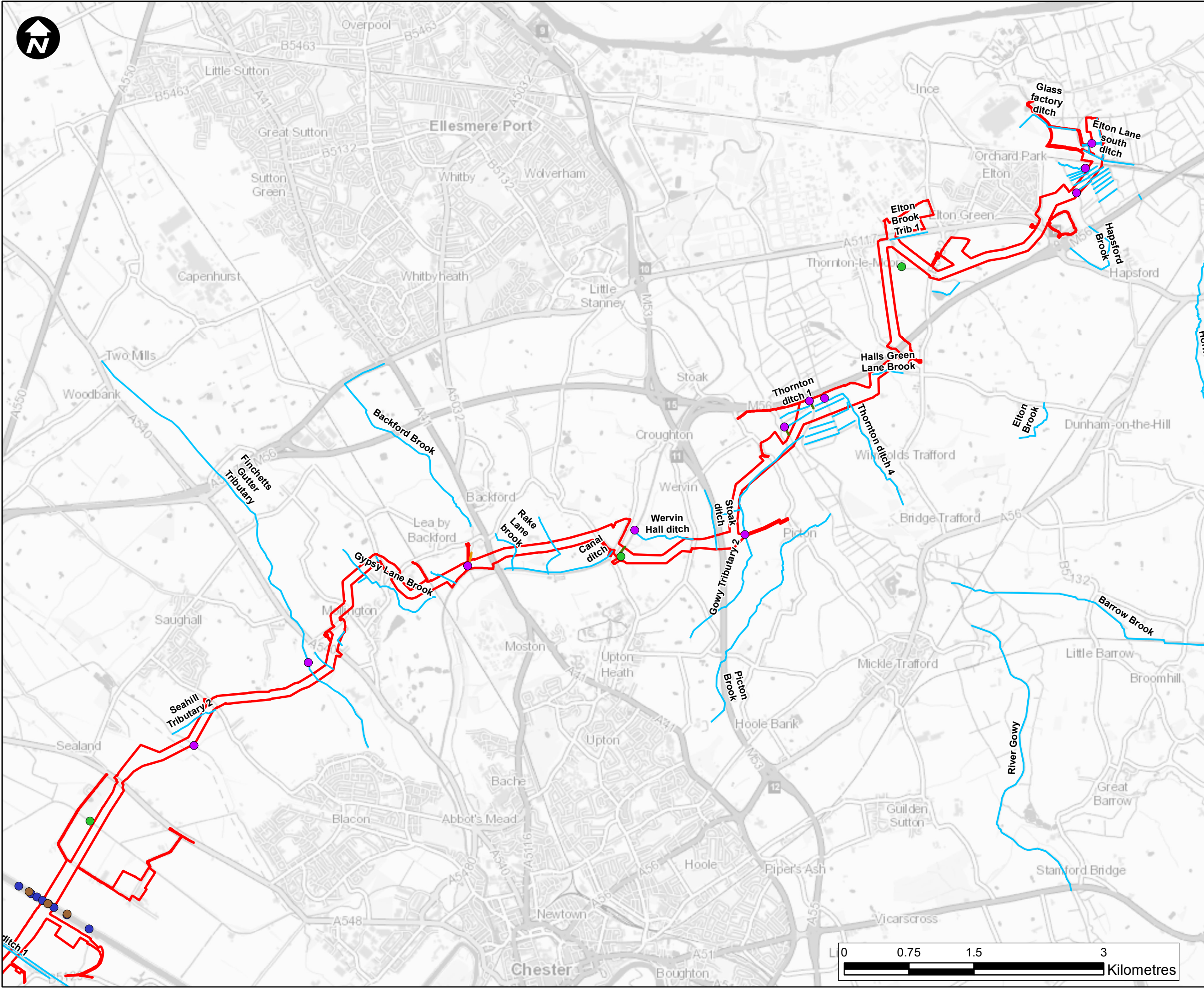
POND 41

3.4.4.   An eDNA sample was obtained from Pond 41 on 17 February 2022.

3.4.5.   However, eDNA metabarcoding of fish for the Pond 41 sample was not successful, with the sample failing to amplify during laboratory analysis.
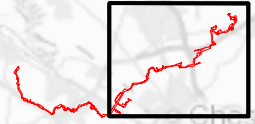
4.   REFERENCES

- **Ref. 1 -** Environment Agency (2021). *Ecology and Fish Data Explorer*. Available online: https://defra-ecology-prod.publishmydata.com/ecology-fish/. [Accessed November 2021].

- **Ref. 2 -** NBN (2021). NBN Atlas occurrence download. Available online: http://nbnatlas.org. [Accessed November 2021].

- **Ref. 3 -** Howard, S. (2002). *A guide to monitoring the ecological quality of ponds and canals using PSYM: PSYM Manual*. December 2002. Environment Agency, Bristol.

- **Ref. 4 -** HMSO (2006). *Natural Environment and Rural Communities Act*. HMSO, Norwich.

- **Ref. 5 -** Chartered Institute of Ecology and Environmental Management (CIEEM) (2019). *Advice note on the lifespan of ecological reports and surveys*. [Online]. Available at: https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf [Accessed November 2021].

Annex A

FIGURES

Figure 9-10-1: Aquatic ecology survey locations - Sheet 1 of 3

Legend
- Newbuild Infrastructure Boundary
- Ordinary Watercourses
- Aquatic Macroinvertebrate Survey
- Benthic Macoinvertebrate Grab Sample
- Fish e-DNA Survey
- Seine Netting Survey
- Electric Fishing Survey
- Macrophyte Survey

HyNet North West
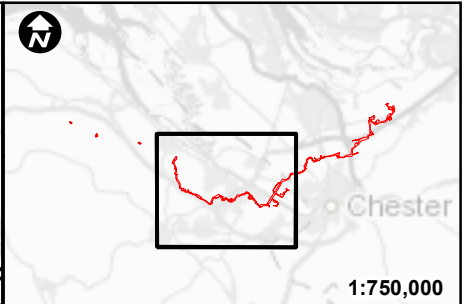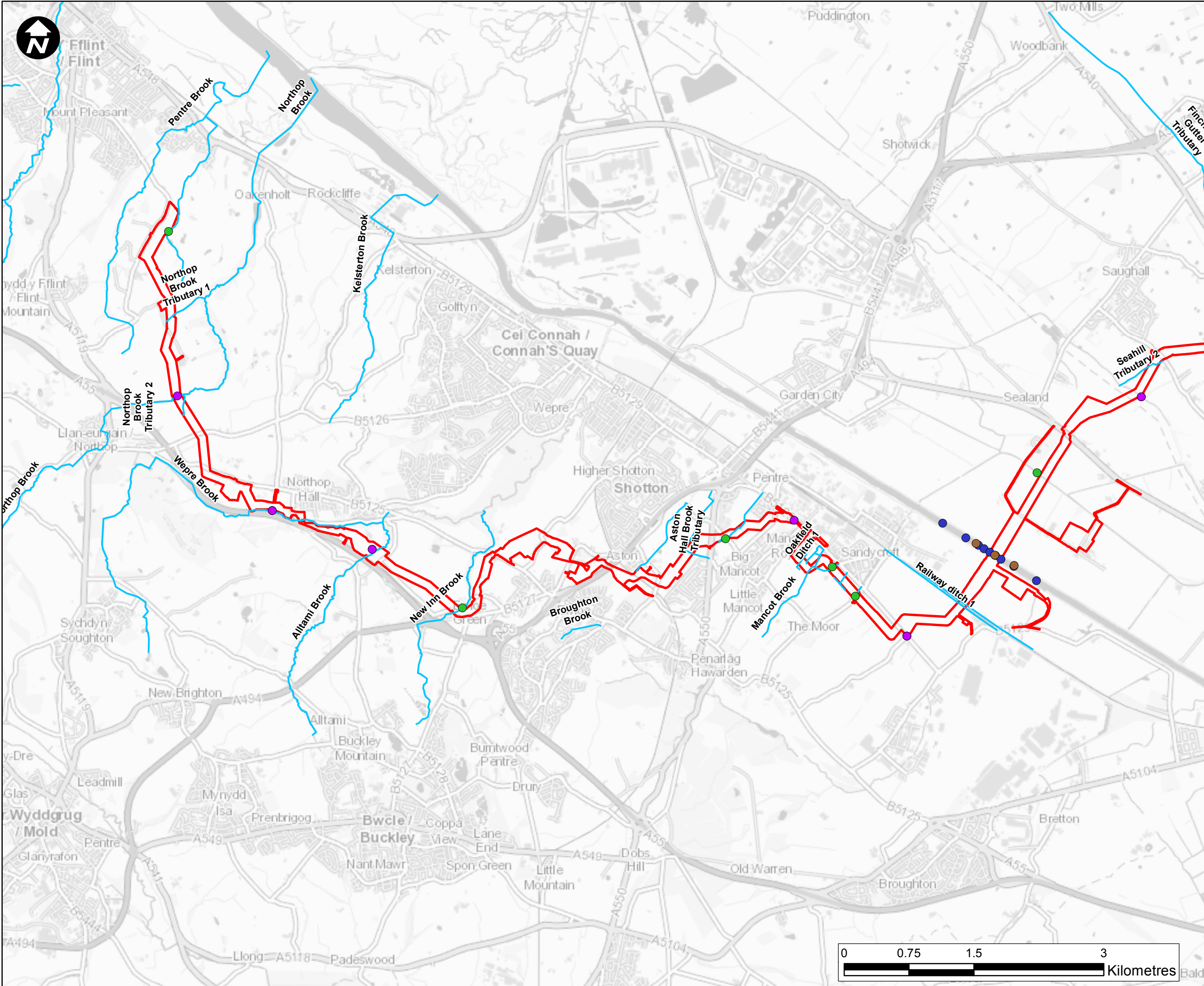
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HyNet Carbon Dioxide Pipeline DCO

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Figure 9-10-1: Aquatic ecology survey locations - Sheet 1 of 3

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Legend

— Newbuild Infrastructure Boundary
— Ordinary Watercourses
● Aquatic Macroinvertebrate Survey
● Benthic Macoinvertebrate Grab Sample
● Fish e-DNA Survey
● Seine Netting Survey

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HyNet North West
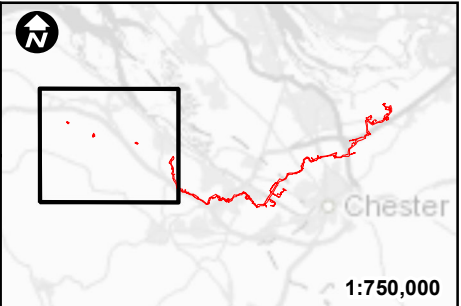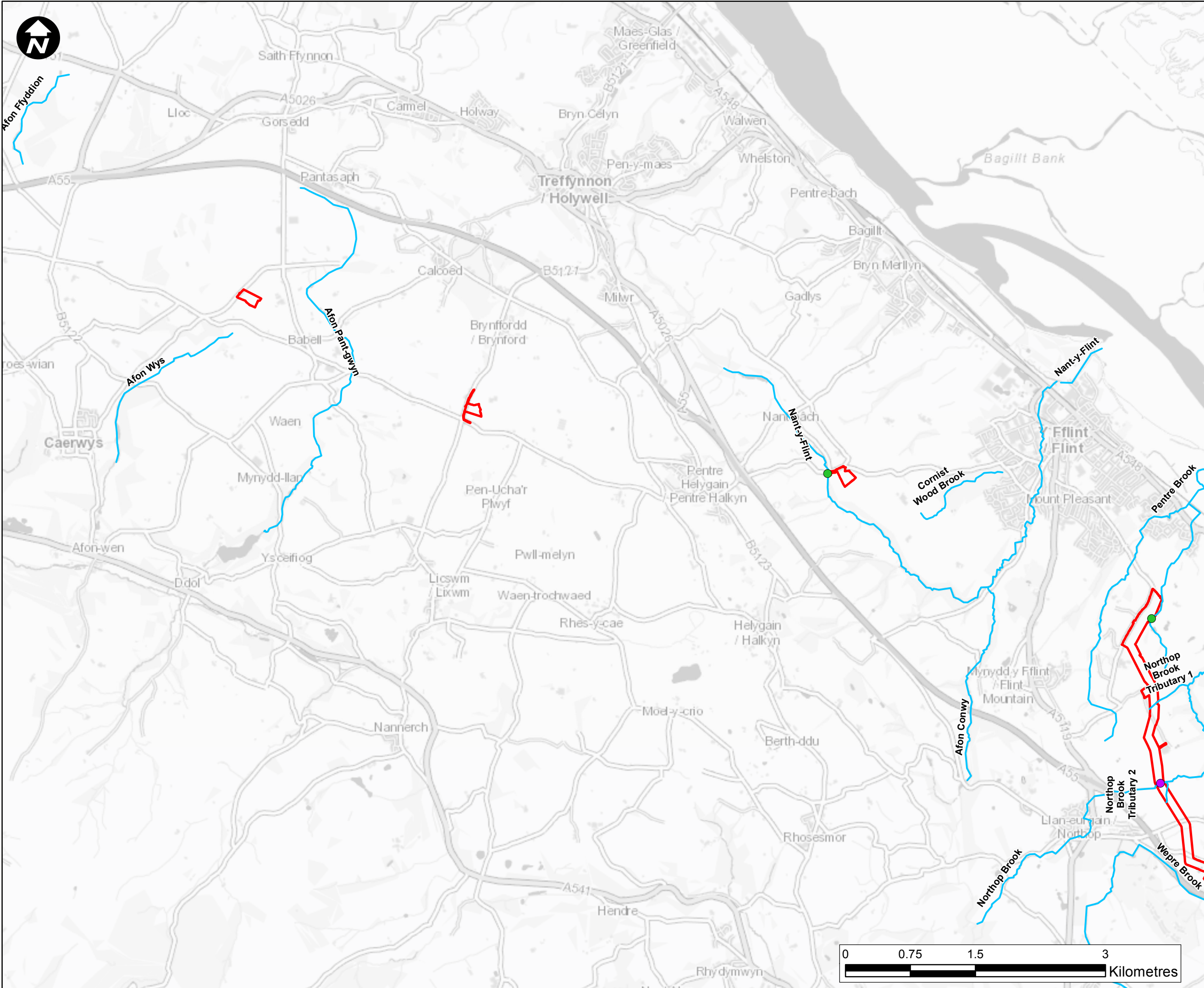
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Figure 9-10-1: Aquatic ecology survey locations - Sheet 2 of 3

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Figure 9-10-1:
Aquatic ecology survey
locations - Sheet 3 of 3

Legend

□ Newbuild Infrastructure Boundary

— Ordinary Watercourses

● Aquatic Macroinvertebrate Survey

● Fish e-DNA Survey

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HyNet North West

PROJECT TITLE
HyNet Carbon Dioxide Pipeline DCO

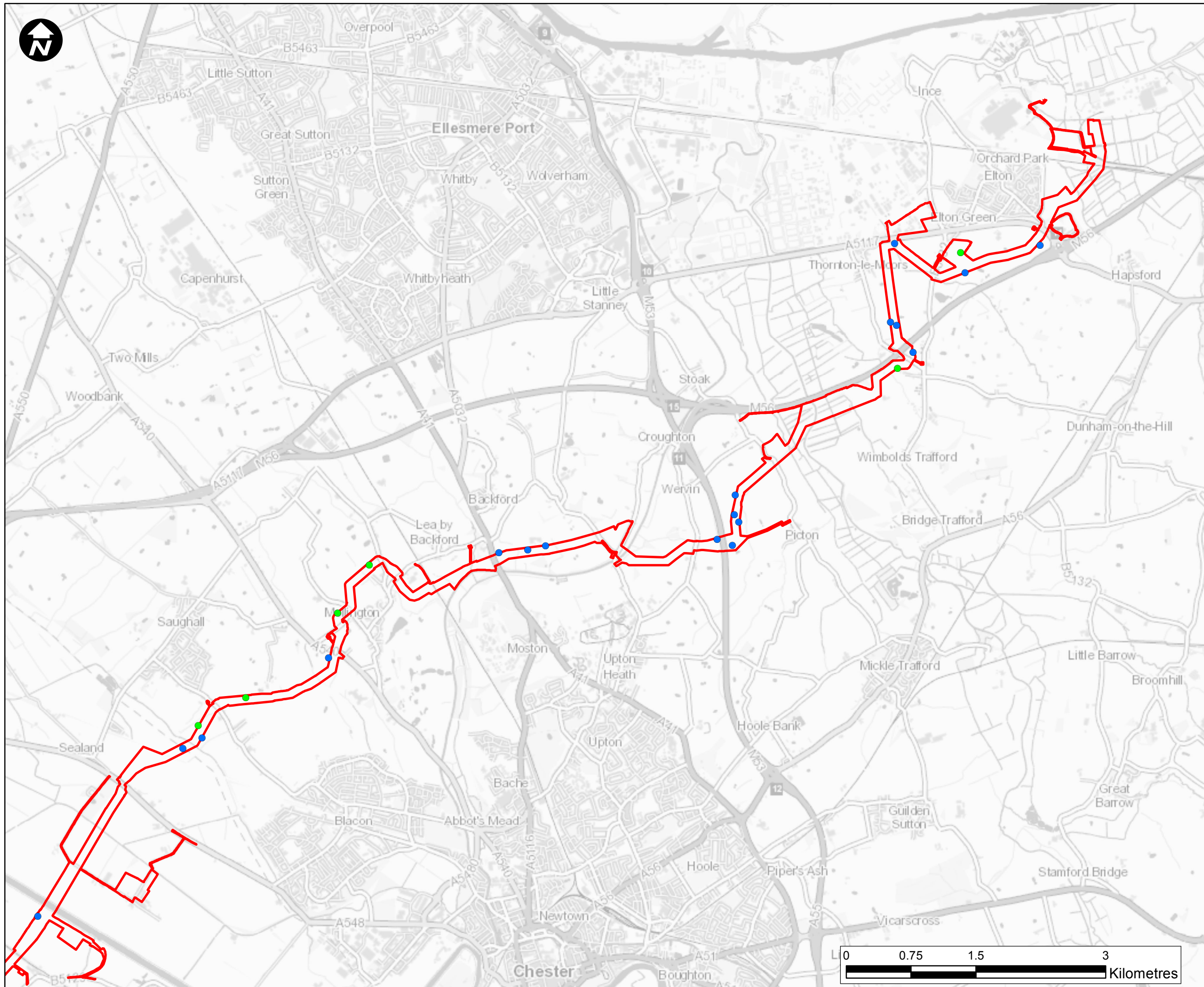DRAWING TITLE
Figure 9-10-1:
Aquatic ecology survey
locations - Sheet 3 of 3

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Legend

⬜ Newbuild Infrastructure Boundary

🟢 PSYM Survey

🔵 Pond Walkover Survey

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HyNet North West

PROJECT TITLE
HyNet Carbon Dioxide Pipeline DCO

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Figure 9-10-2: Pond walkover survey and PSYM survey locations - Sheet 1 of 3

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EN070007-APP-ES-9.10.2-Sheet 1

0   0.75   1.5   3
Kilometres

HyNet North West

Legend
- Newbuild Infrastructure Boundary
- PSYM Survey
- Pond Walkover Survey

1:750,000

0   0.75   1.5   3   Kilometres

HyNet North West

PROJECT TITLE
HyNet Carbon Dioxide Pipeline DCO

DRAWING TITLE
Figure 9-10-2:
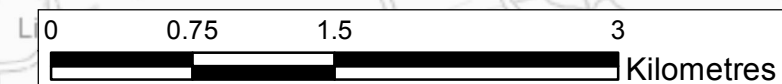Pond walkover survey and PSYM survey locations - Sheet 3 of 3
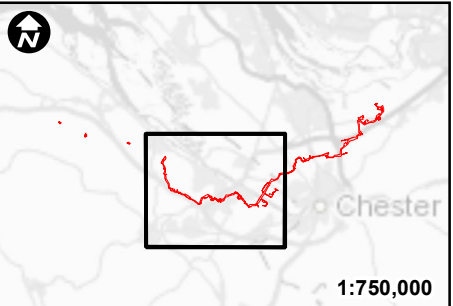
DRAWING STATUS
FOR INFORMATION

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SCALE @ A3 SIZE	DATE	REVISION
1:40,000	04/08/2022	P01

DRAWING NUMBER
EN070007-APP-ES-9.10.2-Sheet 1

Legend

☐ Newbuild Infrastructure Boundary

● PSYM Survey

● Pond Walkover Survey

1:750,000

0   0.75   1.5   3
Kilometres

Annex B

AQUATIC MACROINVERTEBRATE AND MACROPHYTE TAXA LIST

HyNet CO$_2$ PIPELINE

Environmental Statement (Volume III)

Table 6 - Pond 13 aquatic macroinvertebrate results

Common Name	Family	Odonata and Megaloptera (OM) Taxa	Coleoptera (CO) Taxa
Narrow-winged damselflies	Coenagriidae	X	-
Pond skaters	Gerridae	-	-
Backswimmers	Notonectidae	-	-
Lesser water-boatmen	Corixidae	-	-
Diving beetles	Dytiscidae (Noteridae)	-	X
Water scavenger beetles	Hydrophilidae (Hydraenidae)	-	X
Small minnow mayflies	Baetidae	-	-
Pond snails	Lymnaeidae	-	-
Ramshorn snails	Planorbidae	-	-
Bivalve molluscs	Sphaeriidae	-	-
Jawless leeches	Glossiphoniidae	-	-
Leeches	Erpobdellidae	-	-
Hoglice	Asellidae	-	-
Non-biting midges	Chironomidae	-	-
Worms	Oligochaeta	-	-

Table 7 - Pond 13 macrophyte results

Common Name	Latin Name	Rarity Score	Trophic Ranking Score
Emergent Plants			
Common water-plantain	*Alisma plantago-aquatica*	1	9
Soft rush	*Juncus effusus*	1	-
Floating-leaved Plants			
Broad-leaved pondweed	*Potamogeton natans*	1	-
Submerged Plants			
Common water-crowfoot	*Ranunculus aquatilis*	2	10

Table 8 - Pond 19 aquatic macroinvertebrate results

Common Name	Family	Odonata and Megaloptera (OM) Taxa	Coleoptera (CO) Taxa
Freshwater shrimp	Gammaridae (Crangonyctidae)	-	-
Hoglice	Asellidae	-	-
Worms	Oligochaeta	-	-

Table 9 - Pond 19 macrophyte results

Common Name	Latin Name	Rarity Score	Trophic Ranking Score
Emergent Plants			
Pendulous sedge	*Carex pendula*	1	-
Hairy willowherb	*Epilobium hirsutum*	1	-

Common Name	Latin Name	Rarity Score	Trophic Ranking Score
Reed canary grass	*Phalaris arundinacea*	1	8.5
Creeping spearwort	*Ranunculus reptans*	32	-
Floating-leaved Plants			
Common duckweed	*Lemna minor*	1	9

Table 10 - Pond 20 aquatic macroinvertebrate results

Common Name	Family	Odonata and Megaloptera (OM) Taxa	Coleoptera (CO) Taxa
Common skimmers	Libellulidae	X	-
Freshwater shrimp	Gammaridae (Crangonyctidae)	-	-
Flatworms	Planariidae (Dugesiidae)	-	-
Backswimmers	Notonectidae	-	-
Diving beetles	Dytiscidae (Noteridae)	-	X
Small minnow mayflies	Baetidae	-	-
Pond snails	Lymnaeidae	-	-
Jawed leeches	Hirudinidae	-	-
Hoglice	Asellidae	-	-
Non-biting midges	Chironomidae	-	-
Worms	Oligochaeta	-	-

Table 11 - Pond 20 macrophyte results

Common Name	Latin Name	Rarity Score	Trophic Ranking Score
Emergent Plants			
Common water-plantain	*Alisma plantago-aquatica*	1	9
Pendulous sedge	*Carex pendula*	1	-
Hairy willowherb	*Epilobium hirsutum*	1	-
Yellow flag iris	*Iris pseudacorus*	1	-
Soft rush	*Juncus effusus*	1	-
Hard rush	*Juncus inflexus*	1	-
Gyspsywort	*Lycopus europaeus*	1	-
Water forget-me-not	*Myosotis scorpioides*	1	9
Bittersweet	*Solanum dulcamara*	1	10
Branched bur reed	*Sparganium erectum*	1	8.5
Floating-leaved Plants			
Common duckweed	*Lemna minor*	1	9
Ivy-leaved duckweed	*Lemna trisulca*	1	10

Table 12 - Pond 37 aquatic macroinvertebrate results

Common Name	Family	Odonata and Megaloptera (OM) Taxa	Coleoptera (CO) Taxa
Hoglice	Asellidae	-	-
Non-biting midges	Chironomidae	-	-

Table 13 - Pond 37 macrophyte results

Common Name	Latin Name	Rarity Score	Trophic Ranking Score
Emergent Plants			
Yellow flag iris	*Iris pseudacorus*	1	-
Bittersweet	*Solanum dulcamara*	1	10

Table 14 - Pond 41 aquatic macroinvertebrate results

Common Name	Family	Odonata and Megaloptera (OM) Taxa	Coleoptera (CO) Taxa
Broad-winged damselflies	Calopterygidae (Agriidae)	X	-
Flatworms	Planariidae (Dugesiidae)	-	-
Pond skaters	Gerridae	-	-
Saucer bugs	Naucoridae	-	-
Backswimmers	Notonectidae	-	-
Lesser water-boatmen	Corixidae	-	-
Screech-beetles	Hygrobiidae	-	X
Diving beetles	Dytiscidae (Noteridae)	-	X
Small minnow mayflies	Baetidae	-	-
Pond snails	Lymnaeidae	-	-
Ramshorn snails	Planorbidae	-	-
Bivalve molluscs	Sphaeriidae	-	-

Common Name	Family	Odonata and Megaloptera (OM) Taxa	Coleoptera (CO) Taxa
Non-biting midges	Chironomidae	-	-

Table 15 - Pond 41 macrophyte results

Common Name	Latin Name	Rarity Score	Trophic Ranking Score
Emergent Plants			
Common water-plantain	*Alisma plantago-aquatica*	1	9
Lesser water-parsnip	*Berula erecta*	2	10
Nodding bur-marigold	*Bidens cernua*	2	-
Hairy willowherb	*Epilobium hirsutum*	1	-
Marsh horsetail	*Equisetum palustre*	1	-
Marsh bedstraw	*Galium palustre*	1	-
Gypsywort	*Lycopus europaeus*	1	-
Water forget-me-not	*Myosotis scorioides*	1	9
Branched bur reed	*Sparganium erectum*	1	8.5
Floating-leaved Plants			
Ive-leaved duckweed	*Lemna trisulca*	1	10

Table 16 - Pond 59 aquatic macroinvertebrate results

Common Name	Family	Odonata and Megaloptera (OM) Taxa	Coleoptera (CO) Taxa
Freshwater shrimp	Gammaridae (Crangonyctidae)	-	-
Backswimmers	Notonectidae	-	-
Lesser water-boatmen	Corixidae	-	-
Diving beetles	Dytiscidae (Noteridae)	-	X
Hoglice	Asellidae	-	-
Non-biting midges	Chironomidae	-	-

Table 17 - Pond 59 macrophyte results

Common Name	Latin Name	Rarity Score	Trophic Ranking Score
Emergent Plants			
Hairy willowherb	*Epilobium hirsutum*	1	-
Creeping spearwort	*Ranunculus reptans*	32	-
Bittersweet	*Solanum dulcamara*	1	10

Table 18 - Pond 65 aquatic macroinvertebrate results

Common Name	Family	Odonata and Megaloptera (OM) Taxa	Coleoptera (CO) Taxa
Freshwater shrimp	Gammaridae (Crangonyctidae)	-	-

Common Name	Family	Odonata and Megaloptera (OM) Taxa	Coleoptera (CO) Taxa
Screech-beetles	Hygrobiidae	-	X
Diving beetles	Dytiscidae (Noteridae)	-	X
Alderlfies	Sialidae	X	-
Pond snails	Lymnaeidae	-	-
Leeches	Erpobdellidae	-	-
Hoglice	Asellidae	-	-
Non-biting midges	Chironomidae	-	-
Worms	Oligochaeta	-	-

Table 19 - Pond 65 macrophyte results

Common Name	Latin Name	Rarity Score	Trophic Ranking Score
Emergent Plants			
Common water-plantain	*Alisma plantago-aquatica*	1	9
Lesser water-parsnip	*Berula erecta*	2	10
Nodding bur-marigold	*Bidens cernua*	2	-
Hairy willowherb	*Epilobium hirsutum*	1	-
Soft rush	*Juncus effusus*	1	-
Gypsywort	*Lycopus europaeus*	1	-
Water forget-me-not	*Myosotis scorioides*	1	9
Branched bur reed	*Sparganium erectum*	1	8.5

Submerged Plants			
Unbranched bur reed	*Sparganium emersum*	1	10