MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Environmental Statement

Volume 3, Annex 3.7: Fish and eel survey technical report

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Glossary

Term	Meaning
Catchment	An area of land that drains into a river.
Coarse fish	Angling term for freshwater fish that is used to exclude salmonids
Electric Fishing	The process of catching fish by passing an electrical field through water, temporarily stunning the fish.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Expert Working Group	A forum for targeted engagement with regulators and interested stakeholders through the Evidence Plan Process.
Fry and parr	Stages in the development of juvenile salmon
Habitats Regulations	The Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended)
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The offshore and onshore infrastructure connecting the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the national grid. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds. Also referred to in this report as the Transmission Assets, for ease of reading.
Onshore Order Limits	See Transmission Assets Order Limits: Onshore (below).
Species of Principal Importance	Section 41 of the Natural Environment and Rural Communities Act 2006 lists species that are of principal importance. These species need to be taken into consideration by public bodies in England when performing functions related to biodiversity conservation.
Study area	This is an area which is defined for each environmental topic which includes the Transmission Assets Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Survey area	The area within which each survey has been undertaken. This may differ from the Study Area as a Survey Area will be based on species or survey-specific guidance on the extent of survey required, which and may be limited by, for example, habitat conditions, or be defined in terms of buffer areas around an area of potential impact.
Transmission Assets	See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above).
Transmission Assets Order Limits	The area within which all components of the Transmission Assets will be located, including areas required on a temporary basis during construction and/or decommissioning.

Term	Meaning
Transmission Assets Order Limits: Onshore	The area within which all components of the Transmission Assets landward of Mean High Water Springs will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds). Also referred to in this report as the Onshore Order Limits, for ease of reading.

Acronyms

Acronym	Meaning
Defra	Department for the Environment, Food & Rural Affairs
EIA	Environmental Impact Assessment
ES	Environmental Statement
EWG	Expert Working Group
IUCN	International Union for the Conservation of Nature
JNCC	Joint Nature Conservation Committee
LERN	Lancashire Environment Record Network
MAGIC	Multi-Agency Geographic Information for the Countryside
SPI	Species of Principal Importance

Units

Unit	Description
%	Percentage
km	Kilometres
m	Metre
cm	Centimetre
cm/s	Centimetres Per Second (Speed)
S	Second

1 Fish and eel survey technical report

1.1 Introduction

1.1.1 Overview

1.1.1.1 This document forms Volume 3, Annex 3.7: Fish and eel survey technical report of the Environmental Statement (ES) prepared for the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (referred to hereafter as 'the Transmission Assets'). The ES presents the findings of the Environmental Impact Assessment (EIA) process for the Transmission Assets.

1.1.1.2 The purpose of this technical report is to present the results of the fish desk study and site-specific fish habitat and fish population surveys undertaken in June and September 2023 to inform Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES.

1.1.1.3 The desk study and site-surveys were designed to scope in any suitable watercourses for further survey and determine the presence of likely absence of protected and notable fish species, including European eel *Anguilla anguilla*. The surveys were also undertaken to determine fish diversity of each watercourse.

1.1.2 Study area

1.1.2.1 The study area is intended to cover the area within which an impact can be reasonably expected, based on an understanding of the ecology and life history of the fish species expected to be present as well as professional judgement, and describes the geographical extent subject to desk-based research.

1.1.2.2 The study area is the area subject to desk based research for fish and eel and comprises the Onshore Order Limits and a 2 km buffer (hereafter referred to as the 'study area').

1.1.2.3 The location and geographic extent of the fish study area is presented in **Figure 1.1** of this technical report.

1.1.3 Survey area

1.1.3.1 The survey area is defined as the area within which each survey has been undertaken and is based on species or site-specific guidance on the extent of survey required. The survey area for fish and eel surveys (hereafter referred to as the 'survey area') is defined as a 150 m buffer around the Transmission Assets Order Limits: Onshore, as shown in **Figure 1.1**.

1.1.3.2 Adopting a survey area that is greater in extent than the Transmission Assets Order Limits ensures that the ES is accurately informed with data from within the Transmission Assets Order Limits (i.e. that may be subject to direct impacts) and data from outside the Transmission Assets Order Limits (i.e. that may be subject to indirect impacts).

1.1.4 Contextual data

1.1.4.1 Owing to the iterative design process of the Transmission Assets, some surveys were undertaken further than 150 m from the Transmission Assets Order Limits: Onshore. These surveys may have been located within, or within the buffer of, previous iterations of the Transmission Assets Order Limits. Nevertheless, information from these surveys have been included in this technical report because they provide context regarding the ecological sensitivity of the wider area and to inform Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES (where relevant). Locations for which data is considered to be contextual are identified in **Section 1.3.2** below.

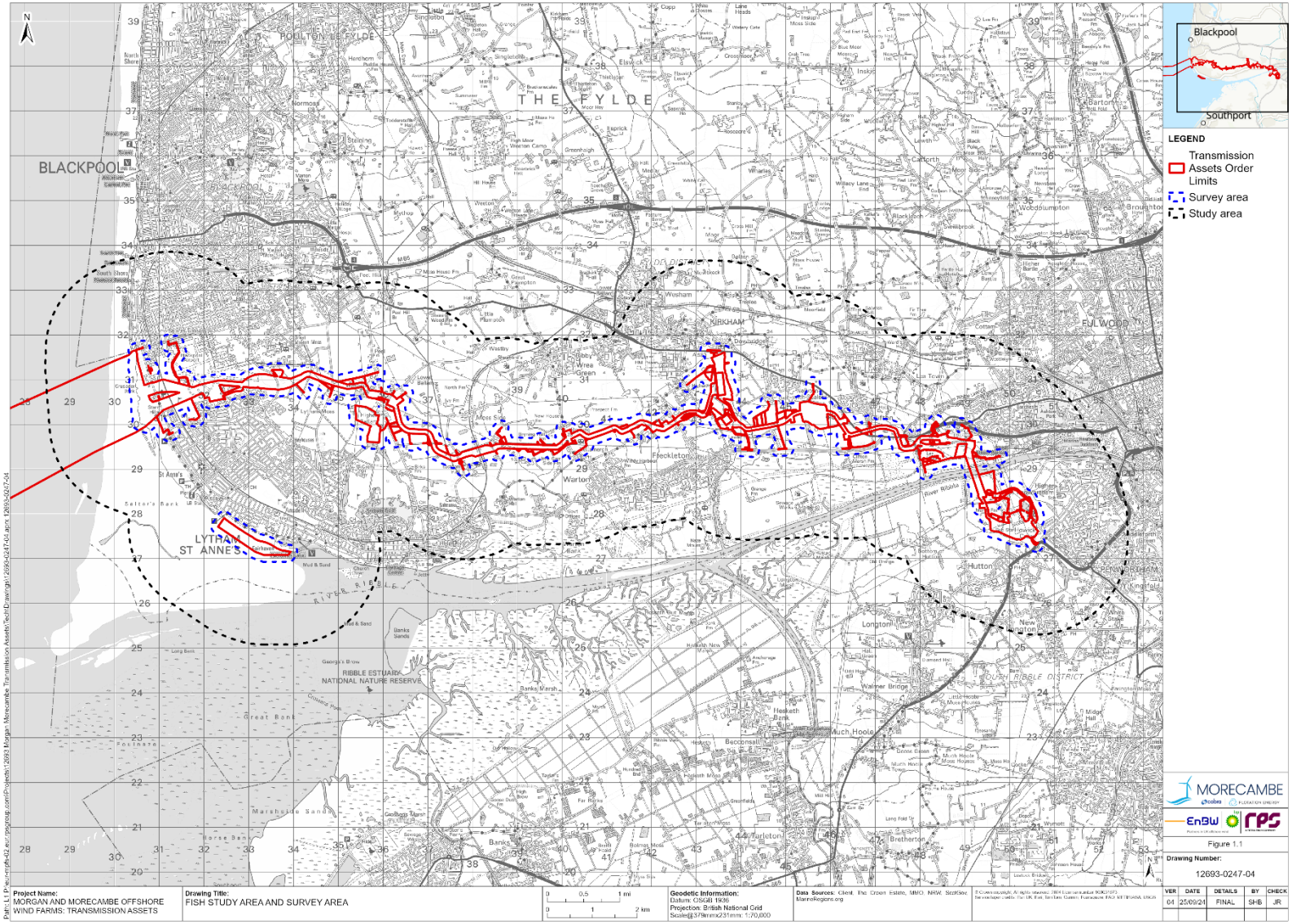

Figure 1.1: Fish study area and survey area

1.1.5 Relevant Legislation

1.1.5.1 The following key pieces of legislation are relevant to fish in the UK: the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations), Schedule 5 of The Wildlife and Countryside Act 1981 (as amended) , the Salmon and Freshwater Fisheries Act 1975, the Eels (England and Wales) Regulations 2009 and the Environment Act 2021. The species which receive protection include:

- allis shad *Alosa alosa;*
- twaite shad *Alosa fallax;*
- Atlantic salmon *Salmo salar;*
- brown/sea trout *Salmo trutta;*
- Atlantic sturgeon *Acipenser sturio;*
- brook lamprey *Lampetra planeri;*
- river lamprey *Lampetra fluviatilis;*
- sea lamprey *Petromyzon marinus;*
- bullhead *Cottus gobio*;
- European eel*;*
- spined loach *Cobitis taenia;*
- vendace *Coregonus albula;* and
- whitefish *Coregonus lavaretus*.

1.1.5.2 Thirty-five marine and freshwater fish species are listed Species of Principal Importance (SPI) in accordance with Section 41 of the Natural Environment and Rural Communities Act 2006, giving public bodies and local planning authorities a legal duty to have regard for conserving a SPI when exercising their duties. They include those listed above with the exception of brook lamprey, bullhead and sturgeon. Smelt *Osmerus eperlanus* is among the additional species.

1.1.5.3 The International Union for the Conservation of Nature (IUCN) Red List provides an assessment of the conservation status of wild species and lists Atlantic sturgeon and European eel as Critically Endangered. In 2023, the International Union for the Conservation of Nature (IUCN) listed the Great Britain population of Atlantic salmon as endangered.

1.1.6 Consultation

1.1.6.1 In October 2022, the Applicants submitted an EIA Scoping Report to the Planning Inspectorate, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Transmission Assets.

1.1.6.2 The scope, methodology and findings of the fish and eel surveys, including those undertaken beyond the current Onshore Order Limits,

were discussed, and agreed with stakeholders via regular onshore ecology Expert Working Group (EWG) meetings. Further detail regarding consultation undertaken with respect to onshore ecology, including fish surveys can be found in Volume 3, Chapter 3: Onshore ecology of the ES and the Consultation Report (Document reference: E.1).

1.2 Methodology

1.2.1 Overview

1.2.1.1 A combination of desk studies and field surveys were undertaken to ascertain the presence or likely absence of notable fish species and the diversity of these species within the study and survey areas.

1.2.1.2 The results of the desk study are presented in Volume 3, Annex 3.1: Onshore ecology desk study technical report of the ES and summarised below.

1.2.2 Desk study

1.2.2.1 Fish species data was collected from existing desk studies and datasets. These sources were targeted based on professional experience and are summarised **Table 1.1** below.

Table 1.1: Summary of key desktop sources for Transmission Assets relevant to fish

Title	Source	Year	Author
Lancashire Environmental Records Network (LERN).	LERN data share site.	2024	LERN
Multi Agency Geographic Information for the Countryside (MAGIC).	Department for Environment, Food and Rural Affairs (Defra).	2024	Defra
UK Protected Area Joint Nature Conservation Committee (JNCC).	JNCC website.	2024	JNCC
Ecology and fish data explorer	Environment Agency.	2024	Environment Agency
Red List	International Union for the Conservation of Nature (IUCN).	2024	IUCN

1.2.3 Site-specific surveys

Extended phase 1 habitat survey

1.2.3.1 In order to inform the baseline and the existing environmental conditions to be reported within the ES, as well as to inform any necessary mitigation, an extended phase 1 survey has been carried out for the Transmission Assets Order Limits: Onshore. Where this has been completed, the need for Phase 2 surveys have been identified, including the freshwater fish surveys considered within this document.

1.2.3.2 Extended phase 1 habitat surveys undertaken between September 2022 and August 2023 identified watercourses with the potential to support protected or notable fish and should be subject to further surveys (see Volume 3, Annex 3.3: Phase 1 habitat, national vegetation classification and hedgerow survey technical report of the ES).

Freshwater fish habitat survey

1.2.3.3 Fish habitat surveys were undertaken to classify aquatic and riparian habitats that are utilised by SPI (see Volume 3, Annex 3.2: Onshore ecology and nature conservation survey methodologies technical report of the ES). In line with best practice, the surveys consisted of a single visit to each watercourse within the Transmission Assets Order Limits, undertaken by experienced and competent freshwater ecologists between June and September 2023. A minimum of 300 m of each watercourse were surveyed where possible.

1.2.3.4 During the survey, habitat characteristics such as the watercourse's width, water depth, substrate composition and stability, flow types, availability of cover and complexity, land use and other significant features (e.g., outfalls, road crossings, obstacles to migration, other significant physical alterations) were recorded. These characteristics were selected as they are typically used to describe general habitat suitability for freshwater fish species of conservation interest and to identify any critical or limiting habitats (e.g., spawning habitat, silt beds for juvenile lamprey) (Volume 3, Annex 3.2: Onshore ecology survey methodologies technical report).

1.2.3.5 Habitat preferences for fish species of conservation interest are summarised in **Table 1.2** and are based on descriptions in Hendry and Cragg-Hine (2003), Maitland (2003), Maitland (2007) and SFCC (2007).

Table 1.2: Fish species habitat descriptions

Species	Life stage	Habitat preferences
Atlantic salmon	Spawning/eggs	Channel width generally at least 3 m, with a gradient 3% or less. Water depth 17-76 cm with current velocity 25-90 cm/s. Substrates for redds (nests) mainly pebble and cobble with little to no silt. Often found at the transition between pool and riffle.
	Juveniles (fry and parr)	Shallow, fast-flowing water with coarse (cobble/boulder) substates and adequate cover (e.g., boulders, aquatic vegetation, undercut banks, overhanging vegetation, tree roots).
	Adults	River should be free from obstacles to migration. Suitably deep pools to allow for resting when migrating upstream, cover for fish when migrating (e.g., undercut banks, tree roots, submerged vegetation and objects, large woody debris).
Brown/sea trout	Spawning/egg	May spawn in smaller channels than Atlantic salmon. Sea trout use similar substates to Atlantic salmon for redds, resident brown trout often spawn in smaller substrates (e.g., gravel to pebble).
	Juveniles (fry and parr)	Shallow, flowing (slow to fast) water, often at stream margins using suitable cover.
	Adults	Same as Atlantic salmon. Although resident brown trout do not migrate to sea, they do migrate within freshwaters.
Lamprey (brook, river and sea lamprey)	Spawning/egg	Gravel substrates with some sand in areas of flowing water, little to no fine sediments.
	Ammocoetes (juveniles)	Deposits of fine substrates (mud, silt, sand) with a high organic matter content to depths of a few centimetres to >30 cm. Often in slow-flowing areas of the watercourse. Deposits must be stable, as ammocoetes live within them for several years.
	Adults	For river and sea lamprey, a migratory path with no obstacles to upstream or downstream migration is required. Adult brook lamprey remain in freshwaters and do not feed but after metamorphosis will migrate from silt beds to suitable spawning habitats.
European eel	Adults/elvers (juveniles)	Arrive in freshwater as elvers and occur in all types of freshwaters that are accessible from the sea. Eels require a route free from obstacles to migration but are able to ascend some obstacles that are barriers to other fish (e.g., salmon, trout, lamprey).

Fish population survey

1.2.3.6 Where a watercourse was considered suitable for fish, a fish population survey was undertaken by means of Electric Fishing in accordance with British Standard (BS) EN 14011:2003 ‘Water Quality: Sampling of fish with electricity’.

1.2.3.7 Electric Fishing involves passing an electric current into each watercourse causing the temporary incapacitation of fish, thus rendering the fish easier to catch, identify and analyse. At each suitable watercourse, the Electric Fishing methodology was used to survey a 100 m stretch of waterbody (where possible), utilising stop nets to prevent fish from moving away from the watercourse, where necessary. All field surveyors were suitably competent, certified and experienced in undertaking this survey. A FR2 permit (Application for authorisation to

use fishing instruments other than rod and line in England) was obtained from the Environment Agency prior to undertaking Electric Fishing.

1.2.3.8 Surveys of each suitable watercourse were undertaken as per Giles *et al.* (2005) and Environment Agency's Electric Fishing operations: equipment and working practices (Environment Agency, 2019). All surveys were undertaken in the optimal survey period for fish (between June and October).

1.2.4 Limitations

1.2.4.1 Access was not granted to all identified watercourses within the survey area and as a result some watercourses could not be fully surveyed. Where access was granted to upstream or downstream sections of these watercourses they were surveyed where possible.

1.2.4.2 It was not possible to access downstream locations of Branch of Dow Brook and Newton Marsh (location references E and F) for Electric Fishing but, as described in **Table 1.6** and **Table 1.7** these watercourses provide respectively unsuitable or suboptimal habitat and it is not considered that these areas would support important assemblages of fish.

1.2.4.3 Due to the trenchless techniques proposed to be employed under the River Ribble, it was determined that there would be no direct or indirect impacts on the River Ribble and therefore no surveys were undertaken on this watercourse (see Volume 1, Chapter 3: Project description of the ES). Publicly available data on fish populations in the River Ribble estuary were obtained from the Environment Agency to provide information on fish populations within the estuary, which provides context for which fish species may be present in its tributaries (Appendix B).

1.3 Results

1.3.1 Desk study

1.3.1.1 The desk study data provided by LERN contained one record for fish in the last 10 years within 2 km of the Transmission Assets Order Limits: Onshore. It is for European eel. The record is likely to be from Deepdale Brook, immediately south of Ash Lane and approximately 740 m north of the Transmission Assets Order Limits: Onshore. The record is shown on Figure 1.20 of Volume 3, Annex 3.1: Onshore ecology desk study technical report of the ES.

1.3.1.2 The Ribble Rivers Trust provided an overview of the fish interest of the Ribble, noting salmonids, eel, river and sea lamprey in the catchment, that will be present at times in the estuary. There are historic captures of shad (unconfirmed species) from 2012/13. Smelt have been caught in the estuary and were historically abundant. Almost all species of coarse fish occur, as well as various species of flat fish (Ribble Rivers Trust, pers. comm. 8 January 2024).

1.3.1.3 An assessment of smelt populations in the Ribble estuary was carried out by Ribble Rivers Trust in spring 2017 at survey locations a short distance upstream of the Transmission Assets Order Limits: Onshore. The principal outcome was that smelt presence during this period could not be confirmed despite suitable spawning habitat being identified and water conditions reaching suitable temperatures from mid-February. Species recorded were chub *Squalius cephalus*, dace *Leuciscus leuciscus*, eel, flounder *Platichthys flesus*, minnow *Phoxinus phoxinus*, roach *Rutilus rutilus* and trout which, except for eel and trout, are not threatened.

1.3.1.4 The Environment Agency's data for the Ribble Estuary contains records from 2002- 2023. For this period there are records for 58 species with annual species diversity ranging from six to 20 species (mean = 17 species). There are infrequent records for protected and notable species, summarised in **Table 1.3** below, which are for Atlantic salmon, brown/sea trout, European eel, river lamprey and smelt between 2004 and 2016.

Table 1.3: Summary of notable fish records for the Ribble Estuary (Environment Agency).

Common name	Total	Min count	Max count	Years (range)	Years (count)
Atlantic salmon	6	6	6	2008	1
Brown/sea trout	11	1	6	2004-2015	5
European eel	39	1	20	2005-2017	6
European eel elvers	4	1	3	2005-2008	2
River lamprey	3	1	1	2002-2013	3
Smelt	28	1	6	2004-2016	11

1.3.2 Site-specific surveys

Watercourses

1.3.2.1 Eleven watercourses were identified within the fish survey area, of which nine watercourses had the potential to support fish.

1.3.2.2 The two remaining watercourses were wholly dry at the time of survey. Information on the location of the watercourses is provided below in **Table 1.4** and **Figure 1.2** to **Figure 1.5** sheets A-D below on which the upstream point of a surveyed section of a watercourse is identified as '1' and the downstream point as '2'.

1.3.2.3 In addition, five watercourses (F, G, H, K and M) were initially identified for survey but are wholly outside of the 150 m buffer of the Transmission Assets Order Limits: Onshore, which defines the survey area, and data for these sites is considered to be contextual (see **section 1.1.4**). Information on the location of contextual watercourses is provided below in **Table 1.5** and shown on **Figure 1.2** to **Figure 1.5** sheets A-D (contextual watercourses are marked in purple).

Table 1.4: Location of watercourses within survey area

Watercourse reference	Watercourse name	Upstream location	Downstream location	Within Transmission Assets Order Limits: Onshore
A	Branch Drain	X 333684 Y 431317	X 333636 Y 431015	Yes
B	Main Drain	X 337412 Y 429534	X 337252 Y 430202	No
C	Wrea Brook	X 338646 Y 429626	X 338495 Y 429711	Yes
D	Dow Brook	X 343657 Y 431143	X 343631 Y 431746	Yes
E	Branch of Dow Brook	X 343878 Y 430091	N/A	Yes
I	Savick Brook	X 347791 Y 429683	X 348013 Y 430177	Yes
J	Deepdale Brook	X 347645 Y 429848	N/A	No
N	Mill Brook 1	X 349023 Y 428788	X 349056 Y 428178	Yes
O	Unnamed Tributary of Mill Brook	X 349042 Y 428231	X 348505 Y 427842	Yes
P	Mill Brook 2	X 349764 Y 427572	X 350001 Y 427469	Yes
Q	Longton Brook	X 347921 Y 426434	X 347658 Y 426505	No

Table 1.5: Location of contextual watercourses

Watercourse reference	Watercourse name	Upstream location	Downstream location	Within Transmission Assets Order Limits: Onshore
F	Newton Marsh	X 345543 Y 429250	N/A	No
G	Unnamed Watercourse 4	X 346498 Y 428769	X 346375 Y 428782	No
H	Unnamed Watercourse 3	X 346444 Y 428369	X 346380 Y 428727	No
K	Unnamed Watercourse 2	X 347681 Y 429916	N/A	No
M	Unnamed Watercourse 1	X 346925 Y 428089	X 347923 Y 428152	No

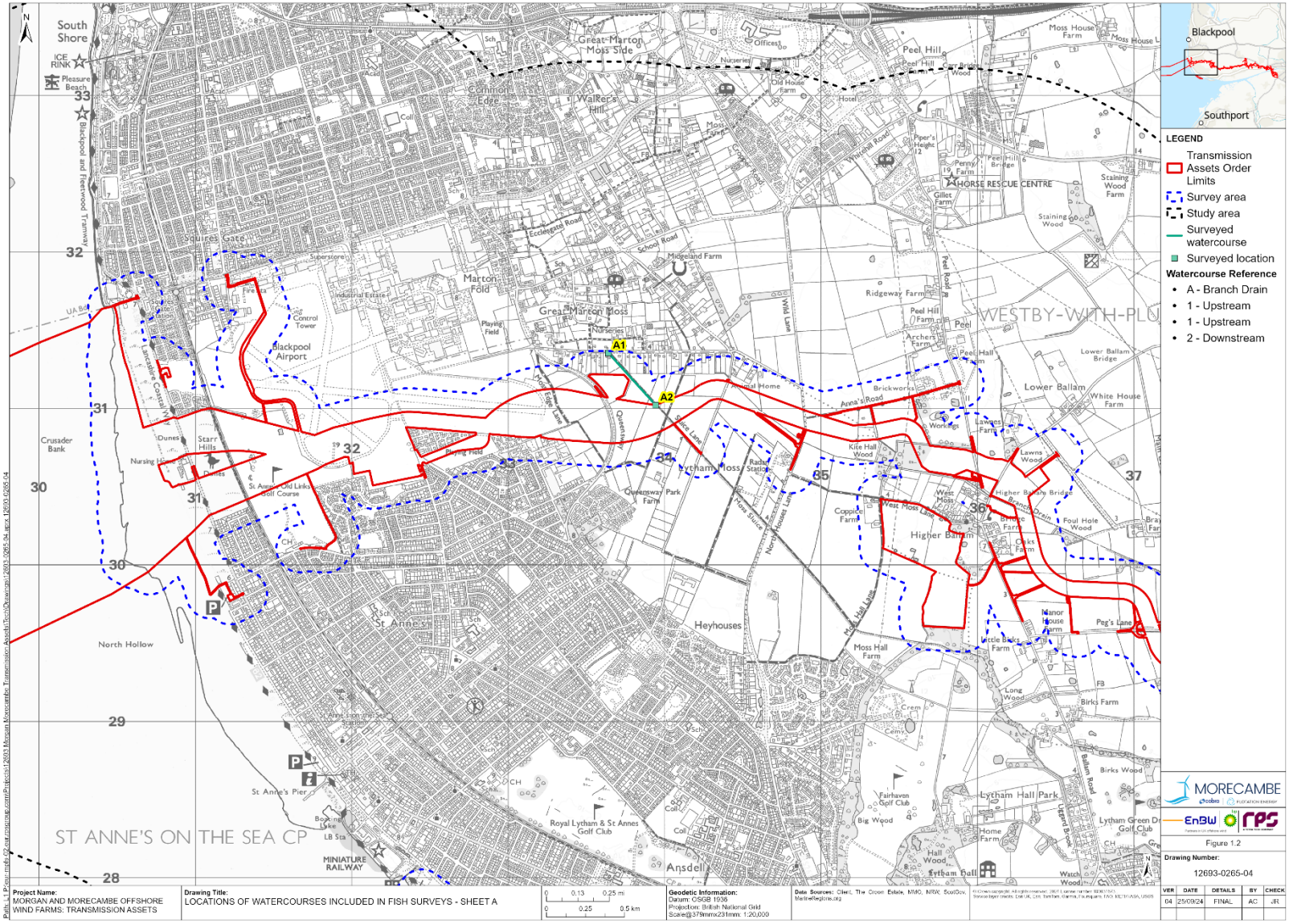

Figure 1.2: Locations of watercourses included in fish surveys (sheet A)

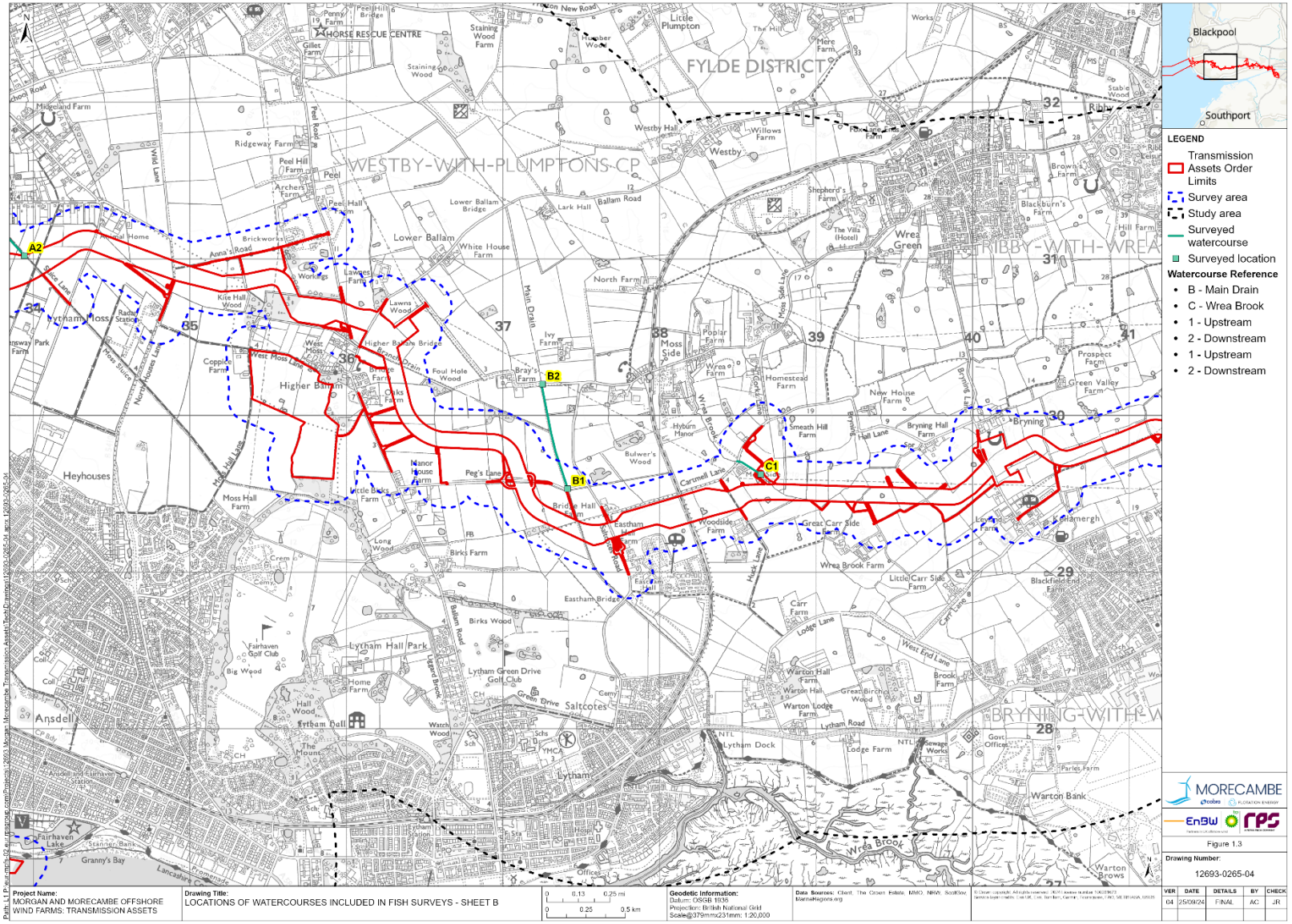

Figure 1.3: Locations of watercourses included in fish surveys (sheet B)

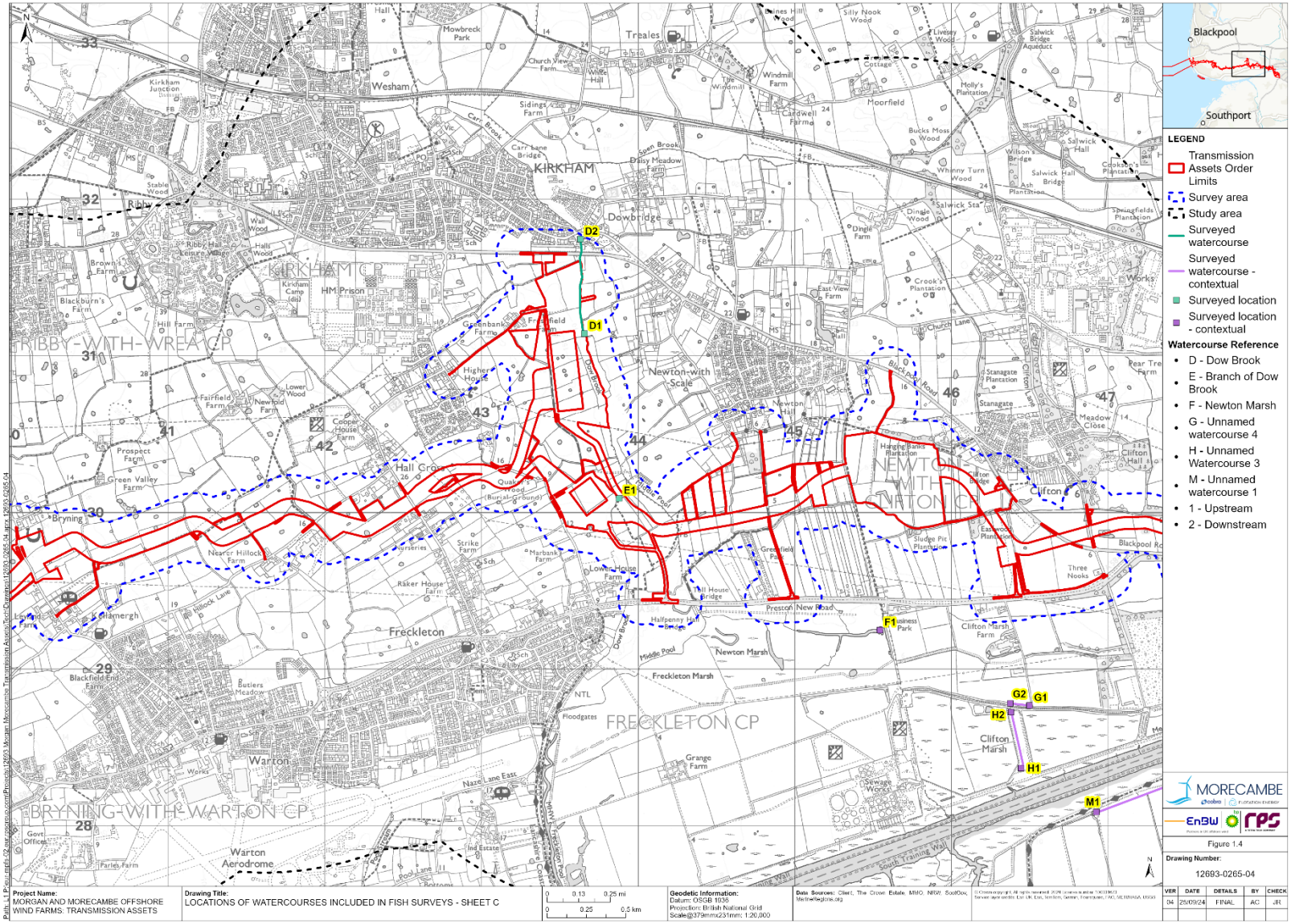

Figure 1.4: Locations of watercourses included in fish surveys (sheet C)

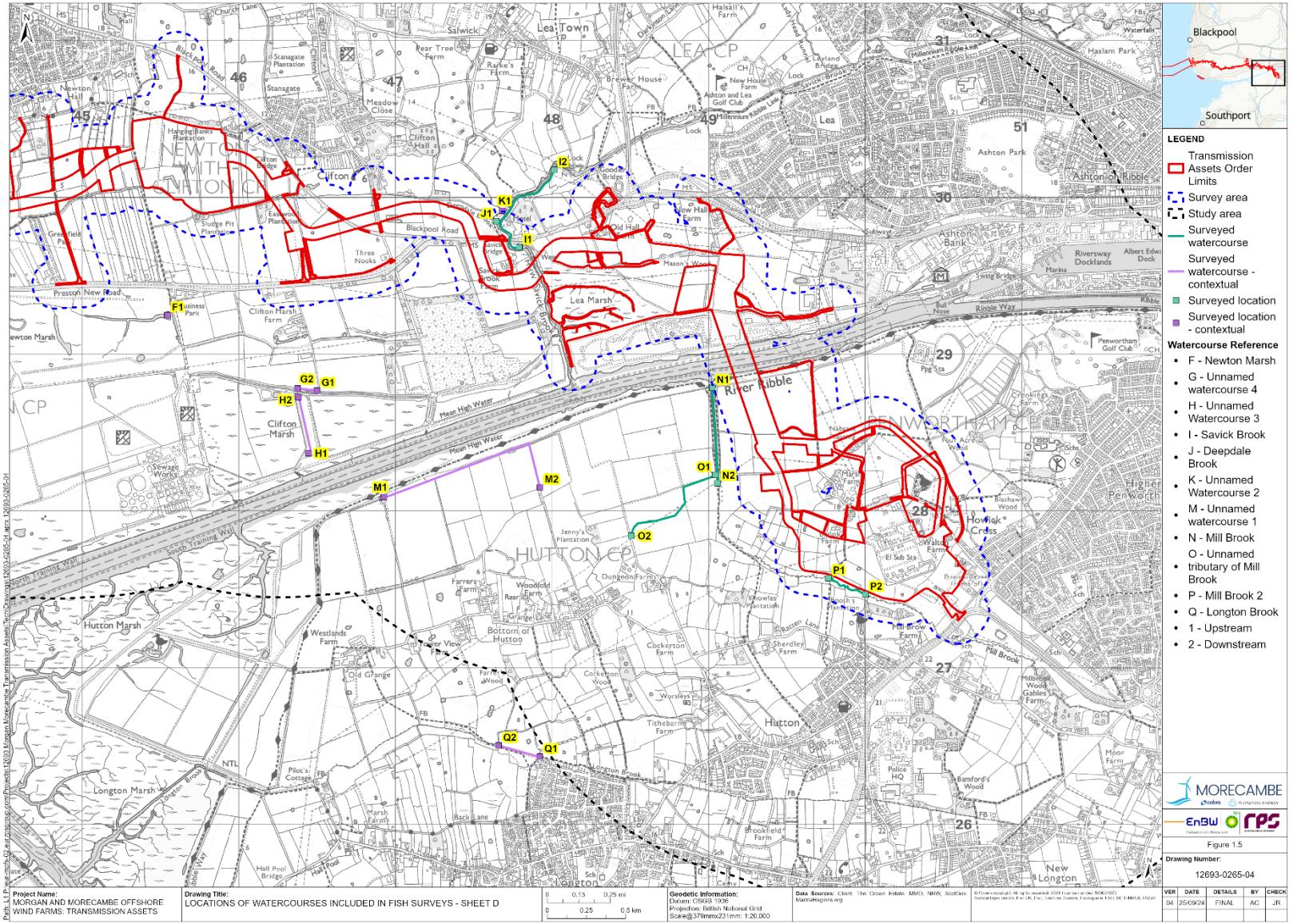

Figure 1.5: Locations of watercourses included in fish surveys (sheet D)

1.3.2.4 **Table 1.6** below summarises the results of the fish surveys and all results are provided in **Appendix A**. Three of the 11 watercourses (references A, E, and J) were dry or partially dry and did not contain fish. No fish were seen or captured in one additional watercourse (references O) and matters that may contributed to their absence included disturbance, turbidity, poor water quality and invasive bankside plant species. Access was limited by site conditions and access permissions at two locations (references C and E), which reduced the extent to which these watercourses could be sampled.

1.3.2.5 **Table 1.7** summarises contextual information from fish surveys undertaken outside of the survey area. Three of the five watercourses (references G, K and M) were dry or partially dry and did not contain fish. No fish were seen or captured in the other two contextual watercourses (references F and H).

1.3.2.6 Information on the species that were recorded is summarised as follows.

- Flounder (species code FL in **Table 1.6**), recorded at Mill Brook and Savick Brook, is 'Least Concern' according to IUCN criteria.
- Three spined stickleback *Gasterosteus aculeatus* (SP3), recorded at Mill Brook 1, Mill Brook 2, Main Drain and Savick Brook, is 'Least Concern' according to IUCN criteria.
- European eel (EE), recorded at Mill Brook 1, Dow Brook and Wrea Brook, is 'Critically Endangered' according to IUCN criteria.
- Roach (RO), recorded at Savick Brook, is 'Least Concern' according to IUCN criteria.
- Dace (DA), recorded at Savick Brook, is 'Least Concern' according to IUCN criteria.
- Chub (CH), recorded at Savick Brook, is 'Least Concern' according to IUCN criteria.

1.3.2.7 Six eel were recorded during the surveys. Presence was confirmed at three of the 11 watercourses scoped in for survey. Four were present in Dow Brook and there are single records in Wrea Brook and Mill Brook one of which the former was a juvenile. No salmonids, lampreys or other notable species were recorded. The greatest number and diversity of fish was in Savick Brook but no eel were recorded in this watercourse.

Table 1.6: Fish survey results

Reference	Watercourse name	Survey comments/ survey constraints	Number of species	Species code[1]	Total number of fish	European eel
A	Branch Drain	Dry watercourse.	0	No fish	0	0
B	Main Drain	Long, deep, fast flowing linear section of drain, approximately 2 m deep.	1	SP3	2	0
C	Wrea Brook	One juvenile European eel captured. Himalayan balsam *Impatiens glandulifera* present towards Cartmell Lane end of survey reach. Access limited due to vegetation and land access permissions.	1	EE	0	1
D	Dow Brook	Himalayan balsam present throughout the survey reach.	1	EE	0	4
E	Branch of Dow Brook	Dry watercourse.	0	No fish	0	0
I	Savick Brook	Fry species captured in channel margins. Turbid, deep water in centre of channel. Used for navigation, narrowboats passed during survey.	5	FL, SP3, RO, DA, CH	35	0
J	Deepdale Brook	Channel is dry above confluence with Savick Brook. There is a flap valve between Deepdale Brook and Savick Brook which is a barrier to fish passage.	0	No fish	0	0
N	Mill Brook 1	Himalayan balsam and giant hogweed *Heracleum mantegazzianum* present throughout survey extent. Giant hogweed encroaches into channel.	3	FL, SP3, EE	7	1
O	Unnamed Tributary of Mill Brook	Himalayan Balsam present throughout survey extent	0	No fish	0	0

[1] Species codes: Flounder (FL), threespined stickleback (SP3), European eel (EE), roach (RO), dace (DA), chub (CH)

Reference	Watercourse name	Survey comments/ survey constraints	Number of species	Species code[1]	Total number of fish	European eel
P	Mill Brook 2	Himalayan balsam present throughout survey extent.	1	SP3	10	0
Q	Longton Brook	Himalayan balsam present throughout the survey reach. Perch captured in one deeper pool, the rest of the reach was devoid of fish.	1	PE	2	0

Table 1.7: Fish survey results (contextual sites)

Reference	Watercourse name	Survey comments/ survey constraints	Number of species	Species code[2]	Total number of fish	European eel
F	Newton Marsh	No fish captured or observed during survey. The reach fished was shallow, turbid and experiences heavy poaching from cattle.	0	No fish	0	0
G	Unnamed Watercourse 4	Partially dry watercourse. A section holds water but was inaccessible with poor water quality.	0	No fish	0	0
H	Unnamed Watercourse 3	No fish captured or observed during survey.	0	No fish	0	0
K	Unnamed Watercourse 2	Dry watercourse.	0	No fish	0	0
M	Unnamed Watercourse 1	Dry watercourse.	0	No fish	0	0

[2] Species codes: Flounder (FL), threespined stickleback (SP3), European eel (EE), roach (RO), dace (DA), chub (CH)

1.4 Summary

1.4.1.1 This technical report presents the results of the fish desk study and field studies undertaken in July 2023 in inform Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES.

1.4.1.2 Eleven watercourses were included in the surveys of which three were dry or partially dry at the time surveys were carried out and fish were also absent in one further watercourse. European eel was the only notable species recorded. Four were present in Dow Brook and there are single records in Wrea Brook and Mill Brook. There is a single desk study record for European eel in Deepdale Brook.

1.4.1.3 The greatest number and diversity of fish was in Savick Brook, but no European eel were recorded in this watercourse.

1.5 References

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Appendix A: Fish survey data

Survey ID	A: Branch Drain		
Run Number	Fish No.	Species	Length (mm)
No fish were caught during this survey			

Upstream	Downstream
	

Survey ID	B: Main Drain		
Run Number	Fish No.	Species	Length (mm)
1	1	Three-spined stickleback	40
1	2	Three-spined stickleback	50
Upstream		Downstream	
			

Survey ID	C: Wrea Brook		
Run Number	Fish No.	Species	Length (mm)
1	1	European eel	150
Upstream		Downstream	
No photograph		No photograph	

Survey ID	D: Dow Brook		
Run Number	Fish No.	Species	Length (mm)
1	1	European eel	300
1	2	European eel	300
1	3	European eel	250
1	4	European eel	200

Upstream	Downstream
	

Survey ID	E: Branch of Dow Brook		
Run Number	Fish No.	Species	Length (mm)
No fish were caught during this survey			

Upstream	Downstream
	No photograph

Survey ID	F: Newton Marsh (Contextual data)		
Run Number	Fish No.	Species	Length (mm)
No fish were caught during this survey			

Upstream	Downstream
	No photograph

Survey ID	G: Unnamed Watercourse 4 (Contextual site)		
Run Number	Fish No.	Species	Length (mm)
No fish were caught during this survey			

Upstream	Downstream
	

Survey ID	H: Unnamed Watercourse 3 (Contextual site)		
Run Number	Fish No.	Species	Length (mm)
No fish were caught during this survey			

Upstream	Downstream
	

Survey ID	I: Savick Brook		
Run Number	Fish No.	Species	Length (mm)
1	1	Flounder	50
1	2	Flounder	50
1	3	Flounder	50
1	4	Flounder	50
1	5	Flounder	50
1	6	Flounder	50
1	7	Flounder	50
1	8	Flounder	50
1	9	Flounder	50
1	10	Flounder	50
1	11	Flounder	50
1	12	Flounder	50
1	13	Three-spined stickleback	50
1	14	Three-spined stickleback	50
1	15	Three-spined stickleback	50
1	16	Three-spined stickleback	50
1	17	Three-spined stickleback	50
1	18	Three-spined stickleback	50
1	19	Three-spined stickleback	40
1	20	Three-spined stickleback	40
1	21	Three-spined stickleback	40
1	22	Roach	40
1	23	Roach	40
1	24	Roach	30
1	25	Roach	30
1	26	Roach	30
1	27	Roach	30
1	28	Dace	40
1	29	Dace	40

Survey ID	I: Savick Brook		
Run Number	**Fish No.**	**Species**	**Length (mm)**
1	30	Dace	30
1	31	Dace	30
1	32	Chub	40
1	33	Chub	40
1	34	Chub	40
1	35	Chub	40

Upstream	Downstream
	

Survey ID	J: Deepdale Brook		
Run Number	Fish No.	Species	Length (mm)
No fish were caught during this survey			

Upstream	Downstream
No photograph	

Survey ID	K: Unnamed Watercourse 2 (Contextual data)		
Run Number	Fish No.	Species	Length (mm)
No fish were caught during this survey			

Upstream	Downstream
No photograph	

Survey ID	M: Unnamed Watercourse 1 (Contextual data)		
Run Number	Fish No.	Species	Length (mm)
No fish were caught during this survey			

Upstream	Downstream
	

Survey ID	N: Mill Brook 1		
Run Number	Fish No.	Species	Length (mm)
1	1	Flounder	50
1	2	Flounder	50
1	3	Flounder	45
1	4	Flounder	45

Survey ID	N: Mill Brook 1		
Run Number	Fish No.	Species	Length (mm)
1	5	Three-spined stickleback	20
1	6	Three-spined stickleback	60
1	7	European eel	250

Upstream	Downstream
	

Survey ID	O: Unnamed Tributary of Mill Brook		
Run Number	Fish No.	Species	Length (mm)
No fish caught during this survey			

Upstream	Downstream
	

Survey ID	P: Mill Brook 2		
Run Number	Fish No.	Species	Length (mm)
1	1	Three-spined stickleback	40
1	2	Three-spined stickleback	40
1	3	Three-spined stickleback	40
1	4	Three-spined stickleback	40
1	5	Three-spined stickleback	40
1	6	Three-spined stickleback	50
1	7	Three-spined stickleback	50
1	8	Three-spined stickleback	50
1	9	Three-spined stickleback	30
1	10	Three-spined stickleback	30

Upstream	Downstream
	

Survey ID	Q: Longton Brook		
Run Number	Fish No.	Species	Length (mm)
1	1	Perch	250
1	2	Perch	250

Upstream	Downstream
	

Appendix B: Summary of fish records for the Ribble Estuary

The Environment Agency's data for the Ribble Estuary contains records from 2002 and 2019 and 2023.

Common name	Scientific name	Grand Total	Min Count	Max Count	Years (range)	Years (count)
10-spined stickleback	*Pungitius pungitius*	1	1	1	2011	1
3-spined stickleback	*Gasterosteus aculeatus*	16	1	4	2004-2018	8
5-bearded rockling	*Ciliata mustela*	23	1	5	2002-2023	9
Ammodytes sp.	*Ammodytes*	3	1	2	2010-2011	2
Atlantic salmon	*Salmo salar*	6	6	6	2008	1
Barbel	*Barbus barbus*	1	1	1	2004	1
Brill	*Scophthalmus rhombus*	6	1	2	2003-2023	5
Brown/sea trout	*Salmo trutta*	11	1	6	2004-2015	5
Bullhead	*Cottus gobio*		0	0	NA	0
Bullrout/Short-spined sea scorpion	*Myoxocephalus scorpius*	1	1	1	2009	1
Butterfish	*Pholis gunnellus*	4	1	3	2003-2016	2
Chub	*Leuciscus cephalus*	5	5	5	2018	1
Cod	*Gadus morhua*	77	1	24	2002-2018	9
Common bream	*Abramis brama*	1	1	1	2016	1
Common carp varieties	*Cyprinus carpio*	1	1	1	2005	1
Common goby	*Pomatoschistus microps*	3576	1	1303	2002-2023	12
Dab	*Limanda limanda*	350	1	337	2002-2018	6
Dace	*Leuciscus leuciscus*	137	3	92	2004-2018	4
Dover sole	*Solea solea*	75	1	15	2003-2017	14
Dragonet	*Callionymus lyra*	2	1	1	2003-2012	2
European eel	*Anguilla anguilla*	39	1	20	2005-2017	6
European eels > elvers	*Anguilla anguilla*	3	3	3	2008	1
European elvers	*Anguilla anguilla*	1	1	1	2005	1
Flounder	*Platichthys flesus*	8694	6	1373	2002-2023	19

Common name	Scientific name	Grand Total	Min Count	Max Count	Years (range)	Years (count)
Greater pipefish	*Syngnathus acus*	59	1	17	2002-2012	10
Greater sandeel	*Hyperoplus lanceolatus*	9	9	9	2009	1
Greater weever/ Weever fish	*Trachinus draco*	3	3	3	2008	1
Herring	*Clupea harengus*	2497	2	644	2002-2023	17
Hooknose/Pogge	*Agonus cataphractus*	21	1	9	2002-2014	8
Lemon sole	*Microstomus kitt*	1	1	1	2007	1
Lesser (Nillsons) pipefish	*Syngnathus rostellatus*	140	1	118	2011-2018	6
Lesser sandeel	*Ammodytes tobianus*	149	1	42	2007-2018	11
Lesser weever	*Echiichthys vipera*	45	1	19	2003-2018	10
Lumpsucker	*Cyclopterus lumpus*	1	1	1	2018	1
Minnow	*Phoxinus phoxinus*	17	17	17	2005	1
Painted goby	*Pomatoschistus pictus*	1	1	1	2011	1
Perch	*Perca fluviatilis*	3	1	1	2004-2017	3
Plaice	*Pleuronectes platessa*	2880	4	548	2002-2023	19
Pollack	*Pollachius pollachius*	2	2	2	2014	1
Poor cod	*Trisopterus minutus*	1	1	1	2013	1
Pouting/Bib	*Trisopterus luscus*	5	1	3	2003-2012	3
Reticulated dragonet	*Callionymus reticulatus*	2	2	2	2014	1
River lamprey	*Lampetra fluviatilis*	3	1	1	2002-2013	3
Roach	*Rutilus rutilus*	89	1	42	2004-2018	7
Sand goby	*Pomatoschistus minutus*	6155	9	1480	2002-2023	19
Sand smelt	*Atherina presbyter*	7	1	2	2006-2013	5
Sand Sole	*Pegusa lascaris*	4	4	4	2007	1
Sea bass	*Dicentrarchus labrax*	130	1	38	2002-2023	12
Sea-snail	*Liparis liparis*	11	3	8	2002-2003	2
Shore rockling	*Gaidropsarus mediterraneus*	2	2	2	2007	1
Smelt	*Osmerus eperlanus*	28	1	6	2004-2016	11
Solenette	*Buglossidium luteum*	3	1	2	2003-2017	2
Sprat	*Sprattus sprattus*	4682	1	2654	2002-2023	16
Straight-nosed pipefish	*Nerophis ophidion*	2	2	2	2007	1

Common name	Scientific name	Grand Total	Min Count	Max Count	Years (range)	Years (count)
Thin lipped grey mullet	*Liza ramada*	6	1	5	2013-2017	2
Thornback ray/Roker	*Raja clavata*	2	2	2	2011	1
Transparent goby	*Aphia minuta*	46	1	30	2003-2016	5
Tub gurnard	*Chelidonichthys lucernus*	1	1	1	2007	1
Whiting	*Merlangius merlangus*	1043	1	302	2002-2023	18