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Yorkshire Green Energy Enablement (GREEN) Project

Volume 5

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Survey Report**

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Annex 8D.1 – Water Vole and Otter Survey Dates
Annex 8D.2 – Scientific Names

Version History

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1. Introduction

1.1 Purpose of the report

- 1.1.1 This report has been produced for the purpose of presenting the results of the otter and water vole survey undertaken as part of the Yorkshire Green Energy Enablement (GREEN) Project (“the Project” or “Yorkshire GREEN”).
- 1.1.2 The Project comprises new electricity infrastructure, such as new overhead lines, substations, cables and equipment to connect overhead lines to buried cables, known as Cable Sealing End Compounds (CSECs), as well as works to existing overhead lines and substations.
- 1.1.3 The Project is a Nationally Significant Infrastructure Project (NSIP) and requires consent from the Secretary of State via a Development Consent Order (DCO).
- 1.1.4 The maximum extent of development for which permission will be sought and within which all works would take place is indicated by the Order Limits, land within which is hereafter referred to as ‘land within the Order Limits’. There are shown on **Figure 1.2, Volume 5, Document 5.4.1**.
- 1.1.5 This report details the results of the otter (*Lutra lutra*) and water vole (*Arvicola amphibius*) surveys in order to inform the Environmental Statement (ES) for the Project. This report forms a technical appendix to **Chapter 8: Biodiversity (Volume 5, Document 5.2.8)**.

1.2 Survey scope

- 1.2.1 Where appropriate, reference is made in this report to the ‘survey area’. For the purpose of the habitat assessment conducted in conjunction with the extended Phase 1 habitat survey, the survey area encompassed land within the Order Limits and a 50m buffer where accessible (see **Figure 8.4, Volume 5, Document 5.4.8**). This buffer accounts for the potential for ecological features occurring outside of the Order Limits to be impacted by the Project. The habitat assessment survey area is dominated by arable fields with rough grass field margins and bound by hedgerows and ditches. Areas of woodland and scrub; ponds; ditches; and large watercourses and smaller tributaries are also present.
- 1.2.2 For the purpose of otter presence/likely absence surveys, the survey area comprised the following:
 - suitable watercourses/ditches to a distance of 100m up and downstream (subject to access) of the construction/operational footprint including proposed watercourse crossings and potentially disturbing bankside construction works;
 - the banks of suitable water bodies; and
 - a buffer of up to 50m from the banks of the watercourses/ditches to target suitable terrestrial habitats.

1.3 Legislative context

Otter

1.3.1 Otters are listed in Schedule 5 of the Wildlife and Countryside Act 1981¹ (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017² (as amended). They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence, inter alia, to:

- deliberately capture, injure or kill any such animal;
- deliberately disturb any such animal, in particular in such a way as to be likely to:
 - impair their ability to survive, breed or reproduce, or rear or nurture their young;
 - impair their ability to hibernate or migrate;
 - affect significantly the local distribution or abundance of that species;
- damage or destroy a breeding site or resting place of any such animal;
- intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

Water vole

1.3.2 As of 6 April 2008, water voles have been given full protection under the Wildlife and Countryside Act 1981¹ (as amended). They are listed on Schedule 5 of the 1981 Act, and are therefore subject to the provisions of Section 9, which make it an offence to:

- intentionally kill, injure or take water vole from the wild;
- possess or control live or dead water voles or derivatives;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection;
- intentionally or recklessly disturb water voles whilst occupying a structure or place used for that purpose; and
- sell water voles or offer or expose for sale or transport for sale.

¹ UK Government (1981). Wildlife and Countryside Act 1981 (online). Available at: <https://www.legislation.gov.uk/ukpga/1981/69> (Accessed October 2022).

² UK Government (2017). Conservation of Habitats and Species Regulations 2017 (online). Available at: <https://www.legislation.gov.uk/uksi/2017/1012/contents> (Accessed October 2022).

2. Methods

2.1 Desk study

2.1.1 To inform the survey process a data-gathering exercise was undertaken in June 2021³ to obtain information relating to designated sites up to 20km from the Order Limits and protected species records up to 5km from the Order Limits. Water vole and otter records were obtained up to 2km from the Order Limits. Ecological data was requested from West Yorkshire Joint Services (WYJS) and North and East Yorkshire Ecological Data Centre (NEYEDC) in June 2021.

2.2 Field surveys

Otter

Habitat assessment

2.2.1 A habitat suitability assessment was carried out concurrently with the extended Phase 1 habitat survey in 2021/22 (**Appendix 5.3.8B, Extended Phase 1 Habitat Survey Report, Volume 5, Document 5.3.8B**). The assessment focussed on watercourses (for the purpose of this report taken to include rivers and streams) and water bodies (for the purpose of this report taken to include ditches, ponds and lakes) that were highlighted as being potentially suitable for otters during the desk study to a buffer of 50m from the Order Limits. Each watercourse and water body was categorised as ‘optimal’, ‘sub-optimal’ or ‘negligible’ with regards to their suitability for foraging, commuting and/or resting sites (holts and couches). The reasons for each categorisation were also recorded. In the absence of standard definitions this rapid appraisal was based on professional judgement with reference to the suitability criteria in **Table 2.1**.

Table 2.1 – Otter habitat suitability

Otter feature	Optimal	Sub-optimal	Negligible
Resting site	Watercourse/water body, particularly those substantial in size, with extensive bankside habitats which are likely to provide otter resting sites (e.g. exposed roots of mature bankside trees; dense areas of scrub/woodland and/or	Watercourse/water body with limited bankside habitat and limited connectivity to suitable resting sites beyond the watercourse/water body bank.	Minor watercourse/water body that is deficient in habitats that are likely to provide otter resting sites.

³ This is considered sufficient in respect of both age of data and geographical spread when used in conjunction with the results of field surveys which provide up to date, accurate data specific to the Project.

Otter feature	Optimal	Sub-optimal	Negligible
	ruderal vegetation; large mammal burrows; holes/cavities in natural/artificial banks).		
Foraging habitat	Substantial sized watercourse/water body which is likely to provide foraging habitat that supports larger sized fish, and large fish populations and/or amphibians.	Minor watercourse/water body which is likely to provide limited foraging habitat that supports smaller sized fish, and small fish populations and/or amphibians.	Minor watercourse/water body which is likely to provide poor foraging habitat that does not support fish or amphibians, and is likely to have little or no water and/or poor water quality.
Commuting habitat	Substantial sized watercourse which is likely to provide a major commuting route between suitable habitats and has sufficient bankside habitat to provide cover, or a minor watercourse/ditch directly connected to a main river.	Minor watercourse which provides limited commuting opportunities, and/or has limited bankside habitat to provide cover.	Minor watercourse which is unlikely to provide a commuting route, and has poor water quality/little or no water and is deficient in habitats that are likely to provide cover.

2.2.2 Watercourses that support otter vary in their habitat suitability/quality and a ‘negligible’ habitat suitability categorisation does not indicate an absence of this species. Otters, for example, often have territories covering tens of kilometres of watercourse, incorporating reaches that vary widely in habitat suitability/quality, with no clear correlation between levels of otter activity and specific habitat characteristics (Chanin, 2003a⁴). The categorisation is therefore a visual appraisal of relative otter habitat quality, primarily to inform the requirement for presence/likely absence surveys.

Presence/likely absence survey

Survey effort

2.2.3 Following the initial habitat assessment of watercourses and water bodies within the survey area, 45 suitable watercourse/ditches that had the potential to be impacted by the Project were surveyed for otter evidence during May to July 2022 in conjunction with water vole surveys.

2.2.4 For the purpose of these otter presence/likely absence surveys, the survey area comprised the following:

⁴ Chanin, P. (2003a). Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough

- suitable watercourses/ditches to a distance of 100m up and downstream (subject to access) of the construction/operational footprint including proposed watercourse/ditch crossings and potentially disturbing bankside construction works⁵; and
 - a buffer of up to 50m from the banks of the watercourses/ditches to target suitable terrestrial habitats.
- 2.2.5 For any watercourse/ditch that could not be adequately surveyed from the banksides or within the channel due to health and safety reasons, small unmanned aerial vehicles (SUAV) were used.
- 2.2.6 SUAV survey comprised a low level transect over the watercourse with the camera aligned horizontal to the bank. Given the low-level flight above water, the survey was conducted under manual flight control by a General Visual Line of Sight Certificate (GVC) Qualified remote pilot and accompanying observer. A series of overlapping images were taken and upon completion of the survey, images were downloaded to a computer and shapefiles of photo points created to aid visual assessment of the recorded data by an ecologist. Any signs of otter activity and habitat features with potential suitability for otter resting sites were noted.

Otter evidence

- 2.2.7 The watercourses were systematically searched for signs of otter employing methods based on guidance by Chanin (2003b⁶). Any signs of otter activity (resting sites⁷, spraints⁸, footprints, slides⁹ or feeding/prey remains) were mapped and recorded.
- 2.2.8 Habitat features with potential suitability for otter resting sites were recorded and mapped, for example: large holes in watercourse/ditch banks (artificial or man-made); cavities in bridges, culverts and amongst exposed rocks or bank reinforcements; mature bankside trees exposed root systems; mammal burrows; and areas of dense vegetation, for example scrub and marshy grassland or tall ruderal vegetation.
- 2.2.9 During analysis of the images obtained using SUAV, any signs of otter activity and habitat features with potential suitability for otter resting sites were noted on a precautionary basis.

⁵ The Zone of Influence for fragmentation/disturbance effects on otter is up to a maximum of 200m from the construction/operational works as detailed in **Scoping of Assessment Summary Appendix 8A, Volume 5, Document 5.3.8A**. Given the nature of the final Project design (which minimises in-channel works and incorporates embedded environmental measures) a survey area comprising 100m up/downstream of construction/operational works along suitable watercourses and a 50m buffer of suitable terrestrial habitat is proportionate and sufficient to assess the potential effects of the Project on otter.

⁶ Chanin, P. (2003b). Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No.10. English Nature, Peterborough

⁷ This report refers to two types of otter resting site: 'holt' refers to an underground ('covered') den/resting site that is used by otter; and 'couch' refers to an above ground ('uncovered') den/resting site that is used by otter.

⁸ Otter droppings

⁹ In this report the term 'slide' refers to any marks on the riverbank where an otter has slid down the bank and into the watercourse, for example flattened/smoothed vegetation/mud.

2.2.10 Otter resting sites can be difficult to identify with certainty (Chanin, 2003a⁴), and a CIEEM presentation on camera trapping otter resting sites¹⁰ suggests recent research did not identify a correlation between spraints being present and regular use at confirmed otter resting sites. However, in line with best practise⁶, each location with potential to be used as a resting site was inspected to record any evidence of otter activity. The evidence was then used to categorise the likelihood of use by otter with reference to the following:

- ‘Low’: no evidence of otter activity at/near the potential resting site and the potential resting site is fairly exposed.
- ‘Moderate’: evidence of otter activity at/near the potential resting site that is not recent e.g. visibly aged spraint, and/or the potential resting site is sheltered and optimal for use by otters but there is no evidence of otter.
- ‘High’: evidence of recent otter activity at/near the potential resting site.

Water vole

Habitat assessment

2.2.11 A habitat suitability assessment was carried out concurrently with the extended Phase 1 habitat survey in 2021/22 (**Appendix 5.3.8B: Extended Phase 1 Habitat Survey Report, Volume 5, Document 5.3.8B**). The assessment focussed on watercourses and water bodies that were highlighted as being potentially suitable for water voles during the desk study to a buffer of 50m from the Order Limits. Each watercourse/water body was subject to a habitat assessment using the Water Vole Habitat Suitability index (WVHS) to determine its suitability.

2.2.12 Features considered were:

- well-developed (>60%) bank-side and emergent vegetation to provide cover;
- year-round availability of food sources;
- suitable refuge areas above extremes in water levels;
- steep banks suitable for burrowing;
- permanent open water;
- presence of berm (ledge at water level);
- lack of disturbance through poaching, grazing and/or recent management; and
- nest building opportunities in vegetation above water level.

2.2.13 For each feature that is present, a score of 1 is provided, and 0 if the feature is absent. These scores are then applied to habitat categories of: <3: Unsuitable, 3-5: Sub-optimal, >5 Optimal.

2.2.14 The WVHS provides a rapid and consistent appraisal for water vole, however it is acknowledged that using this index can sometimes provide an inaccurate representation of the quality of aquatic habitat for water voles. For example, an isolated permanent dry ditch can be categorised as sub-optimal or optimal. Therefore,

¹⁰ CIEEM presentation on camera trapping otter resting sites – understanding set-up and sampling duration. Presented by Dr Mel Findlay on 24 March 2022.

professional judgement was used to consider the following additional factors when assessing the suitability of a habitat for water voles in accordance with the Water Vole Mitigation Handbook¹¹ (Dean *et al.* 2016):

- bank profile;
- bank substrate, specifically its suitability for burrowing;
- water depth;
- likely frequency and height of water level changes, relative to bank height;
- amount of shading from trees/shrubs;
- bankside herbaceous vegetation type (tall tussocky grass, tall grasses/weeds, closely mown grass and so on);
- bankside herbaceous vegetation density;
- in-channel herbaceous vegetation type;
- in-channel herbaceous vegetation density;
- percentage of channel with in-channel herbaceous vegetation;
- evidence of current or recent management, and likely effects of management; and
- any other relevant factors.

2.2.15 The National Water Vole Steering Group suggests that water voles need a minimum of 6km of watercourse to ensure the long-term viability of a population¹². This can mean a network of inter-linked ponds, pools, wetland habitats and watercourses on a site would need to be between 100 and 600ha in size. The Water Vole Conservation Handbook¹³ indicates the minimum viable population (i.e. the smallest isolated population which has a high chance of survival) is likely to be in excess of 100 individuals at peak breeding season (30-50 individuals at beginning of breeding season), occupying approximately 1.5 to 2km length of good quality habitat.

2.2.16 The water vole is a mobile species that responds to habitat changes over the course of a breeding season and may use different ditches at different times of the year¹¹, more so where ditches have fluctuating water levels. It is also subject to chance extinction events and local population fluctuations. Thus, ditches may support water voles only at certain times of the year.

2.2.17 Therefore, for isolated and/or dry ditches assessed as indeterminate under the WVHS method, these were subject to further professional judgement assessments to scope them in or out for presence/likely absence surveys.

¹¹ Dean, M *et al* (2016). The Water Vole Mitigation Handbook. The Mammal Society; London.

¹² Sussex Wildlife Trust (2022). Water Vole. (online). (Accessed June 2022).

¹³ Strachan, R., Moorhouse, T. and Gelling, M. (2011). Water Vole Conservation handbook. Third Edition. Wildlife Conservation Research Unit, Oxford. Recommended for proposed very small-scale works affecting up to 15m of watercourse

Presence/likely absence survey

Survey effort

- 2.2.18 Following the initial habitat assessment of watercourses and water bodies within the survey area, those with potential for water vole that could be subject to impacts from the Project were surveyed twice for water vole evidence during May to July 2022 in conjunction with otter surveys.
- 2.2.19 For the purpose of these water vole presence/likely absence surveys, the survey area comprised the following:
- suitable watercourses/ditches to a distance of 100m up and downstream (subject to access) of the construction/operational footprint including proposed watercourse/ditch crossings and potentially disturbing construction works within 10m of the watercourse/ditch bank¹⁴; and
 - the banks of suitable ponds located within 10m of potentially disturbing construction works.
- 2.2.20 In view of the minimal in-channel works proposed by the Project and the embedded environmental mitigation including 9m watercourse buffers where possible, these surveys were in accordance with survey guidelines¹¹ which recommend surveys are conducted at habitat 100m up and downstream of the footprint of works affecting <15m of a watercourse.
- 2.2.21 The guidelines also recommend that visits be undertaken at least two months apart, with one in the first half of the survey season (mid-April to June) and one in the second half of the season (July to September inclusive) so that changes in habitat suitability and corresponding changes in water vole populations and their distribution can be identified. Survey dates are set out in **Annex 8D.1**.

Water vole evidence

- 2.2.22 In line with best practice guidance¹¹ surveys involved searching both banks for evidence of water voles, including:
- latrines – comprising a concentration of droppings in discrete locations, often near nest sites at range boundaries or often used places to enter and exit the water;
 - feeding stations – comprising neat piles of chewed lengths of vegetation, usually up to 10cm in length, on pathways or haul-out locations;
 - burrows – these are typically found along the water's edge and on top of the bank (up to 5m from the water's edge) and are 4-8cm in diameter. Holes on top of the banks often have 'lawns' around them (areas of grazed vegetation);

¹⁴ Based on the final Project design, the Zone of Influence for fragmentation/disturbance effects on water vole has been reduced since the publication of the PEIR to 100m from the construction/operational works as detailed in **Scoping of Assessment Summary Document, Appendix 5.3.8A, Volume 5, Document 5.3.8A**. Given the nature of the final Project design (which minimises in-channel works and incorporates embedded environmental measures) a survey area comprising 100m up/downstream of construction/operational works along suitable watercourses is proportionate and sufficient to assess the potential effects of the Project on water vole.

- pathways – flattened vegetation or ‘runs’ through vegetation, usually leading from burrows to latrines or feeding stations; and
- footprints – located in soft mud or silt.

2.2.23 Surveys were implemented by walking within the channel and/or along the top of the banks and searching for evidence, targeting visual inspection at accessible features likely to support evidence.

2.2.24 Evidence of water voles may be categorised as conclusive, primarily latrines, and inconclusive such as feeding remains, pathways, burrows and footprints which may also be evidence of other small mammals. As other species create or use burrows which may appear similar to those of water voles (for example rat (*Rattus norvegicus*), kingfisher (*Alcedo atthis*) and crayfish), and as burrows may persist for a number of years (and therefore cannot be used as conclusive evidence of current occupation), any characteristic burrows recorded during the field surveys were classed as ‘potential water vole burrows’.

Population estimate

2.2.25 During the breeding season (generally April to September in northern England), female water vole territories do not overlap, and one male territory will usually include several female territories. A correlation has been recorded between the frequency of latrines and the number of breeding females at a site with studies suggesting an average of six latrines per adult female territory and female territories range between 30 and 150m¹¹. Therefore, the number of latrines recorded gives an indication of the relative population size. **Table 2.2** provides the relative population density based on latrine counts within 100m of bankside habitat¹¹.

Table 2.2 - Relative population density based on latrine count

Number of latrines per 100m of bankside habitat		Relative population density
Visit 1	Visit 2	
10 or more	20 or more	High
3 – 9	6 – 19	Medium
2 or less (or none with other signs)	5 or less (or none with other signs)	Low

2.2.26 The number of latrines were recorded for 100m of bank or shoreline and this number was used to calculate the relative population density for all ditches surveyed where water vole presence was confirmed. This method gives an indication of water vole density only and is not intended to have a precise numerical estimate of water vole numbers.

Evidence of key predators

2.2.27 During the field survey for water vole, evidence of American mink (*Neovison vison*), an invasive non-native species which heavily predated water voles, was also searched for. Evidence of American mink includes footprints and their scat (faeces), which can be found along the banks of watercourses.

Survey timing

2.2.28 Otter and water vole presence/likely absence surveys were conducted of watercourses and waterbodies between May and July 2022 on dates provided in **Annex 8D.1**¹⁵.

Constraints

- 2.2.29 Four ditches (D9, D84, D106 and D107) within or adjacent to the Order Limits were not accessible during surveys. This is not considered to be a constraint for ditch D9 as it is located on the other side of the A19 which provides a barrier from the Project. Pre-construction surveys would be required at ditches D84, D106 and D107 should any works be required within 10m of the ditches.
- 2.2.30 The whole length of both banks in the survey area for each watercourse was not always accessible during surveys, however it is considered that the surveys covered sufficient representative coverage of each watercourse to inform assessment.
- 2.2.31 From approximately mid-June surveys were restricted by vegetation growth. Access throughout some woodlands/scrub was not feasible (e.g. chest high common nettle (*Urtica dioica*) and bramble (*Rubus fruticosus agg.*)). The height of vegetation from mid-June may have reduced the proficiency of locating otter and water vole evidence along watercourses and ditches during the surveys. However, this is not considered a constraint to the robustness of the surveys or to the assessment, as the first survey visit for the majority of watercourses/water bodies was undertaken prior to mid-June when the vegetation was lower. Also, water vole surveys were carried out on suitable watercourses throughout the whole of the Order Limits, thereby providing good coverage of the likely distribution of water vole to inform the assessment.
- 2.2.32 The date of water vole surveys at a small number of watercourses and water bodies fell just outside the recommended windows due to access restrictions. As the variation in each case was only a matter of days it does not represent a constraint on the survey results.
- 2.2.33 For those watercourses/water bodies where two survey visits were carried out, one survey visit was undertaken in each water vole season. However, the two water vole surveys were not carried out a full two months apart. Given that no conclusive evidence of water vole was recorded during the first survey visit, and again, as the variation in each case was only a matter of days this is not considered a constraint to the assessment.
- 2.2.34 One survey was carried out on six ditches (D10, D36, D37, D49, D63, and D94) and four ponds (P28, P29, P39 and P172) as they were assessed to be sufficiently sub-optimal/unsuitable to support water vole and therefore scoped out for the requirement for a second water vole survey. Thus, this is not considered to affect the robustness of the results or assessment.

¹⁵ Where a watercourse/water body extended across multiple land parcels, multiple survey visits may have been required depending on when access could be arranged to each of these.

3. Results

3.1 Desk study

- 3.1.1 Records of otter and water vole in and within 2km of the Order Limits were provided by WYJS and NEYEDC. These are in **Table 3.1**.
- 3.1.2 A check of the Wildlife Trust National Water Vole Database and mapping project¹⁶ indicates the majority of land within the Order Limits is within an area known to have American mink presence and/or a control programme.

Table 3.1 – Otter and water vole records within 2km of the Order Limits from past 10 years

Record type	Grid reference	Date	Distance and direction from the Order Limits
Otter			
Spraint	SE 4507 3784	05/04/2020	~1.06km west
Spraint	SE 42488 42930	02/03/2012	~1.52km northwest
No information available	SE 459 418	2014	Within Order Limits
No information available	SE 47292 44281	2012	~0.11km west
No information available	SE 55 55	2012	~0.15km north
No information available	SE 47 44	2012	~0.24km west
No information available	SE 471 446	2011	~0.36km west
No information available	SE 56020 55004	2015	~0.73km south
No information available	SE 5745 5883	2011	~0.74km east
No information available	SE 48474 43757	2014	~0.83km east
No information available	SE 63051 51894	2019	~0.86km west
No information available	SE 63051 51856	2019	~0.86km west
No information available	SE 62912 51795	2019	~1.01km west
No information available	SE 487 435	2013	~1.11km east
No information available	SE 48729 43469	2011	~1.14km east
No information available	SE 6267 451776	2019	~1.25km west

¹⁶ The National Trusts (2022). The National Water Vole Database & Mapping Project (online). (Accessed October 2022).

Record type	Grid reference	Date	Distance and direction from the Order Limits
No information available	SE 4897 2725	2016	~1.40km south
No information available	SE 49003 43130	2016	~1.53km southeast
One count of adult	SE 578 549	2017	~1.55km southeast
No information available	SE 62265 52718	2019	~1.81km northwest
No information available	SE 62265 52718	2019	~1.81km northwest
No information available	SE 6222 5114	2011	~1.88km southwest
Water vole			
No information available	SE 6340351936	2019	~0.51km west
No information available	SE 5918158580	2016	~1.34km southeast
No information available	SE 6270152878	2014	~1.50km west

3.2 Field survey

Habitat assessment

- 3.2.1 The desk study and extended Phase 1 habitat survey identified 83 potentially suitable watercourses and ditches within 50m of the Order limits. Of these, 76 watercourses/ditches were accessed to determine their suitability to support otter and water vole (access was not available to seven ditches – D9, D57, D84, D105, D106, D107 and D108).
- 3.2.2 A summary of the otter and water vole habitat assessment results are given below, with full results of the habitat assessments provided in **Annex 8B.3 of Appendix 5.3.8B: Extended Phase 1 habitat survey report (Volume 5, Document 5.3.8B)**.

Otter

- 3.2.3 Large watercourses such as the River Ouse (W4), the River Wharfe (W9) and Cock Beck (W12) provide optimal habitat for foraging, commuting, holt creation and resting places, along with smaller tributaries with plentiful bankside cover such as The Foss (W5).
- 3.2.4 Ditches throughout the survey area may provide commuting corridors locally, however where they are dry or hold little or no water, their suitability decreases. Water quality within these ditches is variable and given that they often hold little or no water, significant prey species populations are likely to be lacking and so are predominantly sub-optimal for foraging.
- 3.2.5 Stocked fishing ponds within the survey area offer suitable foraging habitat for otter, depending on distance and connectivity to watercourses and any deterrents (such as fencing) which may be in place. Reports of foraging otter at ponds P97-97w (adjacent to W5 The Foss approximately 15m east of the Order Limits were received from the

landowner¹⁷. Similar reports of foraging otter at pond P77 (adjacent to a tributary of W5 The Foss approximately 50m west of the Order Limits were also received¹⁸.

- 3.2.6 Further to the watercourse/ditch assessment, the desk study/extended Phase 1 habitat survey identified 69 ponds within the Order Limits and to a 50m buffer. Only relatively small ponds are present, and therefore whilst unlikely to provide optimal conditions for rest sites, they could offer limited foraging opportunities.

Water vole

- 3.2.7 Six ditches, although identified by aerial photography or OS mapping, were not present on the ground - D2, D54, D74, D88, D98 and D102.

- 3.2.8 Twenty-two watercourses/ditches were considered optimal to support water vole by the WVHS method.

- D65 and D89 are assessed to be optimal by the WVHS but were dry at the time of survey. Potential vole feeding evidence was recorded along D65 during the extended Phase 1 habitat survey. D89 is connected to W11 which contained water and was assessed to be optimal for water vole. Thus, while D65 and D89 are considered unsuitable to support water vole at this time of year due to being dry, they may have potential to support water vole at other times.

- 3.2.9 Twenty-seven watercourses/ditches were considered sub-optimal to support water vole by the WVHS method.

- D59, D64, D67, D70, D76, and D97 are assessed to be sub-optimal by the WVHS but were dry at the time of survey.
 - D59 is a continuation of D56 which contained water and was assessed to be optimal for water vole. D64 is connected to ponds and other ditches and dikes in the wider landscape. D76 had duckweed (*Lemna minor*) on the ground with damp areas also present indicating the ditch holds water at certain times of the year. D97 is connected to a pond and other ditches in the landscape. Therefore, whilst these ditches are considered unsuitable to support water vole at the time of survey, they may have potential to support water vole at other times.
 - Whilst also being dry, D67 was shaded by woodland and did not have suitable banks for water vole burrows. D70 was choked by terrestrial grasses and herbs indicating it is dry for the majority of the year, was quite shaded from scrub on the northern side, and is fairly isolated within the landscape. These ditches are considered to be unsuitable to support water vole and scoped out for consideration for further survey work.

- 3.2.10 Twenty-one watercourses were considered unsuitable to support water vole by the WVHS method and are considered to be unsuitable to support water vole and scoped out for consideration for further survey work.

- D60 is also assessed to be unsuitable and was dry at the time of survey, but given its close proximity to D59/D56, and there are other ditches/ponds in the near locale, D60 is scoped in for one survey. Depending on the results of the survey, it could be scoped out.

¹⁷ Personal communication with WSP Principal ecologist Tim Kell on 25 August 2022

¹⁸ Personal communication with Wood ecologist Tim Kell on 06 July 2022

3.2.11 Ponds identified in the Order Limits and to a 50m buffer are generally small, fairly isolated, do not have suitable banks for water voles to burrow within, and can be polluted (for example slurry lagoons – e.g. P84-P88), and are mostly considered to be unsuitable to sub-optimal to support water vole.

Otter presence/likely absence survey

3.2.12 Presence/likely absence surveys were carried out at 45 watercourses/ditches during which confirmed evidence of otter was recorded at eight. A summary of the results is provided in **Table 3.2**¹⁹ and shown on **Figure 8.5, Volume 5, Document 5.4.8.**

3.2.13 Twenty-two potential resting sites were recorded, of which two showed notable signs of otter ([REDACTED]). These are described in more detail in **Table 3.3**²⁰ and shown on **Figure 8.5, Volume 5, Document 5.4.8.**

Table 3.2 – Otter presence/likely absence survey results

Watercourse reference	Resting site	Sprints	Footprints	Slides	Feeding/prey remains
[REDACTED]	-	Yes	-	-	-
[REDACTED]	Possible	Yes	-	-	-
[REDACTED]	Yes	Yes	Yes	Yes	Yes
[REDACTED]	Possible	Yes (and possible anal jelly)	Yes	Yes	-
[REDACTED]	-	-	Possible	-	-
[REDACTED]	-	Yes	-	Possible	-
[REDACTED]	Yes	Yes	-	-	-
[REDACTED]	-	Possible	-	-	-
[REDACTED]	Possible	-	-	-	-
[REDACTED]	-	Yes	-	-	-

¹⁹ Only watercourses where evidence of otter was recorded are included in **Table 3.2.**

²⁰ Only watercourses where a potential otter resting site was recorded are included in **Table 3.3.**

Watercourse reference	Resting site	Spraints	Footprints	Slides	Feeding/prey remains
	Possible	-	-	-	-
	Possible	-	-	-	-
	Possible	Yes	-	-	-

Table 3.3 – Potential otter resting site locations

Potential resting site reference	Watercourse (grid reference)	Description	Resting site category (likelihood of use by otter)	Distance and direction from Order Limits
RS1	D12 - SE 55345 57200	Potential resting site at the base of an oak tree (<i>Quercus spp.</i>) positioned on the northern bank of D12, with hollowing evident at its base on the northern aspect, and ledges around the roots on the south. D12 is between two arable fields and as such will be subject to farm traffic disturbance. No evidence of otter was observed. Multiple fox (<i>Vulpes vulpes</i>) droppings were identified in the surrounding area.	Low-moderate	~20m north of the Order Limits
RS2	W3 - SE 56521 55781	Potential resting site at the base of an ash tree (<i>Fraxinus excelsior</i>) on the eastern bank of W3. No evidence of otter was observed. The resting site is immediately adjacent to a cycle route/public footpath, and as such will be subject to disturbance from cyclists/members of the public. There was no obvious entry or exit path leading from the cavity.	Low-moderate	~40m east of Order Limits
RS3	W4 - SE 54764 56053	Potential resting site at the base of a mature ash tree where the tree is hollowed. The tree is in a grass field grazed by cattle and sheep to the east of the River Ouse. No evidence of otter was observed.	Low	~45m south of Order Limits

Potential resting site reference	Watercourse (grid reference)	Description	Resting site category (likelihood of use by otter)	Distance and direction from Order Limits
RS4	W4 - SE 54632 56033	Ledge located on the riverbank underneath a willow tree (<i>Salix spp.</i>) growing on the eastern bank of the River Ouse. This feature could be potentially used by otter as a resting site, but the potential resting site is subject to occasional flooding, and so reduces its suitability. A spraint was found a few metres north of this potential rest site.	Low-moderate	~60m south of Order Limits
RS5	W4 - SE 54603 56122	Potential otter resting site underneath an overhanging mature willow tree on the eastern riverbank of the River Ouse. This is a small hollow in the side of the bank. This does not appear to extend further to a chamber but could be used as a resting place. No evidence of otter was observed.	Low	Within Order Limits
RS6	W4 - SE 54578 56153	Ledge and root overhang at the base of a willow tree located on the eastern bank of the River Ouse but appears to be quite exposed. Several otter signs were found, in the form of slides in the earth leading into the water, potential claw marks, and a spraint on a nearby log partially submerged in the water.	Low	Within the Order Limits
RS7	W4 - SE 54597 56223	Potential rest site in hollow at the base of an ash tree, in a grass field adjacent to the eastern banks of the River Ouse. This field appears to be grazed. The hollow has a north-western aspect and contained a dead lamb. No evidence of otter was observed.	Low	~25m north of Order Limits.
			High	Within the Order Limits
RS9	W5 - SE 54061 56366	A potential resting site underneath a willow trunk, overhanging the southern bank of The Foss. A potential slide	Moderate	~20m west of

Potential resting site reference	Watercourse (grid reference)	Description	Resting site category (likelihood of use by otter)	Distance and direction from Order Limits
		was present, leading from the resting place into the water. No other signs were recorded but it was not possible to assess this area fully (steep slope, dense common nettles, soft stream bed).		Order Limits
RS10	W5 - SE 53850 56173	A cavity underneath a mature willow tree, on the southern bank of The Foss. A potential slide into the river was present, leading into the water e, although this appeared to be fairly old and no recent use. A potential otter footprint was also present, but this could not be confirmed.	Moderate	Within the Order Limits
RS11	W5 - SE 53830 56156	Potential resting site underneath a tree root on the edge of woodland, on the western bank of the watercourse. This feature appears to open into a chamber with some evidence of digging outside the entrance. Three possible old spraints were located close to the entrance.	Moderate	Within the Order Limits
RS12	W5 - SE 53615 55902	Cavity at the base of a mature tree, where the wood has rotted, but is quite exposed. No evidence of otter was observed.	Low	~80m southwest of Order Limits
RS13	W5 - SE 53610 55915	Potential resting site under mature bankside tree. Two potential old spraints were identified on the tree, though they could not be confirmed as otter. No confirmed evidence of otter was observed.	Low-moderate	~75 southwest of the Order Limits
RS14	W5 - SE 53579 55980	A hollow at base of a willow tree adjacent to the watercourse, with the entrance facing towards the water. No evidence of otter was observed.	Moderate	~45m southwest of the Order Limits
RS15	W5 - SE 53304 56080	Hollow under a tree adjacent to The Foss. The cavity is present at the tree base and has some common nettle growth surrounding, indicating no	Low	~35m south of the Order Limits

Potential resting site reference	Watercourse (grid reference)	Description	Resting site category (likelihood of use by otter)	Distance and direction from Order Limits
		recent use. This feature is not optimal but may provide shelter for an otter occasionally resting up. No evidence of otter was observed.		
RS16	W5 - SE 53169 56196	A potential resting site underneath a small bridge across The Foss. The riverbanks underneath the bridge on either side offer an area of potential refuge for otter. No other signs were recorded, although some dried and flattened plant material was present under the bridge that could have been used for bedding.	Moderate	Within the Order Limits
RS17	W5 - SE 53117 56234	A ledge under a willow tree overhanging the eastern bank of The Foss. No evidence of otter was observed.	Moderate	Within the Order Limits
RS18	D65 - SE 48325 48466	A hollow underneath a mature ash tree. The tree is on the eastern bank of a ditch which connects to a larger watercourse (W8 – The Foss Catchment (tributary of Wharfe)), where otter signs have been identified. No evidence of otter was observed here.	Moderate	~10m east of Order Limits
RS19	D65 - SE 48353 48430	A hollow under a mature oak tree, on the eastern bank of a ditch which connects to a larger watercourse (W8 – The Foss Catchment (tributary of Wharfe)), where otter signs have been identified. No evidence of otter was observed here, but grass bedding was inside the hollow, indicating mammal use.	Moderate	~10m northeast of Order Limits
			High	~80m west of the Order Limits

Potential resting site reference	Watercourse (grid reference)	Description	Resting site category (likelihood of use by otter)	Distance and direction from Order Limits
		which bedding vegetation was found. Other signs include multiple spraint, a dead fish and evidence of digging activity.		
RS21	W11 - SE 46511 38016	A hollow at the base of a mature field maple, approximately 2m north of the watercourse. No evidence of otter was observed. The farmer has said that he has never seen any otter but has seen mink ²¹ (but not in a few years).	Moderate	Within the Order Limits
RS22	D90 - SE 46733 37071	Potential resting site on a ledge underneath a hazel tree (<i>Corylus spp.</i>), on the southern bank of a ditch associated with Cock Beck. The water level was high at time of survey and reduced the area of the ledge which otters could use for resting, and thus the ledge is likely to be damp the majority of time. Multiple spraints were found in the surrounding vicinity.	Moderate	~30m east of the Order Limits

Water vole presence/likely absence survey

- 3.2.14 Presence/likely absence surveys were carried out at 45 watercourses and four ponds (P28, P29, P39, and P172), during which no confirmed evidence was recorded.
- 3.2.15 Inconclusive evidence in the form of potential burrows was recorded at W14, D33, D73, D76, and P39, however no conclusive evidence of water vole was recorded, and it is therefore considered highly unlikely that there are water vole. All watercourses, ditches and ponds indicate likely absence.

Evidence of key predators

- 3.2.16 No signs of American mink were recorded during the survey.

²¹ Personal communication with Consultant Ecologist appointed by National Grid on 24.05.22

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4. Summary

4.1 Otter

- 4.1.1 Two highly likely otter resting sites ([REDACTED]) were recorded. These were located on the [REDACTED]) and [REDACTED]) respectively. The rest site along the River Ouse is within the Order Limits.
- 4.1.2 A further 20 potential rest sites were also identified within the survey area; no direct/confirmed evidence of otter was present, although the nature of the features and their location suggest they could be used by otter. These were predominately along the [REDACTED]); The Foss is a tributary of the River Ouse. Seven potential rest sites are within the Order Limits.
- 4.1.3 Additional evidence of otter recorded during field surveys includes spraint, feeding remains, potential slides, and footprints.
- 4.1.4 There is potential for otter rest sites to be present along watercourses/waterbodies within the survey area that have been inaccessible to date and thus have not been surveyed. However, embedded environmental measures (including pre works checks) would minimise the potential for effects on otter if present on these watercourses/waterbodies.

4.2 Water vole

- 4.2.1 No conclusive evidence of water vole such as latrines and feeding remains were recorded along any watercourses or waterbodies that were surveyed. Inconclusive evidence in the form of potential burrows was recorded at [REDACTED] , and [REDACTED] .
- 4.2.2 There is potential for water vole to be present within the survey area along watercourses/water bodies to which access has not been granted and which have therefore not been surveyed. However, it is considered highly unlikely that water vole are present on the basis that: no conclusive evidence of water vole has been recorded within surveyed habitat mink is known to be present within the locale there is a paucity of water vole records in the desk study area of search; and the Local Authority.²²

²² North Yorkshire County Council Ecologist confirmed that water vole are not widespread in the survey area but remnant populations have been found occasionally (Stakeholder Meeting 28 March 2022).

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Annex 8D.1 – Water Vole and Otter Survey Dates

Watercourse/water body reference	Survey 1	Survey 2	Comment
W1	10.05.22	06.07.22	
W2	10.05.22, 11.05.22, 13.05.22, 27.05.22	06.07.22	
W3	11.05.22, 25.05.22, 27.05.22	07.07.66	
W4	11.05.22, 12.05.22	07.07.22, 04.08.22	Survey on 04 August used a SUAV along the western riverbank.
W5	12.05.22, 25.05.22, 26.05.22	08.07.22	
W6	12.05.22, 26.05.22, 31.05.22	11.07.22	
W7	17.05.22, 31.05.22	11.07.22	
W8	17.05.22	11.07.22	
W9	24.05.22, 31.05.22, 01.06.22	12.07.22, 13.07.22, 04.08.22	Survey on 04 August used a SUAV along both riverbanks.
W11	24.05.22, 26.05.22	12.07.22, 13.07.22	
W12	24.05.22	12.07.22	
W13	13.05.22	12.07.22	
W14	18.05.22	13.07.22	
D10	11.05.22, 27.05.22	-	Scoped out after first survey as ditch was dry and banks were unsuitable for water vole burrows.
D11	11.05.22	06.07.22	
D12	11.05.22	06.07.22	
D29	12.05.22	08.07.22	
D30	12.05.22	08.07.22	
D31	12.05.22	08.07.22	
D32	26.05.22	08.07.22	

Watercourse/water body reference	Survey 1	Survey 2	Comment
D33	11.05.22, 25.05.22	08.07.22	
D35	25.05.22	08.07.22	
D36	25.05.22	-	Scoped out after first survey as ditch was dry and banks were unsuitable for water vole burrows.
D37	12.05.22, 25.05.22	-	Scoped out after first survey as ditch was dry and banks were unsuitable for water vole burrows.
D38	12.05.22	08.07.22	
D49	24.05.22	-	Scoped out after first survey as ditch was heavily polluted.
D56	26.05.22	11.07.22	
D59	12.05.22	11.07.22	
D60	12.05.22	11.07.22	
D63	17.05.22	-	Scoped out after first survey as ditch was small and dry.
D64	17.05.22	11.07.22	
D65	17.05.22	11.07.22	
D73	13.05.22	12.07.22	
D75	13.05.22	12.07.22	
D76	13.05.22	12.07.22	
D81	01.07.22	13.07.22	
D82	01.07.22	13.07.22	
D83	01.07.22	13.07.22	
D87	17.05.22, 31.05.22	13.07.22	
D90	24.05.22, 26.05.22	12.07.22	
D94	18.05.22	-	Scoped out after first survey as ditch

Watercourse/water body reference	Survey 1	Survey 2	Comment
			considered permanently dry.
D96	18.05.22	13.07.22	
D97	18.05.22, 26.05.22	13.07.22	
P28	03.06.22	-	Scoped out after first survey as pond is small in size, banks are largely unsuitable for water vole burrows and the pond is fairly isolated.
P29	03.06.22	-	Scoped out after first survey as pond is small in size, banks are largely unsuitable for water vole burrows and the pond is fairly isolated.
P39	20.07.22	-	Scoped out after first survey as banks are largely unsuitable for water vole burrows and the pond is fairly isolated.
P172	13.07.22	-	Scoped out after first survey as banks are largely unsuitable for water vole burrows and the pond is fairly isolated.

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Annex 8D.2- Scientific Names

Common name	Scientific name
Birds	
Kingfisher	<i>Alcedo atthis</i>
Mammal	
American Mink	<i>Neovison vison</i>
Fox	<i>Vulpes vulpes</i>
Otter	<i>Lutra lutra</i>
Rat	<i>Rattus norvegicus</i>
Water vole	<i>Arvicola amphibius</i>
Plants	
Ash	<i>Fraxinus excelsior</i>
Bramble	<i>Rubus fruticosus agg</i>
Common nettle	<i>Urtica dioica</i>
Duckweed	<i>Lemna minor</i>
Hazel	<i>Corylus spp.</i>
Oak	<i>Quercus spp.</i>
Willow	<i>Salix spp.</i>

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

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