# EAST YORKSHIRE SOLAR FARM

East Yorkshire Solar Farm EN010143

## **Environmental Statement**

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## **Executive Summary**

- A riparian mammal survey was undertaken for the proposed East Yorkshire Solar Farm to ascertain the status of otter (*Lutra lutra*) and water vole (*Arvicola amphibius*) within the Site and relevant zones of influence to determine any potential impacts of the Scheme on riparian mammals.
- ES2 Surveys were undertaken in 2022 and 2023 on targeted sections of watercourses where impacts are likely.
- ES3 Otter was recorded as being present on the River Ouse, the River Derwent and a ditch (DE53), with the majority of the records relating to spraints (otter faeces) with an exception being a 'hover' (resting site) recorded at DE53.
- Water vole was found to be 'likely absent' across the Scheme, with American mink (*Neovision vison*) confirmed as being present on the River Foulness, River Derwent and River Ouse. Along with habitat fragmentation, the presence of American mink is a major contributory factor in the decline and local extinction of water vole populations.
- ES5 The population of otter is likely to be of 'District Importance' as a species of conservation value in a local context given the international designation of a Special Area of Conservation of the River Derwent. Otter is a 'qualifying feature' although not the primary reason for the Special Area of Conservation site selection.
- Watercourses and ditches within the Site will be safeguarded from works using a stand-off buffer of 10 metres (minimum) to minimise environmental impacts. However, some will be crossed for cabling works using open cut techniques.
- Watercourses confirmed to support otter (i.e. River Derwent, River Ouse and DE53) will be buffered to 30 metres (minimum) to mitigate against potential disturbance of otter from the construction phase works. Additionally, less intrusive Horizontal Directional Drilling techniques will be used for these watercourses (plus Featherbed drain) which are less intrusive than open-cut methods.
- ES8 Checks for otter and water vole will be undertaken as required prior to the commencement of any construction phase activity.

### 1. Introduction

## 1.1 Background

- 1.1.1 A riparian mammal survey was undertaken for the East Yorkshire Solar Farm (hereafter referred to as the 'Scheme') to ascertain the status of otter (*Lutra lutra*) and water vole (*Arvicola amphibius*) within the Site and relevant zones of influence to determine any potential impacts of the Scheme on riparian mammals.
- 1.1.2 The Scheme will comprise the installation of solar photovoltaic (PV) generating panels (the 'Solar PV Site'), associated grid connection (comprising the 'Interconnecting Cable Corridor' and 'Grid Connection Corridor'), access points ('Site Accesses') and 'Ecology Mitigation Area' collectively referred to as the 'Site'. The boundary of the Site is referred to as the 'Order limits'.
- 1.1.3 Further information on the Scheme and Site is provided in **Chapter 2: The Scheme**, **ES Volume 1** [**EN010143/APP/6.1**].
- 1.1.4 In areas around the solar PV arrays and on other land within the Solar PV Site, opportunities for landscaping, biodiversity enhancements and habitat management will be explored.
- 1.1.5 The landscape features within the Site consist predominately of agricultural fields with areas of woodland, grassland and boundary features including hedgerows, tree lines and watercourses/ditches. There are several woodlands located adjacent to the Site and surrounding area, including deciduous woodland Priority Habitat.

## 1.2 Aims and Objectives

- 1.2.1 The objective of the riparian mammal survey was to identify riparian mammal records relevant to the Site and occurring within the wider potential zone of influence. The potential zone of influence (ZoI) was defined with reference to the Site and the type of development, as detailed in **Chapter 2: The Scheme, ES Volume 6 [EN010143/APP/6.1]**. Additional details on the methods used are provided in Section 3 of this report.
- 1.2.2 The riparian mammal survey was undertaken to:
  - Identify and assess watercourses present within the Site and any areas immediately outside of the Site where there may be potential for direct or indirect effects (the ZoI) for their potential to support ofter and water vole;
  - b. Determine the status of water vole and otter within the Zol;
  - c. Ascertain the status of American mink (*Neovison vison*) within the Zol (because this can affect the likelihood of water vole being present as it is a significant predator of the species); and
  - d. Evaluate the nature conservation value of the habitats within the ZoI for otter and water vole to provide baseline evidence to support the ecological impact assessment.

1.2.3 This report is presented as a technical appendix to accompany **Chapter 8: Ecology, ES Volume 1 [EN010143/APP/6.1]** for the DCO application.

## 1.3 Legislation

- 1.3.1 The following wildlife legislation was considered when undertaking the riparian mammal survey:
- 1.3.2 Water vole and otter are both fully protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended) (Ref. 1). They are afforded protection under Section 9 parts 9 (1), (2), (4) and (5) of the Act, making it an offence to:
  - a. Intentionally kill, injure or take these species;
  - b. Possess or control live or dead individuals of these species or their derivatives;
  - c. Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for their shelter or protection;
  - d. Intentionally or recklessly disturb these species whilst occupying a structure or place of shelter used for that purpose;
  - e. Sell these species or offer or expose for sale or transport for sale; or
  - f. Publish or cause to be published any advertisement which conveys the buying or selling of these species.
- 1.3.3 Otter is also classified under the Habitats Directive (92/43/EEC) (Ref. 2) as a species requiring strict protection in Europe. In the UK this is enabled by The Conservation of Habitats and Species Regulations 2017 (as amended) (Ref. 3).
- 1.3.4 Otter is also included in the following international legislation and conventions:
  - a. Appendix II and IV of the Habitats Directive, Appendix II of the Bern Convention (Ref. 4) and Appendix I of the Convention on international Trade in Endangered Species of Wild Flora and Fauna (CITES) (Ref. 5); and
  - b. Globally threatened on the International Union for Conservation of Nature (IUCN)/ United Nations Environment Programme World Conservation Monitoring Centre (UN WCMC) Red Data List (Ref. 6).
- 1.3.5 American mink is listed as an invasive species on Schedule 9 of the Wildlife and Countryside Act, 1981 (as amended) (**Ref. 1**) making it an offence to release or allow the escape of this species into the wild.
- 1.3.6 Compliance with the above legislation may require the attainment of relevant protected species licences prior to the implementation of the Scheme.
- 1.3.7 Further information on the requirements of the above legislation is provided in Appendix 8-1: Legislation, Policy and Guidance for Ecology, ES Volume 2 [EN010143/APP/6.2].

## 1.4 Natural England Licensing

#### Water vole

- 1.4.1 A water vole licence is required from Natural England to: disturb, damage or destroy their places of shelter (burrows); stop water voles from accessing places they use for shelter or protection; kill or injure them or to take, move, possess or control them.
- 1.4.2 Development and other construction (or decommissioning) activities may be licensed by Natural England under "reasons of overriding public interest". Such works should be undertaken under a Mitigation Licence. This licence requires demonstration of a conservation benefit for water vole and this benefit can be achieved by delivering a net gain in the amount of habitat available to the water vole population. This is typically achieved through habitat creation, improving existing habitat and significantly improving linkages between water vole colonies.
- 1.4.3 Minor works may also be undertaken under the supervision of an ecologist registered to use a Natural England Water Vole Class Licence. This approach does not require a specific development licence for water vole and would permit the displacement of water voles through vegetation removal from areas of bankside habitat not exceeding 50m (metres). There are seasonal constraints applied to the displacement works, with initial vegetation removal (and thus displacement of water voles) only permitted during the period 15 February to 15 April and 15 September to 31 October inclusive.

#### Otter

- 1.4.4 Any operations that may impact upon otters or their places of rest or shelter may require a Natural England European Protected Species (EPS) Mitigation Licence.
- 1.4.5 An EPS Mitigation Licence is required where development and/or construction (and decommissioning) activity will impact ofter through:
  - a. Capturing, killing, disturbing or injury;
  - b. Damaging or destroying their breeding/resting place; or
  - c. Obstructing access to their resting/sheltering place.
- 1.4.6 In the first instance impacts to otter should be avoided through considerate construction (and decommissioning) practices (e.g., minimising work to daylight hours) and through the implementation of 'buffer zones' from known places of shelter. Where breeding holts are affected, the buffer zone would need to be 200m, but for other shelters this can be reduced to 30m (Ref. 7).
- 1.4.7 Where such buffer zones cannot be implemented it is likely that the works will require a licence from Natural England.
- 1.4.8 The licence will stipulate how otter will benefit from mitigation measures, habitat creation, habitat management and habitat maintenance.

## 1.5 Priority Species

- 1.5.1 The Natural Environment and Rural Communities (NERC) list of Species of Principal Importance (Ref. 8) is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act (Ref. 8). Under Section 40 every public authority (e.g., a local authority or local planning authority) must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.
- 1.5.2 In addition, regarding those species on the list of Species of Principal Importance listed under Section 41 (S41), the Secretary of State for Environment, Food and Rural Affairs must:
  - "(a) take such steps as appear to the Secretary of State to be reasonably practicable to further the conservation of the living organisms and types of habitat included in any list published under this section, or
  - (b) promote the taking by others of such steps."
- 1.5.3 The UK Biodiversity Action Plan (UKBAP) (Ref. 9) was launched in 1994 and established a framework and criteria for identifying species of conservation concern. From this list, action plans for priority species of conservation concern were published and have subsequently been succeeded by the UK Post-2010 Biodiversity Framework (July 2012) (Ref. 10).
- 1.5.4 The UK Post-2010 Biodiversity Framework is relevant in the context of Section 40 of the NERC Act, meaning that Priority Species are material considerations in planning. These species are identified as those of conservation concern due to their rarity or a declining population trend.
- 1.5.5 Water vole and otter are included as Priority Species under Section 41 of the NERC Act (Ref. 8).

## 1.6 Local Biodiversity Action Plan

- 1.6.1 The Site straddles the boundary between East Riding of Yorkshire Council and North Yorkshire County Council. The Solar PV Site is located solely with in the administrative area of East Riding of Yorkshire Council. The Grid Connection Corridor is located within the administrative areas of East Riding of Yorkshire Council and the Selby District of North Yorkshire Council.
- 1.6.2 The East Riding Biodiversity Action Plan (BAP) Strategy (Ref. 11) and Selby BAP (2004) (Ref. 12) provide the local nature conservation strategy for identifying threats to species within each of the counties and set out the action plans necessary to conserve them. These action plans provide context to inform identification of threatened or uncommon species within the district and, or county. The plans also identify priorities for conservation and enhancement but confers no legislative or policy protection to the species identified. However, in some cases this is provided through related legislation and local planning policy.

- 1.6.3 Water vole is listed as a Priority Species on the Selby BAP (Ref. 12) and the East Riding BAP (Ref. 11), with species action plans prepared within both counties. Both plans identify the following threats to water vole populations:
  - a. Disturbance and destruction of riparian habitats by development, unsympathetic watercourse management and recreational activities;
  - b. Population fragmentation leaves colonies remote from their neighbours. Colonies isolated by lack of continuity of habitat are more at risk of local extinctions with no chance of re-establishment;
  - c. Predation, particularly by American mink and domestic cats;
  - d. Overgrazing of margins reducing water vole habitat;
  - e. Poisoning through the improper use of rodenticides (confusion with brown rat (*Rattus norvegicus*)).
- 1.6.4 Otter is listed as a Priority Species on the Selby BAP (Ref. 12) and the East Riding BAP (Ref. 11), with species action plans prepared within both counties. Both plans identify the following threats to otter populations:
  - Pollution, impacting both directly on individual otters and indirectly on food supply;
  - b. Lack of prey, which can be affected by reduced water quality, poor inchannel and bank habitat management and flow regimes;
  - c. Degraded bankside habitat;
  - d. Accidental death, particularly on roads and in fishing/crayfish traps;
  - e. Development affecting rivers and bankside habitat;
  - f. Access and recreational disturbance, particularly an issue for breeding sites but also affects watercourses where bankside habitat is poor and human activity high;
  - g. Otter predation at fish farms. There may be conflict of interests where fish-farm management fails to take recommended precautionary measures: and
  - h. Persecution.

## 2. Methodology

## 2.1 Desk Study

- 2.1.1 A desk study was undertaken in July 2022, with results updated in August 2023. This desk study obtained records of protected and notable species within a 2km radius of the Order limits from the North and East Yorkshire Ecological Data Centre (NEYEDC) (Ref. 13).
- 2.1.2 Only records up to ten years old were considered within the assessment, as any records older than ten years are unlikely to be still representative of these species' presence in the local area.

## 2.2 Field Survey

#### **Study Area**

- 2.2.1 Aerial photographs and Ordnance Survey mapping was used to identify riparian and wetland habitats within an appropriate buffer of up to 50m from the Site and this information was used to refine the survey area for riparian mammals. Therefore, the Study Area included any watercourses within the Site and watercourses connected to it.
- 2.2.2 Within the Study Area, the surveys were targeted to those watercourses and ditches where impacts were likely, such as those to be crossed by the Scheme for cabling installation or access purposes.
- 2.2.3 Watercourses within the Site were surveyed up to 200m upstream and downstream of potentially affected areas including those areas impacted temporarily. A precautionary approach was adopted where works may take place alongside, but not directly affecting ditches. These ditches were surveyed using a stratified sampling approach, with discrete 50m sections per 200m stretch surveyed to ascertain the status of water voles.
- 2.2.4 However, for otter the Study Areas were extended as follows:
  - a. River Derwent (crossing point) Study Area was extended 150m beyond the Site upstream and included all bankside habitats and terrestrial habitats downstream to Loftsome Bridge (A63) of the selected crossing point (where access permitted).
  - b. River Derwent (parallel to the Grid Connection Corridor) Study Area was extended approximately 150m upstream and followed the course of the River Derwent to Barmby Tidal Barrage (where access was permitted).
  - c. River Ouse (crossing point) Study Area was extended 150m up and downstream outside of the Site.

#### **Habitat Assessment**

- 2.2.5 Seventy-one watercourses were identified within the Study Area from review of Ordnance Survey mapping. A walkover of the Study Area (see section 2.2) was undertaken by an experienced surveyor in September 2022, and April, June and July 2023 to undertake habitat suitability assessments for water vole and otter, with Main Rivers assessed for otter in March 2023.
- 2.2.6 Watercourses were assessed for their suitability for otter and water vole according to criteria laid out below and in **Table 1**, respectively:
- 2.2.7 The habitat suitability criteria for otter comprises:
  - a. Presence of barriers to dispersal and movement through territory;
  - b. Habitats present and suitability for use by Otter (including terrestrial habitats) and their proximity to the Site;
  - c. Adjoining land use;
  - d. Level of disturbance;

- e. Features of watercourse (e.g., estimated depth, level of flow, width of channel);
- f. Potential presence of food source;
- g. Connectivity to other suitable habitat (main watercourses); and
- h. Pollution.
- 2.2.8 The precautionary principle was applied where ditches were found to be dry in September 2022 following the dry summer, and these were scheduled for re-assessment if other suitable habitat characteristics were met, particularly in relation to water vole. The same rationale was applied where ditches were found to have been recently managed making them appear potentially unsuitable (for water vole primarily).

Table 1. Habitat Suitability Criteria for Water Vole (Ref. 14)

Habitat category	Dry areas for burrows or nests			Herbaceous vegetation	Water
	Bank profile	Bank substrate	Variation in water level		
Optimal (all criteria need to be met)	Steep (approaching 1:1) on at least one side. Steep or shallow banks on static waterbodies or fen-type habitat, where levels do not fluctuate significantly.	Earth or peat	No noticeable variation during the summer months; banks are not overtopped regularly.	Continuous swathe of tall and luxurious riparian vegetation providing 90-100% cover (tall tussocky grassland) and marginal and in-channel vegetation is present.	Permanent water
Good (all criteria need to be met)	Steep (approaching 1:1) on at least one side. Steep or shallow banks on static waterbodies or fen-type habitat, where levels do not fluctuate significantly.	Earth or peat banks, or stony/reinforced bank with gaps allowing access to earth behind.	No noticeable variation during the summer months; banks are not overtopped regularly.	Continuous swathe of bankside or in-channel vegetation providing at least 60% cover. May be dominated by grasses and weeds. The vegetation should generally be tall, except in urban or suburban areas, where shorter bankside vegetation may also qualify.	Permanent water. Or routinely wet for at least 2-3 months during the summer, and where other 'good' habitat is present in immediately adjacent areas with permanent water.
Suitable but poor	Any habitat that falls short of the criteria to qualify as 'good' but does not meet the criteria of 'unsuitable' could reasonably be considered to be 'suitable but poor'.				
Unsuitable – will generally need to meet the criteria for herbaceous vegetation and at least one other	Shallow bank profile	Rocky or gravel unsuitable for burrowing	Considerable variation in water level – the bank toe can move by more than 1m horizontally over the breeding season.	No or limited bankside and marginal vegetation (due to shading or other 'permanent' factors - note that management is often a temporary factor.	No water

Habitat category	Dry areas for burrows or nests			Herbaceous vegetation	Water
	Bank profile	Bank substrate	Variation in water level	_	
	Vertical bank face with no burrowing opportunities behind it.	Reinforced banks with no gaps	N/A		No water

#### **Otter Survey**

- 2.2.9 The aim of the survey was to determine the presence or absence of otter on those watercourses deemed suitable for otter following the habitat suitability assessment. The methodology used was in accordance with guidance in the Environment Agency's Fifth Otter Survey of England 2009-2010 (Ref. 15) and the Natura 2000 publication Ecology of the European Otter (Ref. 16).
- 2.2.10 Otter surveys were carried out concurrently with water vole surveys on watercourses within the Site during September 2022 and April, June and July 2023. Standalone otter surveys were also conducted in March 2023 on the River Derwent and the River Ouse with a focus on the Grid Connection Corridor crossing points and where the Grid Connection Corridor ran parallel to a river. The northern reach of the River Derwent was surveyed in April 2023.
- 2.2.11 Otter surveys can be carried out at any time of year, though the period May to September is optimal when water levels are less variable. Surveys were not undertaken following periods of heavy rain and/or high-water levels as it can obscure or remove signs of otter and result in false negative survey results. Ideally, there should be a period of at least five days without rain before surveying. Therefore, surveys were undertaken during appropriate weather conditions for survey.
- 2.2.12 Due to the low likelihood of making an actual observation of otter, the survey concentrated on locating field signs indicating otter presence or use within the Survey Area.
- 2.2.13 Such field signs include:
  - a. Spraints (droppings) characteristic sweet-smelling, black tar-like (where fresh/relatively recent, i.e., within a few weeks) or grey crumbly (when old) faecal deposits usually containing fish scales, bones and occasionally invertebrate exoskeleton and bird feathers;
  - b. Footprints in good substrate typically asymmetrical and showing five toes arched around a large pad and, depending on substrate, webbing and claw marks. Poorer, generally coarser substrates do not often enable the identification of otter footprints. Additional signs of otter presence may occur, although without additional evidence is not usually conclusive proof of otter presence;
  - c. Feeding remains may include partially eaten fish, frogs, piles of mussel shells or crayfish remains;
  - d. Slides/haul-outs routes into and out of the water, which are usually associated with terrestrial routes, such as short cuts around meanders or along traditionally used otter paths/routes;
  - e. Couches/hovers above ground resting places. Usually associated with cover such as dense scrub, rushes or reed, flood debris or fallen trees. Many couches are rarely used whilst others more so. Couches can be difficult to prove use without radio tracking and/or camera traps; and

f. Holts – below ground resting site, usually associated with sprainting. Sometimes used with greater frequency than couches and can be important for breeding (natal holts) where other signs are usually absent. Notoriously difficult to find or prove without radio tracking and/or camera traps.

#### **Water Vole Survey**

- 2.2.14 Water vole surveys were undertaken immediately following habitat suitability assessments in September 2022, and April, June and July 2023.
- 2.2.15 Water voles typically inhabit slow-moving streams, canals, ditches, dykes and rivers, feeding mostly on waterside vegetation. They are active in daylight hours and leave distinct field signs which can be relied up on to indicate their presence.
- 2.2.16 The survey involved identification of evidence of water vole activity from the toe of the bank (of the surveyed watercourses), with searches focussing on the marginal vegetation extending 1-2m into the channel and vegetation 1-2m up the bank. Field surveys were based on the standard methodologies as described in 'Water Vole Field Signs and Habitat Assessment' (Ref. 14), 'Water Vole Conservation Handbook' (Ref. 17) and 'The Water Vole Mitigation Handbook' (Ref. 18).
- 2.2.17 Field signs searched for included:
  - Latrine sites/droppings distinct piles of water vole droppings found near burrows, at the ranges of territorial boundaries and where the animals enter and leave the water. The <u>only confirmatory sign</u> that water voles are present;
  - Feeding stations areas with distinct neat piles of chewed lengths of vegetation along pathways or haul out platforms along the water's edge;
  - c. Burrows burrow entrances are typically wider than high with a diameter between 4 and 8 cm. Burrow entrances are generally located at the water's edge, but not always;
  - d. Lawns short-grazed areas at the entrances to burrows;
  - e. Prints identifiable prints in soft margins of the watercourse; and
  - f. Runways low tunnels that are pushed through the vegetation and often leading to burrows or feeding stations.
- 2.2.18 In accordance with the guidance set out in the 'Water Vole Mitigation Handbook' (Ref. 18), one survey was conducted in the first half of the breeding season (April to June) and a further survey was carried out in the second half of the breeding season (July to September). All surveys were undertaken during suitable weather conditions and by experienced AECOM ecologists.
- 2.2.19 Any information gathered during the survey on water vole signs were used to calculate and estimate water vole population and, or activity within those

- specific waterbodies or watercourses. American mink was also recorded if the species or signs of their presence was noted.
- 2.2.20 It is not possible to make robust estimates of the number of water voles from latrine counts, but latrines do provide an indication of activity suitable for assessment of impacts and designing mitigation (Ref. 18).

## 2.3 Biodiversity Evaluation

- 2.3.1 An essential prerequisite step to allow ecological impact assessment of the Scheme was an evaluation of the relative biodiversity importance of the identified ecological features (encompassing nature conservation designations, ecosystems, habitats, and species). This was necessary to set the terms of reference for the subsequent ecological impact assessment.
- 2.3.2 The method of evaluation that was utilised has been developed with reference to the Chartered Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the United Kingdom: Terrestrial, Freshwater, Coastal and Marine (Ref. 19). This gives guidance on scoping and carrying out environmental assessments and places appraisal in the context of relevant policies. Data received through consultation, desk study and field-based surveys were used to identify ecological features of biodiversity importance or potential importance, and the main factors contributing to their importance described and related to available guidance.
- 2.3.3 Species can be of biodiversity importance for a variety of reasons, and their relative importance should always be determined on a case-by-case basis. Importance may relate, for example, to the uniqueness of the assemblage, or to the extent to which species are threatened throughout their range, or to their rate of decline.
- 2.3.4 The importance of the species addressed in this report has been defined with reference to the geographical level at which the feature being assessed is considered to matter. Relevant published national and local guidance and criteria can be used, where available, to inform the assessment of biodiversity importance and to assist consistency in evaluation. Current population and conservation status for otter and water vole has been taken from 'A Review of the Population and Conservation Status of British Mammals' (Ref. 20).

## 2.4 Assumptions and Limitations

## **Desk Study**

2.4.1 The aim of the desk study was to help characterise the baseline context of the Site and provide valuable background information that may not be captured by surveys alone. Information obtained from the desk study was dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for riparian mammals does not necessarily mean that this species does not occur in the Study Area. Likewise, the presence of records of riparian mammals does not

automatically mean that these still occurred within the area of interest or were relevant in the context of the Site.

#### Field Survey

- 2.4.2 A worst-case scenario was adopted in assessing watercourses where impacts to the watercourse were undetermined at the time of survey. Such watercourses were still subject to survey where habitat assessment determined they were suitable for otter and/or water vole.
- 2.4.3 The River Foulness was considered too deep and fast-flowing to survey safely. However, there will be no works within at least 10m of this watercourse.
- 2.4.4 Fleet Dike (located west of Solar PV Area 2c) was only surveyed once on 17 July 2023 due to land access constraints. The ditch was assessed as being 'unsuitable' for otter and 'suitable but poor' for water vole. However, there will be no works within at least 10m of this watercourse.
- 2.4.5 With respect to water vole surveys, the follow limitations apply:
  - a. Watercourse OU13 (Grid Connection Corridor) was only surveyed once on 27 July 2023 due to land access constraints. The ditch was assessed as being 'suitable-good' for water vole. However, there will be no works within at least 10m of this watercourse.
  - b. Watercourse OU27 East/West (Grid Connection Corridor) was only surveyed once on 26 July 2023 due to land access constraints. It was assessed as being 'suitable but poor' for water voles. The watercourse is crossed (open-cut) to enable the cable to be laid.
  - c. Great Committee Drain in Solar PV Area 2d (surveyed on 27 June and 28 July 2023 and assessed as 'suitable-good') and Sewer Drain in Solar PV Area 1b (surveyed 20 June and 28 July 2023 and assessed as 'suitable but poor') were surveyed twice in early and late season, but the surveys were spaced at approximately one month apart, rather than the recommended two months due to changes to the design. Great Committee Drain in Solar PV Area 2d is not crossed by any proposed cabling and the Scheme will adhere to a 10m buffer from the watercourse. Sewer Drain in Solar PV Area 1b is crossed (open-cut) to enable cabling to be laid. No field signs of water vole were recorded in either watercourse, and, as one of the visits included the latter part of the season, there is confidence in the negative result (where it is assumed if present water vole numbers would increase through breeding).

## 3. Results

## 3.1 Desk Study

3.1.1 Six records of water vole, none of otter and none of American mink were returned from the data search within 2km of the Site and from within the last

ten years. The data are shown below in **Table 2** and on **Figure 1** in **Annex C**.

3.1.2 The River Derwent between Wykeham downstream to its confluence with the River Ouse at Barmby-on-the-Marsh is designated as a Special Area of Conservation (SAC) and otter is listed on the citation as an "Annex II species present as a qualifying feature, but not a primary reason for site selection".

Table 2. Desk study records of water vole

Date	Location	OS Grid Reference
2013	Near to National Grid Drax Substation, approximately 1. 84km west from the Site	SE 652289
2014	Howden area approximately 752m south from the Site	SE 75799 30128
2015	Near to National Grid Drax Substation, approximately 1.84km west from the Site	SE 652289
2015	Near to National Grid Drax Substation, approximately 1.8 km west from the Site	SE 655294
2018	Near to National Grid Drax Substation, approximately 1.87 km west from the Site	SE 65285 28944
2018	Near to National Grid Drax Substation, approximately 1.93 km west from the Site	SE 65582 29466

## 3.2 Field Survey

#### **Habitat Suitability Assessment**

- 3.2.1 The habitat suitability assessment was undertaken on 71 watercourses in the Study Area. This survey was used to further refine the scope of surveys and determine whether they were suitable (i.e., scoped in for further survey) or unsuitable (i.e., scoped out of further survey) for otter and water vole respectively.
- 3.2.2 A summary of the 71 watercourses surveyed during the habitat suitability assessment and whether these were scoped in (and recommended survey effort) or scoped out, is presented in **Appendix A** of this report, with corresponding maps located in **Figure 2 and Figure 4** of **Annex C**.
- 3.2.3 Thirty-seven watercourses were scoped in for further survey for water vole and 19 for otter, with 52 and 34 watercourses scoped out respectively for otter and water vole. The surveys took place on the dates identified in **Table 3** and **Table 5**.

Table 3. Weather conditions and dates for the River Derwent and River Ouse otter surveys

Date	Weather conditions
1 March 2023	Light breeze, 8°C, 4-8/8 cloud and a single heavy rain event lasting 3 minutes.
2 March 2023	Dry, 7°C, light breeze and 8/8 cloud.
26 April 2023	Dry, 1/8 cloud and 9°C.

3.2.4 Otter was recorded on the River Derwent and River Ouse, and on watercourse DE53 (during water vole surveys) with those results detailed in **Table 4**. Selected photographs of otter field signs are shown in **Appendix B** and **Figure 3** (**Annex C**) of this report.

**Table 4. Otter survey results** 

Watercourse	Otter field sign	Date	OS Grid Reference	Distance from Site
Grid Connection Corridor (GCC) – River Derwent	Spraint	1 March 2023	SE 70012 29644	103m east
GCC – River Derwent	Spraint	1 March 2023	SE 69977 29615	65m east
GCC – River Derwent	Spraint	1 March 2023	SE 69836 29510	61m south
GCC – River Derwent	Spraint/ scrapes	1 March 2023	SE 69799 29496	62m south
GCC – River Derwent	Spraint	1 March 2023	SE 69577 29346	57m south
GCC – River Derwent	Slide	1 March 2023	SE 69501 29320	28m south
GCC – River Derwent	Spraint	1 March 2023	SE 69487 29310	27m south
GCC – River Derwent	Spraint	1 March 2023	SE 69499 29282	56m south
GCC – River Derwent	Print	1 March 2023	SE 69309 29186	29m south
GCC – River Derwent	Spraint	1 March 2023	SE 69043 29039	62m south
GCC – River Derwent	Print	1 March 2023	SE 68745 28943	35m south
GCC River Derwent	Spraint	2 March 2023	SE 68660 28865	71m south

Watercourse	Otter field sign	Date	OS Grid Reference	Distance from Site
GCC – River Derwent	Slide, print and spraint	2 March 2023	SE 68103 28666	118m south
GCC – River Derwent	Path	2 March 2023	SE 68095 28630	154m south
GCC – River Ouse	Path, spraint	2 March 2023	SE 68020 28601	177m south
GCC – River Ouse	Print	2 March 2023	SE 67804 28601	62m east
GCC – River Ouse	Spraint	2 March 2023	SE 67549 28726	74m west
GCC – River Ouse	Print	2 March 2023	SE 67392 28824	260m west
GCC – River Ouse	Print	2 March 2023	SE 67556 28811	110m west
GCC – River Ouse	Print	2 March 2023	SE 67582 28797	81m west
GCC – River Ouse	Print	2 March 2023	SE 67608 28782	51m west
GCC – River Ouse	Print	2 March 2023	SE 67740 28716	Within Site
GCC – River Derwent	Spraint/ slide	26 April 2023	SE 70752 30795	144m west
GCC – River Derwent	Spraint	26 April 2023	SE 70649 30171	48m south- east
GCC – River Derwent	Spraint	26 April 2023	SE 70635 30154	45m south- west
GCC – DE53	Spraint	27 April 2023*	SE 69187 29361	95m north
GCC – DE53	Hover (resting site)	19 July 2023*	SE 69212 29286	20m north

<sup>\*</sup> Recorded during water vole survey.

Table 5. Weather conditions and dates for the water vole surveys<sup>1</sup>

Date	Weather conditions
20 September 2022	Dry, still, 4/8 cloud and 16°C.
21 September 2022	Dry, still, 0/8 cloud, 18°C and humid.

<sup>&</sup>lt;sup>1</sup> Note that otter surveys can be conducted year-round and where appropriate field signs of otter were searched for concurrently with water vole surveys.

Weather conditions
Dry, 17°C, light breeze, cloud 6-7/8.
Dry, 16°C, mild, 4/8 cloud and a light breeze.
Dry, cool easterly breeze, 1/8 cloud and 7°C.
Dry, 7/8 cloud and 11°C.
Dry, 12°C and 5-7/8 cloud.
Occasional rain, still, 8/8 cloud and 17°C.
Dry, still, 4-7/8 cloud and 19-20°C.
Dry, still, 2/8 cloud and 22°C.
Cool, light breeze, dry, 8/8 cloud and 18°C.
Dry, 8/8 cloud, light breeze and 18-20°C.
Humid, dry, 7-8/8 cloud and 26°C.
Light rain in morning only, then sunny spells 4-8/8 cloud and 16-19°C.
Dry, light breeze, 3/8 cloud and 16°C.
Dry, humid, 5/8 cloud and 19-21 °C.
Dry, light breeze, 7/8 cloud and 16 °C.
Dry, light breeze, 4/8 cloud and 21 °C.
Dry, light breeze, 3/8 cloud and 21 °C.

3.2.5 Water vole was not recorded on any of the watercourses indicating a likely absence of this species within the Site. Small vole droppings were recorded on almost every watercourse (data not shown) although it was not possible to determine the species in the field. Additionally, numerous small mammal burrows (<4 cm [centimetres] in diameter) were recorded on almost every watercourse (data not shown).

#### **American Mink**

3.2.6 American mink was recorded on the River Derwent and River Ouse during the otter survey (confirmed through the presence of scat and prints), and there was a direct observation of an animal on the River Foulness during a bird survey by AECOM in March 2023. Those results are detailed in **Table 6** and shown in **Figure 5** in **Annex C**.

Table 6. American mink survey results

Watercourse	American mink field sign	Date	OS Grid Reference	Distance from Site
GCC – River Derwent	Print	1 March 2023	SE 69893 29561	29m south
GCC – River Derwent	Scat	1 March 2023	SE 69851 29544	34m south
GCC – River Derwent	Print	1 March 2023	SE 69844 29543	32m south
GCC – River Derwent	Scat	1 March 2023	SE 69831 29509	62m south
GCC – River Derwent	Print	1 March 2023	SE 68082 28616	168m south
GCC – River Ouse	Print	2 March 2023	SE 67765 28705	Within Site
GCC River Ouse	Print	2 March 2023	SE 67347 28879	328m west
GCC – River Ouse	Print	2 March 2023	SE 67407 28834	249m west
GCC – River Ouse	Print	2 March 2023	SE 67516 28746	111m west
GCC – River Ouse	Print	2 March 2023	SE 67668 28662	Within Site
River Foulness	Direct observation	29 March 2023*	SE 77548 36008	On boundary of Site

<sup>\*</sup> Recorded incidentally during a bird survey.

## 4. Evaluation

#### 4.1 Otter

- 4.1.1 Otter was confirmed present on the River Derwent and River Ouse with numerous field signs recorded. It is likely that watercourses in the vicinity of these rivers are frequented by otter where foraging opportunities are present. For example, at DE53, a deep ditch adjacent to the River Derwent where fish are likely to be present with an aged spraint recorded near a drainage outfall. The watercourse is also on private land away from disturbance from people and dogs, making it highly suitable for this species.
- 4.1.2 Searches for holts, couches and resting sites were concentrated at designated Grid Connection Corridor crossing points. There are limited opportunities for holts along the River Ouse at the Grid Connection Corridor crossing point, and this in conjunction with the tidal nature of the river lead to a likely absence of holts at the River Ouse crossing point.

- 4.1.3 Searches of dense willow scrub along the River Derwent demonstrated a likely absence of holts. A path through vegetation leading from the toe of watercourse DE53 to a ledge with dense overhanging vegetation (large enough to conceal an otter) was present on watercourse DE53. In the absence of detailed camera trapping the precautionary principle is followed, with this feature defined as a hover (resting site) for otter.
- 4.1.4 The surveyed section of the River Derwent is publicly accessible and was noted to be popular with dog walkers, with dogs also observed swimming in the river retrieving balls and sticks. Disturbance from dogs is likely to be a contributory factor in the likely absence of otter holts and resting sites at the surveyed sections of the River Derwent, although does not preclude the foraging/transient use of this habitat by this largely nocturnal species.
- 4.1.5 Otter has an estimated British population of 11,000 (Ref. 20) with an increasing population size and range and are of IUCN Least Concern Status in England. The Rivers Ouse, Derwent and Foulness provide high quality foraging and commuting habitat for otter, supported by other watercourses in the catchment indicating that this species is likely widespread within the Survey Area, although does not appear to breed within the habitats surveyed due to the lack of suitable undisturbed bankside habitats for natal holts.
- 4.1.6 Taking into account the international designation afforded to the River Derwent SAC, for which otter is a qualifying feature (although not a primary reason for site selection), and the large number of field signs indicating the presence of the species throughout the River Derwent, River Ouse and River Foulness, habitat within the Site is therefore assessed as of 'District Importance' for otter as a species of conservation value in a local context (within approximately 2km of the Site).

#### 4.2 Water vole

- 4.2.1 Six records for water vole were received from NEYEDC, with five of these records associated with habitats located within the vicinity of National Grid's Drax Substation and are located over 1.8km west from the Site. The remaining record is from the Howden area, approximately 750m south from the Site. Despite the presence of suitable habitats, water vole was not recorded during the survey work, and as such they are considered likely absent from the Site.
- 4.2.2 No recent records of American mink were received from NEYEDC. American mink along with habitat loss are a major driver in the decline of the water vole and they were recorded on the three main watercourses in proximity of/within the Site. American mink were confirmed present on the River Derwent, River Ouse and River Foulness. It is highly likely that the absence of water vole from watercourses surveyed within the Site can be attributed to the presence of American mink in the wider catchment, with habitat loss, fragmentation and/or degradation of habitats a contributory factor.
- 4.2.3 American mink follow linear features (ditches and hedgerows) and are well suited to hunting and killing water vole, a species which has no defence against this introduced predator. Given the presence of American mink, it is

- considered unlikely that water vole will re-establish within the Site unless American mink were to be eradicated from the wider area.
- 4.2.4 Land access affected survey effort and timings (previously noted in paragraph 2.4.5) with three watercourses only surveyed once rather than the recommended two visits. Notwithstanding this, the three watercourses were surveyed in the second half of the season where if present, water vole field signs are usually more numerous due to the increase in their number from breeding success.
- 4.2.5 Great Committee Drain and Sewer Drain were surveyed in both the early and later part of the season, but the surveys were spaced only one month apart rather than the recommended two months due to land access issues. No field signs of water vole were recorded in either watercourse and as one of the visits included the latter part of the season, there is confidence in the negative result as indicated above in paragraph 2.4.5.

## 5. Conclusions

- 5.1.1 The primary purpose of this report is to provide an assessment of the presence or likely absence of otter and water vole and their biodiversity importance within the Site to inform **Chapter 8: Ecology, ES Volume 1** [EN010143/APP/6.1]. An assessment of potential impacts (considering embedded mitigation), any additional mitigation and residual effects has been undertaken and included within **Chapter 8: Ecology, ES Volume 1** [EN010143/APP/6.1].
- 5.1.2 The riparian mammal surveys, undertaken in 2022 and 2023 recorded both otter and American mink within the Site, with water vole considered likely absent. Otter is fully protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended) (Ref. 1) and Conservation of Habitats and Species Regulations 2017 (as amended) (Ref. 3). American mink is listed as an invasive species on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (Ref. 1).
- 5.1.3 Most watercourses within the Site will be avoided with appropriate environmental stand offs (10m minimum for minor watercourses) and none of the watercourses where intrusive (trenching) methods are proposed were found to support ofter or water vole.
- 5.1.4 Watercourses supporting otter within the Site will be retained, and in the case of the River Derwent, River Ouse and DE53 buffered to a minimum of 30m to avoid potential impacts to otter resting sites (Ref. 20).
- 5.1.5 Watercourses which support otter will be crossed using HDD to minimise direct impacts to the River Derwent, River Ouse and DE53.
- 5.1.6 Pre-commencement checks will be required in advance of construction to ensure that the distribution of otter and water vole remain the same and that any mitigation proposed is appropriate.

## 6. References

- Ref. 1 Wildlife & Countryside Act 1981 (as amended). Available at: <a href="https://www.legislation.gov.uk/ukpga/1981/69">https://www.legislation.gov.uk/ukpga/1981/69</a> [Accessed 04/10/23].
- Ref. 2 EC (1992). Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. EC, Brussels
- Ref. 3 Conservation of Habitats and Species Regulations 2017 (as amended). Available at: https://www.legislation.gov.uk/uksi/2017/1012/contents/made [Accessed 04/10/23].
- Ref. 4 Anon, 2001. Appendices of the Convention and Amendments to the Appendices. Bern Convention. Council of Europe.
- Ref. 5 Anon, 2020. Appendices I, II and III. CITES
- Ref. 6 IUCN, 2020. The IUCN Red List of Threatened Species.
- Ref. 7 Standing advice for planning consultations: otter. Nature Scot. Available at: <a href="https://www.nature.scot/doc/standing-advice-planning-consultations-otters">https://www.nature.scot/doc/standing-advice-planning-consultations-otters</a> [Accessed 04/10/23].
- Ref. 8 The Natural Environment and Rural Communities Act 2006. Available at: <a href="https://www.legislation.gov.uk/ukpga/2006/16/contents">https://www.legislation.gov.uk/ukpga/2006/16/contents</a> [Accessed 04/10/23].
- Ref. 9 JNCC (1994). UK Biodiversity Action Plan
- Ref. 10 UK Post-2010 Biodiversity Framework (2012). Joint Nature Conservation Committee and Department for Environment, Food and Rural Affairs.
- Ref. 11 East Riding Biodiversity Action Plan (2010) Version 1.0. Available at: <a href="https://www.eastriding.gov.uk/EasySiteWeb/GatewayLink.aspx?alId=10521">https://www.eastriding.gov.uk/EasySiteWeb/GatewayLink.aspx?alId=10521</a> 7 [Accessed 04/10/23].
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- Ref. 13 North and East Yorkshire Ecological Data Centre. Available at: https://www.neyedc.org.uk/ [Accessed 04/10/23].
- Ref. 14 Dean, M. 2021. Water Vole Field Signs and Habitat Assessment. A Practical Guide to Water Vole Surveys. Pelagic Publishing.
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- Ref. 16 Chanin, P., 2003. *Ecology of European Otter, Conserving Natura 2000 Rivers*. Ecology. Series No.10 English Nature. Available at: https://publications.naturalengland.org.uk/file/82038 [Accessed 04/10/23].
- Ref. 17 Strachan, R, Moorhouse, Y & Gelling, M. 2011. *The Water Vole Conservation Handbook* (Third Edition).
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- Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.
- Ref. 19 Chartered Institute of Ecology and Environmental Management (CIEEM) (2018), Guidelines for Ecological Impact Assessment in the United Kingdom: Terrestrial, Freshwater, Coastal and Marine.
- Ref. 20 Mathews, F., Kubasiewicz, L. M., Gurnell, J., Harrower, C. A., McDonald, R. A. and Shore, R. F. 2018. Natural England Joint Publication JP025: A Review of the Population and Conservation Status of British Mammals. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Available at: <a href="https://publications.naturalengland.org.uk/file/5468750736523264">https://publications.naturalengland.org.uk/file/5468750736523264</a> [Accessed 04/10/23].

## **Abbreviations**

Abbreviation/Term	Definition
°C.	Degrees centigrade
CEMP	Construction and Environment Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CITES	Convention on International Trade in Endangered Species
cm	centimetres
DCO	Development Consent Order
EEC	European Economic Community
EPS	European Protected Species
ES	Environmental Statement
GCC	Grid Connection Corridor
ha	hectares
HDD	Horizontal Directional Drilling
IUCN	International Union for Conservation of Nature
km	kilometres
m	metres
NEYEDC	North and East Yorkshire Ecological Data Centre
NERC	Natural Environment and Rural Communities
PV	photovoltaic
SAC	Special Area of Conservation
UKBAP	United Kingdom Biodiversity Action Plan
WCMC	World Conservation Monitoring Centre

# **Glossary of Frequently Used Terms**

Term	Definition
Hover	A site where otter can rest out of the weather or during foraging sessions, and is afforded the same legal protection as an otter holt.
Spraint	Otter faeces.
Scat	American mink faeces.

# **Annex A – Habitat suitability assessment (HSA)**

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
Burtles and Highfield Drain		Within Site – Solar PV Area 1a	Unsuitable – lacking water. Likely to hold water only after heavy rain and through winter months. Scoped out.	Unsuitable – isolated. Scoped out.	20 September 2022 20 June 2023	Dry ditch with steep earth banks vegetated with tall grasses/weeds comprising common reed, cow parsley and hedge woundwort. Shaded by adjacent hedgerow.
DE61		Within Site - Solar PV Area 1a	Unsuitable – lacking water. Likely to hold water only after prolonged heavy rain/in winter. Scoped out.	Unsuitable – isolated. Scoped out.	20 September 2022 20 June 2023	A dry ditch shaded by adjacent hedgerow choked with brambles.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
DE62		Within Site - Solar PV Area 1a	Unsuitable – lacking water. Likely to hold water only after prolonged rain/in winter months. Scoped out.	Unsuitable – isolated habitat. Scoped out.	20 June 2023	Dry ditch adjacent to managed boundary hedgerow.
DE57 (west)		Within Site - Solar PV Area 1a	Unsuitable – lacking water. Likely to hold water only after prolonged rain/in winter months. Scoped out.	Unsuitable – isolated habitat. Scoped out.	20 September 2022 20 June 2023	Dry ditch adjacent to mature boundary hedgerow.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
DE57 (east)		Within Site - Solar PV Area 1a	Unsuitable – dry ditch which likely holds water only in winter. Scoped out.	Unsuitable – dry ditch with limited connectivity to wider catchment. Scoped out.	27 September 2022 20 June 2023	Dry ditch adjacent to narrow woodland strip.
DE58		Within Site - Solar PV Area 1a	Suitable – good. In less scrubby section, but isolated habitat.	Unsuitable – isolated habitat.	28 July 2023	Ditch approximately 1.0m x 0.3m with grassy earth banks. Recently managed. Northern section has dense brambles and dog rose.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
Clay Bowdales Drain		Within Site - Solar PV Area 1a	Unsuitable – dry ditch which likely holds water only in winter months/after prolonged rain. Scoped out.	Unsuitable – isolated habitat. No survey required. Scoped out.	27 September 2022 20 June 2023	Dry ditch with steep earth banks, vegetated with tall grasses including reed canary grass and common reed.
FO62		Within Site - Solar PV Area 1a	Suitable but poor. Unlikely to hold water year-round. Scoped in.	Unsuitable – isolated habitat. Scoped out.	20 September 2022 28 June 2023	Ditch dry on initial assessment. Held water to a maximum depth of 5cm, but typically 0.3m x 0.1m (after heavy rain on the 18/06/2023). Ditch shaded by adjacent hedgerow for 50% of its length. Tall grasses present for food and cover.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FO63 (north/south)		Within Site - Solar PV Area 1a	Suitable but poor – lacking water. Scoped in.	Unsuitable – isolated habitat. Scoped out.	20 September 2022 20 June 2023	Ditch dry on initial assessment. Held water (0.3m x 0.1m) after heavy rain on 18/06/23. Tall grasses and weeds present for food and cover. Shaded by adjacent hedgerow for 50% of its length.
FO63 Sewer Drain		Within Site - Solar PV Area 1a	Suitable but poor – likely to hold water after prolonged heavy rain/in winter. Scoped in.	Unsuitable - isolated habitat. No further survey.	20 September 2022 20 June 2023	Dry ditch with adjacent hedgerow. Ruderal vegetation along banks and margins. Half of ditch holding water to 0.5m x 0.2m on second visit.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
Sewer Drain		Within Site - Solar PV Area 1b	Suitable but poor. Unlikely to hold water year-round. Scoped in.	Unsuitable – isolated habitat. Scoped out.	20 June 2023 28 July 2023	Ditch of 0.3m x 5cm with tall tussocky grassed earth banks and limited shading. Found to be dry in March 2023.
F074		North of Solar PV Area 1c	Unsuitable – likely to hold water in winter only. Scoped out.	Unsuitable – isolated habitat. Scoped out.	28 June 2023	Dry ditch in base of hedgerow. Bank to roadside verge recently mown.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FL22		Within Site - Solar PV Area 1d	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	21 September 2022	Dry ditch with 75% shading from adjacent boundary. Noted to be dry in March 2023.
Londes- borough Drain		Within Site - Solar PV Area 1d	Suitable but poor. Likely does not hold water year-round. Scoped in.	Suitable – dispersal only. Connected to River Foulness. Scoped in.	20 September 2022 21 June 2023	Dry at time of initial assessment and recently cut (Sept 2022). Holding water (0.5m x 0.2m) after heavy rain on 18/06/2023. West half of ditch shaded by adjacent boundary to the south; east is open and more suitable for water vole with reed canary grass dominating banks and channel.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FO77		Within Site - Solar PV Area 1e	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	20 September 2022	Dry ditch in base of blackthorn dominated hedgerow.
FO78		Within Site - Solar PV Area 1e	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	21 June 2023	Dry ditch in base of roadside hedgerow.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FO46		Within Site - Solar PV Area 1e	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	20 September 2022	Dry ditch which ends abruptly in arable field. Shaded by adjacent boundary for approximately 80% of its length (noted to be dry in June 2023).
FO47		Within Site - Solar PV Area 1e	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	20 September 2022	Dry ditch with immediately adjacent boundary hedgerow. Noted to be dry in April and June 2023.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FO75		Within Site - Solar PV Area 1e	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	21 June 2023	Dry ditch with immediately adjacent boundary hedgerow.
FO76		Within Site - Solar PV Area 1e	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	21 June 2023	Dry ditch with immediately adjacent mature boundary hedgerow.
River Foulness		Immediately adjacent to the Site (Ecology Mitigation Area 1h)	Suitable – good. Permanent water, fast flowing in parts, dry refuges for burrows and abundant bankside food/cover. Scoped in. Unsafe to survey.	Suitable – dispersal and foraging. Potential laying up areas in tall bankside vegetation. Scoped in. Unsafe to survey.	21 March 2023	River approximately 6m wide and over 1m deep with a fast flow. Steep banks with dense bankside vegetation. No emergent vegetation at time of survey.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FL13		Within Site - Solar PV Area 2a	Suitable – good. Dry refuge areas for burrowing, likely permanent water, herbaceous vegetation for cover/food. Scoped in.	Suitable – dispersal only. Scoped in.	27 September 2022 21 June 2023 22 June 2023	Wet ditch approximately 0.4m x 0.2m. Recently managed at initial assessment. Steep earth banks with grassy vegetation. Limited in-channel vegetation.
Fleet Dike		Within Site - Solar PV Area 2a	Suitable – good. Steep banks for burrowing, likely plentiful food/cover prior to management and likely permanent water. Scoped in.	Suitable – dispersal only. Habitat of ditch improves westwards, degrades with respect to otter east and south towards Solar PV Area 2c. Scoped in.	27 September 2022 22 June 2023	Wet ditch approximately 1.0m x 0.3m. Recently mown banks on initial assessment, but not dredged. Tall grasses including reed canary grass dominate the banks and channel (June 2023).

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FL19		Within Site - Solar PV Area 2a	Suitable but poor. Steep earth banks, shaded by boundary. Scoped in.	Suitable – dispersal only. Scoped in.	27 September 2022 21 June 2023	Wet ditch approximately 0.4m x 0.1m. Earth banks with tall grasses and ruderals with immediate hedgerow boundary.
FL07		Within Site - Solar PV Area 2a	Unsuitable – lacking permanent water. Scoped out.	Unsuitable – Scoped out.	27 September 2023 23 June 2023	Dry ditch with steep earth banks with adjacent boundary hedgerow. Tall tussocky grasses present.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FL08		Immediately adjacent to Solar PV Area 2b	Unsuitable – no ditch. Scoped out.	Unsuitable – isolated habitat. Scoped out.	27 September 2022	Managed roadside boundary. Marked as a ditch on OS mapping.
FL09		North-west from Solar PV Area 2b	Unsuitable – no ditch. Scoped out.	Unsuitable – isolated habitat. Scoped out.	21 July 2023	Dry ditch at the base of a hedgerow with trees.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FO54		North-west from Solar PV Area 2e	Suitable but poor – Scoped in.	Unsuitable – isolated habitat. Scoped out.	27 September 2022 22 June 2023	Wet ditch approximately 0.5m x 0.1m. Earth banks with tall tussocky grasses and ruderals. Suspected annual management.
FO55		Within Site - Solar PV Area 2b	Suitable but poor. Water unlikely to be permanent. Scoped in.	Unsuitable – isolated habitat. Scoped out.	27 September 2022 22 June 2023	Wet ditch approximately 0.5m wide and 0.1m deep. Likely managed annually. Tall grasses and ruderal vegetation on banks and immediately adjacent hedgerow. No in-channel vegetation.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FO56		Within Site - Solar PV Area 2e	Suitable but poor. Scoped in.	Suitable – dispersal only. Scoped in.	27 September 2022 22 June 2023	Wet ditch of 0.6m x 0.2m maximum depth with tall tussocky grasses on earth banks.
FO57		Within Site - Solar PV Area 2b	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	21 September 2022	Dry ditch shaded by immediately adjacent hedgerow. Tall grasses on steep earth banks.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FL05		Within Site - Solar PV Area 2c and 3a	Suitable but poor. Likely dry for most of the year and shaded. Scoped in.		22 September 2022 23 June 2023	Ditch up to 1.0m wide and occasionally wet to 0.1m deep. Immediately adjacent hedgerow along length. Ruderals and occasional tall grasses on bankside.
FL06 (north)		Immediately adjacent to Solar PV Area 2c	Suitable but poor. Sparse herbaceous vegetation and shaded from adjacent hedgerow. Unlikely to hold water year-round. Scoped in.	Unsuitable – isolated habitat. Scoped out.	22 September 2022 23 June 2023	Ditch dry at initial assessment, in 2023 a wet ditch approximately 0.3m x 5cm deep with adjacent hedgerow. Likely dredged within last couple of years. Steep earth banks with sparse tussocky grasses and ruderals/bare earth.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
Fleet Dike		West from Solar PV Area 2c	Suitable, but poor – scoped in.	Unsuitable – Limited cover, shallow ditch. Habitat improves northwards (towards Solar PV Area 2a) Scoped out.	17 July 2023	Wet ditch 0.4m x 0.1m maximum depth, typically 5cm. Hedgerow to west shades channel of ditch. East bank with bare earth and tall tussocky grasses and weeds.
FL06 (south)		Within Site - Solar PV Area 2c	Suitable but poor. Unlikely to hold water year-round. Scoped in.	Unsuitable – isolated habitat. Scoped out.	22 September 2022 23 June 2023	Wet ditch approximately 0.8m wide and 5cm deep with adjacent hedgerow. Steep earth banks vegetated with tall tussocky grasses and ruderals, with areas of bare earth.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FO53		Within Site - Solar PV Area 2c and 2d	Unsuitable – lacking water. Scoped out.	Unsuitable - isolated habitat. Scoped out.	22 September 2022 27 June 2023	Predominantly dry ditch (95%) beneath hedgerow with earth banks and tussocky vegetation.
Great Committee Drain		Within Site - Solar PV Area 2d	Suitable – good. Steep banks for burrowing, food/cover and likely permanent water. Scoped in.	Unsuitable – isolated habitat. Scoped out.	27 June 2023 28 July 2023	Ditch approximately 0.9m x 5cm with a 0.2m deep muddy substrate. Earth banks with tall grasses and ruderals. Occasional inchannel vegetation including celeryleaved buttercup.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
Hall Dyke		Within Site - Solar PV Area 2e	Suitable, but poor – unlikely to hold water year-round. Scoped in.		21 September 2022 27 June 2023	Initial assessment found ditch dry. Subsequent visit in June 2023: wet ditch of 0.5m x 3cm with adjacent hedgerow shading ditch. Banks and base managed last year, now with tall grasses and ruderals.
FO54		Within Site - Solar PV Area 2e	Unsuitable - lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	2 May 2023	Managed hedgerow with trees and associated dry ditch.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
Great Committee Drain		Within Site - Solar PV Area 2e	Suitable, but poor – unlikely to hold water year-round. Scoped in.		21 September 2022 23 June 2023	Initial assessment found ditch to be dry and recently managed. Subsequent visit ditch 0.4m x 0.2m (after heavy rain on 18/06/2023). West bank shaded by hedgerow. Tall tussocky grasses and ruderals.
New Drain		Within Site - Solar PV Area 2f	Suitable but poor. Limited bankside vegetation from management and shading (i.e., limited food and cover). Scoped in.	Unsuitable – isolated habitat. Scoped out.	21 September 2022 27 June 2023	Wet ditch of 1.0m x 0.3m in June 2023. Managed in 2022, but in June 2023 had patchy tall tussocky grasses and ruderals with toe of banks largely bare. Immediately adjacent boundary to west shading ditch.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
Commonend Drain		Within Site - Solar PV Area 2f	Suitable – good. Steep earth banks for burrowing, tussocky vegetation provides food and cover. Likely holds water year-round. Scoped in.	Suitable – low likelihood of dispersal only. Scoped in.	21 September 2022 27 June 2023	Wet ditch approximately 1.0m x 0.3m. Steep earth banks vegetated with tussocky grasses and ruderals. Managed in 2022. Shading from adjacent boundary.
Unnamed drain (south of Commonend Drain)		Within Site - Solar PV Area 2g	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	21 September 2022	Dry ditch which is likely to hold water in winter only. Immediately adjacent mature boundary and brambles.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
Bishopsoil Drain		Within Site - Solar PV Area 2g	Suitable but poor – unlikely to hold water year-round. Scoped in.	Unsuitable – lack of cover and isolated habitat. Scoped out.	29 September 2022 28 June 2023	Ditch initially found to be dry and managed (Sept 2022). In June: wet ditch of 0.3m x 0.1m with channel and lower banksides dominated by common reed, reed canary grass and occasional bulrush. Upper banks with tall grasses and ruderals. Isolated habitat.
CO21		Within Site - Solar PV Area 2g	Unsuitable - lacking water. Scoped out.	Unsuitable - isolated habitat. Scoped out.	28 June 2023	Recently managed dry ditch with adjacent defunct hedgerow. Earth banks with sparsely vegetated grasses. Noted to be dry in March 2023 (during Phase 1 habitat survey).

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
FO01		Within Site - Solar PV Area 2g	Suitable, but poor – lacking water year-round. Annual management removes most food and cover. Scoped in.	Unsuitable – isolated habitat. Scoped out.	22 September 2022 28 June 2023	Ditch predominantly dry in 2022 apart from eastern section. In 2023 wet ditch of 0.6m x 0.1m with frequent bulrush in channel. Both banks recently mown apart from east bank on northern section.
FL23		Within Site Within Site - Solar PV Area 3a	Unsuitable – shaded and lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	23 June 2023	Dry ditch at base of a hedgerow. Likely to hold water in winter months only.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
CO31		Within Site Within Site - Solar PV Area 3b	<b>Unsuitable</b> – no ditch. Scoped out.	Unsuitable – isolated habitat. Scoped out.	21 March 2023	OS mapping shows a ditch, Phase 1 habitat survey March 2023: hedgerow with trees, no ditch.
CO25		Within Site Within Site - Solar PV Area 3c	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	21 July 2023	Dry ditch along tree line with tall grasses/ weeds. Likely to hold water only in winter months. Noted to be dry during Phase 1 Habitat Survey in March 2023.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
CO26		Within Site Within Site - Solar PV Area 3c	Suitable, but poor – likely dry most of the year. Scoped in.	Unsuitable – isolated habitat and limited cover. Scoped out.	22 September 2022 23 June 2023	Initial assessment found ditch to be dry. June 2023: 0.5m x 0.1m ditch with earth banks vegetated with tall grasses (70% cover). Channel with starwort and filamentous algae.
Black Dyke		Within Site Within Site - Solar PV Area 3c	Suitable, but poor – lacking year-round water and ditches known to be managed yearly. Scoped in.	Unsuitable – isolated habitat. Scoped out.	22 September 2022 23 June 2023	Initial assessment in 2022: Dry ditch which is annually mown with grass arisings in base of ditch. June 2023: 0.4m x 5cm ditch with Immediately adjacent hedgerow. Tall grasses and ruderals on earth banks with occasional patches of reed canary grass.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
CO23		Within Site – Grid Connection Corridor	Unsuitable – lacking water. Scoped out.	Unsuitable – isolated habitat. Scoped out.	26 April 2023	Isolated dry ditch with managed banks.
River Derwent		Within Site – Grid Connection Corridor	Suitable, but poor. Vegetated earth banks for burrowing, some areas of dense willow scrub, but open areas subject to poaching. Permanent water, but variable with flooding likely in winter months. Scoped in.		01 March 2023 25 April 2023	Navigable river approximately 20m wide with a depth exceeding 2m. Occasional patches of dense willow/ hawthorn scrub with grassy grazed banks. Some areas subject to poaching. Regular disturbance from dog walkers, with dogs observed entering the river.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
DE28 (east)		Within Site – Grid Connection Corridor	Suitable but poor. Isolated habitat with vegetated earth banks for burrowing, food and cover. Scoped in.	Unsuitable – isolated habitat. Scoped out.	25 April 2023 17 July 2023	Isolated wet ditch approximately 0.4m wide and 0.2m deep in April (only 2/3 holding water to 0.1m in July). Steep earth banks with tussocky grasses and in-channel vegetation limited to filamentous algae.
DE28 (west)		Within Site – Grid Connection Corridor	Suitable but poor. Mostly dry in July, vegetated earth banks for burrowing, food and cover. Scoped in.	Unsuitable – isolated habitat. Scoped out.	25 April 2023 17 July 2023	Wet ditch approximately 0.3m wide and a maximum of 0.2m in April (July typically 1cm). Earth banks with tall tussocky grasses and meadowsweet. Occasional bulrush, soft rush and common reed in channel.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
DE21 and DE21 (East)		Within Site – Grid Connection Corridor	DE21 is fully culverted (unsuitable). DE 21 East is Suitable but poor. DE21 (East) Scoped in.	Suitable – only DE21 (East) adjacent to River Derwent for foraging. Scoped River Ouse in.	25 April 2023 17 July 2023	Largely culverted ditch with open sections approximately 1.0m wide and 0.1m deep. Deep silt substrate. Steep earth banks with tall grasses, forbs and ruderal vegetation. Immediately adjacent mature boundary in non-culverted sections.
DE21 (West)		Within Site – Grid Connection Corridor	Suitable but poor. Open section next to mature boundary. Scoped in.	Unsuitable – isolated habitat.	25 April 2023 17 July 2021	Ditch approximately 1.0 m wide and 0.1 m deep. Deep silt substrate. Steep earth banks with tall grasses, forbs and ruderal vegetation. Immediately adjacent mature boundary to south providing shade to 25% of channel length.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
DE25		Within Site – Grid Connection Corridor	<b>Unsuitable</b> – scoped out.	Unsuitable – scoped out.	27 April 2023	No ditch present; hedgerow with trees.

DE23



Within Site – Unsuitable – scoped Unsuitable – 18 July 2023 Small section of culverted ditch beneath A63 and adjacent boundary.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
DE24		Within Site – Grid Connection Corridor	Unsuitable – unsuitable habitat. Scoped out.	Unsuitable – scoped out.	18 July 2023	Ditch is culverted under: A63; layby and small copse where it feeds into DE21 (dry at that point).
DE53		Within Site – Grid Connection Corridor	Suitable – optimal. Steep densely vegetated earth banks for burrowing, food and cover; likely consistent water level with emergent vegetation present. Scoped in.		27 April 2023 19 July 2023	Wet ditch approximately 4.0m wide with a maximum depth exceeding 1.0m. Steep earth banks vegetated with tall grasses and ruderals. In channel vegetation included broad-leaved pondweed and starwort.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
DE52		Within Site – Grid Connection Corridor	Suitable but poor. Steep vegetated earth banks for burrowing, food and cover. Presence of water likely for most of the year. Scoped in.	Suitable – dispersal only. Scoped in.	27 April 2023 19 July 2023	Ditch approximately 0.7m wide and 0.2m deep in April (dry in July 2023). Steep earth banks vegetated with tall grasses and ruderals. Reed canary grass dominates the channel.
DE03		Within Site – Grid Connection Corridor	Suitable but poor. Limited wet channel for predator avoidance. Scoped in.	Suitable – dispersal only. Scoped in.	26 April 2023 18 July 2023	Wet ditch approximately 0.3m wide and up to 0.2m deep (noted to be dry in July 2023). Steep earth banks with tussocky grasses.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
River Ouse		Within Site – Grid Connection Corridor	Unsuitable – large tidal variations in water level and flood events. Slumping and unstable banks. Scoped out.	Suitable – dispersal, foraging and likely laying up/holt areas outside the Site. Scoped in.	2 March 2023	Navigable tidal river up to 80m wide and a maximum depth likely exceeding 4.0m. Steep banks which have slumped exposing tidal muds. Occasional willows and associated root systems.
OU20		Within Site – Grid Connection Corridor	Suitable but poor. Steep earth banks with tussocky grasses for burrowing, food and cover. Approximately half of ditch is dry in summer.	Suitable – dispersal only. Scoped in.	27 April 2023 21 July 2023	Partially wet ditch, approximately 0.8m wide and 0.1m deep (in summer). Section south of Pear Tree Avenue was dry in July. Steep earth banks vegetated with tussocky grasses. Mature boundary on west side. Northern section of ditch (to north of OU24) is dry and vegetated with

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
						common nettle and common reed.
OU21		Within Site – Grid Connection Corridor	Unsuitable – dry ditch. Scoped out.	Unsuitable – scoped out.	27 July 2023	Dry ditch with steep grassy earth banks.
OU24		Within Site – Grid Connection Corridor	Suitable, but poor. Steep earth banks with herbaceous vegetation, does not hold water year- round. Scoped in.	Suitable - dispersal only. Scoped in.	27 April 2023 21 July 2023	Approximately 0.6m x 0.2m deep ditch in April, but dry in July. Steep earth banks and well-vegetated with tall grasses and ruderals.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
OU13		Within Site – Grid Connection Corridor	Suitable – good. Precautionary, based on one visit. Potentially drier in early season.	Suitable – dispersal only	27 July 2023	Wet ditch approximately 1.0m x 0.2m deep. Steep well vegetated earth banks with tall grasses and weeds.
OU27 (North/ south)		Within Site – Grid Connection Corridor	Unsuitable – scoped out.	Unsuitable – scoped out.	27 April 2023	Dry ditch in base of hedgerow.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
OU27 (East/ west)		Within Site – Grid Connection Corridor	Suitable, but poor – scoped in.	Unsuitable – isolated habitat. Scoped out.	26 July 2023	Wet ditch shaded by plantation woodland for 90m. 0.3m x 0.1m maximum depth, with steep earth banks vegetated with tall grasses and weeds.
OU42		Within Site – Grid Connection Corridor	<b>Unsuitable</b> – scoped out.	Unsuitable – scoped out.	27 April 2023	Dry ditch in base of hedgerow.

Watercourse reference	Photo	Location	HSA for water vole	HSA for otter	Assessment and survey dates	Description
OU31		Within Site – Grid Connection Corridor	Unsuitable – scoped out.	Unsuitable – scoped out.	27 April 2023	Dry shaded isolated ditch.

## **Annex B – A Sample of Field Signs**

## Watercourse Photo **Location (OS Description Date** reference grid reference) 2 March 2023 River Derwent Otter path which avoids Barmby Tidal SE 68095 28630 Barrage, traverses the cycle route on top of the flood embankment before joining the River Ouse. Spraints were recorded at both ends of the path. **River Derwent** Otter slide and spraint approximately 2 March 2023 SE 68020 28601



40m upstream of Barmby Tidal Barrage.

Watercourse reference	Photo	Description	Date	Location (OS grid reference)
River Ouse		Otter prints in recently exposed tidal muds, five toes clearly distinguishable. Second image shows an otter hind foot with fox prints also visible.	2 March 2023	SE 67765 28705
River Derwent		American mink scat recently deposited on drainage inlet linked to Clough Drain. American mink prints on soft bankside mud.	2 March 2023	SE 69831 29509 SE 68082 28616

## **Annex C – Figures**

- Figure 1: Appendix 8-9-1 Desk Study Results
- Figure 2: Appendix 8-9-2 Otter Habitat Suitability Assessment
- Figure 3: Appendix 8-9-3 Otter Survey Results
- Figure 4: Appendix 8-9-4 Water Vole Habitat Suitability Assessment
- Figure 5: Appendix 8-9-5 Water Vole Survey Results

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East Yorkshire Solar Farm

Land not included in the Order limits

Ecology Mitigation Area (xx =

Ecology Mitigation Area)

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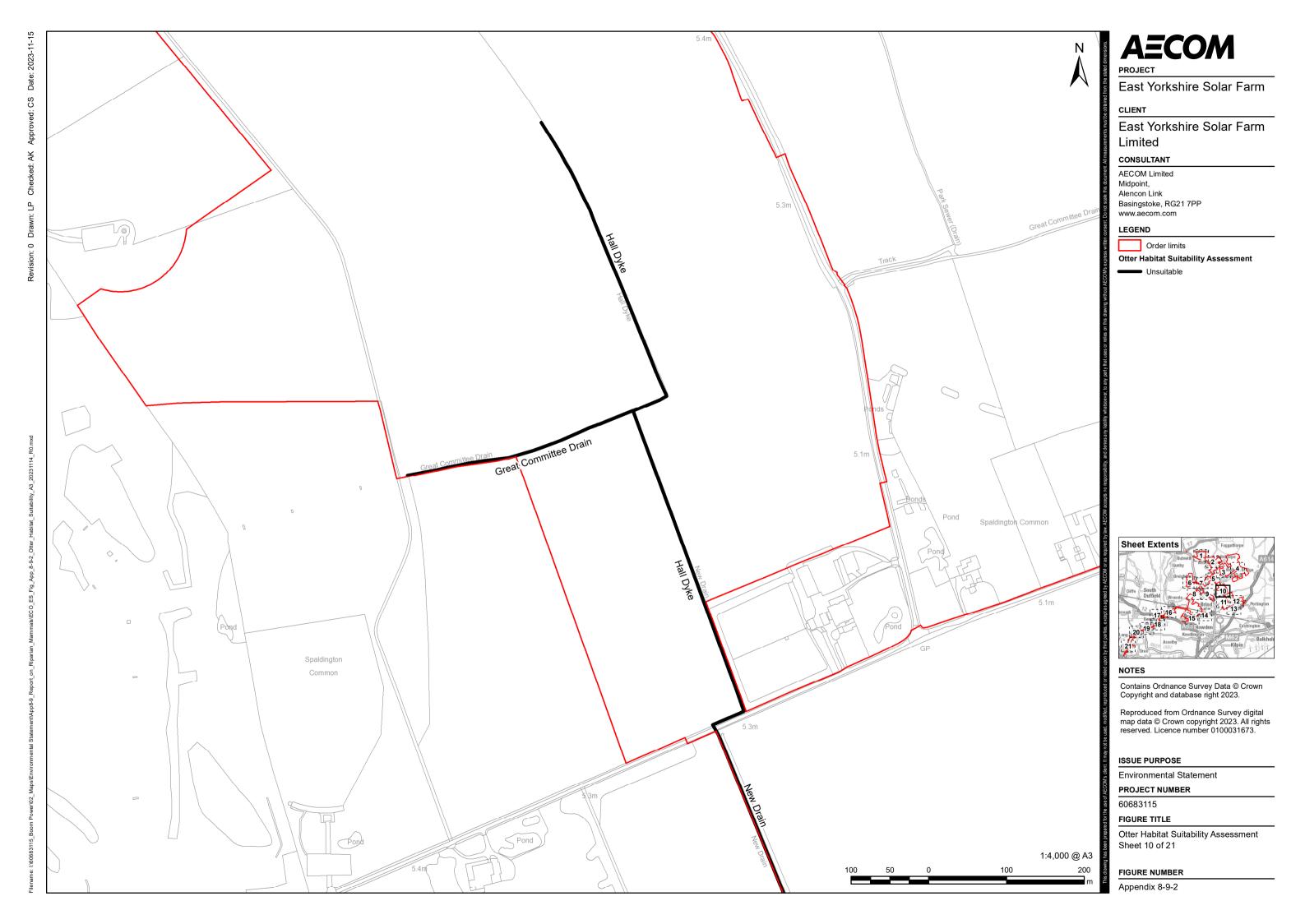




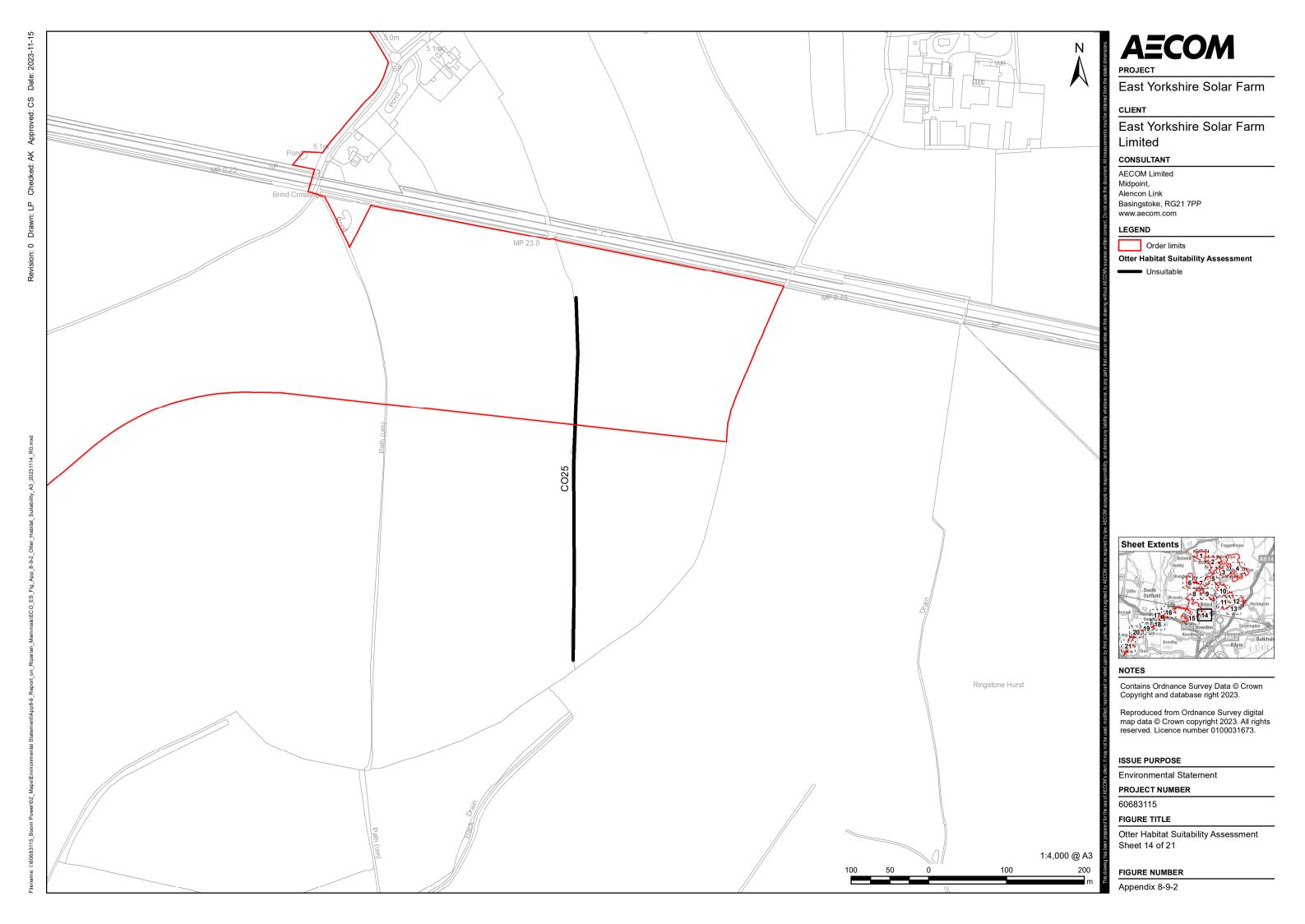


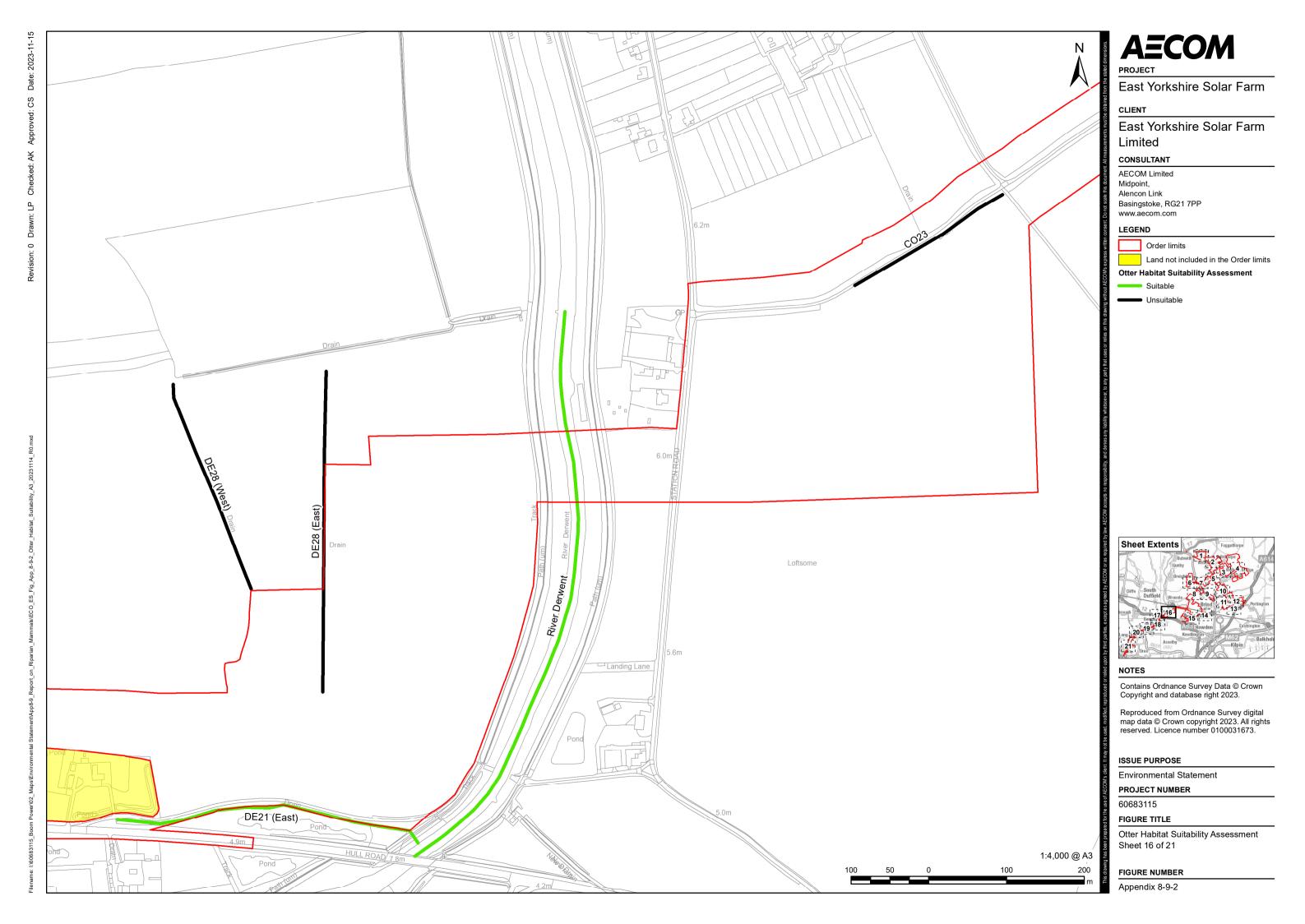








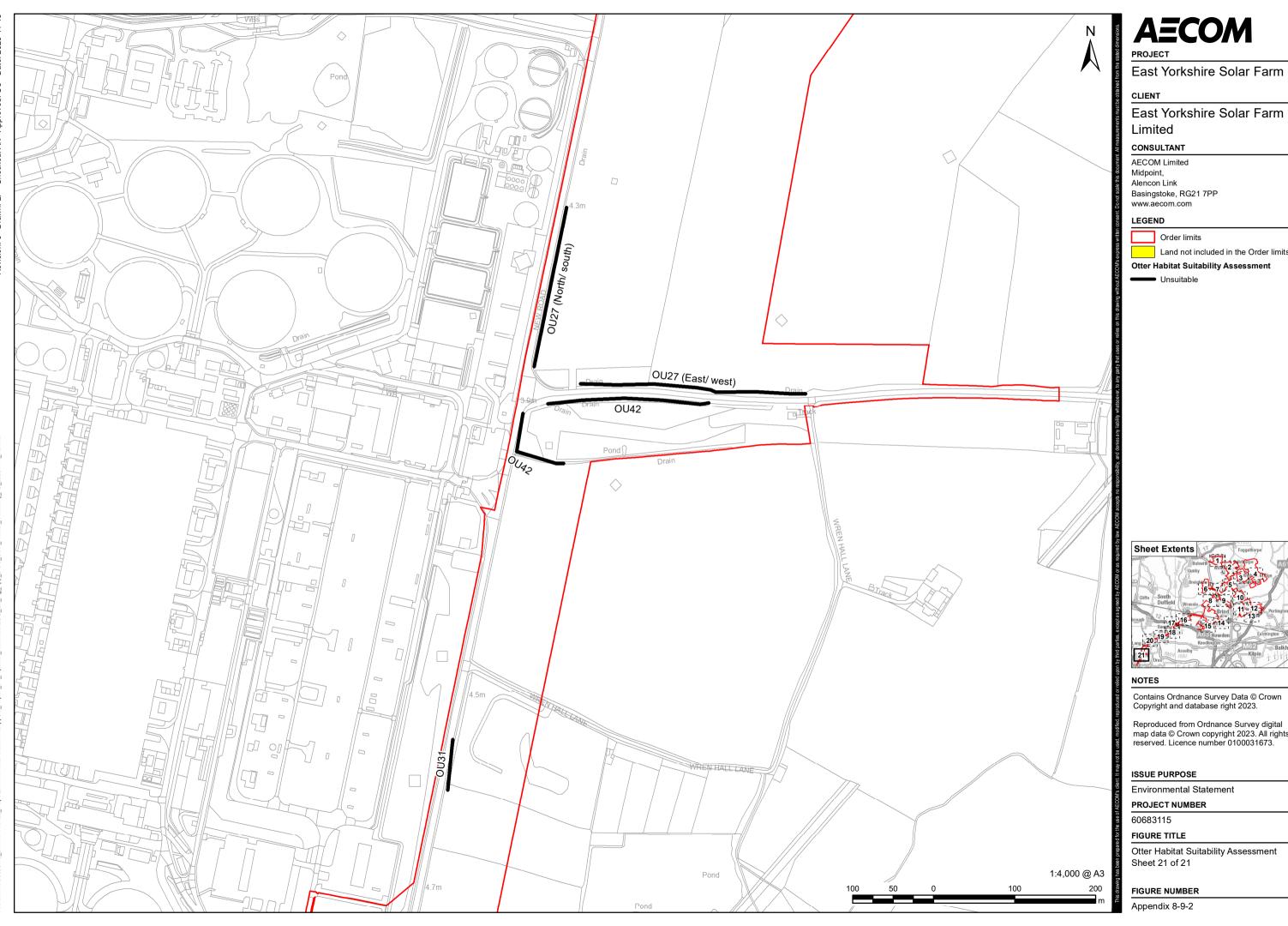












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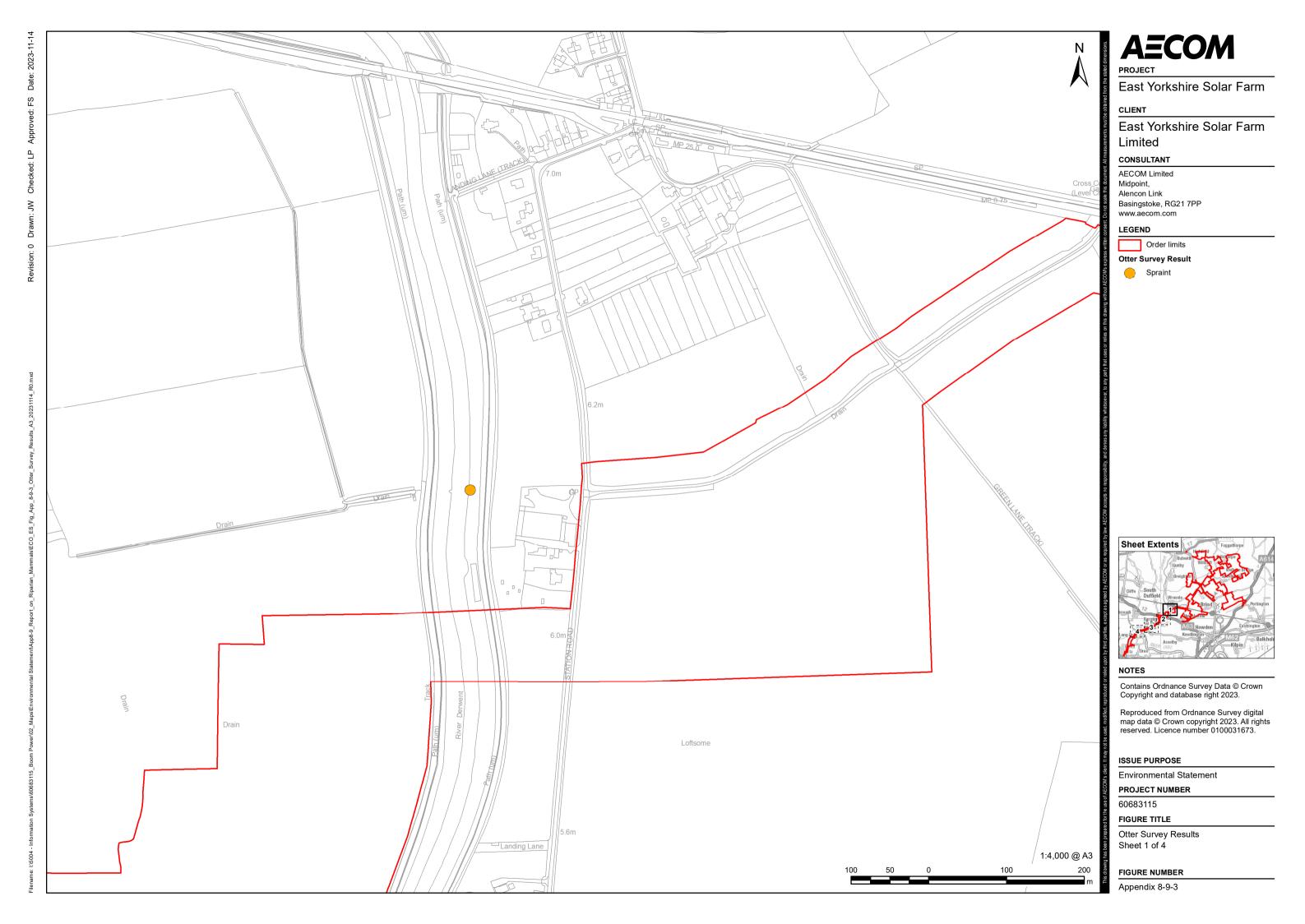
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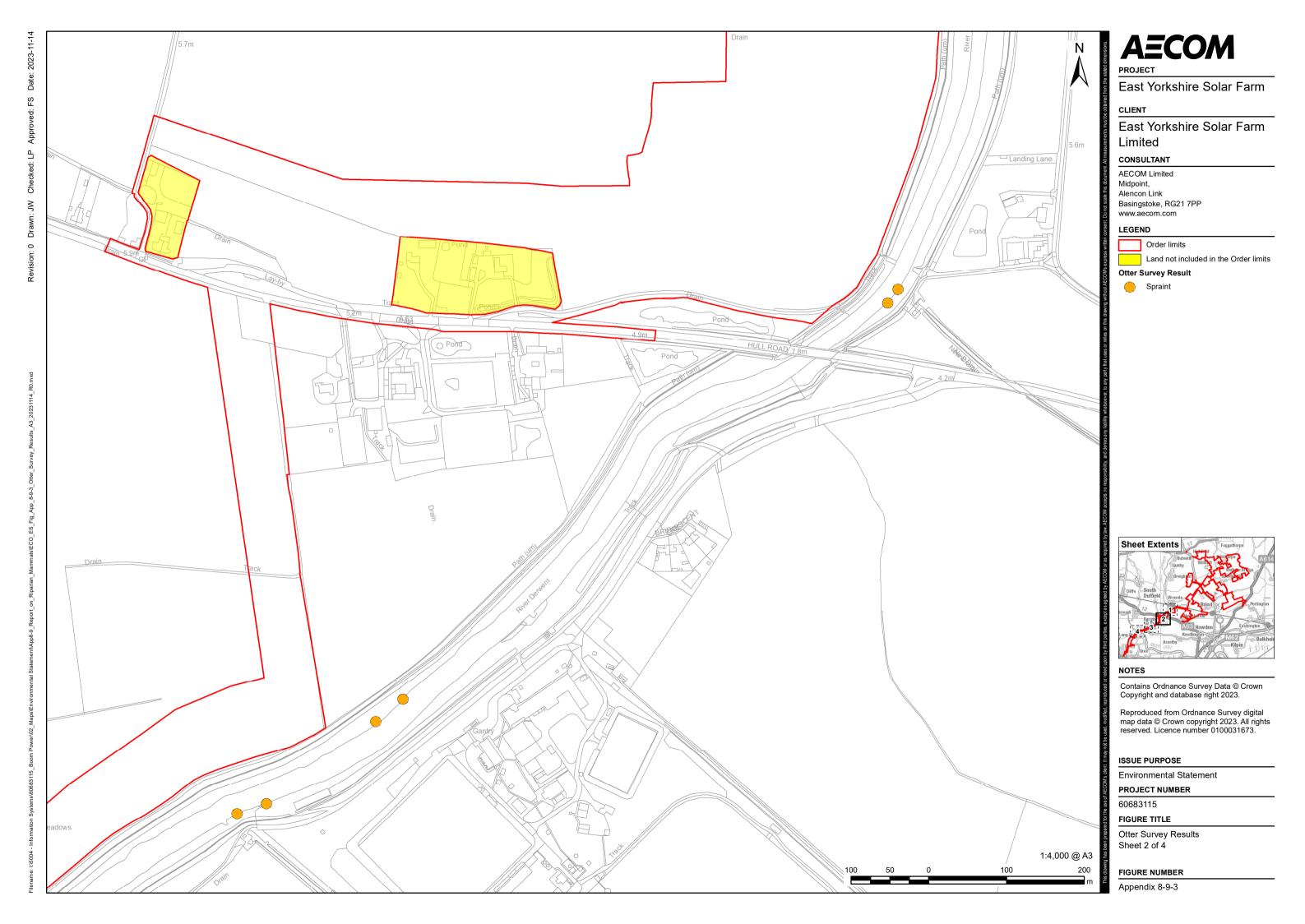


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Otter Habitat Suitability Assessment



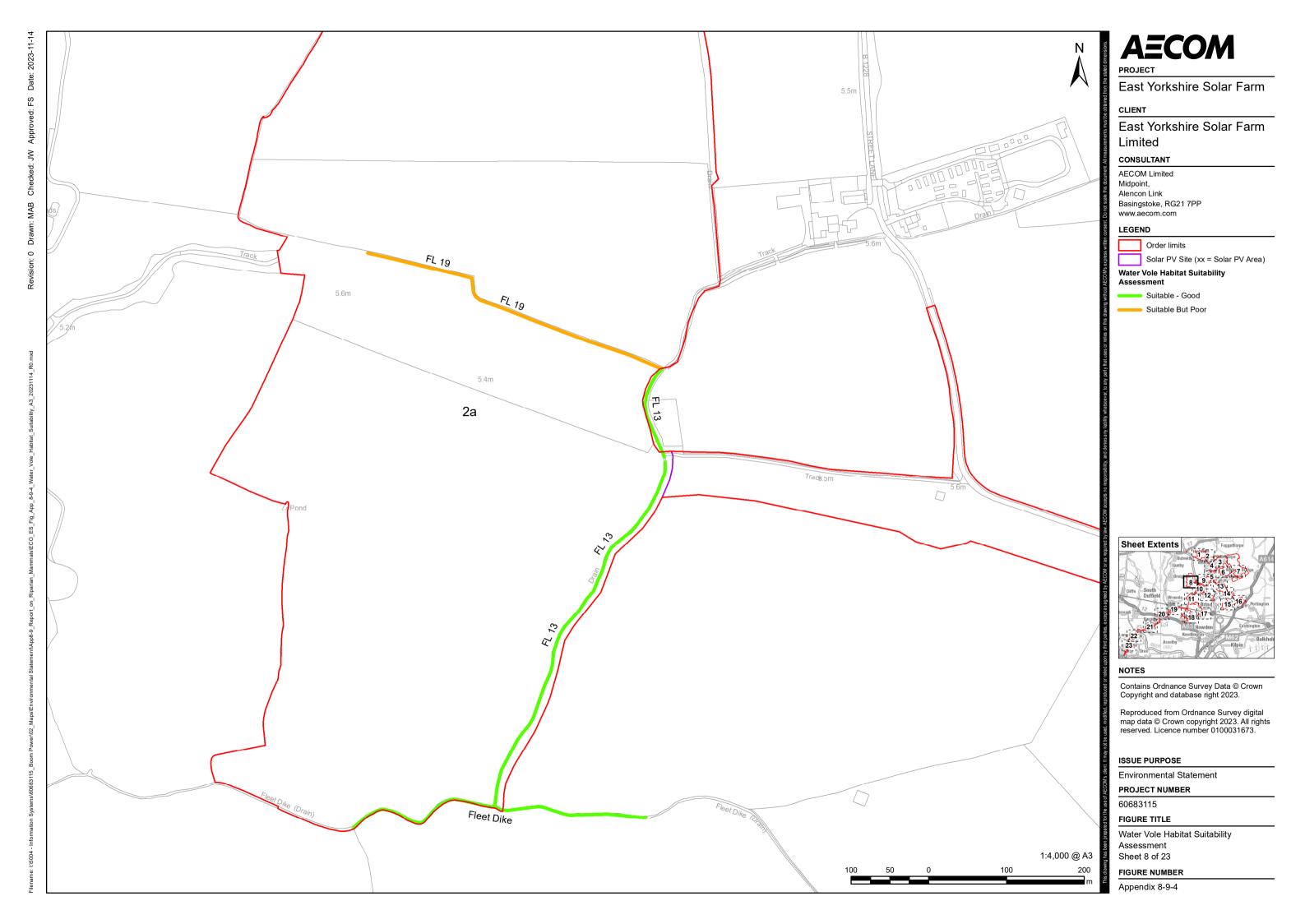




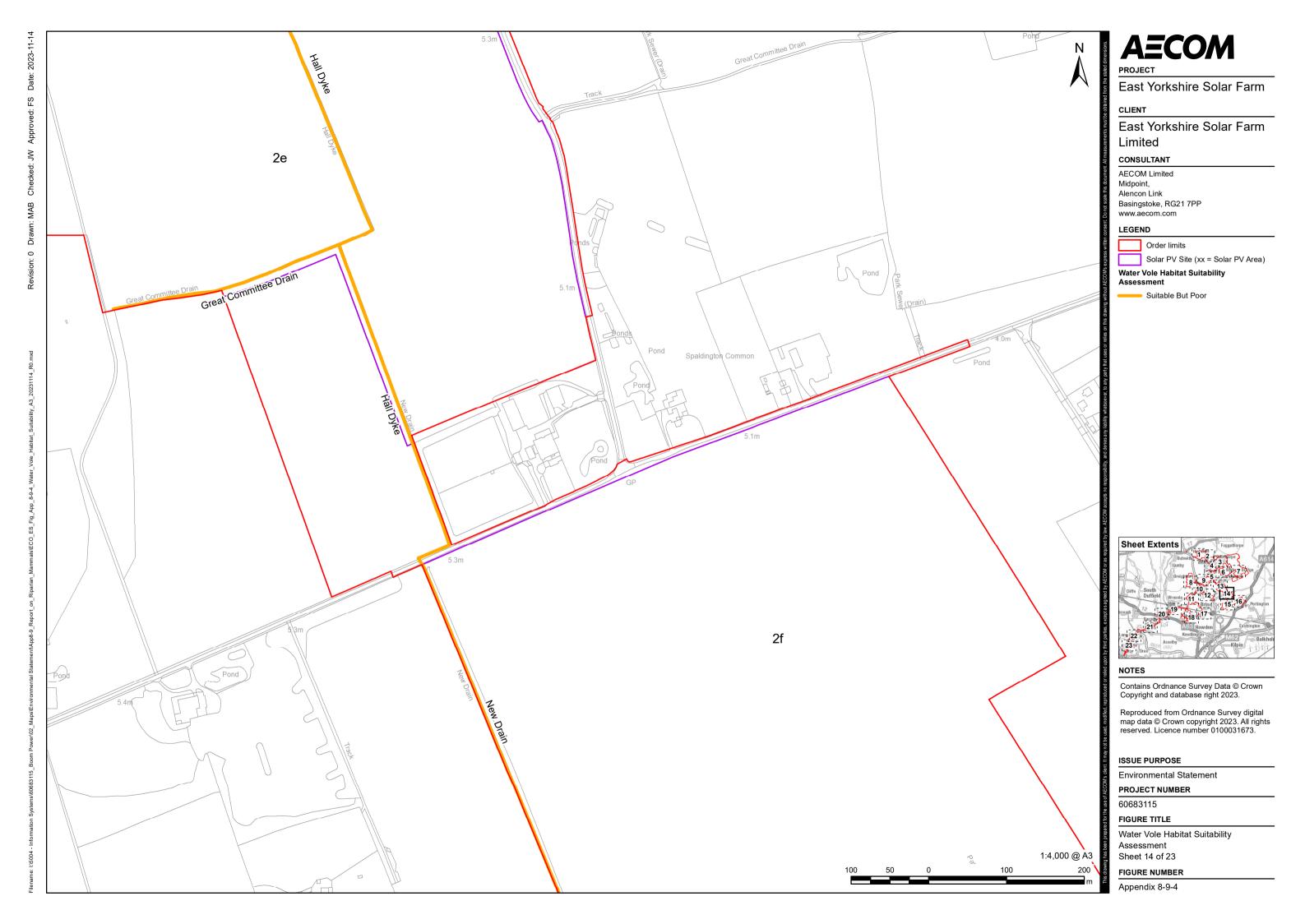




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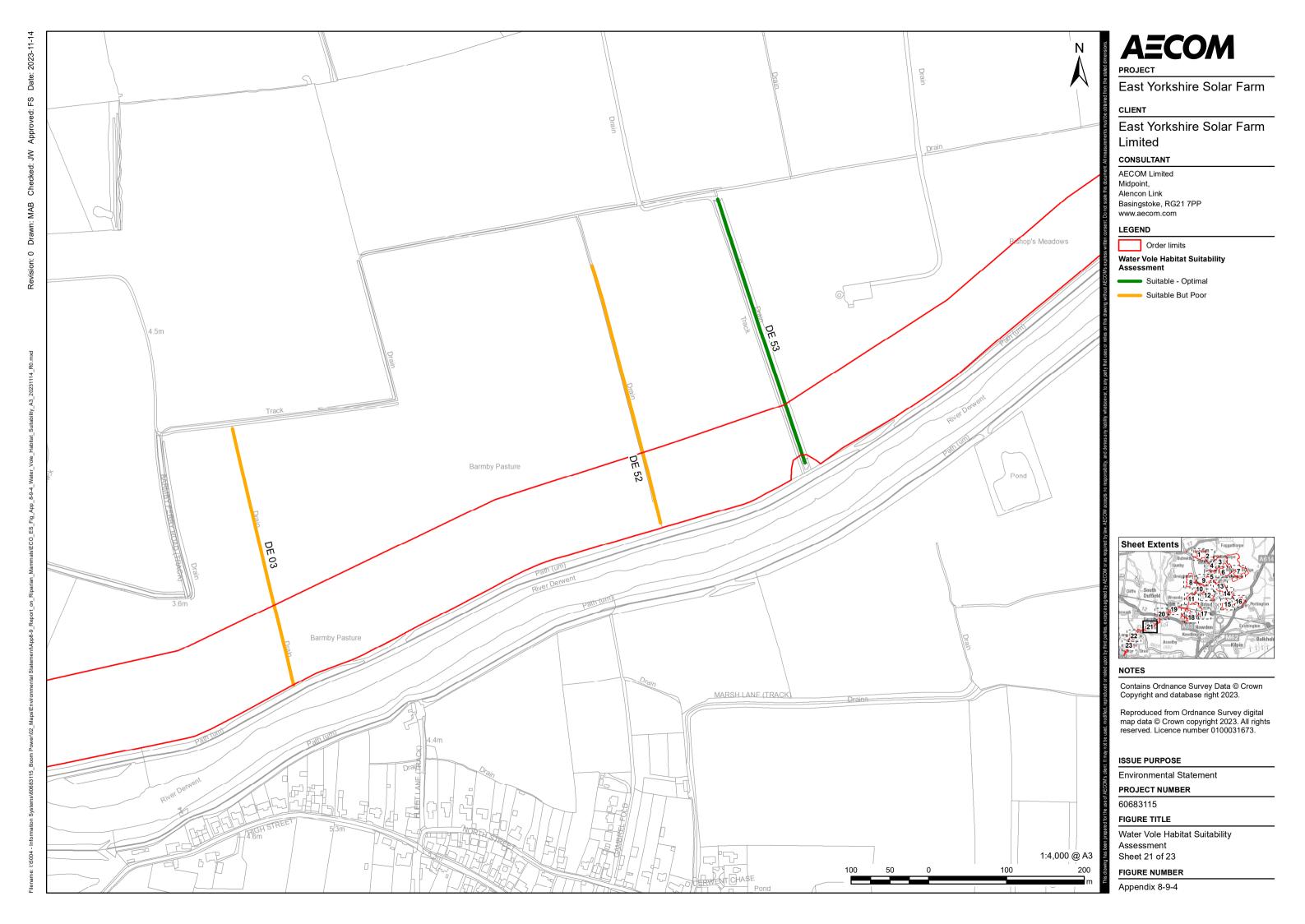










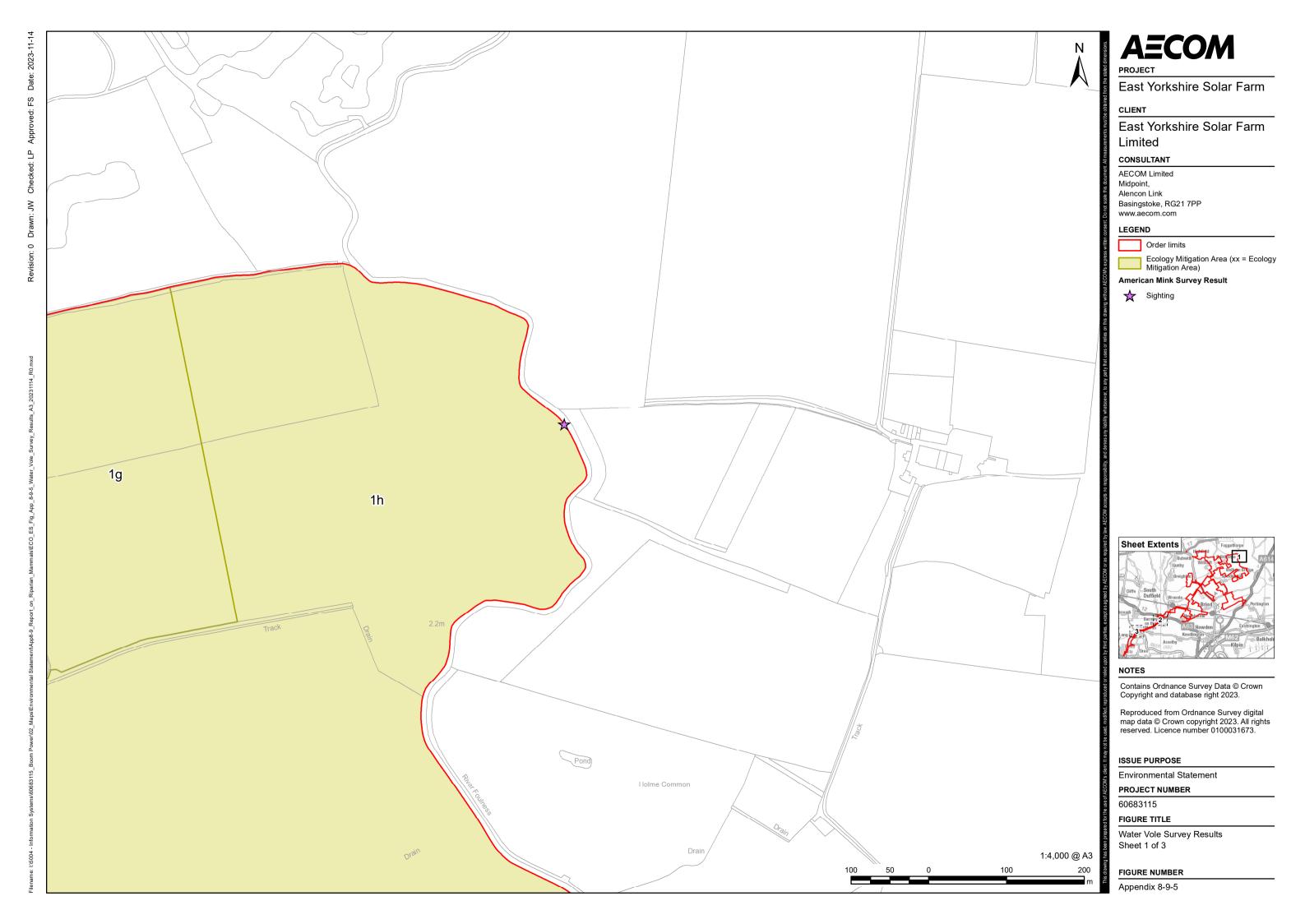


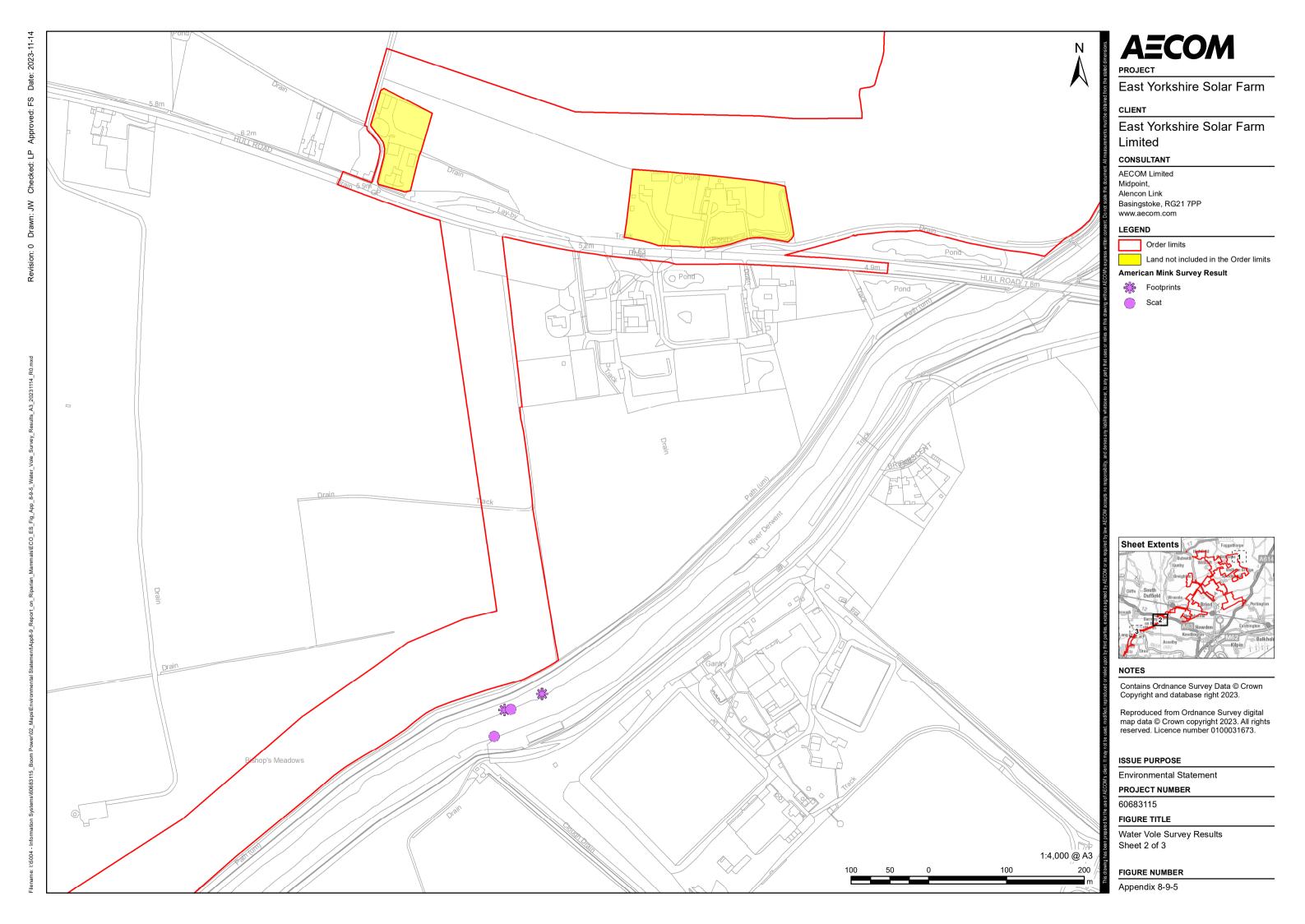
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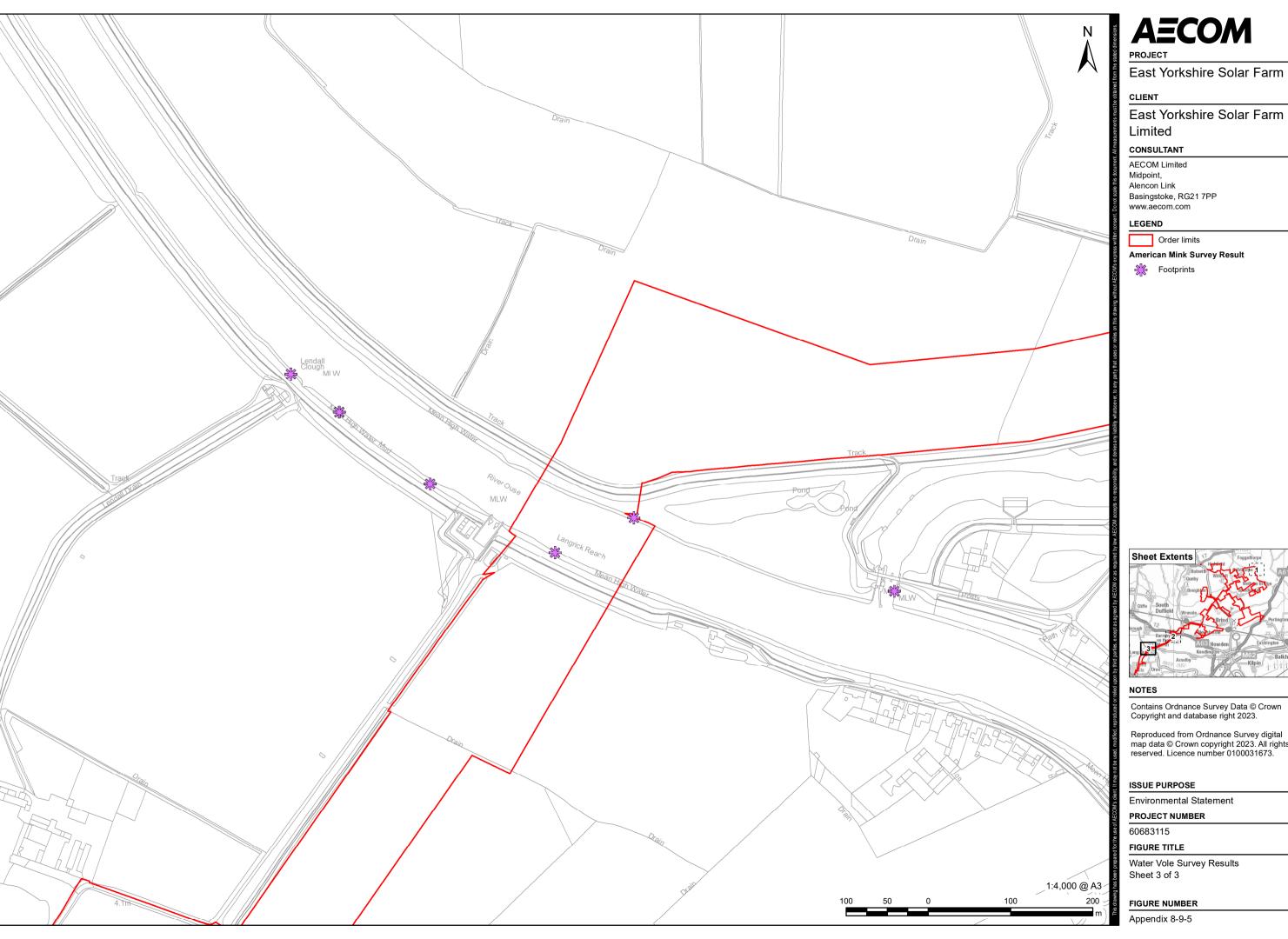
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Water Vole Survey Results