

The Keadby 3 Low Carbon Gas Power Station Project

PINS Ref: EN010114

The Keadby 3 Low-Carbon Gas Power Station Order

**Land at and in the vicinity of the Keadby Power Station site,
Trentside, Keadby, North Lincolnshire**

Preliminary Environmental Information (PEI) Report Volume II - Appendix 11F: Riparian Mammal Survey Report

The Planning Act 2008

**The Infrastructure Planning (Environmental Impact Assessment)
Regulations 2017**

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GLOSSARY

| Abbreviation | Description |
|---------------------|---|
| CIEEM | Chartered Institute of Ecology and Environmental Management |
| Defra | Department for Environment, Food and Rural Affairs |
| EclA | Ecological Impact Assessment |
| EPS | European Protected Species |
| EPSML | European Protected Species Mitigation Licence |
| PEA | Preliminary Ecological Appraisal |

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1.0 INTRODUCTION

1.1 Background

- 1.1.1 This report accompanies **Chapter 11: Biodiversity and Nature Conservation** (PEI Report Volume I) and describes the approach and findings of the riparian mammal surveys undertaken in support of the Ecological Impact Assessment (EclA) of the Proposed Development. For the purposes of this report, riparian mammals are defined as water vole (*Arvicola amphibius*) and otter (*Lutra lutra*).
- 1.1.2 The terms of reference used to describe the Proposed Development in this report are broadly consistent with those defined within the main chapters of the Preliminary Environmental Information (PEI) Report (Volume I) and for clarity include:
- The Proposed Development Site which encompasses an area of approximately 88.1 hectares (ha) which included 17.7ha of land currently under evaluation to determine the suitability for potential construction laydown. It is noted that not all of this land will be required and will be refined through ongoing studies and assessment prior to submission of the Application;
 - The Proposed PCC Site, which comprises:
 - an area of approximately 13.9a of the Keadby Power Station site that is located within Keadby Common on which the power generation (CCGT), carbon capture and compression (CCP) and associated stacks will be developed (herein referred to as the 'Main Site');
 - overhead electricity transmission lines associated with the existing National Grid 400kV Substation which bisect the Proposed PCC Site; and
 - A further 4.8ha of land to the south of these overhead lines for administration/control room/ warehouse buildings and car parking areas within the Proposed PCC Site.

1.2 Survey Scope

- 1.2.1 An initial Preliminary Ecological Appraisal (PEA) of the ecological constraints and opportunities associated with the Proposed Development Site was made by AECOM in March 2020, including identification of the requirements for further protected species survey. The findings of the habitat and scoping survey were compiled as a Preliminary Ecological Appraisal (PEA) report (submitted as **Appendix 11C** in PEI Report Volume II), which should be referred to for a more detailed overview of the site conditions and habitats present.
- 1.2.2 This habitat information was used to identify locations within the potential zone of influence of the Proposed Development that supported conditions potentially suitable for riparian mammals. Accordingly, the PEA report identified eight waterbodies (locations shown on **Figure 11F.1**) requiring further survey and/ or assessment due to the potential for these waterbodies to experience impacts and effects from construction, operation and decommissioning of the Proposed Development. The waterbodies of potential relevance are:

- five field drains (Drains 1, 2, 3, 4 and 5) in association with the Main Site, where construction works for the Proposed Development would be focused;
- the Stainforth and Keadby Canal due to it being considered as a Potential Water Abstraction Option;
- the River Trent in the vicinity of the Potential Water Abstraction and Discharge Options; and
- The North Soak Drain as it is located within the Proposed Development Site. While this waterbody would not be directly affected, it is located adjacent to a potential construction access route to the Potential Water Abstraction Option on the Stainforth and Keadby Canal.

1.2.3 The other waterbodies associated with the Proposed Development Site, all of which are minor ditches and drains, were scoped out as they will not be affected and are located at distance from proposed construction works. These other waterbodies are not considered further in this report.

1.2.4 The purpose of the riparian mammal surveys and this report is to:

- provide data on the level, nature and location of water vole and otter activity associated with the relevant waterbodies and adjacent land;
- present the above data in a manner that allows the results to be used to support an assessment of relative nature conservation value, including review against relevant criteria (see Section 2 of this report); and
- inform the options for impact avoidance, mitigation and/or compensation to be considered during design of the Proposed Development.

1.2.5 The purpose of this report is to provide baseline technical information only. It does not seek to include recommendations, specify mitigation, or make an ecological impact assessment (EclA) of the Proposed Development. The formal EclA is provided as **Chapter 11: Biodiversity and Nature Conservation** of the PEI Report (Volume I), and this riparian mammal report comprises an appendix to that chapter.

2.0 METHODS

2.1 Desk Study

- 2.1.1 A desk study was undertaken as part of the PEA that was completed in advance of the riparian mammal surveys and informed the scoping of requirements for further survey.
- 2.1.2 Desk study results of relevance to the assessment have been carried forward into this report, and where appropriate this data is presented in more detail or re-interrogated for the needs of the current assessment.

2.2 Riparian Mammal Survey

- 2.2.1 The water vole and otter survey of the identified relevant waterbodies (see Section 1) was undertaken with reference to guidance given in Strachan *et al.* (2011) for water vole, and Chanin (2003a) and Crawford (2010) for otter.
- 2.2.2 To meet current good practice requirements for water vole survey, two survey visits were completed (Strachan *et al.*, 2011). These surveys were completed on 19th May and 12th August 2020.
- 2.2.3 The relevant waterbodies were surveyed from within the channel where possible, or on the bank face or bank top (as access and safety considerations permitted) if not, and searched for the following signs that would indicate the presence of water vole or otter:

Water Vole

- direct sightings;
- burrows and nests;
- faeces and latrines;
- feeding remains;
- lawns – around burrows there is often an area of grazed vegetation;
- footprints;
- runways – low tunnels within the vegetation; and
- auditory noises – characteristic ‘plop’ sound as animals enter a waterbody.

Otter

- direct sightings;
- suitable habitat for holts (breeding sites);
- feeding remains;
- footprints;
- slides;

- spraints (faeces); and
- evidence of couches (resting or laying-up sites).

2.2.4 In most cases the presence of faeces/ latrines and footprints are the most reliable field evidence for riparian mammals, in the absence of direct sightings. Not all the other field signs are necessarily definitive to species level, or other factors may prevent a conclusive identification. Where the latter evidence was detected, in the absence of these more reliable field signs, then this evidence has been used with caution to infer the presence of riparian mammals.

2.2.5 The presence/ absence of mink (*Neovison vison*) and brown rat (*Rattus norvegicus*) was also recorded through their field signs, where present. These species may influence habitat suitability for water vole in particular, and may help to explain an absence of field signs in habitats that otherwise appear to be highly suitable

2.3 Nature Conservation Evaluation

2.3.1 Evaluation of the relative nature conservation value of the identified ecological features within a site (encompassing nature conservation designations, ecosystems, habitat and species) is required to inform EclA. This report presents the evaluation for riparian mammals and the impact assessment is presented in **Chapter 11: Biodiversity and Nature Conservation** (PEI Report Volume I).

2.3.2 The method of evaluation that has been utilised has been developed with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater and Coastal and Marine – Second Edition* (CIEEM, 2019). These guidelines give advice on scoping and carrying out environmental assessments and place appraisal in the context of relevant policies. Data received through consultation, desk-based studies and field-based surveys are used to allow ecological features of nature conservation value or potential value to be identified, and the main factors contributing to their value described and related to available guidance. This data can also be used to identify other relevant values e.g. socio-economic or ecosystem services values, but this is beyond the remit of this report and requires the involvement of other relevant specialists.

2.3.3 The value of a faunal species, such as riparian mammals, may relate, for example, to its geographic location (species may be rare and more valued towards the edge of their geographic range), the extent to which the component species are threatened throughout their range, or their rate of decline. The value of the riparian mammal species populations associated with the Proposed Development Site has been defined with reference to the geographical level at which it is considered to matter. This assessment has been made with reference to published guidance and criteria where available e.g. criteria to assess relative value within the context of Lincolnshire are given in Lincolnshire Wildlife Trust (2013).

2.4 Limitations

- 2.4.1 All of the surveys were undertaken at an appropriate time of year and during suitable weather conditions. There was no substantive rainfall prior to the surveys that might have washed field signs away.
- 2.4.2 The bankside vegetation along the northern bank of Drain 1 had recently been cut prior to the second survey visit. Although this did aid the search for water vole burrows along this bank, other evidence for both otter and water vole such as feeding remains, lawns, runs, paths and couches may have been lost as a consequence. However, this is unlikely to have impacted the search for reliable in-channel features to identify presence such as latrines/ spraints and footprints. Similarly, if water vole had been present, it would still have been possible to find field signs on the immediately opposite unaffected bank. As such, the cutting of one bank is not considered a significant limitation.
- 2.4.3 North Soak Drain was not surveyed during the first visit as access was not available. On the second visit, access was obtained but due to safety constraints, could only be surveyed from the top of the bank as the water depth was greater than 1m deep and much of the bank face was covered by bramble scrub. This may have meant that field signs were missed, however as no impacts are anticipated within this drain, this is not considered a major limitation. Habitat quality was considered poor as described in Section 4 and shown in the photographs provided in **Annex B**.
- 2.4.4 There was also no access to survey the eastern section of Drain 2 during the first survey. This is not a limitation, given that access was possible during the second visit. If water vole was present in this drain, then the second visit would have coincided with the peak in water vole activity (which tends to be towards the end of the survey season after breeding).

3.0 LEGISLATION, PLANNING POLICY AND RELATED GUIDANCE

3.1.1 The following wildlife legislation, planning policy and guidance is specifically relevant to the identification and assessment of potential constraints posed by the presence of riparian mammals. At this stage of assessment, this legislation, policy and guidance is primarily listed to demonstrate that an appropriate level of survey and assessment has been undertaken to meet likely data requirements for future decision-making regarding these material considerations.

3.1.2 Wider relevant biodiversity legislation, policy and guidance is detailed in **Appendix 11A: Biodiversity and Nature Conservation Legislation and Planning Policy** (PEI Report Volume II).

3.2 Water Vole

3.2.1 The water vole is protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (the Act). This makes it an offence to:

- intentionally capture, kill or injure water voles;
- damage, destroy or block access to their places of shelter or protection (on purpose or by not taking enough care);
- disturb them in a place of shelter or protection (on purpose or by not taking enough care); and
- possess, sell, control or transport live or dead water voles or parts of them (excluding water voles bred in captivity).

3.2.2 The Act provides a defence against the offences outlined above. However, the defence is only sustained if it can be argued that the potential offence was '*the incidental result of a lawful operation*' and '*could not reasonably have been avoided*' as set out in the Act. In order to demonstrate these two elements of the defence, as far as is reasonable, appropriate action would need to be taken to safeguard water vole and their shelters to ensure there is as little risk as possible of interfering with them. Short-term low-level disturbance which '*allows water vole to flee and then later return*' is not considered likely to trigger an offence under the Act. Where development cannot avoid potential offences then a licence may be required.

3.2.3 The Government has published standing advice (Natural England and Department for Environment, Food and Rural Affairs (Defra), 2015) to guide decision-makers on the determination of proposals with potential to affect protected species such as water vole. The guidance sets out responsibilities and minimum requirements for survey and mitigation.

3.2.4 The water vole is also considered a 'Species of Principal Importance for Nature Conservation in England' pursuant to Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act requires that local planning authorities have regard to the conservation of biodiversity in England, when carrying out their normal functions. The water vole is also included as a priority species for nature conservation within the Lincolnshire Local Biodiversity Action Plan (LBAP) (Lincolnshire Biodiversity Partnership, 2011).

3.3 Otter

3.3.1 The otter is fully protected as a European Protected Species (EPS) under the provisions of Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). It is also protected under Sections 9 and 11 of the Wildlife and Countryside Act 1981 (as amended). Taken together this legislation makes it an offence to:

- capture, kill, disturb or injure otters (on purpose or by not taking enough care);
- damage or destroy a breeding or resting place (deliberately or by not taking enough care);
- obstruct access to their resting or sheltering places (deliberately or by not taking enough care); and
- possess, sell, control or transport live or dead otters, or parts of otters.

3.3.2 The otter is also a 'Species of Principal Importance for Nature Conservation in England' pursuant to Section 41 of the NERC Act 2006.

3.3.3 The Government has published standing advice (Natural England and Defra, 2019) to guide decision-makers on the determination of proposals with potential to affect protected species such as otter. The guidance sets out responsibilities and minimum requirements for survey and mitigation.

3.3.4 Where development cannot avoid potential offences, then it is possible to apply for a European Protected Species Mitigation Licence (EPSML). A licence is only likely to be granted for developments that can demonstrate compliance with the relevant standing advice.

3.3.5 The disturbance offence within the relevant legislation is not concerned with 'trivial' levels of disturbance which would be unlikely to adversely affect otter. There would only be a conflict with the above legislation where disturbance is of sufficient extent or magnitude to:

- impair the ability of otter to survive, to breed or reproduce, or to rear or nurture their young; or
- affect significantly the local distribution or abundance of the species.

3.3.6 It should be noted that there is no evidence that otters are particularly vulnerable to disturbance, except where this closely coincides with habitat features used by otters for breeding or resting. Otters will select resting sites where there is limited risk of direct physical disturbance, but otherwise are tolerant of and do not necessarily avoid areas subject to human activity (Chanin, 2003b).

4.0 RESULTS

4.1 Desk Study

- 4.1.1 The desk study returned 24 individual water vole records made in the vicinity of the Proposed Development Site in 2012 (the most recent records returned). Most of the records returned relate to drains within Keadby Wind Farm to the north and east of the Proposed Development Site. Two records were made from a drain next to the existing 400kV National Grid Substation off Chapel Lane, Keadby in the approximate vicinity of the route of the proposed Emergency Vehicle Access.
- 4.1.2 Previous water vole surveys of field drains bordering the former Keadby Ash Tip by AECOM in 2017 also found limited evidence of water vole in the vicinity of the Proposed Development Site. Two latrines and one water vole burrow, and associated feeding remains, were found on a short section of the minor field drain on the western boundary of the former Keadby Ash Tip.
- 4.1.3 These recent records indicate that water vole is widely distributed within the network of drains and other freshwater waterbodies in the vicinity of the Proposed Development Site.
- 4.1.4 In comparison, just four records of otter were returned and all date back to 2000. These records relate to just two locations. These are the Stainforth and Keadby Canal (in the vicinity of Vazon Bridge, off Chapel Lane, Keadby) 100m to the south of the Proposed Development Site, and the Warping Drain 420m north-east of the Proposed Development Site. Given these records, it should be assumed that otters may explore other minor waterbodies or make use of terrestrial habitats within the vicinity of the canal and Proposed Development Site.
- 4.1.5 No evidence of otter was found by AECOM in 2017 when surveying waterbodies associated with the former Keadby Ash Tip.

4.2 Water Vole Survey Results

- 4.2.1 **Figure 11F.1** (PEI Report Volume III) shows the locations of the waterbodies surveyed and the associated locations of water vole field signs. A summary of results within each waterbodies surveyed for water vole is provided below and summarised in **Error! Reference source not found.** Further information (including details on individual field signs, rather than peak counts) is provided on the survey forms within **Annex A**. Representative photographs of each waterbody are provided in **Annex B**.
- 4.2.2 Where present, an estimate on the number of water vole territories within each waterbody is provided to allow inference of the likely population size present.

Drain 1 (Keadby Common Drain)

- 4.2.3 This drain, located on the northern boundary of Keadby Common, has a channel width of between 1 and 2m and variable water depths that are less than 0.6m throughout. The banks are of earth, so are suitable for water vole burrowing. The drain and its banks support extensive stands of suitable foodplants, including emergent grasses and

sedges (**Annex B**, Photograph 1). Bankside trees are absent and there is no shading of the channel.

- 4.2.4 Drain 1 is connected at both its eastern and western extent to a network of drains in the wider landscape, such that it provides a potential movement corridor for water vole between other areas of suitable habitat. The other drainage ditches associated with Keadby Common (Drains 2 to 5) are connected to Drain 1.
- 4.2.5 Evidence of water vole was found within Drain 1 at three discrete sections along the length of the drain (Figure 11F.1). These locations are:
- between SE 81847 12227 to SE 81944 12212 (approximately 100m total drain length) two latrines and three burrows were found;
 - between SE 82006 12202 to SE 82057 12199 (approximately 50m length of drain), two latrines and one burrow were found; and
 - at SE 82152 12185 where a single latrine was present.
- 4.2.6 Given the limited number of burrows and latrines found, and the concentration of these in relatively discrete areas of the drain, it is considered that this drain supports a maximum of four water vole territories.

Drain 2

- 4.2.7 This drain, located on the southern boundary of Keadby Common, is separated into two discrete sections by a temporary construction haul road crossing for Keadby 2 Power Station.
- 4.2.8 The western section of the drain is approximately 2-3m wide with water depths of between 0.2 and 0.5m (**Annex B**, Photograph 2). This section of drain has earth banks. The southern bank is dominated by dense willow scrub, which overhangs the drain and casts heavy shade over approximately 70% of the channel, reducing the cover of wetland plant species and by so doing making the habitat sub-optimal for water vole. The northern bank supports unmanaged rank, semi-improved grassland. In-channel and bank vegetation suitable to sustain water voles is restricted to the 30% of the channel where shading is reduced.
- 4.2.9 The eastern section of the drain is narrower (approximately 1-2m wide) and is dominated by reeds (**Annex B**, Photograph 3), so contains extensive suitable food plants for water vole. The earth banks support rank semi-improved grassland. This whole section is dry and is judged to only support water during the wetter months of the year.
- 4.2.10 Evidence of water vole was present within a 60m section of the drain (between SE 81933 11872 and SE 81993 11873). A total of four latrines and three burrows were recorded within this area. Additional evidence of water vole presence and activity was present in the form of 30 feeding stations.
- 4.2.11 Given the limited number of burrows and latrines found, and the concentration of these in one short section of drain, it is considered that this drain supports a maximum of two water vole territories (and potentially just one).

Drain 3

- 4.2.12 This drain, located on western boundary of Keadby Common, has a channel width of 1-2m. During the first survey, the water depth was between 0.2 and 0.5m but the whole length was dry during the return survey. The drain is dominated by reeds along its entire length (**Annex B**, Photograph 4), so contains suitable food plants for water vole.
- 4.2.13 The drain has earth banks approximately 0.5 - 1m in height, one of which supports dense scrub, shading approximately 20% of the channel. The other supports unmanaged, rank semi-improved grassland.
- 4.2.14 There was no evidence of water vole associated with this drain. Given that the drain is regularly subject to drying, it is considered sub-optimal for water vole.

Drain 4

- 4.2.15 This drain bisects Keadby Common. The channel width is approximately 1m; the drain, has earth banks, and during the initial survey the water depth was very shallow (0.1m) and the channel was locally dry. By the second survey, the whole drain was dry. The drain is dominated by reeds along its entire length (**Annex B**, Photograph 5) so contains suitable food resources for water vole. Bankside trees are absent and there is no shading of the channel.
- 4.2.16 Very limited evidence of water vole was found, which was restricted to a single burrow with some associated feeding remains. This limited field evidence indicates the presence of only a single water vole territory. Given that the drain is subject to regular and prolonged drying, it is considered sub-optimal for water vole.

Drain 5

- 4.2.17 This drain, on the eastern boundary of Keadby Common has earth banks, a channel width of approximately 1-2m, and was dry during both surveys. The drain is dominated by reeds along its entire length (**Annex B**, Photograph 6). Bankside trees are absent and there is no shading of the channel.
- 4.2.18 There was no evidence of water vole associated with this drain. Given that the drain is regularly subject to drying, it is considered sub-optimal for water vole.

North Soak Drain

- 4.2.19 The section of the drain associated with the Proposed Development Site is approximately 10m wide and is greater than 1m in depth. The drain supports occasional small stands of reeds with the open water areas but is otherwise devoid of vegetation suitable to sustain water vole (**Annex B**, Photograph 7).
- 4.2.20 The drain has steep earth banks approximately 1-2m in height. The southern bank between North Soak Drain and the Stainforth and Keadby Canal supports dense bramble scrub, while the other bank supports rank, unmanaged semi-improved grassland with tall ruderals. Bankside trees are absent and there is no shading of the channel.

4.2.21 There was no evidence of water vole associated with this drain. There is minimal food resource for water vole and as such the drain is considered to be sub-optimal for this species. Previous surveys for Keadby 2 Power Station also did not find water vole in this drain.

Stainforth and Keadby Canal

4.2.22 At the location of the Proposed Development Site, the canal is approximately 40m wide and greater than 1m in depth. The water column is dominated by submerged aquatic plants, with isolated stands of reeds present in the margins (**Annex B**, Photograph 8).

4.2.23 The banks of the canal are vertical and where visible were concrete. Bankside trees and scrub are present on the northern bank of the canal, however given its width shading to the channel is negligible.

4.2.24 Given the prevailing habitat conditions, a water vole survey was not conducted. The banks are unsuitable for water vole and there is minimal food resource. The canal was therefore deemed unsuitable for water vole and was scoped out.

River Trent

4.2.25 At the location of the existing water intake and outfall structures, the River Trent is a large (approximately 150m wide) tidal river (**Annex B**, Photograph 9) and is therefore unsuitable for water vole. Water vole is therefore scoped out in relation to the River Trent.

Table 1: Water vole field signs recorded within each waterbody

| Waterbody Reference | Evidence of Water Vole Found? | Water Vole Field Signs (Peak Count) | | | |
|---------------------|-------------------------------|-------------------------------------|----------|--------------------|------------------------------------|
| | | Burrows | Latrines | Other Field Signs | Estimate of Water Vole Territories |
| 1 | Yes | 4 | 5 | 2 feeding remains | 4 |
| | | | | 1 feeding remains | |
| | | | | None | |
| 2 | Yes | 3 | 4 | 30 feeding remains | 2 |
| 3 | No | 0 | 0 | None | 0 |
| 4 | Yes | 1 | 0 | 1 feeding remains | 1 |
| 5 | No | 0 | 0 | None | 0 |
| North Soak Drain | No | 0 | 0 | None | 0 |

4.3 Otter Survey Results

Keadby Common (Drains 1, 2, 3, 4 and 5)

- 4.3.1 No evidence of otter was found in association with the minor waterbodies on Keadby Common, or in adjacent terrestrial habitats.
- 4.3.2 While otters will explore small waterbodies in their territories, such use would be transitory only, unless there were suitable habitat features to encourage more regular use. In this case, the habitat conditions present are sub-optimal for otter given most of the drains dry up during the summer and only hold shallow water during the wetter months of the year. Most of the drains are therefore not suitable to sustain a regular presence of fish, and therefore do not provide represent attractive foraging habitat for otter. Drain 1 holds permanent water but is still a very minor waterbody and is only likely to support minor fish species.
- 4.3.3 Cover was also poor along most drains, making it unlikely that otter would use the waterbodies of Keadby Common for lying-up or for holts. Only Drains 2 and 3 had any substantive bankside cover, and this was dense scrub with little cover at ground level. No evidence of otter, or habitat features suitable for use by otter, was found in association with this scrub.
- 4.3.4 Given the above habitat conditions, it is considered that otter will not make any substantive use of the drains associated with Keadby Common.

North Soak Drain and Keadby Canal

- 4.3.5 No evidence of otter was recorded in association with these two waterbodies and their adjacent terrestrial habitats. The areas of mature woodland and scrub next to the Proposed Development Site did not have sufficient cover or other habitat features at ground level suitable for use by otters as couches or holts.
- 4.3.6 Currently the land required for the Proposed Development is subject to ongoing construction works for Keadby 2 Power Station (**Annex B**, Photograph 10). Otter has not been identified as a constraint to these construction works, and while construction works are ongoing, this area is unlikely to be attractive to otter.
- 4.3.7 Otter is not considered a constraint in relation to potential works associated with the Proposed Development in the vicinity of the North Soak Drain and the Stainforth and Keadby Canal.

River Trent

- 4.3.8 The survey for otter was restricted to inspections of suitable terrestrial habitat associated with the Proposed Development Site. The River Trent is only relevant to the Proposed Development because of the option to use its existing water intake and outfall structures. As such, although otter will likely forage along the Trent, the Proposed Development has limited potential to affect the species when it is using this large waterbody.

- 4.3.9 The banks of the Trent in association with the Proposed Development are immediately adjacent to a road and are used for recreation by residents of the village. The banks are predominantly under mown improved grassland, with small and narrow stands of scrub and common reed at the edge of the channel. The latter provides limited cover for otter, making it unlikely that otter would preferentially use these areas for lying-up or for holts given the wider resource of less disturbed habitat along the River Trent.
- 4.3.10 No evidence of otter was recorded in association with the River Trent. Otter is not considered to be a constraint in relation to potential works associated with the Proposed Development on the banks of the River Trent.

5.0 CONCLUSIONS AND NATURE CONSERVATION EVALUATION

5.1 Overview

5.1.1 This section provides an assessment of the riparian mammals recorded in association with the Proposed Development Site to determine their relative nature conservation value.

5.2 Water Vole

Keadby Common (Drains 1, 2, 3, 4 and 5)

5.2.1 Given that all the drains present in associated the Main Site are located in close proximity to each other and are connected, they have been evaluated together.

5.2.2 Fields signs were found in a number of discrete locations, indicating that there is only a small and perhaps transitory population of water voles associated with these drains (likely to be less than 10 territories and individuals). It is possible that the sub-optimal drains in particular support animals displaced from more optimal waterbodies elsewhere, and that there is a high turnover of water voles within these drains year to year.

5.2.3 Lincolnshire is a stronghold for water vole, supporting a successful and widespread population, and sightings or their associated field signs can be expected in most suitable waterbodies throughout the county (Lincolnshire Biodiversity Partnership, 2011). The desk study undertaken for the PEA identified a large number of similar drains in the local area, which when considered with the number of desk study records, suggests that this species is relatively common in the wider landscape surrounding the Proposed Development Site. The small numbers of water voles recorded indicates that these drains are of less than county value for the species. The small numbers of water vole recorded are only likely to make a minor contribution to the wider population, especially given the habitat conditions present indicate that these territories may not be sustainable over the long-term.

5.2.4 Given the above it is considered that the drains of Keadby Common support a water vole population of local value.

5.3 Otter

5.3.1 The surveys found no evidence of otter associated with the Proposed Development Site.

5.3.2 As highlighted within the Section 4, it is assumed that otters are moving and foraging along the River Trent and the Stainforth and Keadby Canal habitat corridor, and potentially the other waterbodies associated with the Proposed Development Site. However, there is no evidence that habitats within the Proposed Development Site are of specific importance for otter and there is no evidence that otter currently uses the habitats associated the Proposed Development Site for breeding or resting.

- 5.3.3 Otter is not considered to be a constraint to the Proposed Development, so further assessment is not required. However, top-up surveys are likely to be required in future years to reconfirm the status of the species and the suitability of the habitats present.

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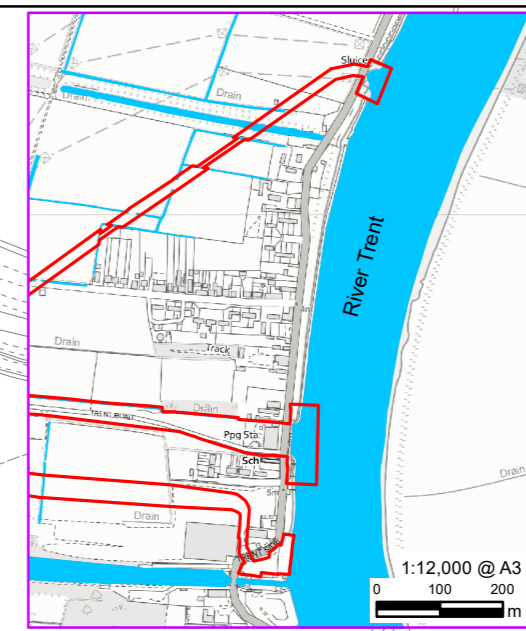
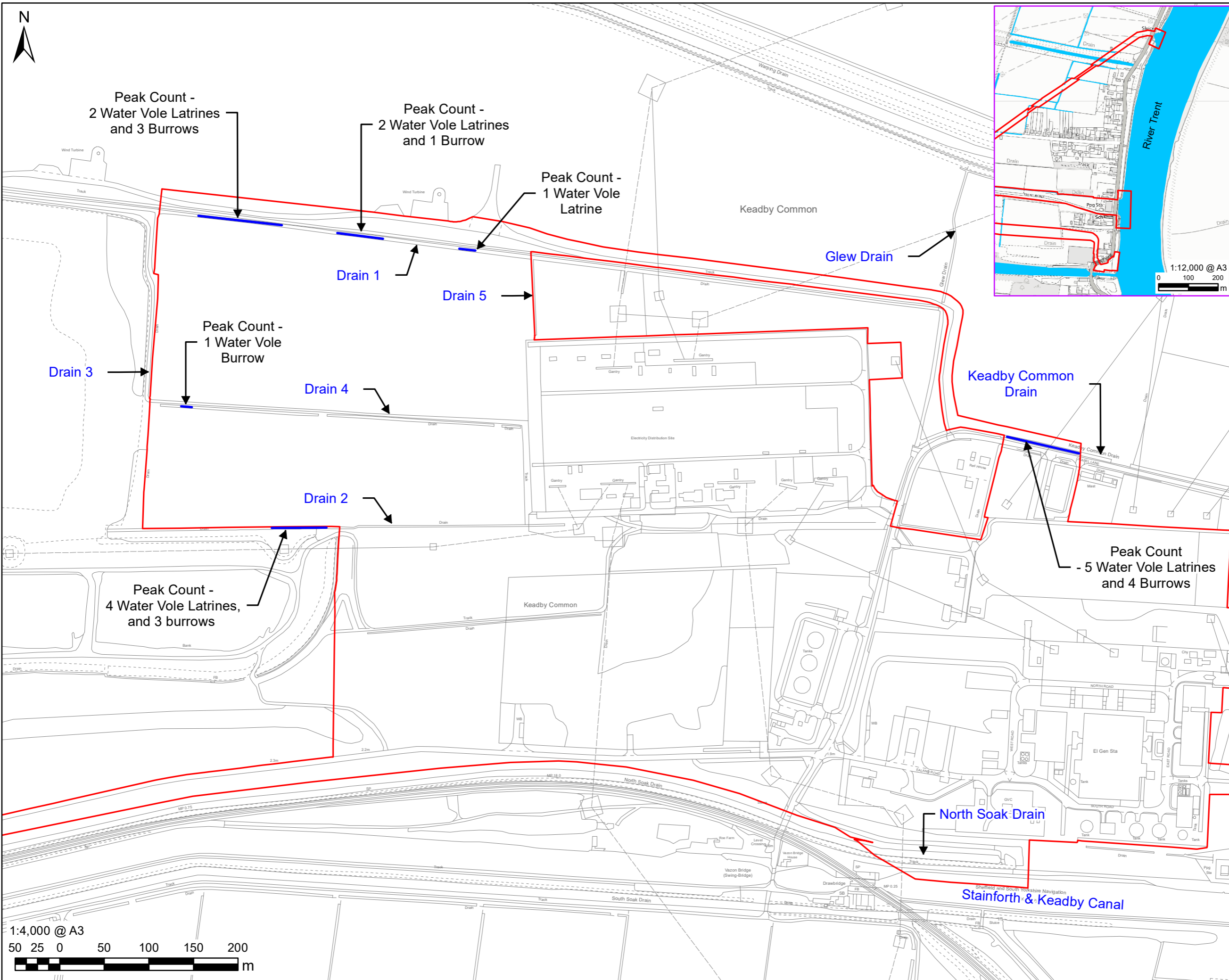
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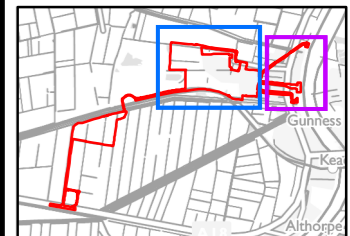
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LEGEND
 Proposed Development Site
 Water Vole Field Signs



NOTES
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ISSUE PURPOSE
 RIPARIAN MAMMAL SURVEY REPORT
PROJECT NUMBER
 60625943
SHEET TITLE
 Riparian Mammal Field Signs
SHEET NUMBER
 Figure 11F.1

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ANNEX A: RIPARIAN MAMMAL SURVEY FORMS

| | | | |
|----------------------------|----------------|--------------------------|----------------|
| Watercourse Number: | Drain 1 | Date of Survey: | 19/05/2020 |
| Grid Reference Start: | SE 81803 12232 | Grid Reference Finished: | SE 82224 12180 |
| Further Notes: | | | |

Watercourse Information (results in bold and italics):

| | | | | | | | | | | | | | |
|------------------------|-------------------|----------------------------------|-----------------------|------------------|------------------|----------------------|--------------------------|-------------------|-------------|---------|------------|---------------|-------------|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | |
| Current: | Rapid | | Fast | Slow | Sluggish | | Static | | | | | | |
| Width: | <1m | 1-2m | 2-5m | 5-10m | 10-20m | 20-40m | >40m | | | | | | |
| Mean Water Depth: | <0.5m | | 0.5-1m | | 1-2m | | >2m | | | | | | |
| Bank Treatment: | Canalised | | | Maintained | | | Wild/Semi-Natural | | | | | | |
| Bank Profile: | Flat <10° | | | Shallow <45° | | Steep >45° | | Vertical/Undercut | | | | | |
| Bank-full Height: | <0.5m | | | 0.5-1m | | 1-2m | | >2m | | | | | |
| Water Use: | Water Abstraction | Power Boating | Sail Boating | Manpower Boating | Bankside Angling | Bankside Shooting | Keepered | Reserve | None | | | | |
| Bordering Land Use: | Upland Grass | Permanent/Temporary Grass | Broad-leaved Woodland | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced |
| Pollution: | Unpolluted | | | Domestic | | Agriculture | | | Industrial | | | | |
| Weed Control: | Mechanical | | | Chemical | | | | | None | | | | |
| Disturbance Factor 1-5 | 1 (low) | | 2 | | 3 | | 4 | | 5 (high) | | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) | Vegetation Types | DAFORN Rating |
|--|--|---|---------------------------------|---------------|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings | Bankside Trees | N |
| <input checked="" type="checkbox"/> Latrines 3 - SE 81926 12221, SE 81944 12212 & SE 82006 12202 | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat | Bankside Bushes | N |
| <input checked="" type="checkbox"/> Burrows 4 - SE 81844 12217, SE 81926 12221, SE 81944 12212 & SE 82006 12202 | | <input type="checkbox"/> Mink Footprints/Runs | Bankside Herbs | O |
| <input type="checkbox"/> Footprints | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Rat Sightings | Submerged Weed | F |
| <input type="checkbox"/> Pathways | | <input type="checkbox"/> Rat Droppings | Floating Weed | R |
| <input checked="" type="checkbox"/> Feeding Remains 3 - SE 81926 12221, SE 81944 12212 & SE 82006 12202 | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Footprints | Emergents | N |
| <input type="checkbox"/> Lawns | | | Marginals – Reeds/Sedges/Rushes | F |
| | | | Bankside Grasses | D |

| | | | |
|---|----------------|--------------------------|----------------|
| Watercourse Number: | Drain 1 | Date of Survey: | 12/08/2020 |
| Grid Reference Start: | SE 81803 12232 | Grid Reference Finished: | SE 82224 12180 |
| Further Notes: The bank along the northern margin of the drain had recently been cut. | | | |

Watercourse Information (results in bold and italics):

| | | | | | | | | | | | | | |
|------------------------|------------------------------|----------------------------------|-----------------------|--------------------------------------|------------------|-------------------|----------------------|------------------------------|------------------------|-------------------|------------|---------------|-------------|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | |
| Current: | Rapid | | Fast | | Slow | | Sluggish | | Static | | | | |
| Width: | <1m | 1-2m | | 2-5m | 5-10m | | 10-20m | 20-40m | | >40m | | | |
| Mean Water Depth: | <0.5m | | 0.5-1m | | | 1-2m | | >2m | | | | | |
| Bank Treatment: | Canalised | | | 1 - Maintained (recently cut) | | | | 1 - Wild/Semi-Natural | | | | | |
| Bank Profile: | Flat <10° | | | Shallow <45° | | | Steep >45° | | | Vertical/Undercut | | | |
| Bank-full Height: | <0.5m | | 0.5-1m | | | 1-2m | | >2m | | | | | |
| Water Use: | Water Abstraction | Power Boating | Sail Boating | Manpower Boating | Bankside Angling | Bankside Shooting | Keeped | Reserve | None | | | | |
| Bordering Land Use: | Upland Grass | Permanent/Temporary Grass | Broad-leaved Woodland | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced |
| Pollution: | Unpolluted | | | Domestic | | | Agriculture | | | Industrial | | | |
| Weed Control: | Mechanical (one bank) | | | | Chemical | | | | None (one bank) | | | | |
| Disturbance Factor 1-5 | 1 (low) | | 2 | | 3 | | 4 | | 5 (high) | | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) | Vegetation Types | DAFORN Rating |
|---|--|---|---------------------------------|---------------|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings | Bankside Trees | N |
| <input checked="" type="checkbox"/> Latrines - 4 (SE 81875 12221, SE 81900 12219, SE 82057 12199, SE 82152 12185) | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat | Bankside Bushes | N |
| <input checked="" type="checkbox"/> Burrows 1 (SE 81847 12227) | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Mink Footprints/Runs | Bankside Herbs | O |
| <input type="checkbox"/> Footprints | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Rat Sightings | Submerged Weed | F |
| <input type="checkbox"/> Pathways | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Droppings | Floating Weed | R |
| <input type="checkbox"/> Feeding Remains | | <input type="checkbox"/> Rat Footprints | Emergents | N |
| <input type="checkbox"/> Lawns | | | Marginals - Reeds/Sedges/Rushes | F |
| | | | Bankside Grasses | D |

| | | | |
|---|----------------|---------------------------------|----------------|
| Watercourse Number: | Drain 2 | Date of Survey: | 12/08/2020 |
| Grid Reference Start: | SE 82302 11884 | Grid Reference Finished: | SE 81788 11878 |
| Further Notes: Whole area accessible for survey. The eastern section between SE 82036 11878 and SE 82302 11884 was dry. | | | |

Watercourse Information (results in bold and italics): /

| | | | | | | | | | | | | | |
|-------------------------------|---------------------------------|-----------------------------------|-----------------------|------------------|------------------|----------------------|--------------------------|-------------------|-------------|------------|------------|---------------|-------------|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | |
| Current: | Rapid | | Fast | Slow | | Sluggish | | Static | | | | | |
| Width: | <1m | 1-2m | 2-5m | 5-10m | 10-20m | 20-40m | >40m | | | | | | |
| Mean Water Depth: | <0.5m (Dry in places) | | 0.5-1m | | 1-2m | | >2m | | | | | | |
| Bank Treatment: | Canalised | | | Maintained | | | Wild/Semi-Natural | | | | | | |
| Bank Profile: | Flat <10° | | | Shallow <45° | | Steep >45° | | Vertical/Undercut | | | | | |
| Bank-full Height: | <0.5m | | 0.5-1m | | 1-2m | | >2m | | | | | | |
| Water Use: | Water Abstraction | Power Boating | Sail Boating | Manpower Boating | Bankside Angling | Bankside Shooting | Keeped | Reserve | None | | | | |
| Bordering Land Use: | Scrub | Permanent /Temporary Grass | Broad-leaved Woodland | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced |
| Pollution: | Unpolluted | | | Domestic | | | Agriculture | | | Industrial | | | |
| Weed Control: | Mechanical | | | Chemical | | | None | | | | | | |
| Disturbance Factor 1-5 | 1 (low) | | 2 | | 3 | | 4 | | 5 (high) | | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) |
|---|--|---|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings |
| <input checked="" type="checkbox"/> Latrines 4 – SE 81959 11874, SE 81942 11873, SE 81937 11873, SE 81984 11876 | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat |
| <input type="checkbox"/> Burrows | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Mink Footprints/Runs |
| <input type="checkbox"/> Footprints | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Sightings |
| <input type="checkbox"/> Pathways | | <input type="checkbox"/> Rat Droppings |
| <input checked="" type="checkbox"/> Feeding Remains - 30 discreet areas between SE81916 11877 and SE82007 11878) | | <input type="checkbox"/> Rat Footprints |
| <input type="checkbox"/> Lawns | | |

| Vegetation Types | DAFORN Rating |
|---------------------------------|----------------------|
| Bankside Trees | F |
| Bushes | N |
| Herbs | N |
| Submerged Weed | N |
| Floating Weed | N |
| Emergents | N |
| Marginals – Reeds/Sedges/Rushes | F |
| Tall Grass | N |
| Short Grass | N |

| | | | |
|---|----------------|--------------------------|----------------|
| Watercourse Number: | Drain 2 | Date of Survey: | 12/08/2020 |
| Grid Reference Start: | SE 82302 11884 | Grid Reference Finished: | SE 81788 11878 |
| Further Notes: Whole area accessible for survey. The eastern section between SE 82036 11878 and SE 82302 11884 was dry. | | | |

Watercourse Information (results in bold and italics):

| | | | | | | | | | | | | | | | | |
|------------------------|---------------------------------|-----------------------------------|-----------------------|------------------|--------------|--------------|----------------------|------------------|--------------------------|-------------------|-------------------|---------------|-------------|---------|-------------|--|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | | | | |
| Current: | Rapid | | Fast | | Slow | | Sluggish | | Static | | | | | | | |
| Width: | <1m | 1-2m | | 2-5m | | 5-10m | | 10-20m | | 20-40m | | >40m | | | | |
| Mean Water Depth: | <0.5m (Dry in places) | | | 0.5-1m | | | 1-2m | | | >2m | | | | | | |
| Bank Treatment: | Canalised | | | | Maintained | | | | Wild/Semi-Natural | | | | | | | |
| Bank Profile: | Flat <10° | | | Shallow <45° | | | Steep >45° | | | Vertical/Undercut | | | | | | |
| Bank-full Height | <0.5m | | | 0.5-1m | | | 1-2m | | | >2m | | | | | | |
| Water Use: | Water Abstraction | | Power Boating | | Sail Boating | | Manpower Boating | | Bankside Angling | | Bankside Shooting | | Keeped | Reserve | None | |
| Bordering Land Use: | Scrub | Permenant /Temporary Grass | Broad-leaved Woodland | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced | | | |
| Pollution: | Unpolluted | | | | Domestic | | | | Agriculture | | | | Industrial | | | |
| Weed Control: | Mechanical | | | | Chemical | | | | None | | | | | | | |
| Disturbance Factor 1-5 | 1 (low) | | | 2 | | | 3 | | | 4 | | | 5 (high) | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) |
|---|--|---|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings |
| <input checked="" type="checkbox"/> Latrines 4 – SE 81959 11874, SE 81942 11873, SE 81937 11873, SE 81984 11876 | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat |
| <input type="checkbox"/> Burrows | | <input type="checkbox"/> Mink Footprints/Runs |
| <input type="checkbox"/> Footprints | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Rat Sightings |
| <input type="checkbox"/> Pathways | | <input type="checkbox"/> Rat Droppings |
| <input checked="" type="checkbox"/> Feeding Remains - 30 discreet areas between SE81916 11877 and SE82007 11878) | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Footprints |
| <input type="checkbox"/> Lawns | | |

| Vegetation Types | DAFORN Rating |
|---------------------------------|---------------|
| Bankside Trees | F |
| Bushes | N |
| Herbs | N |
| Submerged Weed | N |
| Floating Weed | N |
| Emergents | N |
| Marginals – Reeds/Sedges/Rushes | F |
| Tall Grass | N |
| Short Grass | N |

| | | | |
|----------------------------|----------------|--------------------------|----------------|
| Watercourse Number: | Drain 3 | Date of Survey: | 19/05/2020 |
| Grid Reference Start: | SE 81805 12223 | Grid Reference Finished: | SE 81790 11883 |
| Further Notes: | | | |

Watercourse Information (results in bold and italics):

| | | | | | | | | | | | | | |
|------------------------|-------------------|-----------------------------------|------------------------------|------------------|------------------|----------------------|--------------------------|------------------|-------------------|------------|------------|---------------|-------------|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | |
| Current: | Rapid | | Fast | | Slow | | Sluggish | | Static | | | | |
| Width: | <1m | 1-2m | 2-5m | | 5-10m | | 10-20m | | 20-40m | | >40m | | |
| Mean Water Depth: | <0.5m | | 0.5-1m | | 1-2m | | >2m | | | | | | |
| Bank Treatment: | Canalised | | | Maintained | | | Wild/Semi-Natural | | | | | | |
| Bank Profile: | Flat <10° | | Shallow <45° | | | Steep >45° | | | Vertical/Undercut | | | | |
| Bank-full Height: | <0.5m | | 0.5-1m | | | 1-2m | | >2m | | | | | |
| Water Use: | Water Abstraction | Power Boating | Sail Boating | Manpower Boating | Bankside Angling | Bankside Shooting | Keepereed | Reserve | None | | | | |
| Bordering Land Use: | Upland Grass | <i>Permenant /Temporary Grass</i> | <i>Broad-leaved Woodland</i> | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced |
| Pollution: | Unpolluted | | | Domestic | | | Agriculture | | | Industrial | | | |
| Weed Control: | Mechanical | | | Chemical | | | | None | | | | | |
| Disturbance Factor 1-5 | 1 (low) | | 2 | | 3 | | 4 | | 5 (high) | | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) |
|--|--|---|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings |
| <input type="checkbox"/> Latrines | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat |
| <input type="checkbox"/> Burrows | | <input type="checkbox"/> Mink Footprints/Runs |
| <input type="checkbox"/> Footprints | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Rat Sightings |
| <input type="checkbox"/> Pathways | | <input type="checkbox"/> Rat Droppings |
| <input type="checkbox"/> Feeding Remains | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Footprints |
| <input type="checkbox"/> Lawns | | |

| Vegetation Types | DAFORN Rating |
|---------------------------------|---------------|
| Bankside Trees | F |
| Bankside Bushes | N |
| Bankside Herbs | O |
| Submerged Weed | N |
| Floating Weed | N |
| Emergents | N |
| Marginals – Reeds/Sedges/Rushes | D |
| Bankside Grasses | F |

| | | | |
|---|-------------------|-----------------------------------|------------------------------|
| Watercourse Number: | Drain 3 | Date of Survey: | 12/08/2020 |
| Grid Reference Start: | SE 81805 12223 | Grid Reference Finished: | SE 81790 11883 |
| Further Notes: | | | |
| <i>Watercourse Information (results in bold and italics):</i> / | | | |
| Habitat Type: | Coast | Lake | Pond |
| Shore Type: | Boulders | Stones | Gravel |
| Current: | Dry | Fast | Slow |
| Width: | <1m | 1-2m | 2-5m |
| Mean Water Depth: | Dry | <0.5m | 0.5-1m |
| Bank Treatment: | Canalised | Maintained | Wild/Semi-Natural |
| Bank Profile | Flat <10° | Shallow <45° | Steep >45° |
| Bank-full Height | <0.5m | 0.5-1m | >2m |
| Water Use: | Water Abstraction | Power Boating | Sail Boating |
| Bordering Land Use: | Upland Grass | <i>Permanent /Temporary Grass</i> | <i>Broad-leaved Woodland</i> |
| Pollution: | Unpolluted | Domestic | Agriculture |
| Weed Control: | Mechanical | Chemical | None |
| Disturbance Factor 1-5 | 1 (low) | 2 | 3 |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) | Vegetation Types | DAFORN Rating |
|--|--|---|---------------------------------|---------------|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings | Bankside Trees | F |
| <input type="checkbox"/> Latrines | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat | Bankside Bushes | N |
| <input type="checkbox"/> Burrows | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Mink Footprints/Runs | Bankside Herbs | O |
| <input type="checkbox"/> Footprints | | <input type="checkbox"/> Rat Sightings | Submerged Weed | N |
| <input type="checkbox"/> Pathways | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Droppings | Floating Weed | N |
| <input type="checkbox"/> Feeding Remains | | <input type="checkbox"/> Rat Footprints | Emergents | N |
| <input type="checkbox"/> Lawns | | | Marginals – Reeds/Sedges/Rushes | D |
| | | | Bankside Grasses | F |

| | | | |
|------------------------------|----------------|---------------------------------|----------------|
| Watercourse Number: | Drain 4 | Date of Survey: | 19/05/2020 |
| Grid Reference Start: | SE 82212 11990 | Grid Reference Finished: | SE 81800 12016 |
| Further Notes: | | | |

Watercourse Information (results in bold and italics):

| | | | | | | | | | | | | | |
|-------------------------------|-------------------|-----------------------------------|-----------------------|------------------|------------------|----------------------|--------------------------|-------------------|-------------|------------|------------|---------------|-------------|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | |
| Current: | Rapid | | Fast | Slow | | Sluggish | | Static | | | | | |
| Width: | <1m | 1-2m | 2-5m | 5-10m | 10-20m | 20-40m | >40m | | | | | | |
| Mean Water Depth: | <0.5m | | 0.5-1m | | 1-2m | | >2m | | | | | | |
| Bank Treatment: | Canalised | | | Maintained | | | Wild/Semi-Natural | | | | | | |
| Bank Profile | Flat <10° | | | Shallow <45° | | Steep >45° | | Vertical/Undercut | | | | | |
| Bank-full Height | <0.5m | | 0.5-1m | | 1-2m | | >2m | | | | | | |
| Water Use: | Water Abstraction | Power Boating | Sail Boating | Manpower Boating | Bankside Angling | Bankside Shooting | Kepered | Reserve | None | | | | |
| Bordering Land Use: | Upland Grass | Permenant /Temporary Grass | Broad-leaved Woodland | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced |
| Pollution: | Unpolluted | | | Domestic | | | Agriculture | | | Industrial | | | |
| Weed Control: | Mechanical | | | Chemical | | | None | | | | | | |
| Disturbance Factor 1-5 | 1 (low) | | 2 | | 3 | | 4 | | 5 (high) | | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) |
|--|--|---|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings |
| <input type="checkbox"/> Latrines | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat |
| <input type="checkbox"/> Burrows | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Mink Footprints/Runs |
| <input type="checkbox"/> Footprints | | <input type="checkbox"/> Rat Sightings |
| <input type="checkbox"/> Pathways | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Droppings |
| <input type="checkbox"/> Feeding Remains | | <input type="checkbox"/> Rat Footprints |
| <input type="checkbox"/> Lawns | | |

| Vegetation Types | DAFORN Rating |
|---------------------------------|----------------------|
| Bankside Trees | N |
| Bankside Bushes | N |
| Bankside Herbs | O |
| Submerged Weed | N |
| Floating Weed | N |
| Emergents | N |
| Marginals – Reeds/Sedges/Rushes | D |
| Bankside Grasses | D |

| | | | |
|----------------------------|----------------|--------------------------|----------------|
| Watercourse Number: | Drain 4 | Date of Survey: | 12/08/2020 |
| Grid Reference Start: | SE 82212 11990 | Grid Reference Finished: | SE 81800 12016 |
| Further Notes: | | | |

Watercourse Information (results in bold and italics):

| | | | | | | | | | | | | | |
|------------------------|-------------------|----------------------------------|-----------------------|------------------|------------------|----------------------|--------------------------|-------------------|-------------|------------|------------|---------------|-------------|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | |
| Current: | Dry | | | Fast | Slow | Sluggish | | Static | | | | | |
| Width: | <1m | 1-2m | 2-5m | 5-10m | 10-20m | 20-40m | >40m | | | | | | |
| Mean Water Depth: | Dry | | | <0.5m | 0.5-1m | | 1-2m | | | | | | |
| Bank Treatment: | Canalised | | | Maintained | | | Wild/Semi-Natural | | | | | | |
| Bank Profile | Flat <10° | | | Shallow <45° | | Steep >45° | | Vertical/Undercut | | | | | |
| Bank-full Height | <0.5m | | | 0.5-1m | | 1-2m | | >2m | | | | | |
| Water Use: | Water Abstraction | Power Boating | Sail Boating | Manpower Boating | Bankside Angling | Bankside Shooting | Keepered | Reserve | None | | | | |
| Bordering Land Use: | Upland Grass | Permanent/Temporary Grass | Broad-leaved Woodland | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced |
| Pollution: | Unpolluted | | | Domestic | | | Agriculture | | | Industrial | | | |
| Weed Control: | Mechanical | | | Chemical | | | None | | | | | | |
| Disturbance Factor 1-5 | 1 (low) | | 2 | 3 | | 4 | | 5 (high) | | | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) |
|--|--|---|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings |
| <input type="checkbox"/> Latrines | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat |
| <input checked="" type="checkbox"/> Burrows – 1 SE 81837 12013 | | <input type="checkbox"/> Mink Footprints/Runs |
| <input type="checkbox"/> Footprints | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Rat Sightings |
| <input type="checkbox"/> Pathways | | <input type="checkbox"/> Rat Droppings |
| <input checked="" type="checkbox"/> Feeding Remains - 1 SE 81837 12013 | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Footprints |
| <input type="checkbox"/> Lawns | | |

| Vegetation Types | DAFORN Rating |
|---------------------------------|---------------|
| Bankside Trees | N |
| Bankside Bushes | N |
| Bankside Herbs | O |
| Submerged Weed | N |
| Floating Weed | N |
| Emergents | N |
| Marginals – Reeds/Sedges/Rushes | D |
| Bankside Grasses | D |

| | | | |
|------------------------------|----------------|---------------------------------|----------------|
| Watercourse Number: | Drain 5 | Date of Survey: | 19/05/2020 |
| Grid Reference Start: | SE 82224 12179 | Grid Reference Finished: | SE 82228 12091 |
| Further Notes: | | | |

Watercourse Information (results in bold and italics):

| | | | | | | | | | | | | | |
|-------------------------------|-------------------|----------------------------------|-----------------------|------------------|------------------|----------------------|--------------------------|-------------------|-------------|---------|------------|---------------|-------------|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | |
| Current: | Dry | | Fast | Slow | Sluggish | | Static | | | | | | |
| Width: | <1m | 1-2m | 2-5m | 5-10m | 10-20m | 20-40m | >40m | | | | | | |
| Mean Water Depth: | Dry | | <0.5m | 0.5-1m | | 1-2m | | | | | | | |
| Bank Treatment: | Canalised | | | Maintained | | | Wild/Semi-Natural | | | | | | |
| Bank Profile: | Flat <10° | | | Shallow <45° | | Steep >45° | | Vertical/Undercut | | | | | |
| Bank-full Height: | <0.5m | | 0.5-1m | | 1-2m | | >2m | | | | | | |
| Water Use: | Water Abstraction | Power Boating | Sail Boating | Manpower Boating | Bankside Angling | Bankside Shooting | Kepered | Reserve | None | | | | |
| Bordering Land Use: | Upland Grass | Permanent/Temporary Grass | Broad-leaved Woodland | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced |
| Pollution: | Unpolluted | | | Domestic | | Agriculture | | | Industrial | | | | |
| Weed Control: | Mechanical | | | Chemical | | | None | | | | | | |
| Disturbance Factor 1-5 | 1 (low) | | 2 | | 3 | | 4 | | 5 (high) | | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) | Vegetation Types | DAFORN Rating |
|--|--|---|---------------------------------|----------------------|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings | Bankside Trees | N |
| <input type="checkbox"/> Latrines | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat | Bankside Bushes | N |
| <input type="checkbox"/> Burrows | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Mink Footprints/Runs | Bankside Herbs | O |
| <input type="checkbox"/> Footprints | | <input type="checkbox"/> Rat Sightings | Submerged Weed | N |
| <input type="checkbox"/> Pathways | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Droppings | Floating Weed | N |
| <input type="checkbox"/> Feeding Remains | | <input type="checkbox"/> Rat Footprints | Emergents | O |
| <input type="checkbox"/> Lawns | | | Marginals – Reeds/Sedges/Rushes | D |
| | | | Bankside Grasses | D |

| | | | |
|------------------------------|----------------|---------------------------------|----------------|
| Watercourse Number: | Drain 5 | Date of Survey: | 12/08/2020 |
| Grid Reference Start: | SE 82224 12179 | Grid Reference Finished: | SE 82228 12091 |
| Further Notes: | | | |

Watercourse Information (results in bold and italics):

| | | | | | | | | | | | | | |
|-------------------------------|-------------------|-----------------------------------|-----------------------|------------------|----------------------|-------------------|--------------------------|------------------|-------------|------------|------------|---------------|-------------|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | |
| Current: | Dry | | Fast | Slow | Sluggish | | Static | | | | | | |
| Width: | <1m | 1-2m | 2-5m | 5-10m | 10-20m | 20-40m | >40m | | | | | | |
| Mean Water Depth: | Dry | | <0.5m | 0.5-1m | | 1-2m | | | | | | | |
| Bank Treatment: | Canalised | | | Maintained | | | Wild/Semi-Natural | | | | | | |
| Bank Profile: | Flat <10° | | Shallow <45° | | Steep >45° | | Vertical/Undercut | | | | | | |
| Bank-full Height | <0.5m | | 0.5-1m | | 1-2m | | >2m | | | | | | |
| Water Use: | Water Abstraction | Power Boating | Sail Boating | Manpower Boating | Bankside Angling | Bankside Shooting | Keeped | Reserve | None | | | | |
| Bordering Land Use: | Upland Grass | Permanent /Temporary Grass | Broad-leaved Woodland | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced |
| Pollution: | Unpolluted | | | Domestic | | | Agriculture | | | Industrial | | | |
| Weed Control: | Mechanical | | | | Chemical | | | | None | | | | |
| Disturbance Factor 1-5 | 1 (low) | | 2 | | 3 | | 4 | | 5 (high) | | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) |
|--|--|---|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings |
| <input type="checkbox"/> Latrines | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat |
| <input type="checkbox"/> Burrows | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Mink Footprints/Runs |
| <input type="checkbox"/> Footprints | | <input type="checkbox"/> Rat Sightings |
| <input type="checkbox"/> Pathways | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Droppings |
| <input type="checkbox"/> Feeding Remains | | <input type="checkbox"/> Rat Footprints |
| <input type="checkbox"/> Lawns | | |

| Vegetation Types | DAFORN Rating |
|---------------------------------|----------------------|
| Bankside Trees | N |
| Bankside Bushes | N |
| Bankside Herbs | O |
| Submerged Weed | N |
| Floating Weed | N |
| Emergents | O |
| Marginals – Reeds/Sedges/Rushes | D |
| Bankside Grasses | D |

| | | | |
|---|------------------|--------------------------|----------------|
| Watercourse Number: | North Soak Drain | Date of Survey: | 12/08/2020 |
| Grid Reference Start: | SE 82516 11544 | Grid Reference Finished: | SE 82747 11508 |
| Further Notes: The water was too deep to survey from the within the <u>channel</u> so surveys were conducted from the bank. | | | |

Watercourse Information (results in bold and italics):

| | | | | | | | | | | | | | |
|------------------------|-------------------|-----------------------------------|-----------------------|------------------|------------------|-------------------|----------------------|--------------------------|---------------|-------------------|------------|---------------|-------------|
| Habitat Type: | Coast | Lake | Pond | Main River | Stream | Ditch | Canal | Bog/Marsh | | | | | |
| Shore Type: | Boulders | Stones | Gravel | Sand | Silt | Earth | Rock Cliffs | Earth Cliffs | Canalized | Poached | Reinforced | | |
| Current: | Dry | | | Fast | Slow | | | Sluggish | Static | | | | |
| Width: | <1m | 1-2m | 2-5m | 5-10m | 10-20m | | | 20-40m | >40m | | | | |
| Mean Water Depth: | Dry | | | <0.5m | | 0.5-1m | | > 1m | | | | | |
| Bank Treatment: | Canalised | | | Maintained | | | | Wild/Semi-Natural | | | | | |
| Bank Profile | Flat <10° | | | Shallow <45° | | | Steep >45° | | | Vertical/Undercut | | | |
| Bank-full Height | <0.5m | | | 0.5-1m | | | 1-2m | | | >2m | | | |
| Water Use: | Water Abstraction | Power Boating | Sail Boating | Manpower Boating | Bankside Angling | Bankside Shooting | Keepereed | Reserve | None | | | | |
| Bordering Land Use: | Upland Grass | Permenant /Temporary Grass | Broad-leaved Woodland | Conifer Woodland | Peat Bog | Arable | Salt Marsh | Urban Industrial | Park Garden | Heath | Fen | Cattle Grazed | Bank Fenced |
| Pollution: | Unpolluted | | | Domestic | | | Agriculture | | | Industrial | | | |
| Weed Control: | Mechanical | | | Chemical | | | | None | | | | | |
| Disturbance Factor 1-5 | 1 (low) | | 2 | | 3 | | | 4 | | 5 (high) | | | |

Results Overview: Including details of field sign, count and National Grid Reference Numbers

| Water Vole | Otter | Other Species (Mink and Rat) |
|--|--|---|
| <input type="checkbox"/> Sightings | <input type="checkbox"/> Sightings | <input type="checkbox"/> Mink Sightings |
| <input type="checkbox"/> Latrines | <input type="checkbox"/> Spraint | <input type="checkbox"/> Mink Scat |
| <input type="checkbox"/> Burrows | | <input type="checkbox"/> Mink Footprints/Runs |
| <input type="checkbox"/> Footprints | <input type="checkbox"/> Footprints/Runs | <input type="checkbox"/> Rat Sightings |
| <input type="checkbox"/> Pathways | | <input type="checkbox"/> Rat Droppings |
| <input type="checkbox"/> Feeding Remains | <input type="checkbox"/> Holts/couches | <input type="checkbox"/> Rat Footprints |
| <input type="checkbox"/> Lawns | | |

| Vegetation Types | DAFORN Rating |
|---------------------------------|---------------|
| Bankside Trees | N |
| Bankside Bushes | D |
| Bankside Herbs | F |
| Submerged Weed | O |
| Floating Weed | N |
| Emergents | R |
| Marginals – Reeds/Sedges/Rushes | R |
| Bankside Grasses | A |

ANNEX B: PHOTOGRAPHS



Photograph 1 - Drain 1 (Keadby Common Drain)



Photograph 2 - Drain 2, western section



Photograph 3 - Drain 2, eastern section



Photograph 4 - Drain 3



Photograph 5 – Drain 4



Photograph 6 – Drain 5



Photograph 7 – North Soak Drain



Photograph 8 – Stainforth and Keadby Canal



Photograph 9 – River Trent



Photograph 10 – Area of woodland cleared for construction of the Keadby 2 Power Station water intake on the Stainforth and Keadby Canal