



King's Lynn Parkway - Water Vole Report

20 January 2020

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King's Lynn Parkway - Water Vole Report

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1 Introduction

1.1 Background

Mott MacDonald Ltd was commissioned by the Borough Council of King's Lynn and West Norfolk to conduct ecological surveys of land bordering the Gaywood and Fairstead estates in King's Lynn. Water vole (*Arvicola amphibious*) surveys were undertaken on all ditches and watercourses within 50m of the proposed scheme.

A preliminary ecological appraisal (PEA) was undertaken in January 2019, which identified suitable habitat for water vole and recommended further water vole surveys.

1.2 Description of the Proposed Scheme

The Proposed Scheme is located in western King's Lynn, Norfolk between Parkway and the existing railway line. It consists of 385 new housing units that will be constructed and positioned to the south west of Parkway Road, King's Lynn. In addition to the housing units the Proposed Scheme consists of associated supporting infrastructure such as recreational space, drainage areas and a road network. These roads will be linked to the existing road network at the intersection of Queen Mary and Parkway by a spine road that runs through the length of Proposed Scheme.

The housing units are split into two areas, north west and south east of the Howards Junior school playing fields. These areas are joined by a proposed spine road that will be located within the Swaffham Belt. A second highways access to the Proposed Scheme from Rollesby Road will be created, through the construction of a new road bridge over the railway line. This will join the Proposed Scheme at the eastern end.

1.3 Legislation

The water vole is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), receiving full protection since 2008. It is against the law to:

- Intentionally capture, kill or injure water voles
- Intentionally or recklessly damage, destroy or block access to their places of shelter or protection
- Intentionally or recklessly disturb them in a place of shelter or protection
- Possess, sell, control or transport live or dead water voles

If found guilty of an offence punishment can include an unlimited fine and a six-month prison sentence.

1.4 Activities which could affect water vole

Activities likely to take place as part of the development of the Proposed Scheme, which could harm water voles include, but are not limited to:

- Habitat loss (watercourses, waterbodies and the associated bank habitat within 5m)
- Changes to water quality
- Changes to water flow
- Changes to habitat as a result of alterations to groundwater conditions

- Fragmentation of existing habitat
- Disturbance
- Death or injury of animals as a result of construction activity

1.5 Survey area

An indicative survey area is shown in Appendix A, as the final design of the Proposed Scheme is not yet available. All waterbodies and ditches within 50m of the boundary of the Proposed Scheme were surveyed for water voles, during the optimal survey season (April to September inclusive). Section 2.3 details the number of surveys each watercourse section received and the date of surveys.

1.6 Scope of the report

Mott MacDonald has been commissioned to undertake water vole surveys in and surrounding the boundary of the Proposed Scheme for King's Lynn Parkway. The objectives of this report are:

- To present the results of the surveys.
- To identify the potential impacts of the scheme on water voles.
- To inform the environmental impact assessment, if required.
- To provide recommendations for further mitigation and enhancement.

2 Methodology

2.1 Desk study

As part of the PEA, an ecological desk study was undertaken for all areas within 500m footprint of the Proposed Scheme to identify records of water vole. Data for the desk study was provided by the Norfolk Biodiversity Information Service. The results of the study are shown in Appendix B, and summarised in Section 3.

2.2 Habitat assessment and field signs survey

A habitat assessment was undertaken for each of the ditch sections and considered the following factors:

- Bank profile, channel profile and characteristics and water levels
- Habitat types present (indication of abundance using DAFOR¹ scale)
- Predominant bank substrate
- Availability of food sources
- Vegetation structure (particularly the extent of suitable marginal vegetation)
- Level of shading (%)
- Watercourse depth and width (m)
- Rate of flow
- Disturbance levels
- Bordering land use
- Connectivity with other areas of suitable or sub-optimal habitat

Disturbance levels were assessed using the follow categories:

- No disturbance – no people or noise pollution
- Low disturbance – few people, some noise pollution
- Moderate disturbance – people present, close to areas of human use
- High disturbance – frequent use by people, noise pollution present

During each survey, the banks of each waterbody (up to a distance of 6m from the water's edge) were inspected for signs of use by water vole, and each type of sign was recorded. Field signs recorded included presence of:

- Latrines
- Burrows (both active and inactive)
- Runs
- Footprints
- Feeding remains
- Individual droppings
- Sightings and/or sounds (characteristic sound entering the water) of individuals.

¹ DAFOR is a scale used to provide a quick estimate of the relative abundance of species. DAFOR stands for the categories Dominant, Abundant, Frequent, Occasional, Rare.

Signs of other mammal species were also recorded during the surveys, including bank vole, field vole, mink and brown rat. The areas surveyed for water vole are shown on the map in Appendix C.

Surveyors applied the principles of standard methodologies which included:

- The Water Vole Mitigation Handbook for Development and Other Construction Activities – Dean et al. (2015)
- Water Vole Conservation Handbook. Third Edition. – Strachan et al. (2011)

2.3 Survey timings

Water vole surveys were undertaken during the optimal survey season, April to September, as per the Water Vole Conservation Handbook (Strachan et al, 2011). Different sections of the study area were surveyed on different dates throughout the season. This is partly owing to the land access availability with specific land owners and changes in design as the Proposed Scheme developed. The map in Appendix C highlights the different survey sections and Table 2.1 details the dates of those surveys.

Where access was not possible during the optimal survey season, visits were undertaken outside of this period, in order to better understand the distribution of water voles.

Table 2.1: Date of water vole surveys for each watercourse section

Section	Date
1	02/05/19, 13/08/19
2	02/05/19, 13/08/19
3	02/05/19, 13/08/19
4	02/05/19, 13/08/19
5	02/05/19, 13/08/19
6	02/05/19, 13/08/19
7	20/08/19
8	02/05/19, 13/08/19
9	20/08/19
10	20/08/19
11	20/08/19
12	20/08/19
13	20/08/19
14	20/08/19
15	17/10/19
16	17/10/19

2.4 Predicting the number of water voles

To estimate the number of water voles present within each section, the number of latrines identified were subject to the following standard calculation, as described in Morris et al, 1998:

$$\text{Estimated water vole numbers} = 1.48 + (0.683 \times (\text{number of latrines}))$$

The numbers resulting from the above calculation were rounded up to the next whole number. These results are presented in Table 3.3 below. This calculation was used on each section of watercourse (Morris et al, 1998).

Results of these calculations would be subject to change, should further surveys be completed.

2.5 Survey limitations

Dense bramble scrub was a constraint to access at Sections 9, 15 and 16. This is a recognised limitation, and methods described in Section 4.2 will address this.

Sections 7, 9, 10, 11, 12, 13 and 14 (Appendix C) were only surveyed once on the 20 August 2019 due to land access agreements and changes to the proposed route of the road which expanded the survey area. Sections 15 and 16 were also only surveyed once on 17 October 2019. This is outside the optimal water vole survey season, and could therefore only confirm water vole presence. Section 4.2 discusses how to address these limitations.

Steep banks and deep silt limited the surveys at the Anglian Water Reservoir, Sections 15 and 16. A boat was used to survey Section 15, but it was not possible to access Section 16 by boat or on foot. However, given that water voles were found to be present in Section 15, it is likely that they are present in Section 16 as it is part of the same waterbody.

The equation above to predict an estimation of water vole numbers may not provide a robust estimate in all habitat types. Precise numerical estimates of water vole populations can only be obtained using capture-mark-recapture methods (Strachan et al, 2011).

The numbers returned by this calculation will need to be revised for those sections of ditch which have not two surveys. Calculations will be updated once the second visit has been undertaken (see Section 4.2).

3 Results

3.1 Desk study

Five records of the European water vole were recorded within 500m of the Proposed Scheme in the last 10 years. These are detailed below in Table 3.1 below and shown on the map in Appendix B.

The water vole record obtained in May 2013 does not have sufficient geographic data to reliably identify its location and proximity to the scheme.

Table 3.1: Records of water voles within 500m of redline boundary from the Norfolk Biodiversity Information Service

Species	Grid reference	Date	Approximate distance from the Proposed Scheme (m)	Record type
<i>Arvicola amphibius</i>	TF632187	05/2009	815	Field record
<i>Arvicola amphibius</i>	TF638192	04/11/2009	75	Field record
<i>Arvicola amphibius</i>	TF635186	01/05/2009	660	Field record
<i>Arvicola amphibius</i>	TF625205	01/06/2011	960	Field record
<i>Arvicola amphibius</i>	TF62K	01/05/2013	N/A	Field record

Source: Norfolk Biodiversity Information Service, 2019.

3.2 Habitat Assessment

Table 3.2 below details the habitat assessment of each section of ditch.

Table 3.2 : Water vole habitat assessment by ditch section

Section	Water body type	Estimated depth (m)	Width (m)	Flow rate	Bank substrate	Bank profile	Adjacent land use	DAFOR							Habitat description and vegetation structure	Shading (%)	Disturbance
								Bankside trees	Reeds/ sedges	Bushes	Tall grasses	Herbs	Short grass	Submerged			
1	Ditch	<0.5	1	Low	Earth	Steep >45°	School, mixed woodland belt and improved grassland	A	R	N	O	R	D	R	Some short grasses with little vegetation in southern section due to shading from trees. Not well connected to other suitable habitats.	50	Low
2	Ditch	<0.5	1	Low	Earth	Steep >45°	Railway line and mixed woodland belt.	D	N	O	N	R	N	F	Little vegetation due to shading from trees. Not well connected to other suitable habitats.	100	Low
3	Ditch	0.5	1	Low	Earth	Steep >45°	Broad-leaved woodland and improved grassland	D	N	O	N	N	N	N	Little vegetation due to shading from trees. Not well connected to other suitable habitats.	100	Low
4	Ditch	0.5	1.5	Low	Earth	Steep >45°	Scrub and cycle path	A	F	A	O	O	O	R	Some sections of sedge and reed with short grass further up the bank.	50	Moderate
5	Ditch	0.5	1.5	Low	Earth	Steep >45°	Scrub, mature trees and cycle path	F	A	A	O	R	O	R	Larger sections of sedge and reed with short grass further up the bank.	30	Moderate
6	Ditch	0.5	1.5	Low	Earth	Steep >45°	Scrub and railway line	O	F	A	O	O	O	R	Some sections of sedge and reed. Southern sections of the ditch hold brambles	25	Low

								DAFOR									
7	Ditch	<0.5	1.5	Low	Earth	Steep >45°	Scrub, grassland and railway line	N	D	O	O	O	O	R	Some sections of sedge and reed. Southern sections of the ditch hold brambles.	30	Low
8	Ditch	1	2	Low	Earth	Steep >45°	Scrub and railway line	O	F	F	O	F	R	R	Some sections of sedge and reed. Southern sections of the ditch hold brambles.	40	Low
9	Ditch	0.5	2	Low	Earth	Steep >45°	Scrub and arable	R	F	A	R	A	R	R	Some sections of sedge and reed. Southern sections of the ditch hold brambles.	20	Low
10	Ditch	1	3	Low	Earth	Steep >45°	Scrub and arable	R	F	F	O	F	O	R	Reeds, reedmace and sedges make up the main food source, but there are also some tall herbs and grasses further up the bank. Good connectivity to other watercourses.	10	Low
11	Ditch	<0.5	1.5	Low	Earth	Steep >45°	Scrub, arable and grassland	F	O	O	O	F	O	R	Reeds, reedmace and sedges make up the main food source, but there are also some short and tall grasses on the bank. Good connectivity to other watercourses.	60	Low
12	Ditch	0.5	2	Low	Earth	Steep >45°	Scrub and arable	O	O	O	O	F	R	R	Some sections with sedge and reeds. Other sections have relatively low levels of vegetation due heavy shading. Good connectivity to other watercourses.	60	Low
13	Ditch	1	3	Low	Earth	Steep >45°	Scrub and arable	A	O	A	O	O	R	R	Sedge and longer grasses in un-shaded sections of the bank. Also, longer and shorter grasses on the bank. Good connectivity to other watercourses.	60	Low
14	Drain	1.5	4	Low	Earth	Steep >45°	Grassland and arable	N	O	N	F	O	A	R	Bank predominantly made up of short and long grasses. Some sections of rush and sedge along the water's edge. Good connectivity to other watercourses.	5	Low
15	Pond	1	10 - 20	Low	Earth	Steep >45°	Scrub, grassland and railway line	O	F	O	R	O	O	R	Reeds, reedmace and sedges make up the main food source, but there are also some tall herbs and grasses further up the bank.	30	Low

														DAFOR							
16	Pond	1	10 - 20	Low	Earth	Steep >45°	Scrub, grassland and railway line	O	F	O	R	O	O	R	Reeds, reedmace and sedges make up the main food source, but there are also some tall herbs and grasses further up the bank.	25	Low				

3.1 Field survey

Signs of water vole were identified in six sections of ditch. Table 3.3 shows results for each survey section. A map of water vole signs is shown in Appendix C.

Table 2.3: Water vole field signs

Section	Field signs identified?	Number and type of field signs identified	Access notes	Number of visits	Estimated water vole numbers
1	No	None	All sections of the ditch were accessed.	2	N/A
2	No	None	All sections of the ditch were accessed.	2	N/A
3	No	None	All sections of the ditch were accessed.	2	N/A
4	No	None	All sections of the ditch were accessed.	2	N/A
5	Yes	2 latrines, 1 feeding station, 3 burrows and 3 runs.	All sections of the ditch were accessed.	2	3
6	No	None	Some southern sections of the ditch were heavy with bramble making it impossible to conduct a thorough survey.	2	N/A
7	No	None	All sections of the ditch were accessed.	1	N/A
8	No	None	Some southern sections of the ditch were heavy with bramble making it impossible to conduct a thorough survey. In addition, steep banks and deep silt made other areas difficult to access due to safety concerns.	2	N/A
9	Yes	1 burrow and 1 feeding station.	Some southern sections of the ditch were heavy with bramble making it impossible to conduct a thorough survey.	1	N/A
10	No	None	Deep silt/water and steep banks made some areas difficult to survey.	1	N/A
11	Yes	2 latrines, 2 burrows and 1 run.	All sections of the ditch were accessed.	1	3
12	No	None	Deep silt/water and steep banks made some areas difficult to survey.	1	N/A
13	Yes	1 burrow, 1 latrine.	All sections of the ditch were accessed.	1	3
14	Yes	4 burrows, 2 droppings, 6 feeding stations, 5 latrines and 2 runs.	Only the southern bank of the ditch was accessed.	1	5
15	Yes	4 latrines and 4 feeding stations.	Approximately half of the bank was inaccessible.	1	5
16	N/A	N/A	Inaccessible for survey in October 2019 due to dense vegetation within the pond and on the banks.	1	N/A

Source: Primary data

Estimated water vole numbers for each section of watercourse are subject to change once further surveys have been completed in 2020.

Section 16 could not be surveyed due to safety concerns associated with dense vegetation within the pond and deep silt. However, given water voles are present in Section 15, which is part of the same waterbody, and there is no physical barriers present, it is likely that water voles are also present in Section 16.

4 Mitigation and further survey work

4.1 Mitigation

Water voles have been identified within the Proposed Scheme and impacts to water voles should be avoided where possible. Impacts can be avoided by limiting works that effect watercourses, waterbodies, and habitat within 5m either side of these habitats. If impacts to water vole and their habitat are unavoidable, then mitigation and compensation methods must be employed.

Water voles are known to be present in at least five watercourse sections throughout the survey area, and because the habitat is interconnected, it is assumed that water voles are/could be present in other areas of suitable habitat where surveys have not yet taken place, or where vegetation was so dense as to preclude effective surveys. To reflect the risk of water voles being present in watercourses across the Proposed Scheme, a 5m buffer from the top of the bank should be retained along all watercourses, in which no construction takes place.

If negative impacts to water voles are unavoidable through design alteration, a site-specific licence will need to be obtained from Natural England, and water voles will have to be displaced or translocated dependent on the timing and nature of works.

Water vole mitigation requires considerable lead-in time to allow for the creation of new habitat, habitat improvements and seasonal constraints associated with the species. A licence from Natural England can be applied for once planning permission has been granted. However because of the lead in time required it is recommended that the licence is agreed and produced (but not submitted) prior to this.

The licencing process requires that project must result in a conservation gain for water voles. Consequently, suitable habitat must be created or existing habitat must be enhanced within the range of the affected population. The result of this must be a significantly greater extent of good quality water vole habitat after the completion of the works than there was before the works began (Natural England, 2019). As many of the ditches within the Proposed Scheme footprint are of sub-optimum quality, there is potential to make considerable improvements for water voles throughout the site.

There are two potential methods of mitigation for water vole these are displacement or translocation. Where possible displacement is preferred over translocation, for many reasons including the welfare of the water voles, timing restrictions and cost implications.

4.1.1 Displacement

Displacement is the process of undertaking habitat manipulation to encourage the movement of a limited number of water voles to a safe area outside the location of development. This method is only likely to be effective where the footprint of the works are small and the number of water voles affected is relatively small. Displacement should only be used to relocate water voles from a small section of linear habitat which is less than 50m in length (Strachan et al, 2011). Displacement on this project is will require either (or a combination of) the creation of good water vole habitat or enhancement of existing habitat.

Displacement can be undertaken between 15 February and the 15 of April. Displacement may also take place between 15 September and 31 October, although this is less likely to be successful.

4.1.2 Translocation

If multiple areas are affected and the areas impacted are over 50m in length, displacement will not be an appropriate method of mitigation. Relocation by trapping of water voles involves the live capture and release of the proportion of the colony affected by the footprint of the development, into unoccupied suitable habitat within the site boundary (Strachan et al, 2011). If relocation by trapping of water voles is required, suitable habitat within the site boundary will need to be identified and enhanced to support the relocated water voles. If this is not possible, a receptor site outside the site boundary which does not already host water voles and is ideally within the same catchment will need to be identified for the translocation of water voles outside of the development footprint.

If relocation by trapping or translocation is required, receptor sites will need to be identified and surveyed to understand the current population levels. Receptor sites will need to be sufficiently large that they can support the maximum number of individuals and allow for the future expansion of the population. The receptor sites should be at least 50-100% larger than the habitat lost. The lead-in time for the creation of receptor sites is likely to be at least 9-15 months. The vegetation within a receptor site must be established, with friable soils to allow burrowing, and complete bankside cover and dense marginal vegetation before water voles can be released (Dean et al, 2011).

The optimal window for trapping water voles is between the 1 March and the 15 April. If essential, further trapping can be undertaken between 15 September and 30 November (Dean et al, 2016).

If water voles are trapped before the 15 April and the receptor site has not established sufficiently, which is likely to be an issue at the start of the growing season, then the following protocols are suggested:

- Water voles trapped before 15 April must be taken into captivity until the vegetation has matured sufficiently to allow them to be released, or;
- Water voles trapped before 15 April must be held in 'complete cages' within the release site as an on-site holding facility. The cages must be positioned in an entirely secure location where they cannot be removed or interfered with by predators or people (Dean et al, 2011).

4.1.3 Licencing

Once the final project design has been confirmed, the mitigation approach can be developed. Until the design is confirmed this cannot be accurately undertaken.

It is recommended that the mitigation is developed at the earliest opportunity in order to ensure that it can be executed.

It may be appropriate to use a combination of the methods described above to allow phases of the development to commence. However, it is important to ensure that these operations do not conflict or subject water voles to increased risk (Dean et al, 2011). Once the approach to mitigation is agreed and planning permission is obtained, a licence application will be submitted to Natural England. Natural England are not currently providing timescales for granting mitigation licences. Natural England advise that they will assess the application within a minimum of 30 working days, but it is likely to be in excess of this.

4.2 Further surveys

Ditch sections 7, 9, 10, 11, 12, 13, 14, and 15 will need a further survey. Section 16 will be surveyed if the survey can be carried out safely. These surveys must take place during the early part of the optimal water vole season between April and the end of June. All first visits were undertaken in the late optimal season between July and September.

Given the scale of the scheme and the survey results obtained thus far, it is possible that translocation of water voles will be required. Therefore, two surveys of any potential receptor sites outside the footprint of the works will also be required to identify suitable habitat. These watercourses will be identified, if required, once the final design of the scheme is obtained and the mitigation is agreed.

Once these surveys are complete and the final design of the Proposed Scheme is available, the water vole mitigation strategy can be designed and a licence can be applied for.

4.3 Summary

The following points summarise the next steps with regard to water vole mitigation for the Proposed Scheme:

- Further surveys are required to further understand the population level of water vole present.
- Impacts to water vole as a result of the Proposed Scheme should be avoided where possible.
- If impacts to water vole cannot be avoided, a site-specific licence will need to be obtained from Natural England.
- Where mitigation is required, this could result in programme and cost implications.
- Displacement of water voles is preferable to translocation with regard to the welfare of water voles. There are also greater costs and timing restrictions associated with translocation.
- Mitigation must result in a conservation gain for water vole. Habitat enhancement and creation is likely to be required and this is associated with considerable lead-in time.
- The final design of the Proposed Scheme is required before detailed mitigation can be designed.

5 References

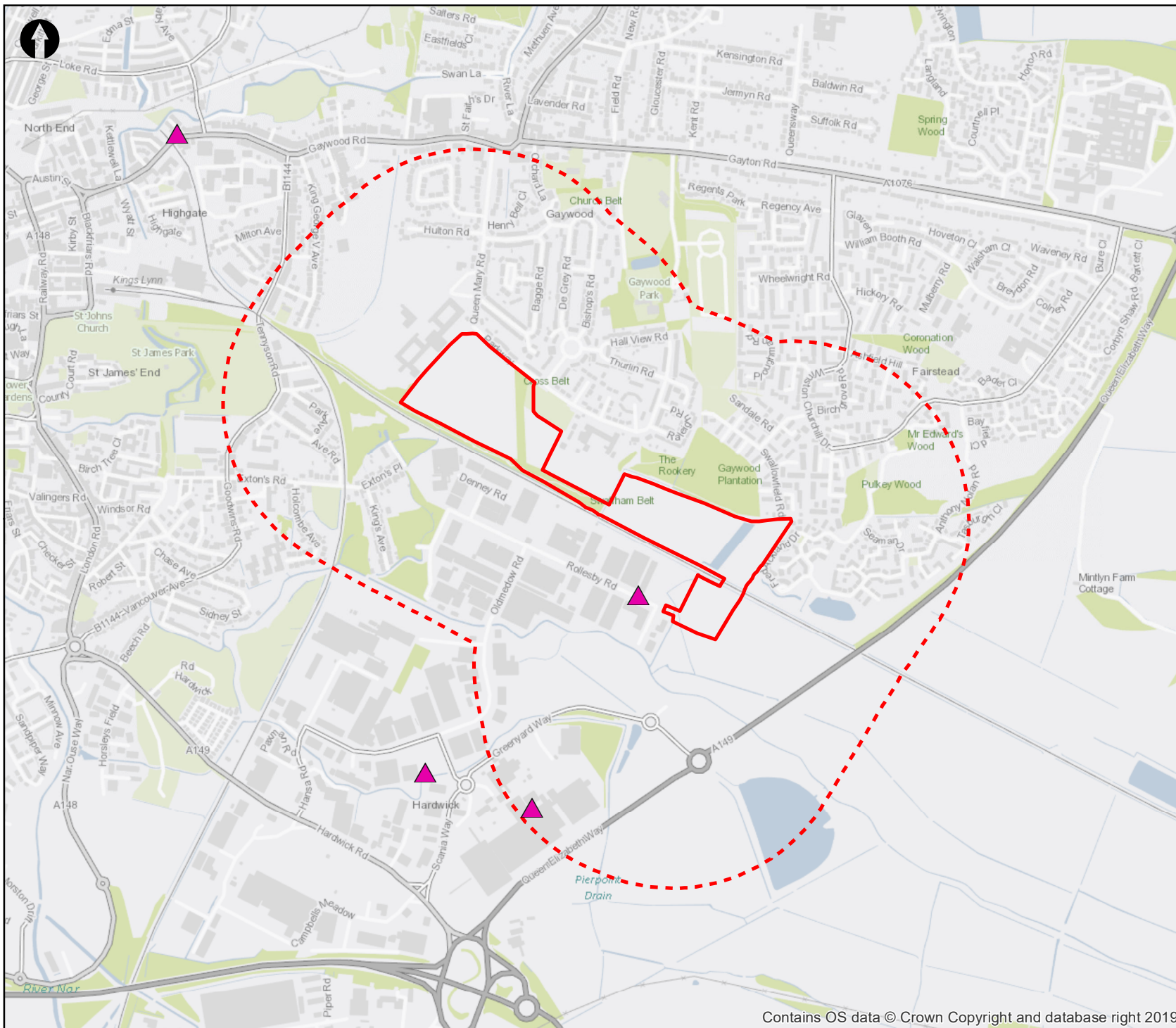
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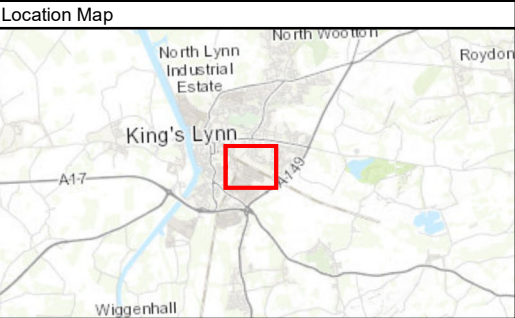
A. Appendix A – Indicative survey area and desk study records



Legend					
	Draft outline of proposed scheme				
	500m buffer of draft proposed scheme				
	Water vole biological records				
P1	16/01/2020	For information	KV	SA	JF
Rev	Date	Description	Drawn	Ch'k'd	App'd
King's Lynn and West Norfolk Borough Council					
		Environment Division 22 Station Road Cambridge, CB1 2JD T +44 (0)1223 463 500 F +44 (0)1223 461 007 W www.mottmac.com			
Project Title					
Parkway, King's Lynn					
Drawing Title					
Water vole biological records					
Scale	1:15,000	MM Project No.	407004	Status	INF
GIS File	Gaywood - Watervole Biological Records				
Drawing No.	407004-MMD-00-DR-EN-0008				Rev 1

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B. Appendix B – Water vole signs by section



Key to Symbols

	No access	Sections		1
	Alcove		2	
	Burrow		3	
	Droppings		4	
	Feeding remains		5	
	Feeding station		6	
	Latrine		7	
	Run		8	
			9	
			10	
			11	
			12	
			13	
			14	
			15	
			16	

Notes

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01	16/01/20	KV	For information	SA	JF
Rev	Date	Drawn	Description	Ch'k'd	App'd
			Environment Division 22 Station Road Cambridge, CB1 2JD T +44 (0)1223 463 500 F +44 (0)1223 461 007 W www.mottmac.com		

Client

King's Lynn and West Norfolk Borough Council

Title

Water vole field signs

Designed	K Jolly	Eng Check	S Allen	
Drawn	K Vahakuopus	Coordination	S Allen	
GIS Check	S Allen	Approved	J Fookes	
Scale at A3	Status	Rev	Security	
1:5,000	PRE	P1	STD	

Drawing Number
407004-MMD-00-DR-EN-0009

