Jupiter Urban Wildlife Centre: Water Vole Survey Report 2010

Ref: CC0016/R2

6th December 2010

Prepared by:

Robert Tyrrell, Associate

Chris Cathrine, Director

Caledonian Conservation Ltd

E: chris.cathrine@caledonianconservation.co.uk

T: 07789 77 11 66

A: 141 Clydesdale Avenue, Hamilton, ML3 7SU

Report prepared by Caledonian Conservation Ltd.

Contents

Summary

Caledonian Conservation Ltd was commissioned by Scottish Wildlife Trust (SWT) to complete a water vole survey of the Jupiter Urban Wildlife Centre reserve in 2010.

The water vole survey was undertaken by Robert Tyrrell on behalf of Caledonian Conservation Ltd in October 2010.

This report was completed by Robert Tyrrell and Chris Cathrine.

No evidence of water vole was identified on site. In addition, no field signs of rat, otter or mink activity were identified during the survey.

Habitat suitability was assessed as sub-optimal with potential for enhancement to support a viable water vole population. However, status of water voles in the surrounding area would need to be ascertained, and connectivity considered.

Reference photographs are provided in Appendix 1.

1 Introduction

Caledonian Conservation Ltd was commissioned by Scottish Wildlife Trust (SWT) to complete a water vole (*Arvicola terrestris*) survey of the Jupiter Urban Wildlife Centre reserve in 2010.

The reserve is 4.35ha, and located between a railway line and industrial units set within an urbanized and brownfield landscape dominated by buildings and hard standing with occasional pockets of more natural (although often landscaped) habitats.

Water vole survey and analysis was conducted by Robert Tyrrell (RST Environment Ltd) on behalf of Caledonian Conservation Ltd.

This report presents the results of this survey together with habitat management advice.

This report was prepared by Robert Tyrrell and Chris Cathrine (Caledonian Conservation Ltd). Mapping was undertaken using ArcGIS 10, and completed by Chris Cathrine.

As well as presenting new information, this report draws upon data provided by SWT.

2 Methodology

The water vole survey was undertaken at Jupiter Urban Wildlife Centre on 6th October 2010, which is within the optimal survey period of March to the end of October and local recommended survey period of late April and early October (restricted due to latitude). The survey included all water courses encompassed within the site boundary, as shown in Figure 1 and Figure 2 (Appendix 2).

The survey method employed involved two stages:

- Activity survey (searching for signs of water vole populations currently occupying watercourses at the site); and
- Habitat suitability assessment (to determine whether habitat is suitable to support viable water vole populations or to identify if enhancement would benefit the site).

The survey methods are described in more detail in the following sections.

2.1 Activity Survey

The activity survey was conducted with adherence to standard survey guidance (Harris 2001, Strachan and Moorhouse 2006). A visual inspection was undertaken of within 6m of the water's edge of all freshwater features. In areas of dense and prolific vegetation (*i.e.* marginal plants and woodland edge), visual inspections were made where accessible to the surveyor.

Field signs indicative of water vole activity searched for include:

- Faeces – recognisable by their size, shape, and content, and also distinguishable from rat droppings by their smell, if not desiccated;
- Latrines – faeces are often deposited at discrete locations known as latrines;
- Feeding stations – food items are often brought to feeding stations along pathways and haul out platforms, recognisable by neat piles of chewed vegetation up to 10cm long;
- Burrows – appear as a series of holes along the water's edge distinguishable from rat burrows by size and position;
- Lawns – may appear as grazed areas around burrows;
- Nests – where the water table is high, above ground woven nests may be found;
- Footprints – tracks may occur at the water's edge leading into vegetation cover, and may be distinguishable from rat footprints by size; and
- Runways – low tunnels pushed through vegetation near the water's edge, which are less obvious than rat runs.

All field signs were to be recorded as Target Notes on a large scale (1:2,000) map.

2.2 Habitat Suitability Assessment

The suitability of habitat to support viable water vole populations was assessed using the Water Vole Habitat Suitability Index (WVHSI) method described by Harris *et al.* (2009). Although this method was developed to assess habitat suitability for water voles in coastal and riparian grazing dyke systems in Norfolk, the requirements of water voles are similar in other habitats and so this approach was considered helpful in identifying potential habitat enhancement opportunities on site, within a structured framework.

Watercourses were assessed based upon particular features important to the establishment and maintenance of viable water vole populations as shown in Table 1. Each feature is awarded a score of '1' if present or '0' if absent. The habitat suitability is the scored using the system detailed in Table 2.

Features of particular interest were recorded as Target Notes on a large scale (1:2,000) map, and reference photographs were also taken.

Table 1. Water Vole Habitat Suitability Index scoring features.

Habitat suitability feature
Well-developed (>60%) bankside and emergent vegetation to provide cover
Year round availability of food sources
Suitable refuge areas above extremes in water levels
Steep banks suitable for burrowing
Permanent open water
Presence of berm (ledge at water level)
Lack of disturbance through poaching, grazing and/or recent management
Nest building opportunities in vegetation above water level

Table 2. Water Vole Habitat Suitability Index scoring categories.

Habitat type	**Number of Water Vole Habitat Suitability features exhibited**
Unsuitable (no potential for enhancement)	<3
Sub-optimal (potential for enhancement)	3-5
Optimal	>5

3 Results

Survey results and limitations are detailed in the sections below.

3.1 Site Summary

Freshwater habitats identified on site included:

- two mature ponds (approximately 10m and 35m diameter) linked by a narrow ditch;
- a small (approximately 3m diameter) mature pond in close proximity to the site office;
- five recently constructed ponds; and
- a small section of spring-fed ditch flowing through a stand of immature and semi-mature trees. Ditch flows into a culvert passing under a local access road along the southern perimeter of site.

The results of the two survey methods are detailed below.

3.2 Activity Survey

No evidence of water voles was identified on site.

3.3 Habitat Suitability Assessment

The WVHSI indicates that Jupiter Urban Wildlife Centre offers sub-optimal habitat for water vole, that may benefit from enhancement.

In addition, no field signs of rat, otter or mink activity were identified during the survey.

The WVHSI is fully detailed in Table 3.

The site is described through Target Notes detailing habitat features of interest and reference photographs. Details of Target Notes are provided in Table 4, and locations are shown in Figure 1 (Appendix 2). Reference photographs are provided in Appendix 1, and photograph locations are shown in Figure 2 (Appendix 2).

Table 3. Water Vole Habitat Suitability Index results. 1 = present. 0 = absent.

Habitat suitability feature	**Score***
Well-developed (>60%) bankside and emergent vegetation to provide cover	1
Year round availability of food sources	1 (assumed)
Suitable refuge areas above extremes in water levels	1
Steep banks suitable for burrowing	0
Permanent open water	1
Presence of berm (ledge at water level)	0
Lack of disturbance through poaching, grazing and/or recent management	0
Nest building opportunities in vegetation above water level	1
Habitat suitability assessment score	**5**

*1 = feature present; 0 = feature absent.

Table 4. Water vole habitat Target Notes. (Target Note locations are shown in Figure 1, Appendix 2.)

Target Note Number	**Description**
1	Recently constructed pond. Approximately 2m x 2.5m x 0.3m depth. No emergent vegetation and shallow bank profile (Photograph 1).
2	Recently constructed pond. Approximately 2m x 1m x 0.5m depth. Vegetated with yellow-flag iris (*Iris pseudacorus*) and sedge species (*Carex* spp.) over approximately 60% of pond surface. Shallow bank profile (Photograph 3).
3	Recently constructed pond. Approximately 5m x 4m x ≤1m depth. Sparse emergent vegetation (<1%) and shallow bank profile (Photographs 2 and 4).
4	Recently constructed pond. Approximately 6m x 3m x ≤1m depth. Small stand of emergent vegetation. Predominantly shallow bank profile with slightly steeper bank profile to the northern edge (Photograph 5). Six small fish (2cm in length, potentially stickleback (*Gasterosteus* sp.)) identified.

Target Note Number	Description
5	Recently constructed pond. Approximately 3.5m x 3m 0.5m. Sparse emergent vegetation and shallow bank profile (Photograph 6).
6	Mature pond with island to centre. Western bank comprised of alder (*Alnus* sp.), silver birch (*Betula pendula*) with yellow-flag iris on banks (Photograph 8). Southern and eastern edges of pond were dominated by large stands of bulrush *Typha* sp., common reed (*Phragmites australis*) and sedge species with occasional yellow-flag iris (Photographs 7 and 9).
7	Large mature pond. South-eastern half of the pond was dominated by dense stands of bulrush species and common reed (Photographs 12 and13). North-eastern half of pond dominated by open water with marginal fringe of bulrush species, common reed and yellow flag iris (Photograph 14).
8	A short section of shallow ditch running through stand of immature and semi-mature trees in places and sections of emergent vegetation dominated by yellow-flag iris, sedge species and brambles (*Rubus fructicosus*) at the water edge. Flows towards a culvert under an access road (Photograph 15).
9	A small pond approximately 3m x 2m. Crack willow (*Salix fragilis*) trees surround part of the pond and elsewhere emergent vegetation (yellow-flag iris and sedge species) dominate (Photographs 16 and 17).

3.4 Survey Limitations

Water voles can intermittently colonise and leave an area to disperse to other areas of suitable habitat within a meta-population territory. Therefore, no account can be made for the presence or absence of field signs of water vole activity on a given day owing to the transient nature of this species.

During the survey weather conditions were sub-optimal as rainfall had occurred within the previous 24 hours and recommenced in the latter stages of the survey period.

The survey was undertaken within an acceptable survey season (late April through to early October) with optimal opportunity to identify water vole breeding territories, marked by latrines, where possible (Strachan and Moorhouse 2006).

4 Discussion and Recommendations

The lack of evidence of water vole activity on site may be due to the sub-optimal habitat suitability of the site to support a viable population of water vole.

It should be born in mind that the Harris *et. al.* (2009) methodology assumes an interconnectedness of freshwater network in coastal and riparian grazing marsh dyke systems. The Jupiter Urban Wildlife Centre is thought to be largely disconnected from a wider freshwater network by culverts along the ditch that may act to present a significant obstacle to natural dispersal of water vole to and from site. In addition, despite five out of eight suitable habitat features being represented on site, the features were not often present in abundance and were rarely all present in one defined area together.

It is noted, however, that this species is transient in nature and some signs of low levels of water vole activity may have been obscured by dense vegetation in places or from rainfall that preceded the survey.

It is recommended that the following measures are considered to determine whether enhancement of the site to support water vole is appropriate and achievable.

However, it must be stressed that the success of any habitat enhancement measures will be dependent on the presence of a water vole population within the surrounding area. Given the fragmented nature of the industrialised environment surrounding the Jupiter Urban Wildlife Centre, it is possible that the site is isolated. Therefore, the status of the water vole population in the wider area should be established before proceeding with habitat enhancement measures.

4.1 Desk Study and Consultation

While anecdotal evidence suggests water voles may once have been present at Jupiter Urban Wildlife Centre (Stephen Owen, Jupiter ranger, pers. comm.), the success or failure of habitat enhancement efforts will be dependent upon the current population in the area surrounding the site. Therefore, consultation of historical data will help determine past records of water vole activity in the local freshwater network and may help to establish whether changes in water vole activity have occurred in recent decades, and whether habitat enhancement may be successful. Relevant sources of data will include the Scottish Natural Heritage (SNH) published Water Vole Survey of the Forth and Clyde Canal (WildCRU 2002) report, the National Biodiversity Network Gateway online survey records database and the Water Vole and Mink Survey of Britain 1996-1998 (Vincent Wildlife Trust 2003).

It may also be of benefit to liaise with SNH and other local groups to identify whether local water vole conservation initiatives are being undertaken in the region. This may also provide further indication of whether future habitat creation or enhancement for water voles are appropriate on site.

4.2 Habitat creation and enhancement

Raynor (2005) has suggested that the management of any potentially suitable water vole habitat should be undertaken within 1.5km of an occupied site where natural colonisation and dispersal are achievable.

Where deemed applicable, a habitat creation, enhancement and management plan could set objectives and targets that would aim to increase the suitability of site to support a viable water vole population within a more expansive water vole meta-population territory.

If deemed appropriate, management measures should adhere to the following basic principles as defined by Raynor (2005):

- Improving habitat availability and suitability;
- Improving habitat connectivity to encourage dispersal and natural colonisation;
- Implementing management measures to ensure long-term habitat suitability; and
- Controlling American mink predation risk.

With regards to the Jupiter Urban Wildlife Centre in particular, it is recommended that habitat features identified as currently lacking should be created in some watercourses. These include steep banks suitable for burrowing and berm (ledge at water level). In addition, as the site shows signs of considerable disturbance, it may be adviseable to fence off sections of watercourse, preventing access to the public and rabbits, while retaining access for water voles. Once again, it must be stressed that such habitat enhancement activities should only e undertaken after establishing whether there is a water vole population within the wider area that may colonise the new habitat. It may be necessary to undertake collaborative projects with surrounding land managers to create the connectivity required to allow water voles to recolonise the wider area.

Practical guidance for habitat creation, enhancement and management measures are outlined in detail in Strachan and Moorhouse (2006), while Cosgrove (2008) provides an excellent case study.

4.3 Monitoring

Should habitat enhancement be undertaken, monitoring is recommended in before commencement and at periodic intervals upon completion of any habitat creation or management activities. A water vole activity and habitat suitability assessment survey should extend to all watercourses and wetland habitats within the site boundary. Ideally, these surveys should be extended outside of the site boundary, wherever possible, to help assess the suitability and connectivity of habitat within the surrounding area.

5 References

Cosgrove, P. 2008. *Millersneuk Wetland: Conserving and enhancing a water vole population through mitigation*. Institute of Ecology and Environmental Management (IEEM) (Mitigation: Smoke and Mirrors or Biodiversity Enhancement Conference) & EnviroCentre Ltd. Available from: http://www.ieem.net/docs/11a%20Peter%20Cosgrove.pdf

Harris, J. 2001. *Salthouse Flood Protection Scheme, Water Vole Survey. Report to Environment Agency.* Environment Agency, Peterborough, UK.

Harris, J., Markwell, H.and Raybould, B. 2009. A Methodology for Assessing Water Vole Habitat Suitability. *IEEM In Practice* 65, 28-31.

Raynor, R. 2005. *Conserving Scotland's Water Voles, Scottish Natural Heritage*. Available from: http://www.snh.org.uk/publications/on-line/wildlife/voles/default.asp

Strachan, R. and Moorhouse, T. 2006. *Water Vole Conservation Handbook. 2nd Edition.* Wildlife Conservation Research Unit, Oxford.

Vincent Wildlife Trust. 2003. *The Water Vole and Mink Survey of Britain 1996-1998 with a History of the Long-Term Changes in the Status of Both Species and their Causes.* Vincent Wildlife Trust, Eastnor, UK.

WildCRU, Oxford University. 2002. Water vole survey of the Forth and Clyde

Canal 2001 Scottish Natural Heritage Commissioned Report F01LI06. Scottish Natural Heritage.

APPENDIX 1: Photographs

Locations of photographs are indicated in Figure 2 (Appendix 2).

Photograph 1.

Photograph 2.

Photograph 3.

Photograph 4.

Photograph 5.

Photograph 6.

Photograph 7.

Photograph 8.

Photograph 9.

Photograph 10.

Photograph 11.

Photograph 12.

Photograph 13.

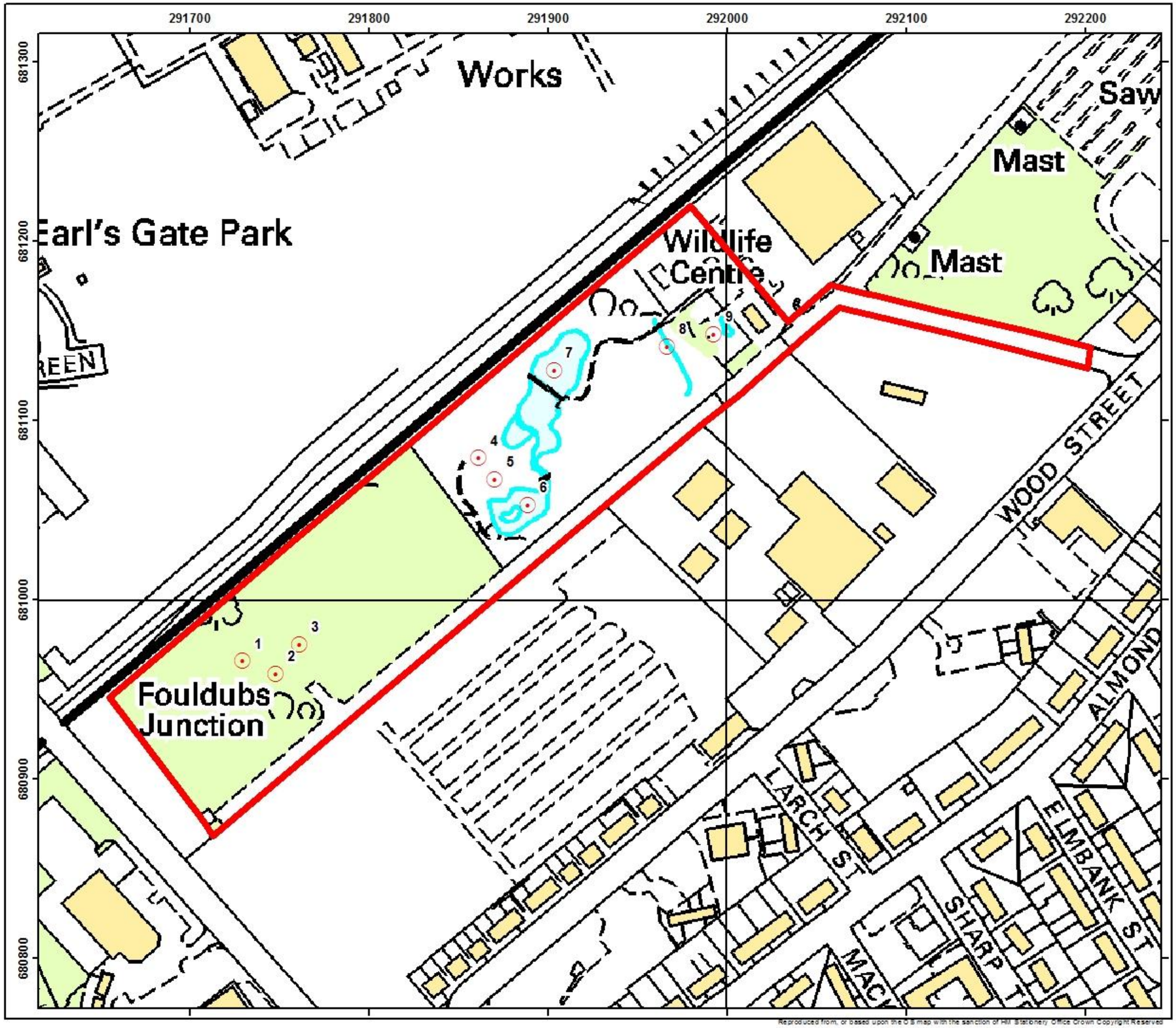
Photograph 14.

Photograph 15.

Photograph 16.

Photograph 17.

APPENDIX 2: Figures



Reproduced from, or based upon the O S map with the sanction of HM Stationery Office Crown Copyright Reserved

Scottish Wildlife Trust

Caledonian Conservation Ltd

Key

- Target note
- Site boundary

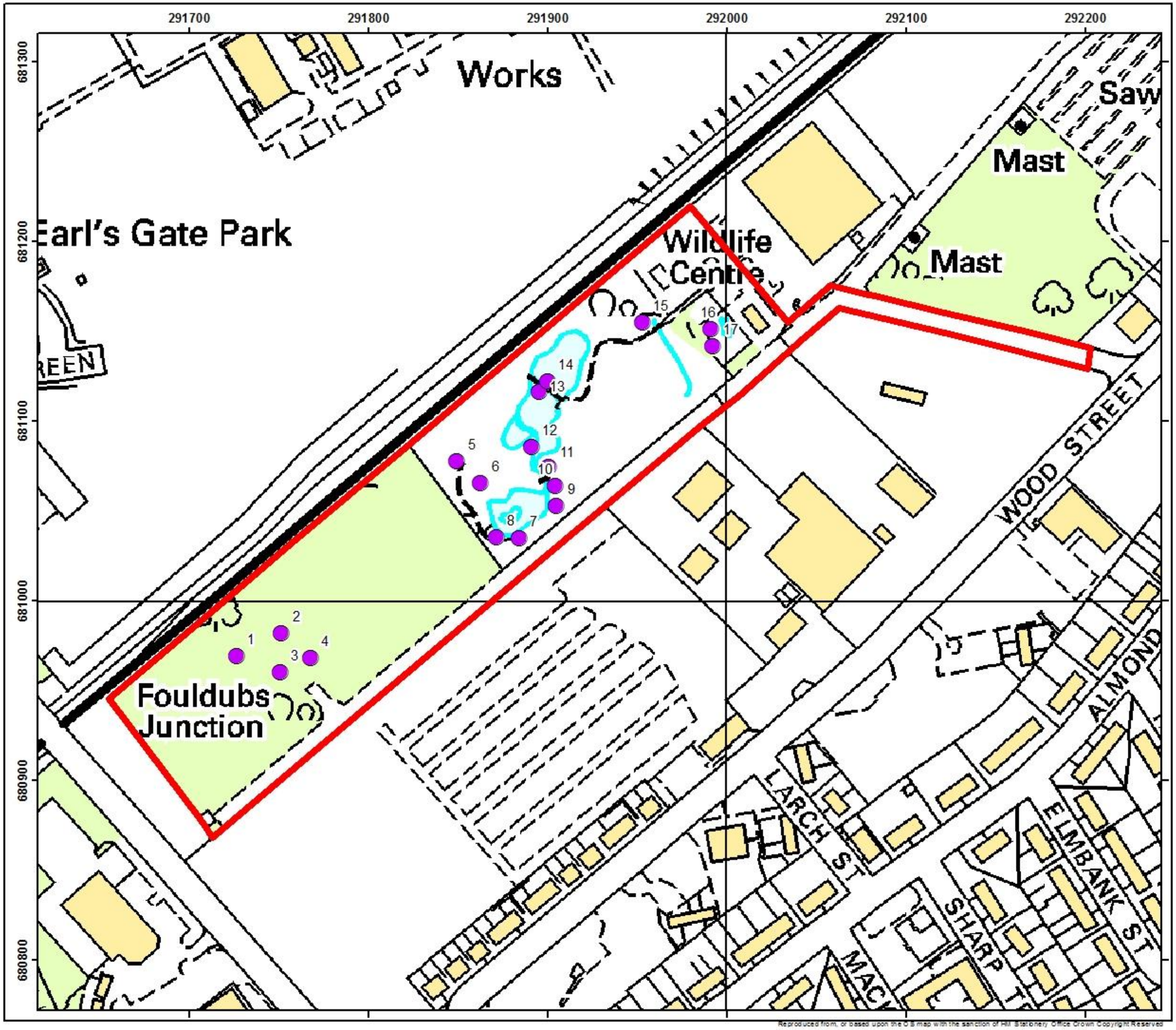
Scale 1:2,000 @ A3

0 20 40 80 m

N

Figure 1
Target Notes

Jupiter Urban Wildlife Centre
Water Vole Survey Report



Scottish Wildlife Trust

Caledonian Conservation Ltd

Key

Photo Location

Site boundary

Scale 1:2,000 @ A3

0 20 40 80 m

N

Figure 2
Photo Locations

Jupiter Urban Wildlife Centre
Water Vole Survey Report