Ecological Impact Assessment

RSPB Old Moor and Wombwell Ings Re-profiling

Authors: Jon Goodrick Adele Harrison

j.goodrick@wildsheffield.com

a.harrison@wildsheffield.com

Quality Assurance

PROJECT NUMBER	0795.18
PROJECT NAME	Old Moor Re-profiling
SITE LOCATION	RSPB Dearne Valley – Old Moor, Old Moor Lane, Wombwell, Bolton upon Dearne, Barnsley, S73 0YF
FILE NAME	0795_OldMoorReprofilingEcIA final Wildscapes V01.docx
VERSION	01

PRINCIPAL AUTHORS	CHECKED BY	APPROVED BY
Jon Goodrick & Adele Harrison	Paul Liptrot	Jon Goodrick

Field Investigations and Data

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Wildscapes CIC and Sheffield and Rotherham Wildlife Trust for inaccuracies in the data supplied by any other party.

Declaration of Compliance

The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed within this document are our true and professional bona fide opinions.

Copyright

The contents and layout of this report are subject to copyright owned by Wildscapes CIC and Sheffield and Rotherham Wildlife Trust

Third Party Disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Wildscapes CIC and Sheffield and Rotherham Wildlife Trust at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. No other warranty, expressed or implied is made as to the professional advice included in this report.

Contents

CONTENTS 3

TABLES 5

FIGURES 5

1 INTRODUCTION 7

1.1 NATURE OF THE PROPOSALS 7

2 PLANNING POLICY AND LEGISLATION 9

2.1 THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2010 9

2.2 WILDLIFE & COUNTRYSIDE ACT 1981 9

2.3 NATIONAL PLANNING POLICY FRAMEWORK 9

2.4 SECTION 41 HABITATS AND SPECIES (NERC ACT 2006) 9

2.5 LOCAL PLANNING POLICY 10

2.6 NATURE IMPROVEMENT AREAS (NIAS) 10

3 METHODOLOGY 11

3.1 DESK STUDY 11

3.2 FIELD SURVEY 11

4 RESULTS 12

4.1 DESIGNATED SITES 12

4.2 DEARNE VALLEY 13

4.3 PRIORITY HABITATS 14

4.4 HABITATS 15

4.5 FLORA 20

4.6 FAUNA 21

5 INTERPRETATION OF RESULTS 28

5.1 DESIGNATED SITES 28

5.2 HABITATS 28

5.3 FLORA 31

5.4 FAUNA 31

6 IMPACT ASSESSMENT 35

6.1 DESIGNATED SITES 35

6.2 HABITATS 35

6.3 FLORA 37

6.4 FAUNA 38

7 SUMMARY OF THE IMPACTS OF THE PROPOSALS IN THE ABSENCE OF MITIGATION 42

8 RECOMMENDATIONS, OUTLINE MITIGATION, COMPENSATION AND ENHANCEMENT MEASURES 44

8.1 FURTHER SURVEY 44
8.2 MITIGATION 44
8.3 COMPENSATION 45
8.4 ENHANCEMENT 45
9 RESIDUAL IMPACTS 46
10 CONCLUSIONS 48
11 REFERENCES 49
12 APPENDICES 51
12.1 APPENDIX A - LOCATION INFORMATION 51
12.2 APPENDIX B – ENVIRONMENTAL DNA RESULTS – WILDSCAPES 70
12.3 APPENDIX C – RSPB SURVEY REPORTS 88

Tables

Table 1-1 Pre-existing information 7
Table 3-1 Survey Personnel 11
Table 4-1 Designated site Search with 2km 12
Table 4-2 RSPB Old moor and Wath Ings, Broomhill Flash and Wombwell Ings, Gypsy Marsh, Parkhill Nature Reserve, Flatts Valley 12
Table 4-3 RSPB Dearne Valley 14
Table 4-4 Priority Habitats within a 2km radius 14
Table 4-5 Breeding birds recorded on Old Moor (RSPB Dearne Valley Reserves, 2018c) 22
Table 4-6 RSPB transect survey results 2015 (RSPB Dearne Valley Reserves, 2018e) 26
Table 6-1Breeding birds within 50 metres of Green Lane path in associated scrub and hedgerow habitat - ((RSPB Dearne Valley Reserves, 2018c) 40
Table 7-1 Summary of the identified impacts in the absence of mitigation 42
Table 9-1 Summary of the residual impacts based upon the implementation in full of all of the Mitigation, Compensation and Enhancement measures provided in section 8 46
Table 12-1. Priority Habitat Compartments 64
Table 12-2. Personal 71
Table 12-3 Enviromental DNA Waterbody Details 74
Table 12-4. Otter at Dearne Valley* 101
Table 12-5. Otter Sightings 102
Table 12-6 Badger at Dearne Valley 102
Table 12-7. Harvest Mouse records 120
Table 12-8. Harvest Mouse Presence (27/01/18) 120
Table 12-9. Water Shrew Records 121

Figures

Figure 12-1. Phase 1 Plan Overview 52
Figure 12-2 Phase 1 Habitat Survey Legend 53
Figure 12-3. Area 1 Wombwell Ings 54
Figure 12-4. Area 2 North-east Reservoir Access Track 55
Figure 12-5. Area 3 Reservoir North End 56
Figure 12-6. Area 4 Mere North Bank 57
Figure 12-7. Area 5 Wader Scrape 58
Figure 12-8. Area 6 Green Lane, Green Lane Triangle and Field Pools East 59
Figure 12-9. Missing Habitat Information 60
Figure 12-10. Local Wildlife Site within 2km 61
Figure 12-11 Nature Improvement Area 62
Figure 12-12 Priority Habitats with 2km 63
Figure 12-13.Sample Locations 73
Figure 12-14 Mammal Survey points 105
Figure 12-15 Harvest mouse plan 121
Figure 12-16. Old Moor water vole Raft Locations 125
Figure 12-17. Water Vole Records 2017 126
Figure 12-18. Water Vole Records 2015 127
Figure 12-19. Water Vole Records 2016 128
Figure 12-20. Water Vole Records 2017 129
Figure 12-21. Water Vole Records 2014 -17 130
Figure 12-22. Raft Location Wombwell Ings 131

1 Introduction

1. The following report has been compiled by Jon Goodrick BSc MCIEEM and Adele Harrison BSc (Hons) MSc.

2. The report was commissioned by Jayne Wood on behalf of RSPB Old Moor.

3. The site is referred to as Old Moor and Wombwell Ings. It is located in Wombwell, Barnsley, circa. 8km to the south-east of the town centre. The site is an RSPB owned nature reserve including a variety of wetlands, grassland, meadow and hedgerow.

4. The approximate central grid reference for the site is SE 42589 02579. Appendix A shows the location of the site.

5. The report includes an assessment of potential ecological impacts of the proposed re-profiling of the site, along with ways to avoid, minimise or mitigate potential impacts. Recommendations for further surveys and for enhancement of the site are made where appropriate.

1.1 Nature of the Proposals

6. Wildscapes has been provided with background information detailing the proposed project details as shown within Table 1-1 Pre-existing information.

Table 1-1 Pre-existing information

TYPE	ITEM TITLE / REFERENCE	DATE ISSUED / PUBLISHED	AUTHOR
17 Images	Field Pools – Images 322381 – 322398 (omitting 322392)	Received Oct 2018	RSPB Old Moor
12 Images	Field Pools East – Images 322366 – 322379 (omitting 322367, 322375)	Received Oct 2018	RSPB Old Moor
21 Images	Green Lane and Triangle – Images 322344 – 322365 and 322380 (omitting 322348, 322359)	Received Oct 2018	RSPB Old Moor
29 Images	Mere North Bank – Images 322270 – 322298	Received Oct 2018	RSPB Old Moor
18 Images	Reservoir North End – Images 322322 – 322343 (omitting 322329, 322332, 322333, 322335)	Received Oct 2018	RSPB Old Moor
Report	Dearne Valley Project Botanical Survey	Fieldwork 16/05/18 Received Oct 2018	RSPB Old Moor Dr Tim Melling, Heather Bennett
Report	Hedgerows	Received Oct 2018	RSPB Old Moor
Report	Mammal Survey Report	Received Oct 2018	RSPB Old Moor
Maps (PDF)	Old Moor Common Bird Census Results 2018 Maps	Received Oct 2018	RSPB Old Moor
Report	Old Moor Breeding Bird Survey 2018	Received Oct 2018	RSPB Old Moor
Report	Old Moor Fish Assemblage – GNAH in the Dearne (Fish)	Received Oct 2018	RSPB Old Moor
Report	Old Moor Other Mammals– GNAH in the Dearne (Other Mammals)	Received Oct 2018	RSPB Old Moor
Survey Sheet (blank example)	Vole Survey Sheets	Received Oct 2018	RSPB Old Moor

TYPE	ITEM TITLE / REFERENCE	DATE ISSUED / PUBLISHED	AUTHOR
Report	Water Vole Report	Received Oct 2018	RSPB Old Moor
Slides (PDF)	Ecology Brief Associated Slides (Final) Habitat Works at RSPB Old Moor and Wombwell Ings Brief for the appointment of a design consultant	Received Sept 2018	RSPB Old Moor
Letter	MEC BAT 2018 104 Old Moor	11/10/18	Middleton Bell Ecology
Excel Spreadsheet	Updated Species List for Field Pools (South Side)	Received Oct 2018	RSPB Old Moor
Shapefiles (for use in GIS)	Habitat, Linear Habitat, Target Note	Received Oct 2018	RSPB Old Moor
13 Images	Green Lane or Access Track – 13 Images: 20181009_143340, 20181009_143348, 20181009_143359, 20181009_143423, 20181009_143524, 20181009_143819, 20181009_143823, 20181009_143826, 20181009_143836, 20181009_144229, 20181009_144555, 20181009_144559, 20181009_144606	Received Oct 2018	RSPB Old Moor
7 Maps	Old Moor Water Vole Raft Locations, Water Vole Records 2014; Water Vole Records 2015; Water Vole Records 2016; Water Vole Records 2017; Water Vole Records 2014-2017; Wombwell Ings Water Vole Raft Locations	Received Nov 2018	RSPB Old Moor

2 Planning Policy and Legislation

7. This legal information is a summary and intended for general guidance only. It is recommended that the original documentation is referred to for detailed and definitive information. Web addresses are located in the References and Bibliography section of this report.

2.1 The Conservation of Habitats and Species Regulations 2010

8. The Conservation of Habitats and Species Regulations 2010 (as amended) transpose Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (Habitats Directive) into English law, making it an offence to deliberately capture, kill or disturb wild animals listed under Schedule 2 of the Regulations. It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is absent at the time).

2.2 Wildlife & Countryside Act 1981

9. The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act (CRoW) 2000 and the Natural Environment and Rural Communities Act (NERC) 2006 (which also places a duty on authorities to have due regard for biodiversity and nature conservation) consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive), making it an offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act; intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act; intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection;
- Pick or uproot any wild plant listed under Schedule 8 of the Act.

2.3 National Planning Policy Framework

10. The National Planning Policy Framework (NPPF) outlines government planning policies and how they should be applied to local authorities. The framework places an emphasis on sustainable development, encouraging the re-use of land that has previously been developed over using land that has a higher environmental value and by minimising impacts on biodiversity. The NPPF states that developments should aim to conserve or enhance biodiversity and encourages opportunities to incorporate biodiversity in and around developments.

2.4 Section 41 Habitats and Species (NERC Act 2006)

11. Section 41 (S41) of the NERC Act 2006 requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40.

2.5 Local Planning Policy

12. Barnsley Local Biodiversity Action Plan (2009 – 2012) is under review with an update anticipated in 2018. Local priority species include common toad and great crested newt. Sites with good assemblages of amphibian species including common frog and other species of newt are also a local priority.

2.6 Nature Improvement Areas (NIAs)

13. Nature Improvement Areas (NIA) were established to create joined up and resilient ecological networks at a landscape scale. They are run by partnerships of local authorities, local communities and landowners, the private sector and conservation organisations with funding provided by the Department for the Environment, Food and Rural Affairs (Defra) and Natural England. Twelve NIAs were announced in 2012.

14. The Dearne Valley Nature Improvement Area is one of the twelve NIAs selected in 2012. The aim of the Dearne Valley Green Heart Partnership for the Nature Improvement Area is to help restore and enhance the ecological networks of the river, its floodplain, and its link to habitats on surrounding slopes and hills.

3 Methodology

3.1 Desk Study

15. The report has been compiled via a desk study undertaken using information and reports provided by RSPB Old Moor, as shown in Table 1-1. The relevant reports can be found in the Appendices. The relevant methods and constraints are discussed in each pertinent results and discussion section, if required.

16. Online mapping sources including Google Maps, Where's the path and Bing Maps were used to view both satellite imagery and maps of the site and surrounding land.

3.2 Field Survey

17. The only fieldwork undertaken by Wildscapes CIC Ltd as part of this investigation was a great crested newt environmental DNA survey, the details of which can be found below.

3.2.1 Environmental DNA (eDNA)

18. Environmental DNA sampling kits were provided by Fera Science Ltd. Sampling was carried out by Matt Purkis who is a Natural England Licenced Surveyor (Natural England Class 1 Licence Ref: 2016-20241-CLS-CLS). The samples were taken in May 2018, and collected in accordance with the methods detailed in Biggs et. al. (2014). One sample kit was used per separate water body unless a water body exceeded 1 hectare in area, in which case two sample kits were used. Waterbodies which exceeded 2 hectares were sampled with three sample kits. The sample kits were refrigerated until the analysis was carried out by Fera Science Ltd in accordance with Biggs et al. (2014). Please refer to *Appendix B – Environmental DNA Results – Wildscapes* laboratory report provided by Fera Science Ltd.

Table 3-1 Survey Personnel

SURVEY	DATE	PERSONNEL
eDNA sampling – Old Moor, waterbodies W28 + W29 (merged ponds), W30, W31, W32, W33, W34, W35, W47	10/05/18	Matt Purkis BSc (Hons), MSc (Natural England Class 1 Licence Ref: 2016-20241-CLS-CLS) Rebecca Davenport BSc (Hons), MSc
eDNA sampling – Old Moor, waterbodies W41, W42, W43, W44, W45	11/05/18	Matt Purkis BSc (Hons), MSc (Natural England Class 1 Licence Ref: 2016-20241-CLS-CLS) Rebecca Davenport BSc (Hons), MSc
eDNA sampling – Old Moor, waterbodies W36, W37A, W37B, W38, W46, W48,	14/05/18	Matt Purkis BSc (Hons), MSc (Natural England Class 1 Licence Ref: 2016-20241-CLS-CLS) Megan Burton
eDNA sampling – Wombell Ings, waterbodies WI01, WI02, WI03, WI04	23/05/18	Matt Purkis BSc (Hons), MSc (Natural England Class 1 Licence Ref: 2016-20241-CLS-CLS) Sara Blackburn BSc (Hons), MSc

4 Results

4.1 Designated Sites

19. Five non-statutory designated Local Wildlife Site (LWS), one RSPB nature reserve, 202 compartments of priority habitats and one potential Site of Special Scientific Interest was recorded with 2km of the proposed development site. Table 4-1 shows a summary of the sites searched for and recorded during the data consultation process. The following tables, Table 4-2, Table 4-3 and Table 4-4 show the details for the sites returned. Please refer to *Appendix A - Location Information* for plans showing LWS and priority habitats within 2km.

20. No nationally designated or statutory designated sites were returned within the data consultation. However, personal communication with Trevor Mayne, Biodiversity Officer at Barnsley Metropolitan Borough Council suggested that the RSPB Dearne Valley Reserve is a potential candidate for SSSI status.

21. Five Local Wildlife Sites were returned within the data consultation, two of which are immediately adjacent to or within the proposed development site. These sites are considered to be of regional importance. The LWS within 500m of the proposed site are discussed further below.

Table 4-1 Designated site Search with 2km

Designated site Search with 2km	Present	Absent
Priority Habitat	✓	
RSPB Reserves	✓	
Local Wildlife Sites (LWS)	✓	
Potential Site of Scientific Interest (P-SSSI)*	✓	
Local Nature Reserves (LNR)		✓
National Nature Reserves (NNR)		✓
Important Bird Areas (IBA)		✓
Site of Special Scientific Interest (SSSI)		✓
Ancient Woodland (AW)		✓
Special Protection Areas (SPA)		✓
Special Areas for Conservation (SAC)		✓

* Personal communication with Trevor Mayne, Biodiversity Officer Barnsley Council

4.1.1 Local Wildlife Sites

Table 4-2 RSPB Old moor and Wath Ings, Broomhill Flash and Wombwell Ings, Gypsy Marsh, Parkhill Nature Reserve, Flatts Valley

Site ID	Site Name	Grid Reference	Area (Ha)	Distance from Site(m)
38	Old Moor and Wath Ings	SE 430023	81.8	0
36	Broomhill Flash and Wombwell Ings	SE 418033	56.9	0
37	Gypsy Marsh	SE 418024	5.1	74.4
104	Parkhill Nature Reserve	SE 407032	10.3	512.3
88	Flatts Valley	SE 428008	4.1	1116.8

Old Moor and Wath Ings

22. RSPB nature reserve Old Moor is a large floodplain adjacent to the River Dearne and Knoll Beck which was reclaimed by BMBC in 1998 and managed by the RSPB since 2003. The site is designated and managed primarily for birds. Some of the species know to winter or breed on site include Schedule 1 species avocet *Recurvirostra avosetta*, bittern *Botaurus stellaris*, Mediterranean gull *Larus melanocephalus*, kingfisher *Alcedo atthis,* barn owl *Tyto alba* and little-ringed plover *Charadrius dubius.* As well as priority species such as skylark *Alauda arvensis,* reed bunting *Emberiza schoeniclus*, grasshopper warbler *Locustella naevia*, tree sparrow *Passer montanus*, grey partridge *Perdix perdix,* willow tit *Poecile montanus,* dunnock *Prunellamodularis,* bullfinch *Pyrrhula pyrrhula*, song thrush *Turdus philomelos*, lapwing *Vanellus vanellus*, water vole *Arvicola amphibius* and grass snake *Natrix natrix*.

Broomhill Flash and Wombwell Ings

23. The site is a nature reserve and LWS. The southern section of the site is owned and managed by the Garganey Trust, where hides and on-site interpretation are provided. Most of the vegetation is flat semi-improved neutral grassland managed to be attractive to breeding waders such as lapwing *Vanellus vanellus*, snipe *Gallinago gallinago* and redshank *Tringa tetanus.*

24. Both of these sites are important for a range of breeding, passage and wintering birds. Schedule 1 breeding species include garganey *Anas querquedula*, kingfisher *Alcedo atthis*, barn owl *Tyto alba* and little-ringed plover *Charadrius dubius*. Breeding UKBAP species are skylark *Alauda arvensis,* yellowhammer *Emberiza citronella,* reed bunting *Emberiza schoeniclus,* yellow wagtail *Motacilla flava,* tree sparrow *Passer montanus,* grey partridge *Perdix perdix* and lapwing *Vanellus vanellus*. A number of rare passage birds have been recorded at both sites and they are important for wintering wigeon *Anas Penelope* and golden plover *Pluvialis apricaria.*

Gypsy Marsh

25. Gypsy Marsh is located immediately west of Old Moor Nature Reserve.

26. Gypsy Marsh consists of a swamp, marshy grassland, modified neutral grassland and unimproved neutral grassland habitats, with a small area of heather *Calluna vulgaris* heath at the western end of the site. The swamp areas are dominated by greater reedmace *Typha latifolia*, with some small areas of open water with localised areas of willow scrub *Salix sp*.

27. It has been suggested that Water vole *Arvicola amphibious* (UKBAP and local BAP species) occurs on the site in moderate numbers, however, recent survey undertaken by Wildscapes CIC Ltd indicates that this population has experienced declines or is now absent from the reserve. A number of nationally important UKBAP bird species have also been recorded breeding in the area, including tree sparrow *Passer montanus*, reed bunting *Emberiza schoeniclus,* grasshopper warbler *Locustella naevia,* bullfinch *Pyrrhula pyrrhula* and song thrush *Turdus philomelos*.

4.2 Dearne Valley

28. The RSPB Dearne Valley reserve incorporates several patches of land throughout the Dearne Valley, centred around the Old Moor and Wombwell Ings wetland reserves. Old moor incorporates several lakes which form marsh and reed bed habitats bordered by grassland meadows and pastures.

Table 4-3 RSPB Dearne Valley

Site ID	Name	Type	Site Area (ha)	Distance from Site(m)
159	DEARNE VALLEY	RSPB	229.7	0

4.3 Priority Habitats

29. 202 compartments of four priority habitat categories were returned within the data consultation. Two of these habitat types, coastal and floodplain grazing marsh and deciduous woodland, occur within the proposed development area. Table 4-4details the area of each habitat type returned for within the development area. Table 12-1 details the location of all the compartments within 2km.

4.3.1 Coastal and Floodplain Grazing Marsh

30. Flood plain grazing marsh is defined as pasture or meadow grassland that is periodically inundated with flood water which is maintained by an associated ditch system.

"The exact extent of grazing marsh in the UK is not known but it is possible that there may be a total of 300,000ha. England holds the largest proportion with an estimate in 1994 of 200,000ha. However, only a small proportion of this grassland is semi-natural supporting a high diversity of native plant species (5,000ha in England, an estimated 10,000ha in the UK)" – UK BAP Priority Habitat Descriptions - Coastal and floodplain grazing marsh (2008)

4.3.2 Lowland Mixed Deciduous Woodland

31. Lowland mixed deciduous woodland incorporates woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England, and in parts of lowland Wales and Scotland.

"There are no precise data on the total extent of lowland mixed deciduous woodland in the UK, but in the late 1980s the Nature Conservancy Council estimated the total extent of this type to be about 250,000ha. There is however no doubt that the area of this priority type on ancient woodland sites has declined in area by clearance, overgrazing and replanting with non-native species, by about 30–40% over the last 50 years." - UK BAP Priority Habitat Descriptions - Lowland Mixed Deciduous Woodland (2008).

Table 4-4 Priority Habitats within a 2km radius

Priority Habitat	Habitat (ha)		
	Within 2km outside site	**Within Site**	**Grand Total**
Coastal and floodplain grazing marsh	23.3	31.6	54.9
Deciduous woodland	106.5	1.0	107.4
No main habitat but additional habitats present	18.2	-	18.2
Traditional orchard	0.3	-	0.3
Grand Total	148.3	32.5	180.8

4.4 Habitats

32. A Phase 1 Habitat survey was undertaken by Catherine Porter and Laura Hodgkinson on 9th October 2018. This was provided for the desk study in the form of shapefiles which were viewed using GIS software (QGIS, 2018). For maps of the six areas surveyed, see *Appendix A - Location Information* The following habitat descriptions are compiled from the notes provided with the shapefiles and species lists (where present). All of the areas were also subject of a detailed botanical survey on 16th May 2018 by Dr Tim Melling and Heather Bennett (RSPB Dearne Valley Reserves, 2018a)(see Appendix A - Location Information), the results of which provide a species list for those areas within the main botanical survey period (no habitat mapping was provided to accompany this report). In addition to this the hedgerows on site within Area 6 were subject of a separate Hedgerow survey report (RSPB Dearne Valley Reserves, 2018b) see *Appendix C – RSPB Survey Reports*.

4.4.1 Constraints

33. Both the botanical survey and Phase 1 Survey exclude areas which are included in the re-profiling plans as shown in Appendix C – RSPB Survey Reports. This is further discussed in section 6.2.1. The areas have been assigned letter codes for the purpose of this report.

34. The Phase 1 Habitat Survey was undertaken outside the main botanical survey (i.e. March to September) and as a result key botanical species may have been missed leading to the miss classification of the habitat. Whilst the majority of the work areas were also surveyed by Dr Tim Melling and Heather Bennett (RSPB Dearne Valley Reserves, 2018a) within the main botanical survey period it should be noted that not all of the habitats identified Phase 1 areas were surveyed at this time. This is discussed further in the results below.

35. The detailed botanical survey (RSPB Dearne Valley Reserves, 2018a) failed to separate the botanical survey results into the constituent habitats, making an assessment of individual habitat value difficult. The implications of this decision are discussed further in sections 5.2 and 6.2 respectively.

36. The survey of the hedgerows carried out to support the hedgerow report (RSPB Dearne Valley Reserves, 2018b) did not include an assessment following the standard methodology set by the Hedgerow Regulations 1997. The implications of this decision are further discussed in section 5.2.2.

37. Although the survey undertaken does try to make an assessment of the ecological value of the hedgerows on site, the survey has not been undertaken using the national standard methodology as stated within the *Hedgerow Survey Handbook* (DEFRA, 2007). As a result of this, the assessment made cannot be used to place the value of the hedgerows on site in their national or district context. The implications of this decision are further discussed in section 5.2.2.

4.4.2 Area 1: Wombwell Ings

38. The species list included within the botanical survey report (RSPB Dearne Valley Reserves, 2018a) for this area shows a relatively species rich semi improved grassland with wet features (likely floodplain meadow) which grades into marshy grassland (flood plain grazing marsh).

39. The habitat descriptions and individual species lists below are taken from the GIS information provided by RSPB Dearne Valley.

Dense Scrub

40. Willow *Salix sp.* scrub on the northern edge of the western body of water. A grazed sedge-dominated understorey is present.

41. Scrub is target noted to be present on the western bank of the eastern waterbody. This includes willow *Salix sp.* and bramble *Rubus fruticosus agg*.

Neutral Semi-improved Grassland

42. The earth banks present are maintained by Natural England. These are regularly mown with a short sward. There is a 'lack of herbs' present. No separate species list was provided for this area.

Marsh/Marshy Grassland

43. A 'large field' of marshy grassland is present, dominated by hard rush *Juncus inflexus* and soft rush *Juncus effuses*, with scattered tall ruderal vegetation such as spear thistle *Cirsium vulgare*. The field is grazed by ponies.

44. A target note is included in this area which states that the areas includes approximately 30% grazed hard rush and soft rush. Small areas are grass-dominated (neutral semi-improved grassland). The dominant species include meadow foxtail *Alopecurus pratensis*, alder *Alnus glutinosa*, cock's-foot *Dactylis glomerata*, meadow-grass *Poa sp(p)*, soft rush, hard rush, white clover *Trifolium repens*, creeping thistle *Cirsium arvens*, *Ranunculus sp(p)*, common knapweed *Centaurea nigra*.

Swamp

45. Reed beds including bulrush *Typha latifolia* on the edge of the water on the eastern area of swamp.

46. Reed bed of bulrush and branched bur-reed *Sparganium erectum* in the western area of swamp.

Standing Water

47. The shape of the western bare earth/pond is likely highly changeable depending on seasonal conditions. Vegetation on dry bank is predominantly knotgrass *Polygonum arviculare*.

48. The main waterbody (the eastern area of standing water) is infested with invasive, non-native New Zealand pygmyweed *Crassula helmsii*. The pond edge is likely highly changeable depending upon seasonal conditions. The species at the water's edge include common orache *Atriplex patula*, redshank *Persicaria maculosa*, silverweed *Potentilla anserine* and knotgrass *Polygonum aviculare*.

Bare Ground

49. The bare earth present is assumed to be a pond which was dry at the time of survey. This is thought to be standing water in winter. No separate botanical species list was provided for this area.

Running Water

50. There is a drainage ditch system across the majority of this area which was mostly dry at the time of the Phase 1 Habitat Survey, but did include marginal vegetation which suggested a wetter habitat. Vegetation present included bulrush *Typha latifolia*, soft-rush, hard rush, branched bur-reed, common nettle *Urtica dioica*, bramble and hawthorn *Crataegus monogyna*.

51. Billing Dyke runs along the south edge of this area and includes branched bur-reed *Sparganium erectum* within the channel and common nettle, willowherb *Epilobium sp(p)* and *Rumex sp(p)* within the marginal vegetation.

Species-poor Hedgerow – Intact

52. A hawthorn hedge runs along the bank of the River Dearne and park (eastern and south-eastern edges of this area).

Earth Bank

53. An earth bank maintained by the Environment Agency runs around the outside edge of this area. No separate botanical species list was provided for this area.

4.4.3 Area 2: North-east Reservoir Access Track

54. The detailed botanical survey (RSPB Dearne Valley Reserves, 2018a) focused on the Neutral Semi-improved grassland only.

Broadleaved Plantation Woodland

55. A screen of trees is present on the bank of the River Dearne along the northern edge of this area.

56. The section of woodland to the edge of this section, running parallel with the road, consists of hawthorn, rose *Rosa sp*., sycamore *Acer pseudoplatanus* and willow *Salix sp*.

Dense scrub

57. The dense scrub to the north-east of the section is dominated by bramble, hawthorn and elder *Sambucus nigra*.

Neutral Semi-improved Grassland

58. The strip of grassland is an access track through the arable field present. It is bounded by hedgerow.

59. Cock's-foot *Dactylis glomerata*, creeping bent *Agrostis stolonifera*, creeping buttercup *Ranunculus repens* and common bird's-foot-trefoil *Lotus corniculatus*.

60. The species list provided within the detailed botanical report (RSPB Dearne Valley Reserves, 2018a) for this area is similarly indicative of neutral semi-improved grassland with meadow vetchling *Lathyrus pratensis,* common vetch *Vicia sativa* and knapweed *Centaurea nigra* indicative of herb rich grassland.

Arable Field

61. The largest habitat present in this section is the arable field to the south of the area, this is a field with harvested crop and evidence of ploughing.

4.4.4 Area 3: Reservoir North End

62. The species list included within botanical survey report (RSPB Dearne Valley Reserves, 2018a) indicates that the survey focused on the semi-improved grassland and swamp. The species shows a relatively species rich semi-improved grassland (as indicated by meadow vetchling and cowslip *Primula veris*) with wet features (as indicated by cookoo flower *Cardamine pratensis*, wild angelica *Angelica sylvestris* and greater bird's-foot trefoil *Lotus uliginosus*) which grades into marsh as indicated by water plantain *Alisma plantago-aquatilis*, common reed *Phragmites australis (communis)* and gypsywort *Lycopus europaeus*.

63. The habitat descriptions and individual species lists below are taken from the GIS information provided by RSPB Dearne Valley.

Broadleaved Plantation Woodland

64. Dominated by hawthorn, rose *Rosa sp.* and blackthorn *Prunus spinosa*.

Scattered Scrub

65. Dominated by bramble, hawthorn and willow sp.

Neutral Semi-improved Grassland

66. This area is grazed by cattle.

67. Key vegetation includes sweet vernal grass *Anthoxanthum odoratum*, cock's-foot, meadow grass *Poa sp*. wild carrot *Daucus carota*, red fescue *Festuca rubra*, white clover *Trifolium repens*, *Epilobium sp(p)*, *Rumex sp*.

68. Common reed is present at the water's edge.

Swamp

69. Common reed and willow sp. are present at the water's edge.

Standing Water

70. The ditch through which water can be extracted from the River Dearne is present in this area.

71. The standing water to the east of the surveyed area is the north-western edge of a larger waterbody. The macrophytes within the water were not assessed and were obscured by marginal vegetation.

4.4.5 Area 4: Mere North Bank

72. The botanical survey report (RSPB Dearne Valley Reserves, 2018a) combines the species list for the North bank and East bank of the Mere. The species included matches the assessment of the Phase 1 Survey, finding the grassland to be species rich, with key indicator species such as cowslip and meadow vetchling present within the sward.

73. The habitat descriptions and individual species lists below are taken from the GIS information provided by RSPB Dearne Valley.

Neutral Semi-improved Grassland

74. The grassland is 'relatively species rich' with dominant species being meadow grass *Poa sp.*, Yorkshire fog *Holcus lanatus*, meadow foxtail *Alopecurus pratensis*, cock's-foot, creeping bent *Agrostis stolonifera*, ribwort plantain *Plantago lanceolata*, thistle *Cirsium sp(p)*, common knapweed, common nettle, *Rumex sp(p)*.

Marsh/Marshy Grassland

75. This is rush-dominated vegetation by the water's edge. No separate botanical species list was provided for this area.

Swamp

The area of swamp to the north of this section is a reed bed dominated by common reed. Downy birch *Betula pubescens* and willow are also present.

Inundation Vegetation

76. There are two areas of muddy bank of the main waterbody, to the north and east. These are likely seasonal and change with the water levels.

77. The northern section of inundation vegetation includes silverweed, greater plantain *Plantago major* and dandelion *Taraxacum officinale* agg.

Standing Water

78. The macrophytes in the waterbody were not assessed.

4.4.6 Area 5: Wader Scrape

79. The botanical survey report (RSPB Dearne Valley Reserves, 2018a) indicates that the grassland is relatively diverse with species such knapweed and bulbous buttercup *Ranunculus bulbosa*, indicative of less improved grassland.

80. The habitat descriptions and individual species lists below are taken from the GIS information provided by RSPB Dearne Valley.

Dense Scrub

81. The dense scrub to the south-east of the area is dominated by bramble.

Neutral Semi-improved Grassland

82. The dominant habitat in this area is neutral semi-improved grassland which makes up the wader scrape. No separate botanical species list was provided for this area.

Marginal Vegetation

83. There is a narrow band of marginal vegetation around the edge of the waterbody to the north. This includes branched bur-reed and common reed.

Standing Water

84. The standing water to the north of this area includes invasive, non-native New Zealand pygmyweed.

85. The standing water to the south of this area was not assessed in detail and was obscured by the tree line.

Scattered Broadleaved Tree Line

86. A tree line of hawthorn and willow is present on the eastern edge of the semi-improved grassland within this area.

4.4.7 Area 6: Green Lane, Green Lane Triangle and Field Pools East

87. The species list within the separate botany report (RSPB Dearne Valley Reserves, 2018a) includes a mix of hedgerow, rank grassland species and more varied semi-improved grassland species.

88. The presence of field woodrush *Luzula campestris*, knapweed, bird's-foot trefoil, common vetch and oxeye daisy *Leucanthemum vulgare* point to good grassland sward diversity although there are no particularly notable species

89. Buckthorn *Rhamnus cathartica* is listed within the Triangle, this is unusual in the area so is likely to have been planted.

90. The mixed hedgerow (at field pools east) contains some planted species (sea buckthorn *Hippophae rhamnoides*) but will be of local value with blackthorn *Prunus spinosa*, gorse *Ulex europaeus*, dogwood *Cornus sanguinea*, hawthorn providing shelter and food for a range of species. Ground flora in indicative of reasonable quality semi-improved grassland (common vetch, knapweed, hairy tare, yarrow, wild carrot).

91. The habitat descriptions and individual species lists below are taken from the GIS information provided by RSPB Dearne Valley.

Broadleaved Semi-natural Woodland - Hedgerow

92. The strip of woodland to the north of this area contains an ancient hedgerow. The invasive, non-native Japanese rose *Rosa rugosa* is present, as well as an unknown rose species *Rosa sp.*, willow and hawthorn.

93. The hedgerow report (RSPB Dearne Valley Reserves, 2018b) includes the following description of the hedgerow:

94. *"The only mature hedge on old moor is that which runs parallel to the current Green Lane Trail, sitting between the Mere and Field Pools. This hedge pre-dates the creation of the Old Moor nature reserve making it over 50 years old, likely close to 100 years old."* (RSPB Dearne Valley Reserves, 2018b).

Dense Scrub

95. The area of dense scrub at the far north of this area is planted along an embankment. This includes non-native, invasive species such as Japanese rose, as well as willow, unknown rose species *Rosa sp.*, hawthorn, bramble, elder, Scotch broom *Cytisus scoparius (Sarothamnus scoparius)* and blackthorn.

Scattered Scrub

96. Along the southern edge of the broadleaved woodland, there is a strip of scattered gorse dominated scrub with bramble and unidentified rose species *Rosa sp.* At the edge of this habitat there is a narrow strip of poor semi-improved grassland which becomes marsh/marshy grassland towards the water's edge.

Neutral Semi-improved Grassland

97. The eastern section of neutral semi-improved grassland includes frequent bird's-foot trefoil, silverweed, cock's-foot, ribwort plantain, curled dock *Rumex crispus*, broad-leaved dock *Rumex obtusifolius*, soft rush, creeping bent *Agrostis stolonifera* and common knotgrass *Polygonum arviculare*.

98. The western section is similar to the eastern but includes scattered sedge and a greater proportion of rush.

99. There is also frequent invasive, non-native New Zealand pygmyweed in both sections of this habitat.

Swamp

100. There is a 'broad strip of wetland swamp' present in the west of this section which is dominated by reed vegetation. No separate botanical species list was provided for this area.

Inundation Vegetation

101. There are five areas of inundation vegetation, all rush-dominated with invasive, non-native New Zealand pygmyweed present. There are also ruderal species present and an exposed mud margin.

Standing Water

102. There is invasive, non-native New Zealand pygmyweed present.

4.4.8 Overflow Car Park Hedge

103. In addition to the habitats identified above, the hedgerow report includes the following statement:

104. *"The only other hedge to be effected by the HLF project is a hawthorn hedge running between the existing and overflow car parks. Again, this hedge was planted by Barnsley Council around 20 years ago, and breeding tree sparrows occupy this area."* (RSPB Dearne Valley Reserves, 2018b).

4.5 Flora

105. The detailed botanical survey (RSPB Dearne Valley Reserves, 2018a) found no UK BAP Priority species or rare or notable species in any of the areas surveyed.

106. The results below are taken from the GIS information provided by RSPB Dearne Valley and from incidental records taken from surveyors undertaking other surveys on site.

4.5.1 Area 1: Wombwell Ings

107. The main waterbody (the eastern area of standing water) is infested with invasive, non-native New Zealand pygmyweed. No other species of note were recorded.

4.5.2 Area 2: North-east Reservoir Access Track

108. No invasive or notable species were recorded in this area.

4.5.3 Area 3: Reservoir North End

109. No invasive or notable species were recorded in this area.

4.5.4 Area 4: Mere North Bank

110. Common spotted orchid *Dactylorhiza fuchsii* were recorded by experienced ecologist Paul Liptrot during the great crested newt assessment. The orchids were present within grassland to the north west of the Mere.

4.5.5 Area 5: Wader Scrape

111. During the Phase 1 Habitat survey, the standing water to the north of this area was found to include invasive, non-native New Zealand pygmyweed.

4.5.6 Area 6: Green Lane, Green Lane Triangle and Field Pools East

112. The Phase 1 Habitat Survey found the invasive, non-native Japanese rose *Rosa rugosa* to be present within the planted dense scrub and broadleaved semi-natural woodland to the north of this section, along Green Lane. The separate botanical survey (RSPB Dearne Valley Reserves, 2018a) undertaken also found this species in the Green Lane Triangle area of dense scrub and along Green Lane.

113. The neutral semi-improved grassland within the Field Pools was found to contain invasive, non-native New Zealand pygmyweed *Crassula helmsii* in both sections of this habitat.

114. There are five areas of inundation vegetation within the Field Pools, all with invasive, non-native New Zealand pygmyweed *Crassula helmsii* present. The species is also in the standing water in this area.

4.6 Fauna

4.6.1 Amphibians

Presence/Absence Survey Data

115. As part of a survey investigation undertaken by Wildscapes CIC Ltd in 2018, some of the waterbodies on Old Moor were included in a Great Crested Newt Presence/Absence survey (Wildscapes CIC Ltd, 2018a). The full results of these surveys are available on request.

116. No great crested newts were recorded during this survey.

117. Smooth newt *Lissotriton vulgaris*, palmate newt *Lissotriton helveticus* and common frog *Rana temporaria* were all found on Old Moor.

GCN eDNA – Pre-existing survey results

118. As part of a survey investigation undertaken by Wildscapes CIC Ltd in 2018, some (W17, W18 and W19) the waterbodies on Old Moor and in the local area were included in a Great Crested Newt Environmental DNA survey (Wildscapes CIC Ltd, 2018a). See

119. *Appendix B – Environmental DNA Results* – Wildscapes.

120. No great crested newt DNA was found.

GCN eDNA – Old moor and Wombwell Ings Survey results

121. No great crested newt environmental DNA was recorded on site. A map of the waterbodies sampled with their location descriptions can be found in

122. *Appendix B – Environmental DNA Results* – Wildscapes. The laboratory report detailing DNA identification methods can be found in 0

Incidental Records

123. As part of the reptile survey to support works to the local road network (Wildscapes CIC Ltd, 2018b), a terrestrial refugia survey was undertaken on part of the old moor site and wider local area. Surveyors were also instructed to check any natural refugia present and to note any amphibians or reptiles seen whilst walking the route to check the tins. In line with the standard guidance for reptile presence/absence surveys (Froglife, 1999), six visits were undertaken to check the refugia in May – July 2018. Terrestrial amphibians have been demonstrated to use reptile tins as refugia (Hampton, 2007), although they are known to show a preference for carpet tiles (as they maintain damper conditions).

124. No amphibians were recorded during this survey.

4.6.2 Badger

125. Two badger records were provided from Little Houghton and Old Moor, both are from 2003. Regular monitoring of the Old Moor and Wombwell Ings sites has revealed no signs of badger setts or regular badger activity (RSPB Dearne Valley Reserves, 2018d).

4.6.3 Bats

126. The bat surveys undertaken in 2016 and 2017 by South Yorkshire Bat Group (SYBG) found soprano pipistrelle, common pipistrelle, Leisler's bat and Daubenton's bat to be using Old Moor in 2016, and soprano pipistrelle, common pipistrelle and noctule bat to be using the site in 2017. Of these species, soprano and common pipistrelle were found to be roosting on Old Moor in both years using bat boxes fixed to trees (RSPB Dearne Valley Reserves, 2018d) (Middleton, 2018).

127. There are historic records of a Daubenton's bat roost in the Five Arches Bridge to the east of the site (RSPB Dearne Valley Reserves, 2018d).

128. Records of common pipistrelle, soprano pipistrelle, Daubenton's bat and noctule bat were also recorded on Old Moor through an activity survey project in 2010 (RSPB Dearne Valley Reserves, 2018d).

129. Further surveys in 2012 recorded all of the above species, with the addition of brown long-eared bat.

130. No activity surveys have been undertaken at Wombwell Ings, but it is assumed that the species found to be foraging on Old Moor are also using Wombwell Ings (RSPB Dearne Valley Reserves, 2018d). There have been no suitable roosting sites recorded on Wombell Ings (RSPB Dearne Valley Reserves, 2018d).

4.6.4 Birds

131. A Common Bird Census survey was undertaken from March to the end of June 2018 (RSPB Dearne Valley Reserves, 2018c) on the RSPB Old moor site. The full results provided by RSPB can be found in *Appendix C – RSPB Survey Reports*

132. The survey found 82 species of bird to be on site including Schedule 1 species; barn owl, bittern, Cetti's warbler, garganey, greylag goose, kingfisher, Mediterranean gull. The following Section 41 species were recorded; bullfinch, dunnock, grasshopper warbler, house sparrow, lapwing, linnet, reed bunting, skylark, song thrush, starling, tree sparrow, willow tit, yellow wagtail, and yellowhammer. Of the 82 species recorded, 65 were recorded breeding on site as shown within the table below.

Table 4-5 Breeding birds recorded on Old Moor (RSPB Dearne Valley Reserves, 2018c)

Species	Pairs/nests/Territories	Total	Schedule 1	Section 41	RSPB National Status
Barn owl	3 nests in boxes	3	Y	N	Green
Bearded tit	1 pair in the reedbeds	1	N	N	Amber
Bittern	2 booming males, 3 nests, 12 fledged young	3	Y	Y	Red
Blackbird	20 territories	20	N	N	Green
Blackcap	12 territories	12	N	N	Green
Black headed gull	2500 pairs	2500	N	N	Amber
Blue tit	12 territories	12	N	N	Green
Bullfinch	8 territories	8	N	Y	Amber
Canada Goose	15 pairs	15	N	N	Green
Carrion Crow	3 pairs	3	N	N	Green
Cetti's Warbler	2 territories	2	Y	N	Green
Chaffinch	9 territories	9	N	N	Green
Chiffchaff	17 singing males	17	N	N	Green
Collared Dove	Present	0	N	N	Green
Common Tern	2 pairs	2	N	N	Amber
Coot	30 pairs	30	N	N	Green
Dunnock	12 territories	12	N	Y	Amber
Gadwall	56 pairs. 21 broods noted by the end of June	56	N	N	Amber
Garden Warbler	1 territory	1	N	N	Green
Goldfinch	8 territories	8	N	N	Green
Great Crested grebe	4 pairs	4	N	N	Green
Great Tit	12 pairs	12	N	N	Green
Greenfinch	16 territories	16	N	N	Green
Grey Wagtail	1 pair, on the edge of the site at the '5 arches' bridge	1	N	N	Amber
Greylag Goose	12 pairs	12	Y	N	Amber
Jay	1 pair	1	N	N	Green

Species	Pairs/nests/Territories	Total	Schedule 1	Section 41	RSPB National Status
Kestrel	1 pair	1	N	N	Amber
Kingfisher	2 pairs nested adjacent to the reserve on the R. Dearne and regularly fed on site	2	Y	N	Amber
Lapwing	7 pairs nested on the Field Pools	7	N	Y	Amber
Lesser Black Backed Gull	3 nests on the Mere/Wader Scrape	3	N	N	Amber
Lesser Whitethroat	3 territories	3	N	N	Green
Linnet	8 territories	8	N	Y	Red
Little Grebe	25 pairs	25	N	N	Green
Long-tailed Tit	3 pairs	3	N	N	Green
Magpie	3 nests	3	N	N	Green
Mallard	At least 19 pairs	19+	N	N	Amber
Meadow Pipit	1 territory on Field Pools	1	N	N	Amber
Mediterranean Gull	1 pair bred on the Mere	1	Y	N	Amber
Mistle Thrush	1 pair	1	N	N	Amber
Moorhen	25 pairs	25	N	N	Green
Mute Swan	4 pairs and up to 50 non breeding birds	4	N	N	Amber
Oystercatcher	3 pairs	3	N	N	Amber
Pheasant	Present but not recorded in detail	0	N	N	Green
Pochard	12 pairs produced 8 broods	12	N	N	Amber
Redshank	3 pairs nested on the Field Pools	3	N	N	Amber
Reed Bunting	At least 35 territories	35+	N	Y	Red
Reed Warbler	At least 80 territories in the reedbeds	80+	N	N	Green
Robin	15 territories	15	N	N	Green
Sand Martin	7 pairs bred in the artificial bank (18 in 2017)	7	N	N	Amber
Sedge Warbler	14 territories	14	N	N	Green
Shelduck	3 pairs	3	N	N	Amber
Shoveler	6 pairs	6	N	N	Amber
Skylark	1 territory	1	N	Y	Red
Snipe	2 drumming birds	2	N	N	Amber
Song Thrush	6 territories	6	N	Y	Red

Species	Pairs/nests/Territories	Total	Schedule 1	Section 41	RSPB National Status
Sparrowhawk	1 pair	1	N	N	Green
Stock Dove	6 pairs, all in nest boxes	6	N	N	Amber
Tawny Owl	1 pair	1	N	N	Amber
Tree Sparrow	8 pairs	8	N	Y	Red
Tufted Duck	25 pairs	25	N	N	Green
Water Rail	15-20 territories, hard to census in deep reed	20	N	N	Amber
Whitethroat	6 territories	6	N	N	Green
Willow Warbler	15 territories	15	N	N	Amber
Wood Pigeon	Present throughout	-	N	N	Green
Wren	Present in good numbers but not specifically mapped	-	N	N	Green

133. No bird records for Wombwell Ings were provided.

4.6.5 Fish

134. RSPB Old moor has been extensively surveyed by electrofishing and the since 2011. Species composition and stock levels are carefully managed (RSPB Dearne Valley Reserves, 2018e).

135. 15 species of fish are now known to be present within the reserve

- Common Bream, *Abramis brama*
- European Eel, *Anguilla anguilla*
- Crucian Carp, *Carassius carassius*
- Common Carp, *Cyprinus carpio*
- Pike, *Esox Lucius*
- Three-spined Stickleback, *Gasterosteus aculeatus*
- Nine-spined Stickleback, *Pungitius pungitius*
- Dace, *Leuciscus leuciscus*
- Perch, *Perca fluviatilis*
- Minnow, *Phoxinus phoxinus*
- Roach, *Rutilus rutilus*
- Rudd, *Scardinius erythrophthalmus*
- Chub, *Squalius cephalus*
- Tench, *Tinca tinca*

136. Transect surveys undertaken by the RSPB in 2015 revealed the following fish abundance:

Table 4-6 RSPB transect survey results 2015 (RSPB Dearne Valley Reserves, 2018e)

Species	Count	Total Weight (g)	Biomass (Kg/ha)
3-spined Stickleback	1	1	0.01
Common Carp	1	11	0.13
European Eel	7	625	7.27
Perch	1	8	0.09
Roach	10	162	1.88
Rudd	14	167	1.94
Tench	9	242	2.81
Total	**43**	**1216**	**14.14**

137. The report goes on to state:

138. *"This species mix is representative of the whole site. Fish densities are at their highest in the reedbed cells but are still significant in the Mere and Field Pools. The wader scrape has a more significant seasonal drawdown and smaller outer ditch and therefore is more prone to fish predation in the later summer. The fish population is therefore less dense here but the species mix is still present."* (RSPB Dearne Valley Reserves, 2018e).

4.6.6 Harvest Mouse

139. There are two historic records for Harvest Mouse from the Old Moor Reserve one from 2005 and one from 2012 (RSPB Dearne Valley Reserves, 2018f).

140. There are no records from Wombwell Ings and the site's habitat composition is considered not to be suitable for this species (RSPB Dearne Valley Reserves, 2018f).

141. The report provided by RSPB cites the following survey information for Old Moor and Wath Ings:

142. *"In 2014/15 the Dearne Valley Green Heart Nature Improvement Area commissioned a survey by Sheffield City Council Ecology Unit of several sites in the Barnsley area, including RSPB Old Moor. The site was surveyed on 27 January 2015 by Liz Harding, Richard Harris, Michael Senkins and Chris Smith from the Ecology Unit.*

143. *Several suitable areas were searched including the whole of the Green Lane area. However, no nests were found here, despite there being suitable Phalaris grass habitat. Despite this, the survey did note two potential nest sites in this area.*

144. *The far end of Wath Ings contains suitable habitat and this was where all of the records were concentrated – in areas dominated by Phalaris with structural support from the occasional bramble patch."* (RSPB Dearne Valley Reserves, 2018f).

145. 14 confirmed nests were found within vegetation at the far eastern end of Wath Ings whilst two unconfirmed nest sites were identified within the Green Lane area of the site.

4.6.7 Otter

146. There were four records of otter provided by the RSPB within the last 10 years. The most recent, from 2016, was a dead otter found at Wombwell Ings and is suspected to have come from upstream (RSPB Dearne Valley Reserves, 2018d).

147. The second record is of an otter spraint found by RSPB Old Moor at Wombwell Ings in 2010 (RSPB Dearne Valley Reserves, 2018d).

148. Two further records were supplied to the RSPB from the Environment Agency from 2015, these were both from close to Old Moor and Wombwell Ings and were sightings of live otters (RSPB Dearne Valley Reserves, 2018d).

149. Despite the presence of wildlife cameras and regular surveys undertaken on site (further detail can be found in 'Mammal Survey Report' provided by RSPB), no other evidence of otter presence has been found on site (RSPB Dearne Valley Reserves, 2018d).

4.6.8 Reptiles

150. As part of a survey investigation undertaken by Wildscapes CIC Ltd in 2018, a Reptile Terrestrial Refugia Presence/Absence survey was undertaken in the area surrounding Old Moor (Wildscapes CIC Ltd, 2018b). Surveyors were also instructed to check any natural refugia present and to note any amphibians or reptiles seen whilst walking the route to check the tins. In line with the standard guidance for reptile presence/absence surveys (Froglife, 1999), six visits were undertaken to check the refugia in May-July 2018.

151. No reptiles were found on Old Moor, but a single grass snake *Natrix natrix* was confirmed within the survey area (Wildscapes CIC Ltd, 2018b), approximately 500m to the north.

4.6.9 Water Shrew

152. Water shrew has been recorded regularly on the Old moor site with 6 confirmed records within the past 15 years (4 records since 2012) (RSPB Dearne Valley Reserves, 2018f). The species has not been recorded at Wombwell Ings, however no systematic survey for the species has been carried out on either site (RSPB Dearne Valley Reserves, 2018f).

4.6.10 Water Vole

153. Water vole surveys have been undertaken on Old Moor yearly since 2009 and on Wombell Ings in 2010, 2014, 2017 and 2018 (RSPB Dearne Valley Reserves, 2018g).

154. There has been evidence of water vole presence intermittently throughout these years, as well as intermittent evidence of mink presence. Signs of water vole are steadily decreasing in all areas of the reserve, and mink numbers have increased (RSPB Dearne Valley Reserves, 2018g). The full report can be made available on request.

155. Mink are controlled at Old Moor, with 63 individuals caught since the start of control, 3rd December 2014 (Wood, 2018). No mink control is currently in place at Wombwell Ings.

156. In addition to this, selected waterbodies within the Old moor and surrounds were assessed for the presence of water vole in 2018 as part of a separate scheme (Wildscapes CIC Ltd, 2018c). The survey found that water voles were likely to be absent from the local area apart from within RSPB Old Moor.

4.6.11 Other Mammal Species

157. In addition to those species above, the following mammal species have been recorded on site (RSPB Dearne Valley Reserves, 2018f):

- American mink *Neovison vison – (Non-native invasive species)*
- Bank vole *Myodes glareolus*
- Brown hare *Lepus europaeus – (Section 41 species)*
- Brown rat *Rattus norvegicus*
- Common shrew *Sorex araneus*
- European Hedgehog *Erinaceus europaeus – (Section 41 species)*

- European rabbit *Oryctolagus cuniculus*
- Field vole *Microtus agrestis*
- Grey squirrel *Sciurus carolinensis*
- Mole *Talpa europaea*
- Pygmy shrew *Sorex minutus*
- Red fox *Vulpes vulpes*
- Roe Deer *Capreolus capreolus*
- Stoat *Mustela erminea*
- Weasel *Mustela nivalis*
- Wood mouse *Apodemus sylvaticus*

5 Interpretation of Results

5.1 Designated Sites

158. The proposals will impact two Local Wildlife Sites (LWS) and one priority habitat type. Old Moor and Wath Ings, and Broomhill Flash and Wombwell Ings are regionally important sites, known to support a range of species and are especially important for an assemblage of wintering, passage and breeding birds.

5.2 Habitats

159. The following habitat types have been identified within the surveyed areas. Where appropriate, the categorisations are based on the Barnsley Biodiversity Trust Local Priority Habitats Summary (Barnsley Biodiversity Trust, 2009).

5.2.1 Arable Field

160. The arable field included within Area 2 is likely to be of limited ecological value; as a result, this is considered to be of negligible importance as a habitat for wildlife.

5.2.2 Hedgerow

161. Hedgerow is designated as a priority habitat for conservation at both national and district level. Barnsley Biodiversity Trust (Barnsley Biodiversity Trust, 2009) uses the UK BAP priority habitat definition, which defines priority hedgerow as:

162. *"All hedgerows with 80% or more of at least one native woody species of tree or shrub, with the best being ancient &/or 'species rich' that is with at least four different native tree or shrub species."* (JNCC, 2007).

163. The hedgerows within surveyed areas would meet the criteria for the priority habitat.

164. Barnsley Biodiversity Trust sets its criteria for Local Wildlife Selection for Hedgerows (Barnsley Biodiversity Trust, 2009) as:

- Any hedgerow with at least 4 or more woody species and in addition, at least 6 from a list of 37 non-woody herbaceous plants.

- Any hedgerow that connects a priority habitat to another priority habitat and contains 4 or more woody species
- Any hedgerow that qualifies on the basis of the fauna it supports.

165. As the hedgerow survey undertaken was not undertaken using the standard assessment methodology it is not possible to judge any of the hedgerows on site against the LWS criteria.

166. As a result of this, is not possible to assess the importance of the hedgerows on site. However, as all of the hedgerows meet the criteria as priority habitat, the minimum importance will be Local. However, should any of the hedgerows be demonstrated to meet the criteria for LWS status (as an individual feature) this could be raised to district level importance.

5.2.3 Lowland Neutral Grassland

167. Unimproved and semi-improved neutral grassland is designated as a priority habitat for conservation at both national and district level.

168. Barnsley Biodiversity Trust states that:

169. "*All unimproved and semi-improved grassland is important for biodiversity in Barnsley.*" (Barnsley Biodiversity Trust, 2009).

170. Neutral semi-improved grassland has been recorded in all 6 surveyed areas. Although, due to the recording methodology used, it is difficult to define the species richness of the differing habitat types on site, the species list included is indicative of florally diverse grassland. The grassland within surveyed areas would meet the criteria for the priority habitat.

171. Barnsley Biodiversity Trust sets its criteria for Local Wildlife Site selection for lowland neutral grassland (Barnsley Biodiversity Trust, 2009) as:

- ≥0.5ha in size and have an affinity with NVC communities MG4 or MG5 [or MG8]
- And/or have 15 or more species from a list of 50 Neutral Grassland indicator plants including grasses.
- It may also be selected because of the fauna that such grassland supports.

172. As the botanical survey undertaken was not undertaken using a standard assessment methodology (the detailed botanical survey was not cross-referenced to the Phase 1 Habitat Survey map or a separate NVC survey map) it is not possible to judge any of the grasslands on site against the LWS criteria.

173. As a result of this, is not possible to assess the importance of the grassland on site. However, as all of the grasslands meet the criteria as priority habitat, the minimum importance will be Local. However, should any of the grassland areas be demonstrated to meet the criteria for LWS status (as an individual feature) this could be raised to district level importance.

5.2.4 Floodplain Grazing Marsh

174. Floodplain grazing marsh is designated as a priority habitat for conservation at both national and district level.

175. Barnsley Biodiversity Trust states that:

176. *"Natural England identifies grassland as Floodplain Meadow when it has at least one frequent example of nine wildflowers typical of seasonally inundated grassland, and three occasional wildflowers from the list of 43 wildflowers for neutral grassland.*

177. *Grassland or Grazing Marsh that meets these priority habitat criteria is quite scarce.*

178. *Floodplain Grazing Marsh is a local priority habitat because of this scarcity, the plants and wildlife it supports - especially breeding and overwintering birds - and the opportunities for its conservation."* (Barnsley Biodiversity Trust, 2009).

179. Barnsley Biodiversity Trust has no publically available LWS criteria for this priority habitat and as a result it is not possible to assess the importance of the floodplain grazing marsh on site. However, as all of the floodplain grazing marsh meets the criteria as priority habitat, the minimum importance will be local. However, subject to the district conservation priorities, this could be raised to district value.

5.2.5 Running Water, River and Streams

180. Billing Dyke forms the southern boundary of Wombwell Ings. The feature was not actively surveyed as part of the botanical survey (RSPB Dearne Valley Reserves, 2018a). Barnsley Biodiversity Trust state that:

181. "*All rivers and streams in Barnsley have possible value for wildlife and should be viewed as potential local priority habitat."* (Barnsley Biodiversity Trust, 2009).

5.2.6 Standing Water and Ponds

182. Standing water and ponds are designated as a priority habitat for conservation at both national and district level.

183. Barnsley Biodiversity Trust states that:

184. *"Standing water is a local priority habitat; we recognise that all standing water can be valuable habitat for wildlife.*

185. *Standing open water is a broad UK BAP habitat category and standing water is identified in Phase 1 habitat surveys.*

186. *It includes: lakes, reservoirs, ponds, flooded pits, subsistence flashes, water-filled ditches, and canals."* (Barnsley Biodiversity Trust, 2009)

187. Barnsley Biodiversity Trust sets its criteria for Local Wildlife Selection for standing water and ponds (Barnsley Biodiversity Trust, 2009) as:

- a population of white-clawed crayfish
- a colony of water vole
- a good population of great crested newt or assemblage of amphibians
- a good assemblage of dragonfly or damselfly species breeding in the water body.

188. Based upon the historic water vole populations identified in Area 4 and 6, the mere and ditch would classify as LWS as independent features and would therefore classify as being of district value.

189. However, the standing water on site is a characteristic feature identified within the designation of the Old Moor and Wombwell Ings Local Wildlife Sites and therefore it is considered that all of the standing water should be considered as of district value.

5.2.7 Scrub

190. Although not identified as a national priority habitat, Barnsley Biodiversity Trust has recognised the local importance of this habitat, particularly for its importance for supporting willow tit (Barnsley Biodiversity Trust, 2009).

191. Willow tit was not recorded in the common bird census undertaken at Old Moor in 2018 (RSPB Dearne Valley Reserves, 2018c). However, the species has been recorded on site previously. As a result, the scrub habitat within the surveyed areas should be considered to be of local value.

5.2.8 Wetlands – Fen, Marsh and Swamp - Reedbed

192. Areas 1, 3, 4 and 6 include established areas of reedbed. Reedbed is designated as a priority habitat for conservation at both national and district level. Reedbed over 20Ha in size is classified as a UK priority habitat (Barnsley Biodiversity Trust, 2009).

193. Barnsley Biodiversity Trust sets its criteria for Local Wildlife Site selection for Reedbed (Barnsley Biodiversity Trust, 2009) as:

- reedbeds ≥25ha and a good assemblage of wetland plant species

Or that regularly support any of the following:

- a colony of water vole
- a good population of great crested newt or assemblage of amphibians

194. Based upon the historic water vole populations identified in Area 4 and 6, the reedbeds within these areas would classify as LWS as independent features and would therefore classify as of district value.

195. However, the reedbed on site is characteristic feature identified within the designation of the Old Moor and Wombwell Ings Local Wildlife Sites and therefore it is considered that all of the standing water should be considered as of district value.

5.3 Flora

5.3.1 Protected and Notable Species

196. Common spotted orchid was identified as present within Area 4 in the grassland to the north west of the mere. This species, whilst granted no special protection (other than that granted to all species of wildflower under the Wildlife and Countryside Act), is indicative of florally diverse grassland due to its specific ecological requirements.

5.3.2 Invasive Species

197. The invasive species New Zealand pygmyweed and Japanese rose have been identified within the proposed works areas on site.

198. New Zealand pygmyweed appears to be widespread within waterbodies both within the reserve and local area, the interconnected status of the waterbodies in this area rendering control extremely difficult. RSPB are undertaking measures to control the further spread of the species but eradication of the species is impossible without highly intrusive intervention.

Japanese rose appears to be relatively sparsely distributed within the proposed works area, the information provided does not state if any measures have been undertaken to eradicate this species from the site.

5.4 Fauna

5.4.1 Amphibians

199. The combined survey results indicate that great crested newt are not present at the Old Moor or Wombwell Ings sites. In addition, the fish populations present on both of these sites is likely to render any waterbodies unsuitable for great crested newt.

200. Populations of common frog, smooth newt and palmate newt have been confirmed at Old Moor (Wildscapes CIC Ltd, 2018a), it is likely that these species are also present at Wombwell Ings. Whilst these three species are more resilient to fish predation than GCN, the presence of major fish and bird populations (Old Moor is stocked artificially to encourage bird populations) is likely to significantly reduce the likely carrying capacity of the site for these species.

201. As a result of these factors, Old Moor and Wombwell Ings are considered to be of local importance for Amphibian populations.

5.4.2 Badger

202. Regular monitoring of RSPB Old Moor and Wombwell Ings sites has revealed no evidence of badger setts or regular badger activity on site (RSPB Dearne Valley Reserves, 2018d). In addition to this, the majority of the habitats within the proposed work areas are considered to be unsuitable for sett creation by this species.

5.4.3 Bats

203. Common and soprano pipistrelle bats have been confirmed roosting on site, however the proposed work areas contain no features suitable for roosting bats (Middleton, 2018).

204. The survey information provided by RSPB Dearne Valley (RSPB Dearne Valley Reserves, 2018d) and by Middleton Bell Ecology (Middleton, 2018) state that 6 species of bat have been recorded foraging on the RSPB Old Moor site. The Barnsley LWS criteria for bats states that the following criteria can be a justification for consideration of a site for LWS status.

205. *"Any habitat area (e.g. woodlands, river corridors, lakes/lodges/ponds) which regularly support four or more foraging bat species."*

206. The data provided to support this report gave no temporal distribution for the recorded species and as a result it is not possible to make a determination of the regularity of usage by the 6 species. The habitats mix included on site would appear to be highly suited to a variety of bat species, however. As a result of this, the site is considered to be of district importance for foraging bats.

207. Although no systematic survey for bats has been carried out on the Wombwell Ings site, the combination of habitats on site is similar to that on Old Moor and as a result it is likely to be of similar importance for foraging bats.

5.4.4 Birds

208. The habitats within the Old Moor and Wombwell Ings reserves are key for bird species within the local region, particularly for Schedule 1 species; barn owl, bittern, Cetti's warbler, greylag goose and Mediterranean gull, all of which have been recorded as breeding on site. As a result of this, the reserve is considered to be of regional importance for bird species. When treated as a part of a wider wetland complex within the region (as included within the candidate SSSI), this rises to a nationally important habitat feature. However, it should be noted this value is primarily associated with the wetland habitats on site.

5.4.5 Fish

209. The RSPB have undertaken extensive work since 2011 to diversify the fish species present within the Old Moor reserve and surrounding river network (as an aim to improve foodstock for breeding bittern) (RSPB Dearne Valley Reserves, 2018e). This has proved to be successful particularly with the re-introduction and establishment of the IUCN critically endangered species European eel on site and in surrounding reserves (RSPB Dearne Valley Reserves, 2018e). The site supports a diverse species list, and as periodic

stocking is still undertaken, this is likely to be relatively unique within the local area. As a result of this, the proposed works areas are considered to be of district importance for their stocked fish populations.

5.4.6 Harvest Mouse

210. An established population of harvest mouse is present on the Old Moor reserve. This species is primarily associated with habitats such as tall grass, cereal crops, road side verges and reed beds. This is reflected with the location of the territories within Old Moor reserve. The habitat within Old Moor is likely to be important within the local context as habitat in appropriate management for this species is likely to be fragmented in the wider landscape (particularly to the south where urban habitats dominate).

5.4.7 Otter

211. Otter have been recorded on the river Dearne within the past 3 years (RSPB Dearne Valley Reserves, 2018d). However regular monitoring of RSPB old moor and Wombwell Ings has shown no sign of activity by otter within the reserve (RSPB Dearne Valley Reserves, 2018d). As a result of this, it is highly unlikely that the proposed work areas included significant features (holts/lay-up areas) for Otter. The sites do offer potential as off river foraging resources for otter and it is possible that the site's value to the species, will increase if the otter population continues to recover in the local area. Based upon this, it is considered that the proposed works areas are of site importance for otter.

5.4.8 Reptiles

212. A population of grass snake are present within the local area. This species is likely to use both the Old Moor and Wombwell Ings sites as significant foraging resources. In addition, the habitats surrounding the water bodies, particularly the hedgerows and scrub habitats, have potential as refugia for this species. Insufficient survey has been undertaken to assess the population size present in the wider area. However, as the Old Moor and Wombwell Ings sites include substantial areas of suitable foraging habitat (marginal vegetation, ditch systems etc.) for this species when compared to the surrounds, it is likely that the sites are of local importance for grass snake.

213. Insufficient survey has been undertaken to rule out the presence of common lizard or slow worm from within the Old Moor and Wombwell Ings work areas. There are historic records for these species within the Old Moor site in 2012 (Wildscapes CIC Ltd, 2018b). The survey carried out by Wildscapes CIC Ltd focused on the habitats immediately adjacent to the existing road corridors, therefore excluding Wombwell Ings and much of the Old Moor site (Wildscapes CIC Ltd, 2018b). The habitats within the proposed work areas, whilst likely to be sub-optimal (due to the dominance of wetland habitats), do include some suitable features for these species (rough grassland, hedgerow habitats etc.). Based upon this, it is likely that the proposed works areas are of site importance for slow worm and common lizard.

214. There are no historic records for adder within the local area (Wildscapes CIC Ltd, 2018b) and the habitats within the proposed work area are considered to be unsuitable for this species.

5.4.9 Water Shrew

215. An established population of water shrew is present within the Old Moor reserve. The habitats on Wombwell Ings site are also likely to support a population of this species. Both sites are likely to be of local importance for the species

5.4.10 Water Vole

216. Sustained mink predation (as evidenced by the large numbers of individuals caught at Old Moor since 2014 (Wood, 2018)) is likely to have rendered the water vole functionally extinct outside of the reserve (Wildscapes ClC Ltd, 2018c). However, it is possible that small low density populations may still exist in isolated waterbodies outside of the reserve.

217. The available evidence suggests that the populations within RSPB Old Moor itself is declining; likely as a result of predator impact and habitat degradation (RSPB Dearne Valley Reserves, 2018g). Although regular monitoring has been undertaken for the species within the reserve since 2009 (RSPB Dearne Valley Reserves, 2018g) due to the constraints of the site (the potential impact on Schedule 1 breeding birds), an exhaustive territory search has not been carried and as a result, it is not possible to establish the exact size and extent of the population present. The likely local extinction of the species in the wider area, as evidenced by local records and the 2018 water vole survey (Wildscapes ClC Ltd, 2018c), the Old Moor site is likely to be of district importance for the species. However, this assessment should be tempered by the fact that it is possible that the population at RSPB Old Moor has already declined to a point where local extinction is inevitable.

5.4.11 Other Mammals

Old Moor reserve has been monitored for mammal species. A diverse species list has been generated as a result and this, including the non-native, invasive North American mink and Section 41 species brown hare and hedgehog.

The mammal report states that the site is known to have an extensive hedgehog population (likely as a result of reduced predator numbers) (RSPB Dearne Valley Reserves, 2018d). Based upon this information, it is likely that the Old moor site is of local importance for this species, the dominance of wetland habitats on site is likely to be the main restricting factor to the population on site.

The reports supplied as background information for this report do not state the numbers or locations of the brown hare recorded on site. However, based on the predominant nature of wetland on site it is unlikely that the population is going to be extensive. As a result of this, it is likely that Old Moor and Wombwell Ings are only likely to be of site importance for this species.

6 Impact Assessment

218. The following impact assessment is based upon the programme of works identified within *Giving Nature a Home in the Dearne, Habitat Works at RSPB Old Moor and Wombwell Ings, Brief for the appointment of a design consultant* (RSPB Dearne Valley Reserves, 2018g).

219. The following impact assessment takes into account all of the proposals for the Old Moor and Wombwell Ings sites regardless of timeline. The impact assessment considers the overall impact of the works in the absence of mitigation.

6.1 Designated Sites

220. The only designated sites that will be affected by the works are Old Moor and Wath Ings, and Broomhill Flash and Wombwell Ings. The impacts to the individual sites habitats and resident flora and fauna are discussed further below. The impact on the sites is best seen as a cumulative total of all of the factors below. However, it should be noted that the proposed works are designed to improve the sites for the primary feature for designation (birds). As a result, it is highly unlikely that the works would result in the loss of this designated status.

6.2 Habitats

221. There are a number of constraints with the survey information provided to support this report that make it difficult to assess the potential impacts and their likely extent. These include:

- The Phase 1 Habitat Survey does not include all of the Old Moor reserve (even excluding areas included within the proposed works). This makes it difficult to assess the impact of the proposed habitat changes on the overall site.
- The botanical survey species lists, although thorough, are not split by component habitats. As a result, it is difficult to assess the species diversity and therefore relative value of the habitats.
- The botanical survey did not cover all of the habitats included within the Phase 1 Habitat Survey.

222. As a result of these constraints, the following impact assessment for habitats should be considered to be an outline at this stage.

6.2.1 Un-surveyed Habitats

223. The areas shown in red on the *Figure 12-9. Missing Habitat Information* are included within the proposed works areas but no survey information has been provided for them.

Area North-east of Area 4 – Proposed new pipeline connection to wader scrape

224. Aerial photography appears to indicate a main gravel path, grassland and scrub.

225. No plans have been provided for the connection, it is not confirmed as to whether the pipeline will be above ground or require excavation. As a result, the impacts of the proposed works cannot be quantified at this time.

Area West of Area 4 – Proposed shallow to be planted with reed

226. Aerial photography appears to indicate an existing shallow in this area.

227. Although no botanic information has been supplied for this area, it is highly unlikely that the planting of reed in this area will have a detrimental effect. It is likely that the change will represent a positive impact, as it is extending the area of Barnsley Priority Habitat Reedbed on site.

Area West of Area 5 – Proposed re-profiling of wader scrape

228. Aerial photography appears to indicate a large pool including a number of small vegetated islands, interspersed with shallows.

229. Extensive re-profiling works are planned for this area. Whilst it is possible that the works will involve the disruption of priority habitat (reedbed), the intention is for the creation of more extensive wetland habitat suitable for waders. As a result, it is likely that the proposals would represent a long term positive impact.

Area North of Area 6 – Proposed creation of new wader scape and re-profiling of existing bund

230. Aerial photography appears to indicate shallow water, marginal vegetation and some smaller islands.

231. Extensive re-profiling works are planned for this area. Whilst it is possible that the works will involve the disruption of priority habitat (reedbed), the intention is for the creation of more extensive wetland habitat suitable for waders. As a result, it is likely that the proposals would represent a long term positive impact.

Access Routes for Machinery

232. The plans provided do not indicate any access routes for machinery. The proposed works will require the use of excavation machinery. The movement of the excavation machinery around the site will present a number of temporary impacts.

233. Habitat degradation – a number of the work areas proposed have limited vehicular access. It is likely that new access routes will need to be created through existing vegetation. This will be a temporary effect for the duration of the works.

234. Pollution – the movement of machinery around the site will pose a significant risk of pollution (leaking fuel, oil etc.). This will be a temporary effect for the duration of the works.

6.2.2 Arable Field

235. The proposal for the arable field is to use the field as potential compensation (non-conservation) grazing for the tenant.

236. This considered to have no significant impact.

6.2.3 Hedgerow

237. Of the hedgerows identified on site, only the following hedgerows are listed as being impacted by the proposed works.

Area 6 Hedgerow

238. The central historic hedgerow within Area 6 is to be retained, however the scrub habitat that has developed on the adjacent earth banks is to be removed as part of re-profiling of the adjacent waterbodies. Without an appropriate plan to protect the root zone of the existing hedgerow, the proposed excavation could pose a significant risk to the feature.

239. In the absence of mitigation, the proposed works are considered to present a moderate negative impact in the short term.

Overflow Carpark Hedgerow

240. This hedgerow is to be removed entirely. This is considered to offer a major negative impact in the long term.

6.2.4 Lowland Neutral Grassland

241. The proposed re-profiling of Areas 4, 5 and 6 to create new wetland requires the loss of neutral semi-improved grassland.

242. *"Unimproved neutral grassland habitat has undergone a remarkable decline in the 20th century, almost entirely due to changing agricultural practice. It is estimated that by 1984 in lowland England and Wales, semi-natural grassland had declined by 97% over the previous 50 years to approximately 0.2 million hectares. Losses have continued during the 1980s and 1990s, and have been recorded at 2–10% per annum in some parts of England."* (UKBAP, 2008).

243. The loss is considered to be a significant major negative long term impact on a feature of at least local value.

6.2.5 Floodplain Grazing Marsh

244. The proposed works to Area 1 are designed to improve and better regulate water flows on Wombwell Ings to maintain and improve the existing floodplain grazing marsh. As a result of this, the proposed works are considered to be a long term moderate positive impact.

245. However, the movement of machinery around the site will pose a significant risk of pollution (leaking fuel, oil etc.). This will be a temporary effect for the duration of the works.

6.2.6 Running Water

246. No significant works are planned for the running water habitat on site.

247. However, the movement of machinery around the site will pose a significant risk of pollution (leaking fuel, oil etc.). This will be a temporary effect for the duration of the works.

6.2.7 Standing Water

248. The proposed creation of new pond in Area 6 and re-profiling of other waterbodies will improve significantly the standing water habitat on site. As a result of this, the proposed works are considered to be a long term moderate positive impact.

249. However, the movement of machinery around the site will pose a significant risk of pollution (leaking fuel, oil etc.). This will be a temporary effect for the duration of the works.

6.2.8 Wetland – Fen, Marsh and Swamp – Reedbed

250. The proposed works include significant reedbed creation in Areas 4, 5 and 6. This will improve significantly the reedbed habitat on site. As a result of this, the proposed works are considered to be a long term moderate positive impact.

251. However, the movement of machinery around the site will pose a significant risk of pollution (leaking fuel, oil etc.). This will be a temporary effect for the duration of the works.

6.3 Flora

6.3.1 Protected and Notable species

252. The grassland habitat in Area 4 containing common spotted orchid is to be lost to the re-profiling to create additional reedbed.

253. This is considered to be a major negative effect for the long term.

6.3.2 Invasive Species

254. Two invasive species of plant have been identified: New Zealand pygmyweed and Japanese rose. These species are covered by Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Under this legislation, it is illegal to plant or otherwise cause to grow in the wild any plant listed in Schedule 9 of the act. In the absence of mitigation, the works present a risk of the inadvertent spread of these species. This is considered to represent a major significant negative long term impact on habitats of district importance.

6.4 Fauna

6.4.1 Amphibians

255. Populations of common frog, smooth newt and palmate newt have been confirmed at Old Moor (Wildscapes CIC Ltd, 2018a), it is likely that these species are also present at Wombwell Ings.

256. The proposed re-profiling works pose a significant risk to both breeding and terrestrial populations.

257. If undertaken in the breeding period, the proposed creation of new reedbed and shallows would present a risk to breeding individuals, eggs and larval stages of the three species present, of particular concern is the risk to eggs and larval stages which are less likely to be able to move out of the work area. This represents a significant short term negative impact.

258. However, in the long term, the proposed re-profiling expansion of reedbed and creation of new shallows will increase the available breeding habitat on site (increasing the area of suitable egg laying habitat and increasing the available cover for larval stages). The works will likely result in an increase in the population on site in the long term. This represents a significant positive impact in the long term.

259. The proposed works present a negative impact to amphibians in both the short and long term. The re-profiling works present a risk of destruction of foraging and refugia habitats (earth banks, scrub habitats and grassland). This represents a significant short term negative impact to any adult individuals present.

260. In the long term, the creation of the pond on Green Lane and re-profiling of Field Pools will permanently lead to the loss of approximately 4ha of grassland and scrub habitats. These habitats are suitable for foraging and refugia of terrestrial amphibians and as a result, this loss represents a significant long term negative impact. However, the lost habitat represents a small proportion of the available suitable habitat in the wider area both within the reserves and beyond.

6.4.2 Badger

261. No evidence of setts or regular badger activity has been recorded on site. As a result, the proposed works are considered to have no significant impact on this species.

262. However, badgers are a highly mobile species and although territorial, will opportunistically colonise new areas in response to other environmental factors (splitting of main clans, disruption of usual foraging resources, etc.) (Pearce, 2011). As a result of this, the species may be found in the work areas despite its previous absence.

263. If badgers were present within the development area, it is likely that any sett created would be an outlier (as main setts tend to be more habitual (Pearce, 2011)). The likely location for a sett would be the earth banks on site (as the high water table of the site is likely to discourage sett creation elsewhere on site). The proposed works involve the re-profiling of areas of the embankments on site to provide soil to create fresh shallows in the waterbodies for reedbeds. These works would pose a significant risk to badgers if a sett were present.

264. In addition to this, any open temporary earthworks (trenches etc) created as a result of the works would pose a significant risk to individual badgers moving around the site.

6.4.3 Bats

265. No bat roosts have been identified within the work areas (RSPB Dearne Valley Reserves, 2018d) (Middleton, 2018).

266. The proposed works do effect foraging and commuting habitats identified to be used by up to six bat species (RSPB Dearne Valley Reserves, 2018d).

267. None of the works are proposed to be undertaken at night and the proposals include no additional lighting. As a result, there is unlikely to be any significant lighting impact as a result of these proposals.

268. The loss of scrub habitat proposed at Green Lane and for the re-profiling of Field Pools presents a loss of suitable foraging and commuting habitat (particularly for species such as brown long-eared bats), representing a significant long term negative impact. However, the lost habitat represents a small proportion of the available suitable habitat in the wider area both within the reserves and beyond.

269. The proposed re-profiling works and wetland creation will increase the proportion of marginal vegetation and shallow water, a key foraging resource for bat species such as soprano pipistrelle and Daubenton's bat. This represents a significant long term positive impact.

6.4.4 Birds

270. The proposed works will have a number of impacts on bird species.

Disturbance – Nesting Birds

271. If undertaken in the main breeding period, the proposed re-profiling and vegetation clearance works would present a significant impact on breeding birds and may present a risk of nest destruction or abandonment. The habitats affected include nesting habitat of Schedule 1 species including bittern.

272. This represents a significant short term major negative impact.

Disturbance – Wintering Birds

273. Significant populations of birds overwinter on the Old Moor reserve and surrounding wetlands. Works within this period would disturb the colonies present and may lead to the temporary abandonment of the site.

274. This represents a significant short term moderate negative impact.

Habitat Loss – Nesting Birds

275. The loss of hedgerow, scrub and grassland on site will result in the loss of suitable breeding habitat for a number of breeding bird species including linnet, house sparrow, willow tit and skylark.

Table 6-1Breeding birds within 50 metres of Green Lane path in associated scrub and hedgerow habitat - ((RSPB Dearne Valley Reserves, 2018c)

Species	No. Pairs
Garden warbler	1 pair
Lesser whitethroat	2 pairs
Whitethroat	2 pairs
Blackcap	4 pairs
Sedge warbler	3 pairs
Reed warbler	6 pairs
Willow warbler	7 pairs
Chiffchaff	5 pairs
Song thrush	2 pairs
Dunnock	8 pairs
Robin	6 pairs
Linnet	7 pairs
Goldfinch	2 pairs
Bullfinch	3 pairs
TOTAL	**58 PAIRS**

276. In particular, the loss of the Field Pools grassland will lead to the loss of the one skylark nesting site identified in the 2018 Common Bird Census (RSPB Dearne Valley Reserves, 2018c).

277. This represents a significant long term major negative impact.

Habitat Loss – Foraging Birds

278. The loss of the grassland and scrub on site will reduce the available foraging habitat for species reliant on these habitats. In particular, the loss of the grassland habitats will reduce the available foraging habitat for barn owl within the Old Moor complex.

279. This represents a significant long term minor negative impact.

Habitat Creation – Wetland Birds

280. The proposed works are primarily designed to increase the habitat available for breeding wetland birds, particularly waders, gulls and terns.

281. This represents a significant long term major positive impact.

6.4.5 Fish

282. The proposed works will increase the area of shallows and reedbed which are essential components for increasing fish population and species diversity. As a result, this is considered to offer a long term moderate positive impact.

6.4.6 Harvest Mouse

283. Although no nests were confirmed within the proposed work area, potential field signs were discovered. As a result, the works pose a risk of disturbance of potential nesting habitat. This is considered to present a short term minor negative impact.

284. The proposed works will increase the area of reedbed which is suitable harvest mouse nesting habitat. As a result, this is considered to offer a long term major positive impact.

6.4.7 Otter

285. No sign of holts, lay up areas or regular otter activity has been recorded on site. As a result, the proposed works are considered to have no significant impact on this species.

286. However, as otter are a highly mobile species and have extremely large territories within a river catchment, any open temporary earthworks (trenches etc.) created as a result of the works would pose a significant risk to individual otter moving around the site.

6.4.8 Reptiles

287. The proposed works will increase the area of suitable foraging habitat for grass snake (reedbed and standing water). This is considered to offer a moderate positive impact in the long term.

288. Conversely, the loss of grassland and scrub habitats will reduce the available foraging habitat for common lizard and slow worm. This is considered to offer a minor negative impact in the long term.

6.4.9 Water Shrew

289. The proposed works present a significant risk to water shrew habitat (marginal vegetation and banks of the water bodies). The proposed works are considered to offer a short term major negative impact.

290. However, once completed, the works will lead to an increase in suitable habitat for this species, therefore the works are considered to offer a minor positive impact in the long term.

6.4.10 Water Vole

291. There is likely a declining population of water vole present on Old Moor. The survey information available suggests that the local and site population is declining and may have declined beyond recoverable levels.

292. The proposals have the potential to have a major negative impact on any of the remaining water vole population in the short term.

293. The proposals have the potential to have a major positive impact for the species in the long term at site level. The proposals will results in a net gain of suitable water vole habitat and the continued control of mink population will help the species to recover at a site level.

6.4.11 Other Mammals

294. The proposed works will lead to a reduction in the available habitat for brown hare and European hedgehog as a result of the loss of grassland and scrub habitat on site.

295. As a result of this, the proposed works are considered to offer a minor negative impact in the long term.

7 Summary of the Impacts of the Proposals in the Absence of Mitigation

Table 7-1 Summary of the identified impacts in the absence of mitigation

Type	Habitat feature / Species	Action	Importance of Ecological feature	Duration of impact	Significance of Impact
Designated sites	RSPB Old Moor	Proposed wetland improvements	**District**	**Long**	**Moderate +**
	Wombwell Ings	Proposed wetland improvements	**District**	**Long**	**Moderate +**
Habitats	Un-surveyed area north-east of Area 4	New pipeline connection to wader scrape	**Unknown**	**Unknown**	**Unknown**
	Un-surveyed area west of Area 4	Shallow to be planted with reed	**Unknown**	**Long**	**Minor +**
	Un-surveyed area west of Area 5	Re-profiling wader scrape	**Unknown**	**Long**	**Minor +**
	Un-surveyed area north of Area 6	Creation of new wader scrape and re-profiling of existing bund	**Unknown**	**Long**	**Minor +**
	Un-surveyed area - Access routes for machinery	Habitat degradation	**Unknown**	**Short**	**Moderate -**
		Pollution	**Unknown**	**Short**	**Moderate -**
	Arable field	Conversion of field to non-conservation grazing	**Site**	**Long**	**No significant impact**
	Hedgerow – Area 6	Damage to roots as a result of nearby excavations	**Local (District)**	**Moderate**	**Moderate -**
	Hedgerow – Overflow Car Park	Hedgerow removal	**Unknown**	**Long term**	**Major -**
	Lowland Neutral Grassland	Habitat loss as a result of wetland re-profiling	**Local (District)**	**Long term**	**Major -**
	Floodplain Grazing Marsh	Habitat improvement as a result of wetland works	**Local (District)**	**Long term**	**Moderate +**
		Pollution	**Local (District)**	**Short term**	**Moderate -**
	Running Water	Pollution	**Local (District)**	**Short term**	**Moderate -**
	Standing Water	Habitat creation and improvement	**Local (District)**	**Long term**	**Moderate +**
		Pollution	**Local (District)**	**Short term**	**Moderate -**
	Wetland - Reedbed	Habitat creation and improvement	**Local (District)**	**Long term**	**Moderate +**
		Pollution	**Local (District)**	**Short term**	**Moderate -**
Flora	Protected and Notable species	Loss of common spotted orchid as a result of re-profiling Area 4	**Site**	**Long**	**Major -**

Type	Habitat feature / Species	Action	Importance of Ecological feature	Duration of impact	Significance of Impact
	Invasive species – Japanese Rose, New Zealand Pygmyweed	Clearance of existing habitats, habitat creation (inadvertent spread of Invasive plant species)	**District**	**Long**	**Major -**
Fauna	Amphibians	Disturbance of breeding habitat	**Local**	**Short**	**Major -**
		Re-profiling of waterbodies, creation of new wetland and new pond – (new breeding habitat)	**Local**	**Long**	**Moderate +**
		Re-profiling of waterbodies, creation of new wetland and new pond – (loss of terrestrial habitat)	**Site**	**Long**	**Minor -**
		Disturbance of terrestrial habitat	**Site**	**Short**	**Moderate -**
	Bats	Re-profiling of waterbodies, creation of new wetland and new pond – (new wetland foraging habitat)	**Local**	**Long**	**Moderate +**
		Re-profiling of waterbodies, creation of new wetland and new pond – (loss of terrestrial foraging and commuting habitat)	**Local**	**Long**	**Minor -**
	Birds	Disturbance – Nesting birds	**Regional**	**Short**	**Major -**
		Disturbance – Wintering birds	**Regional**	**Short**	**Moderate -**
		Habitat Loss – Breeding birds	**District**	**Long**	**Major -**
		Habitat loss – Foraging birds	**District**	**Long**	**Minor -**
		Habitat creation – Wetland birds	**Regional**	**Long**	**Major +**
	Fish	Re-profiling and wetland creation	**District**	**Long**	**Moderate +**
	Harvest Mouse	Habitat disturbance	**Local**	**Short**	**Minor -**
		Habitat creation - Reedbed	**Local**	**Long**	**Major +**
	Reptiles	Habitat creation – Wetland – Grass snake	**Local**	**Long**	**Moderate +**
		Habitat loss – Grassland – Scrub – Slow worm, common lizard	**Site**	**Long**	**Minor -**
	Water shrew	Habitat loss and disturbance	**Local**	**Short**	**Major -**
		Re-profiling of waterbodies, creation of new wetland and new pond	**Local**	**Long**	**Minor +**
	Water vole	Disturbance of breeding habitat	**District**	**Short**	**Major -**
		Re-profiling of waterbodies, creation of new wetland and new pond	**District**	**Long**	**Major +**
	Other mammals	European hedgehog, brown hare habitat Loss	**Site**	**Long**	**Minor -**

8 Recommendations, Outline Mitigation, Compensation and Enhancement Measures

296. The following measures are designed to minimise the negative impacts identified within the impact assessment above.

8.1 Further Survey

8.1.1 Habitats and Detailed Botanical Survey

297. The current Phase 1 Habitat Survey should be expanded to include all areas of Old Moor in order to allow a more appropriate assessment of machinery access routes and the site importance of the habitat loss. The botanical survey should be expanded at the same time, with the particular focus to assess the value of the habitats on site against the LWS criteria. This will allow both an assessment of the value of the habitats to be lost, but also will identify areas for compensatory improvements (particularly focusing on the grassland habitats to be lost).

8.1.2 Hedgerow Assessment

298. The hedgerows scheduled for works (Overflow Car Park and Area 6) should be subject to a Hedgerow Regulations Assessment and a Hedgerow Survey Handbook assessment. The results of these assessments should be used to design a suitable mitigation and compensation plan for any loss. Where hedgerows are to be retained (Area 6), an appropriately qualified arborist should be appointed to advise on an appropriate root protection plan and/or safe excavation measures.

8.1.3 Water Vole

299. Additional, targeted survey should be carried out before the proposed works is undertaken to identify the status of the population and to identify if burrows are present within the work zone. If presence is confirmed, a protected species licence to disperse the species will be required. If presence is still inconclusive, the works should be undertaken under the supervision of a suitably qualified ecologist using an appropriate method statement.

8.2 Mitigation

8.2.1 Construction Environmental Management Plan

300. It is recommended that all of the protection and enhancement measures below be formalised into the Construction Environmental Management Plan for the scheme.

8.2.2 Ecological Lead

301. Prior to the commencement of works, a suitably experienced ecologist will be appointed to oversee the works. The ecologist will be retained throughout the works programme to provide toolbox talks, ecological clerk of works duties during high risk activities, monitoring, and advice.

8.2.3 Pollution Control

302. A suitable pollution control methodology must be included in the Construction Environmental Management Plan.

8.2.4 Invasive Species Control

303. Suitable biosecurity measures should be employed during the construction phase to avoid the spread of the invasive species recorded on site (New Zealand pygmyweed and Japanese rose).

304. As an additional biodiversity enhancement measure for the development, it is recommended that measures to control and/or permanently eradicate these species from the site are undertaken.

8.2.5 Timing of Works

305. All vegetation clearance and re-profiling works will be timed to avoid the main bird breeding period (March-August inclusive). This will also limit impacts on breeding amphibians.

8.2.6 Vegetation Clearance

Harvest Mouse

306. Vegetation clearance of suitable vegetation for harvest mouse should be kept to a minimum. Where removal is unavoidable, removal should be undertaken in autumn and should be preceded by an inspection by a suitably trained individual for field signs. Care should be taken when designing access routes for machinery not to sever the linking vegetation between nesting areas on site.

Scrub, Grassland and Bankside Vegetation

307. Vegetation removal should be kept to a minimum. Prior to excavation, scrub and bankside vegetation should be strimmed and cut in stages. The vegetation should be initially strimmed to a 10cm level for a hand inspection and then cut to ground level and maintained at this level for the duration of the works. These measures will limit the risk to water shrew, reptiles, amphibians and birds.

8.2.7 Excavation

308. All excavations left overnight should be covered or left with a suitable ramp to allow wildlife such as mammals and reptiles to escape. Prior to the commencement of each work day, workers should inspect around any machinery left on site overnight for sheltering wildlife.

8.3 Compensation

8.3.1 Arable Field

309. The arable field on site has been targeted for potential use as non-conservation grazing. It is recommended that in order to compensate for the loss of priority habitat, semi-improved grassland, and this field be restored to semi-improved grassland and be placed into long term management for floral diversity.

8.3.2 Reptile and Amphibian Refugia

310. In order to compensate for the loss of suitable terrestrial habitat for these species, it is recommended that artificial refugia be constructed in suitable locations on site. These could be supplemented by deadwood piles to provide suitable foraging and refugia habitat.

8.4 Enhancement

8.4.1 Water Vole

311. It is recommended that mink control efforts are increased in the wider area to help the water vole population re-establish throughout the Dearne Valley NIA.

9 Residual Impacts

Table 9-1 Summary of the residual impacts based upon the implementation in full of all of the Mitigation, Compensation and Enhancement measures provided in section 8

Type	Habitat feature / Species	Action	Importance of Ecological feature	Duration of impact	Significance of Impact
Designated sites	RSPB Old Moor	Proposed wetland improvements	**District**	**Long**	**Moderate +**
	Wombwell Ings	Proposed wetland improvements	**District**	**Long**	**Moderate +**
Habitats	Un-surveyed area north-east of Area 4	New pipeline connection to wader scrape	**Unknown**	**Unknown**	**Unknown**
	Un-surveyed area west of Area 4	Shallow to be planted with reed	**Unknown**	**Long**	**Minor +**
	Un-surveyed area west of Area 5	Re-profiling wader scrape	**Unknown**	**Long**	**Minor +**
	Un-surveyed area north of Area 6 –	Creation of new wader scape and re-profiling of existing bund	**Unknown**	**Long**	**Minor +**
	Un-surveyed area Access routes for machinery	Habitat degradation	**Unknown**	**Short**	**Minor -**
	Arable field	Conversion of field to conservation grazing	**Site**	**Long**	**Minor +**
	Hedgerow – Overflow car park	Hedgerow removal	**Unknown**	**Long term**	**Major -**
	Lowland Neutral Grassland	Habitat loss as a result of wetland re-profiling	**Local (District)**	**Long term**	**Moderate -**
	Floodplain Grazing Marsh	Habitat improvement as a result of wetland works	**Local (District)**	**Long term**	**Moderate +**
	Standing Water	Habitat creation and improvement	**Local (District)**	**Long term**	**Moderate +**
	Wetland - Reedbed	Habitat creation and improvement	**Local (District)**	**Long term**	**Moderate +**
Flora	Protected and Notable species	Loss of common spotted orchid as a result of re-profiling Area 4	**Site**	**Long**	**Moderate -**
	Invasive species – Japanese Rose, New Zealand Pygmyweed	Control and/or eradicate species on site	**District**	**Long**	**Major +**
Fauna	Amphibians	Disturbance of breeding habitat	**Local**	**Short**	**Minor -**
		Re-profiling of waterbodies, creation of new wetland and new pond – (new breeding habitat)	**Local**	**Long**	**Moderate +**

Type	Habitat feature / Species	Action	Importance of Ecological feature	Duration of impact	Significance of Impact
		Re-profiling of waterbodies, creation of new wetland and new pond – (loss of terrestrial habitat)	**Site**	**Long**	**Minor -**
		Disturbance of terrestrial habitat	**Site**	**Short**	**Minor -**
	Bats	Re-profiling of waterbodies, creation of new wetland and new pond – (new wetland foraging habitat)	**Local**	**Long**	**Moderate +**
		Re-profiling of waterbodies, creation of new wetland and new pond – (loss of terrestrial foraging and commuting habitat)	**Local**	**Long**	**Minor -**
	Birds	Disturbance – Nesting birds	**Regional**	**Short**	**Minor -**
		Disturbance – Wintering birds	**Regional**	**Short**	**Moderate -**
		Habitat Loss – Breeding birds	**District**	**Long**	**Major -**
		Habitat loss – Foraging birds	**District**	**Long**	**Minor -**
		Habitat creation – Wetland birds	**Regional**	**Long**	**Major +**
	Fish	Re-profiling and wetland creation	**District**	**Long**	**Moderate +**
	Harvest Mouse	Habitat disturbance	**Local**	**Short**	**Minor -**
		Habitat creation - Reedbed	**Local**	**Long**	**Major +**
	Reptiles	Habitat creation – Wetland – Grass snake	**Local**	**Long**	**Moderate +**
		Habitat loss – Grassland – Scrub – Slow worm, common lizard	**Site**	**Long**	**Minor -**
	Water shrew	Habitat loss and disturbance	**Local**	**Short**	**Major -**
		Re-profiling of waterbodies, creation of new wetland and new pond	**Local**	**Long**	**Minor +**
	Water vole	Disturbance of breeding habitat	**District**	**Short**	**Major -**
		Re-profiling of waterbodies, creation of new wetland and new pond	**District**	**Long**	**Major +**
	Other mammals	European hedgehog, brown hare habitat Loss	**Site**	**Long**	**Minor -**

10 Conclusions

312. If the recommended mitigation, compensation and enhancement measures detailed within section 8 of this report are implemented, the proposed development should result in an overall significant positive enhancement of the district/regional biodiversity value, particularly for wetland birds.

11 References

Andrews, H., 2016. *Bat Tree Habitat Key,* Bridgwater: AEcol.

Averis, B., 2013. *Plants and Habitats. An Introduction to common plants and their habitats in Britain and Ireland.* 1st Edition ed. s.l.:B Averis.

Barnsley Biodiversity Trust, 2009. *Local Priority Habitats summary.* [Online]
Available at: http://www.barnsleybiodiversity.org.uk/habitats_summary.html
[Accessed 23 November 2018].

Bat Conservation Trust, 2017. *The state of the UK's bats 2017,* s.l.: Bat Conservation Trust.

Biggs, J. et al., 2014. Analytical and methodological development for improved surveilance of the Great Crested Newt. *Defra Project WC 1067.*

BTO, 2018. *Bird of Conservation Concern 4 : the Red List for Birds.* [Online]
Available at: https://www.bto.org/science/monitoring/psob
[Accessed 01 2018].

CIEEM, 2013. *Guidelines for Preliminary Ecological Appraisal,* Winchester: Chartered Institute of Ecology and Environmental Mangement .

CIEEM, 2016. *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal.* 2nd Edition ed. Winchester: Chartered Institute of Ecology and Environmental Management.

Collins , J., ed., 2016. *Bat Survey for Professional Ecologist: Good Practice Guidance.* 3rd ed. s.l.:The Bat Conservation Trust.

Cresswell, W. J. et al., 2012. *UKBAB Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation.* 1st Edition ed. Southampton: The Mammal Society.

DEFRA, 2007. *Hedgerow Survey Handbook A standard procedure for local surveys in the UK 2nd Edition,* s.l.: DEFRA.

Froglife, 1999. *Froglife Advice Sheet 10, Reptile Survey, An introduction to planning, conducting and interpreting surveys for snake and lizard conservation.,* s.l.: Froglife.

Hampton, P., 2007. A comparison of the succes of artificial cover types for capturing amphibians and reptiles. *Amphibia-Reptilia,* 28(3), pp. 433-437.

JNCC, 2007. *UK BAP priority habitats.* [Online]
Available at: http://jncc.defra.gov.uk/page-5718
[Accessed 23 November 2018].

JNCC, 2010. *The Handbook for Phase 1 habitat survey, A technique for enironmental audit.* [Online]
Available at: http://jncc.defra.gov.uk/PDF/pub10_handbookforphase1habitatsurvey.pdf

JNCC, 2018. *Guidance on contents and use of the Conservation Designations Spreadsheet.* [Online]
Available at: http://jncc.defra.gov.uk/page-3418
[Accessed 01 2018].

Middleton, P., 2018. *Earth works and removal of scrub at Old Moor (letter).* Sheffield: Middleton Bell Ecology.

Mitchell-Jones, A. J., 2004. *Bat Mitigation guidelines.* s.l.:English Nature .

Mitchell-Jones, A. J. & McLeish, A. P., 2004. *Bat Workers Manual.* Peterborough: Joint Nature Committee.

NARRS, 2007. *Reptile Habitat Guide.* [Online]
Available at: http://www.narrs.org.uk/documents/Reptile_habitat_guide.pdf
[Accessed July 2017].

Oldham, R. S., Keeble, J., Swan, M. & Jeffcote, M., 2000. Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus). *Herpetological Journal,* 10(4), pp. 143-155.

Pearce, G. E., 2011. *Badger Behaviour Conservation & Rehabilitation.* Exeter: Pelagic Publishing.

QGIS, 2018. *QGIS 2.18.17,* s.l.: s.n.

Rose, F., 2006. *The Wild Flower Key: How to identify wild flowers, trees and shrubs in Britain and Ireland.* s.l.:Frederick Warne.

RSPB Dearne Valley Reserves, 2018a. *Dearne Valley Project Botanical Survey,* Barnsley: RSPB Dearne Valley Reserves.

RSPB Dearne Valley Reserves, 2018b. *Hedgerows,* Barnsley: RSPB Dearne Valley Reserves.

RSPB Dearne Valley Reserves, 2018c. *Old Moor Breeding Bird Survey 2018,* Barnsley: RSPB Dearne Valley Reserves.

RSPB Dearne Valley Reserves, 2018d. *Mammal survey Report (Compilation of pre-existing survey information),* Barnsley: RSPB Dearne Valley Reserves.

RSPB Dearne Valley Reserves, 2018e. *Fish (Compilation of pre-exisiting survey information),* Barnsley: RSPB Dearne Valley Reserves.

RSPB Dearne Valley Reserves, 2018f. *Other Mammal Species (Compilation of pre-existing survey information),* Barnsley: RSPB Dearne Valley Reserves.

RSPB Dearne Valley Reserves, 2018g. *Giving Nature a Home in the Dearne, Habitat Works at RSPB Old Moor and Wombwell Ings, Brief for the appointment of a design consultant,* Barnsley: RSPB Dearne Valley Reserves.

RSPB Dearne Valley Reserves, 2018g. *Water Voles at Old Moor and Wombwell Ings (Commpilation of pre-existing survey information),* Barnsley: RSPB Dearne Valley Reserves.

Stace, C., 2010. *New Flora of the British Isles 3rd Edition,* Cambridge: Cambridge University Press.

UKBAP, 2008. *UK Biodiversity Action Plan Priority Habitat Descriptions, Lowland Meadows,* s.l.: UKBAP.

Wildscapes CIC Ltd, 2018a. *Ecological Results Report - Great Crested Newt, Goldthorpe Highways Mitigation Scheme,* Sheffield: Wildscapes CIC Ltd.

Wildscapes CIC Ltd, 2018b. *Ecological Results Report - Reptiles Goldthorpe Highways Mitigation Scheme,* Sheffield: Wildscapes CIC Ltd.

Wildscapes ClC Ltd, 2018c. *Ecological Results Report - Water vole, Goldthorpe Highways Mitigation Scheme,* Sheffield: Wildscapes CIC Ltd.

Wood, J., 2018. *FW:EcIA (Email regarding mink control at RSPB Old Moor) ,* Barnsley: RSPB .

12 Appendices

12.1 Appendix A - Location Information

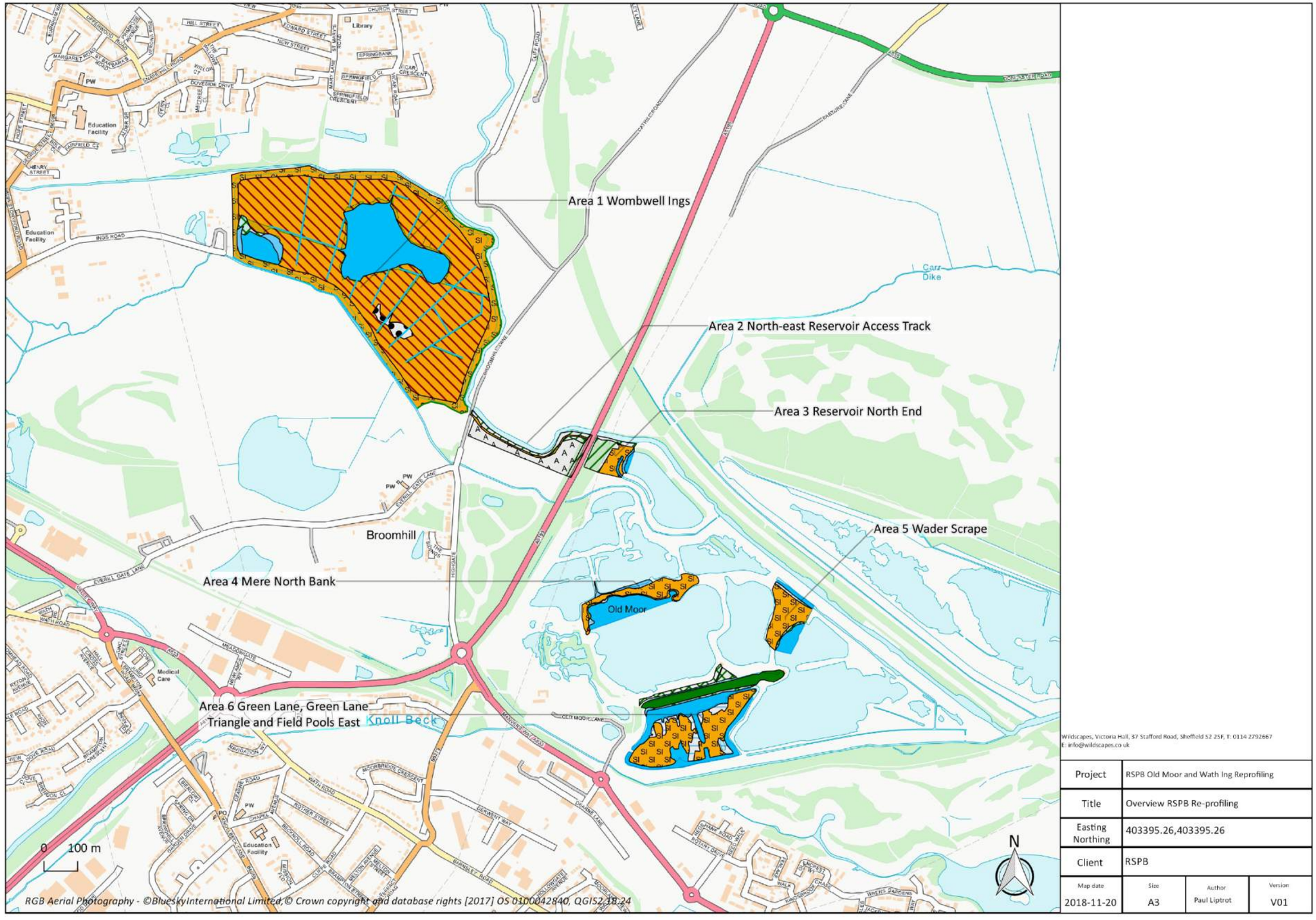


Figure 12-1. Phase 1 Plan Overview

Legend

Linear Habitat

- G2 - Running water
- J2.1.1 - Native species-rich intact hedge
- J2.1.2 - Species-poor intact hedge
- J2.4 - Fence
- J2.5 - Wall

Habitat

- A1.1.1 - Broadleaved woodland - semi-natural
- A1.1.2 - Broadleaved woodland - plantation
- A1.2.1 - Coniferous woodland - semi-natural
- A1.2.2 - Coniferous woodland - plantation
- A1.3.1 - Mixed woodland - semi-natural
- A1.3.2 - Mixed woodland - plantation
- A2.1 - Scrub - dense/continuous
- A2.2 - Scrub - scattered
- A3.1 - Broadleaved Parkland/scattered trees
- A3.2 - Coniferous Parkland/scattered trees
- A3.3 - Mixed Parkland/scattered trees
- A4.1 - Broadleaved woodland - recently felled
- A4.2 - Coniferous woodland - recently felled
- A4.3 - Mixed woodland - recently felled
- B1.1 - Acid grassland - unimproved
- B1.2 - Acid grassland - semi-improved
- B2.1 - Neutral grassland - unimproved
- B2.2 - Neutral grassland - semi-improved
- B3.1 - Calcareous grassland - unimproved
- B3.2 - Calcareous grassland - semi-improved
- B4 - Improved grassland
- B5 - Marsh/marshy grassland
- B6 - Poor semi-improved grassland
- C1.1 - Bracken - continuous
- C1.2 - Bracken - scattered
- C2 - Upland species-rich ledges
- C3.1 - Other tall herb and fern - ruderal
- C3.2 - Other tall herb and fern - non ruderal
- D1.1 - Dry dwarf shrub heath - acid
- D1.2 - Dry dwarf shrub heath - basic
- D2 - Wet dwarf shrub heath
- D3 - Lichen/bryophyte heath
- D4 - Montane heath/dwarf herb
- D5 - Dry heath/acid grassland
- D6 - Wet heath/acid grassland
- E1.6.1 - Blanket sphagnum bog
- E1.6.2 - Raised sphagnum bog
- E1.7 - Wet modified bog
- E1.8 - Dry modified bog
- E2.1 - Flush and spring - acid/neutral flush
- E2.2 - Flush and spring - basic flush
- E3.1 - Fen - valley mire
- E3.2 - Fen - basin mire
- E3.3 - Fen - flood plain mire
- E4 - Bare peat
- F1 - Swamp
- F2.1 - Marginal and inundation - marginal vegetation
- F2.2 - Marginal and inundation - inundation vegetation
- G1.1 - Standing water - eutrophic
- G1.2 - Standing water - mesotrophic
- G1.3 - Standing water - oligotrophic
- G1.4 - Standing water - dystrophic
- G1.5 - Standing water - marl
- G1.6 - Standing water - brackish
- G2.1 - Running water - eutrophic
- G2.2 - Running water - mesotrophic
- G2.3 - Running water - oligotrophic
- G2.4 - Running water - dystrophic
- G2.5 - Running water - marl
- G2.6 - Running water - brackish
- H1.1 - Intertidal - mud/sand
- H1.1.1 - Intertidal - mud/sand - zoostera beds
- H1.1.2 - Intertidal - mud/sand - green algal beds
- H1.1.3 - Intertidal - mud/sand - brown algal beds
- H1.2 - Intertidal - shingles/cobbles
- H1.2.1 - Intertidal - shingles/cobbles - zoostera beds
- H1.2.2 - Intertidal - shingles/cobbles - green algal beds
- H1.2.3 - Intertidal - shingles/cobbles - brown algal beds
- H1.3 - Intertidal - boulders/rocks
- H1.3.2 - Intertidal - boulders/rocks - green algal beds
- H1.3.3 - Intertidal - boulders/rocks - brown algal beds
- H2.3 - Saltmarsh/dune interface
- H2.4 - Saltmarsh - scattered plants
- H2.6 - Saltmarsh - dense/continuous
- H3 - Shingle above high tide mark
- H4 - Boulders/rocks above high tide mark
- H6.4 - Dune slack
- H6.5 - Dune grassland
- H6.6 - Dune heath
- H6.7 - Dune scrub
- H6.8 - Open dune
- H8.1 - Hard cliff
- H8.2 - Soft cliff
- H8.4 - Coastal grassland
- H8.5 - Coastal heathland
- I1.1.1 - Inland cliff - acid/neutral
- I1.1.2 - Inland cliff - basic
- I1.2.1 - Scree - acid/neutral
- I1.2.2 - Scree - basic
- I1.3 - Limestone pavement
- I1.4.1 - Other exposure - acid/neutral
- I1.4.2 - Other exposure - basic
- I1.5 - Cave
- I2.1 - Quarry
- I2.2 - Spoil
- I2.3 - Mine
- I2.4 - Refuse-tip
- J1.1 - Cultivated/disturbed land - arable
- J1.2 - Cultivated/disturbed land - amenity grassland
- J1.3 - Cultivated/disturbed land - ephemeral/short perennial
- J1.4 - Introduced shrub
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.1 - Defunct hedge - native species-rich
- J2.3.1 - Hedge with trees - native species-rich
- J2.3.2 - Hedge with trees - species-poor
- J2.4 - Fence
- J2.5 - Wall
- J2.6 - Dry ditch
- J2.7 - Boundary removed
- J2.8 - Earth bank
- J3.4 - Caravan site
- J3.5 - Artificial sea wall
- J3.6 - Buildings
- J4 - Bare ground
- J5 - Other habitat
- J5 water
- Null

Figure 12-2 Phase 1 Habitat Survey Legend

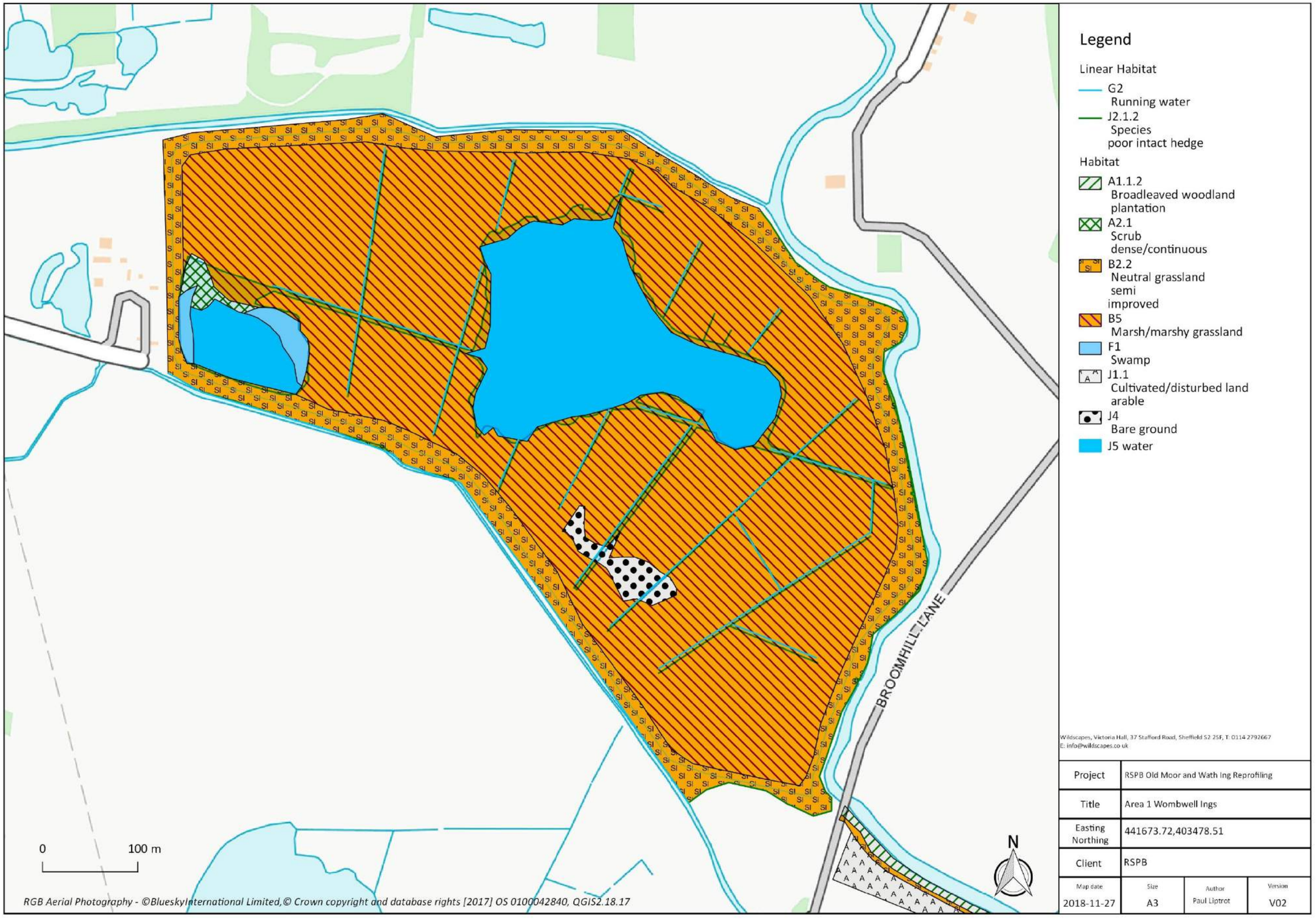


Figure 12-3. Area 1 Wombwell Ings

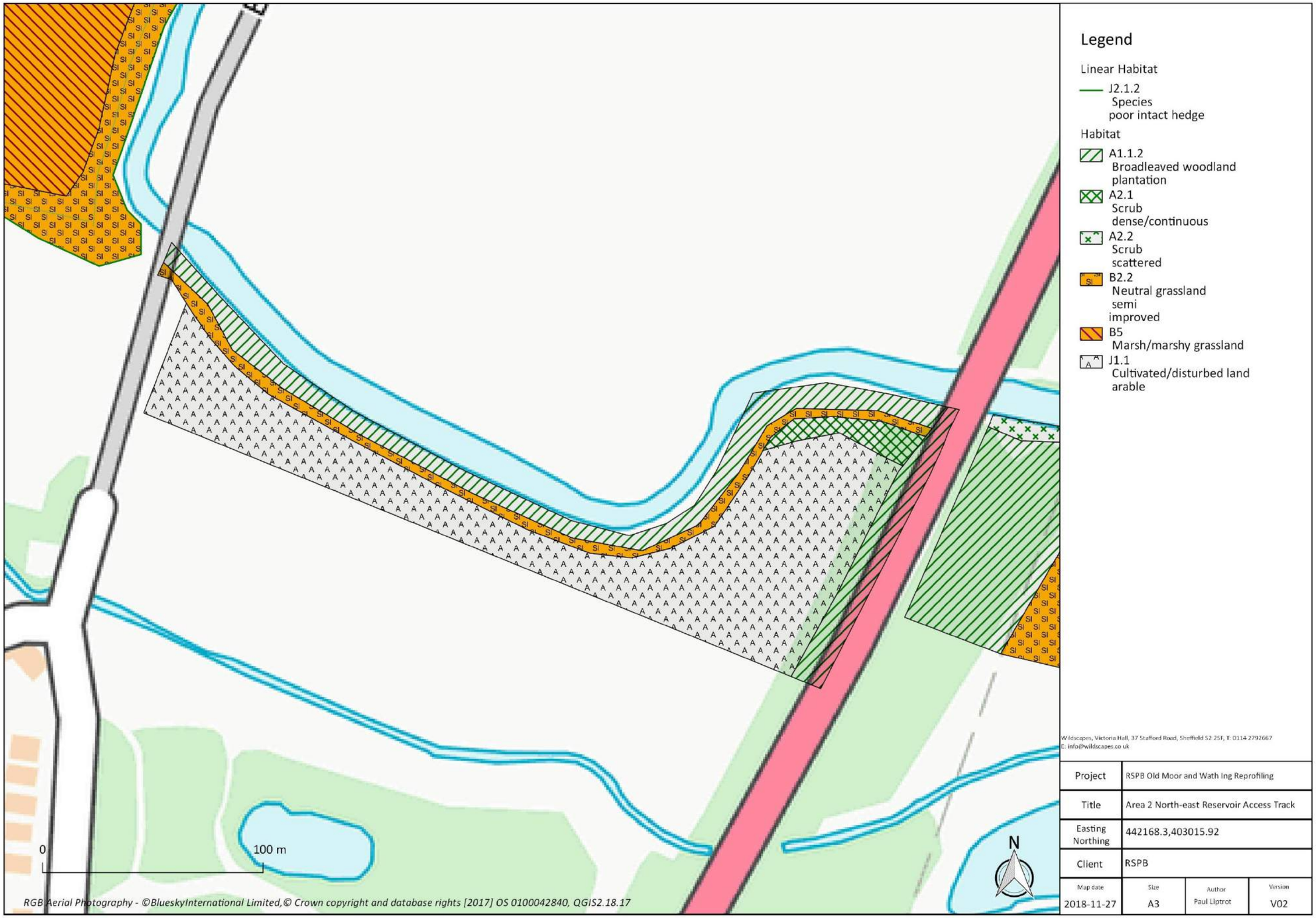


Figure 12-4. Area 2 North-east Reservoir Access Track



Figure 12-5. Area 3 Reservoir North End

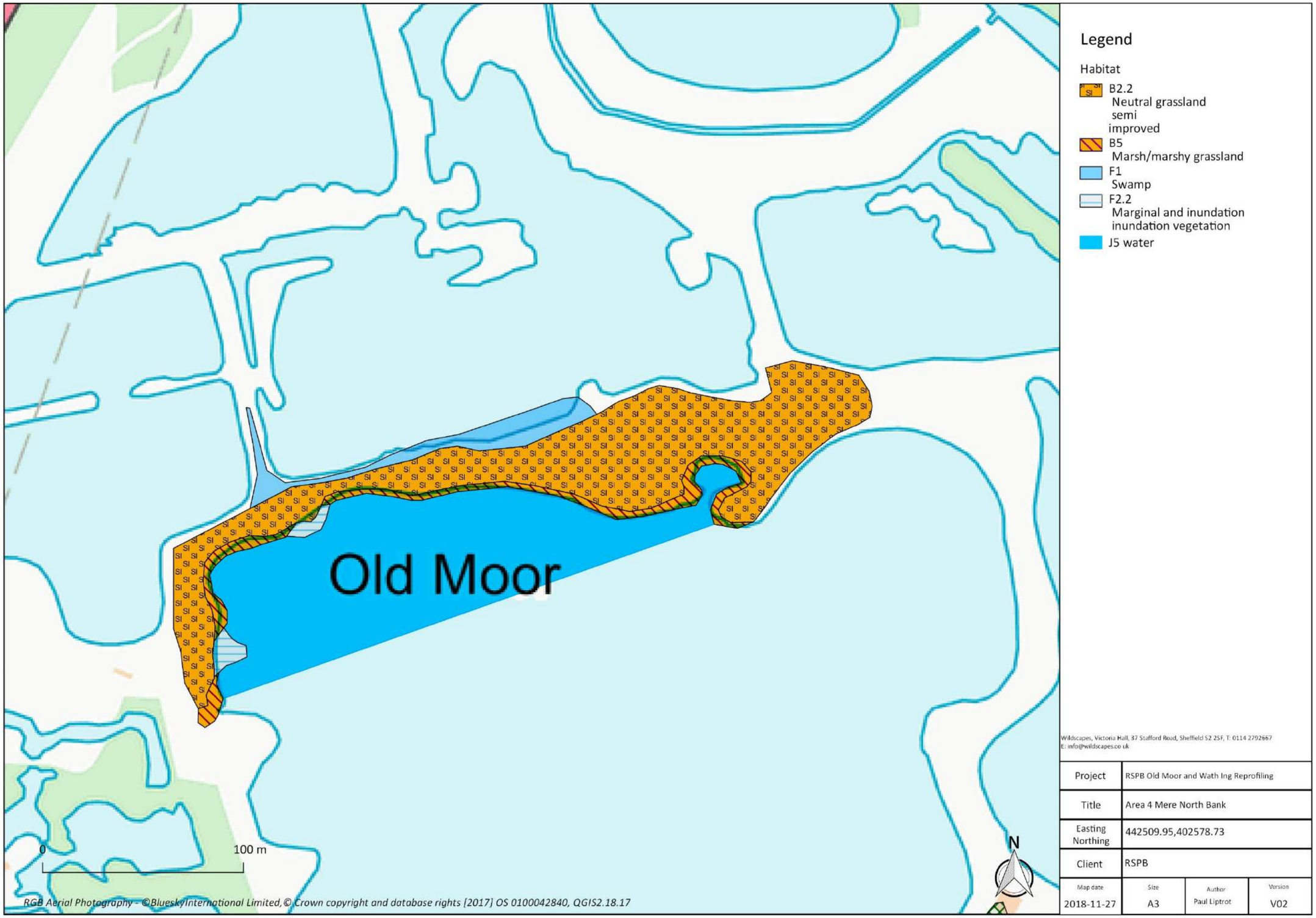


Figure 12-6. Area 4 Mere North Bank

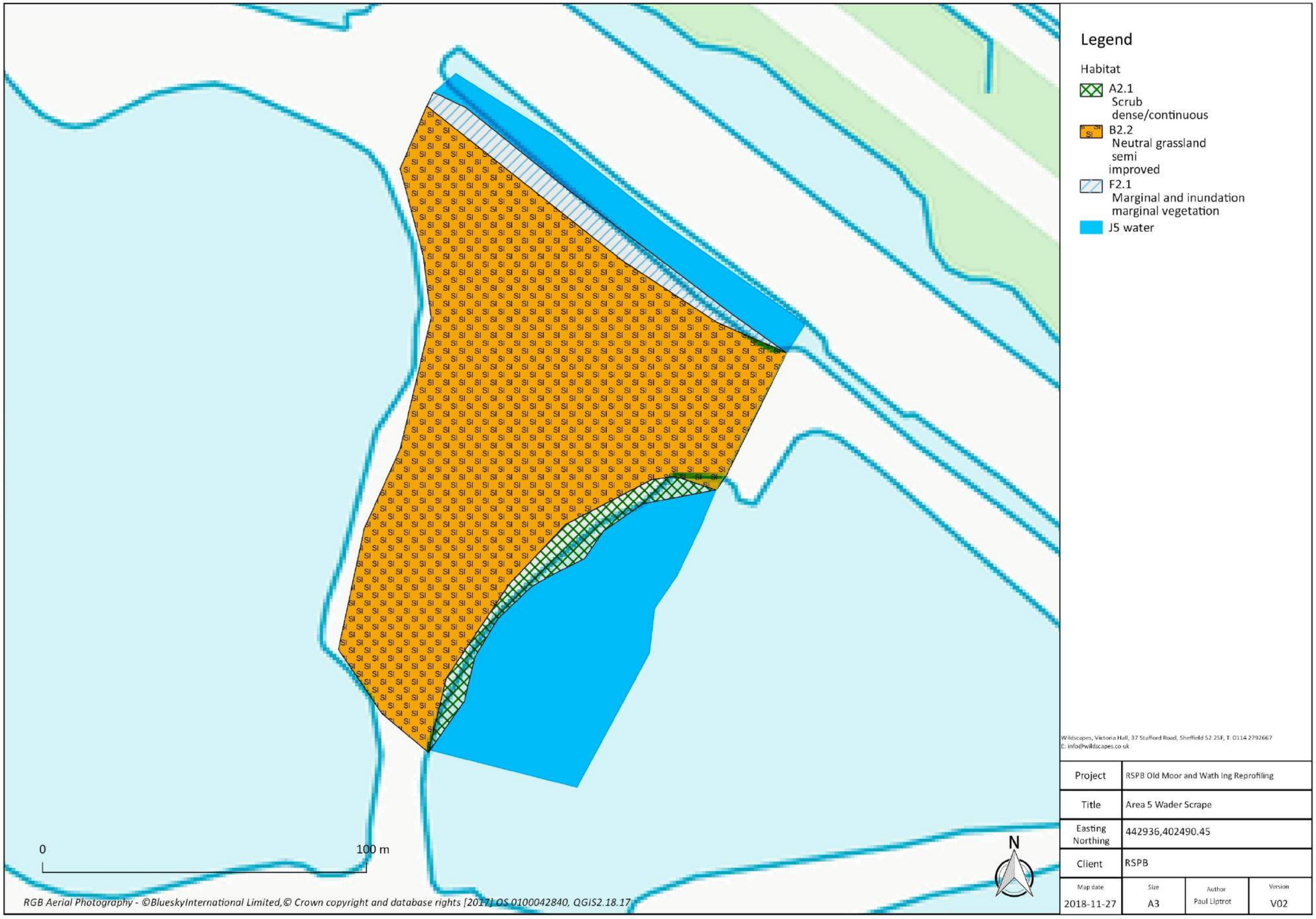


Figure 12-7. Area 5 Wader Scrape

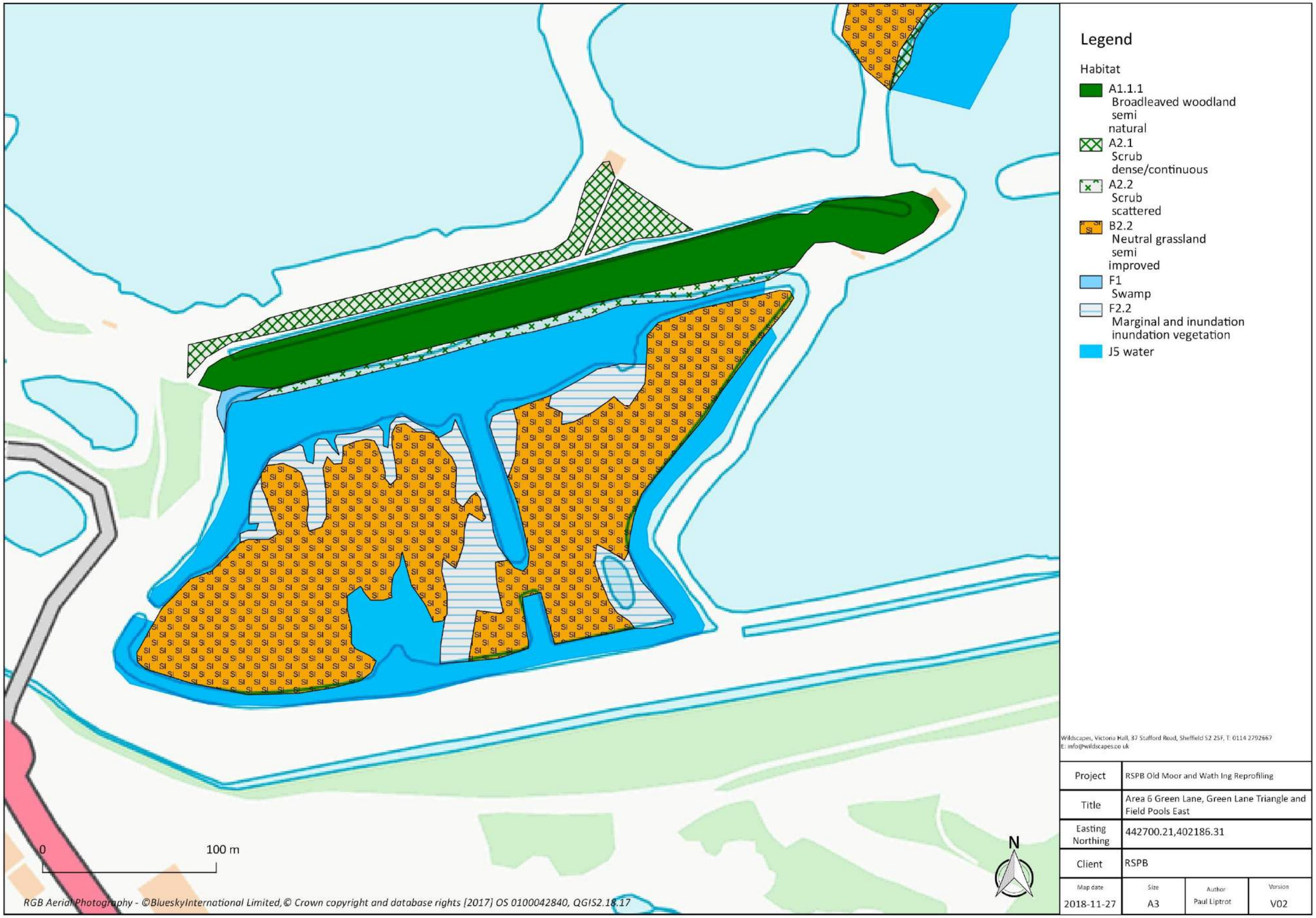


Figure 12-8. Area 6 Green Lane, Green Lane Triangle and Field Pools East

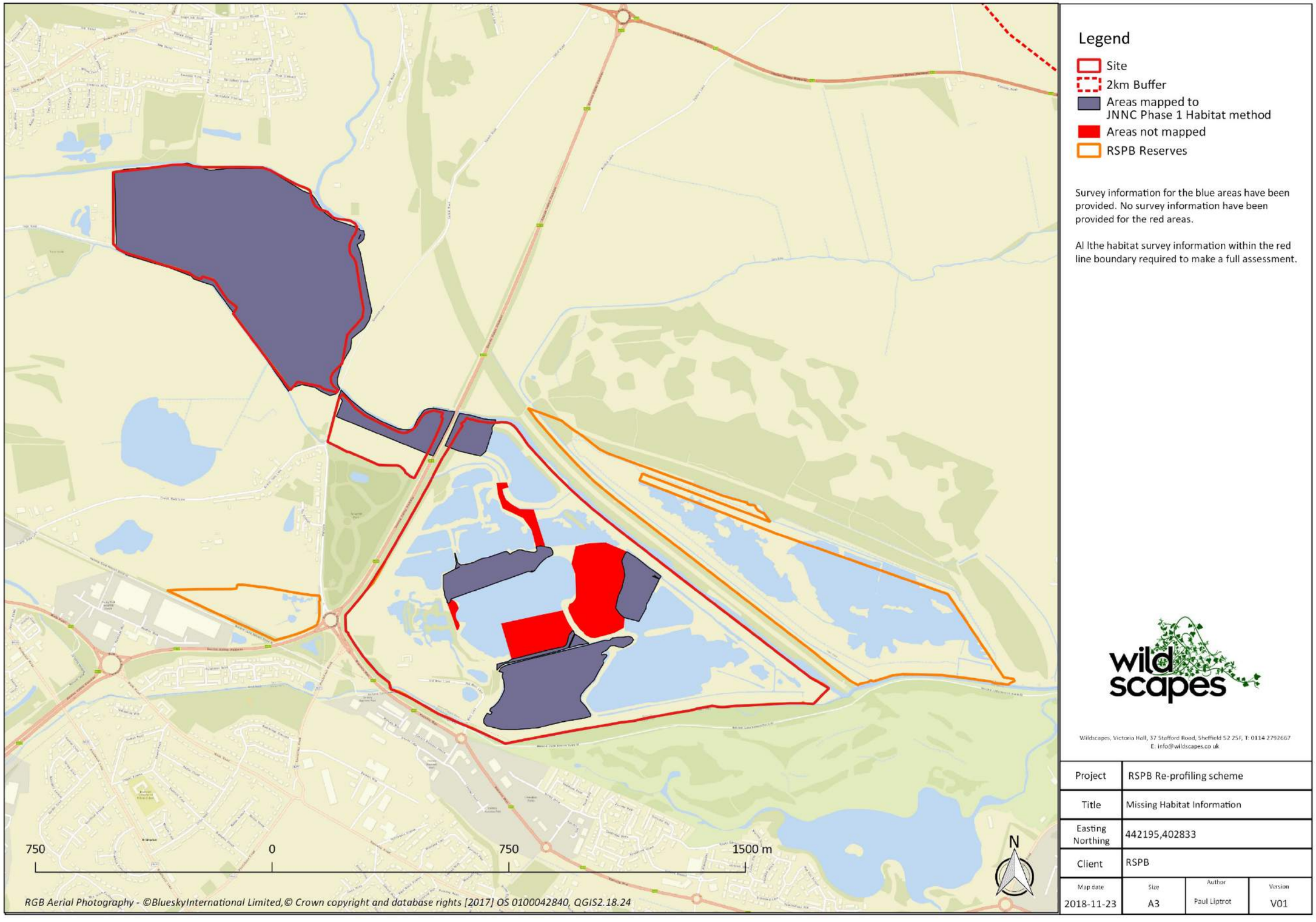


Figure 12-9. Missing Habitat Information

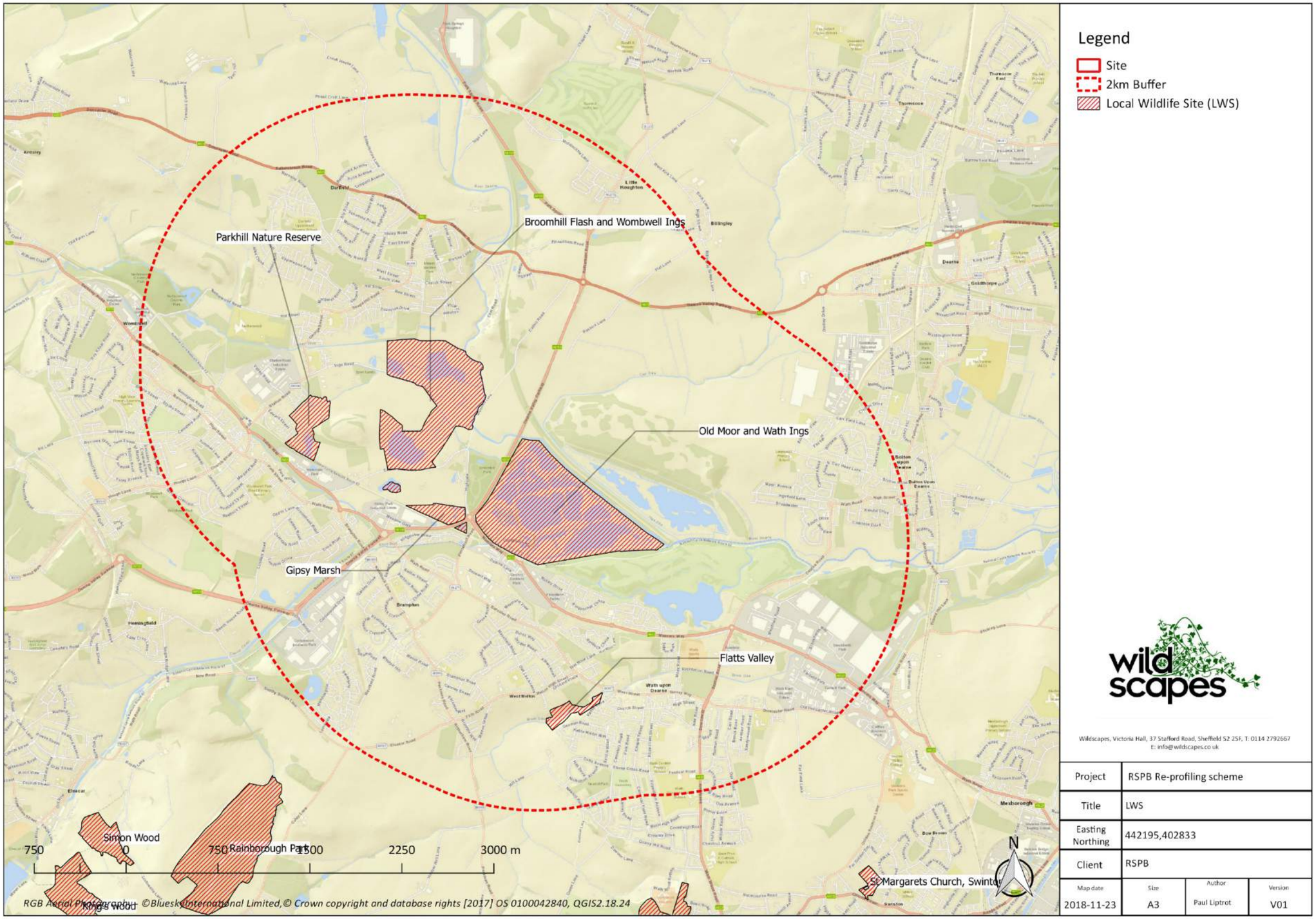


Figure 12-10. Local Wildlife Site within 2km

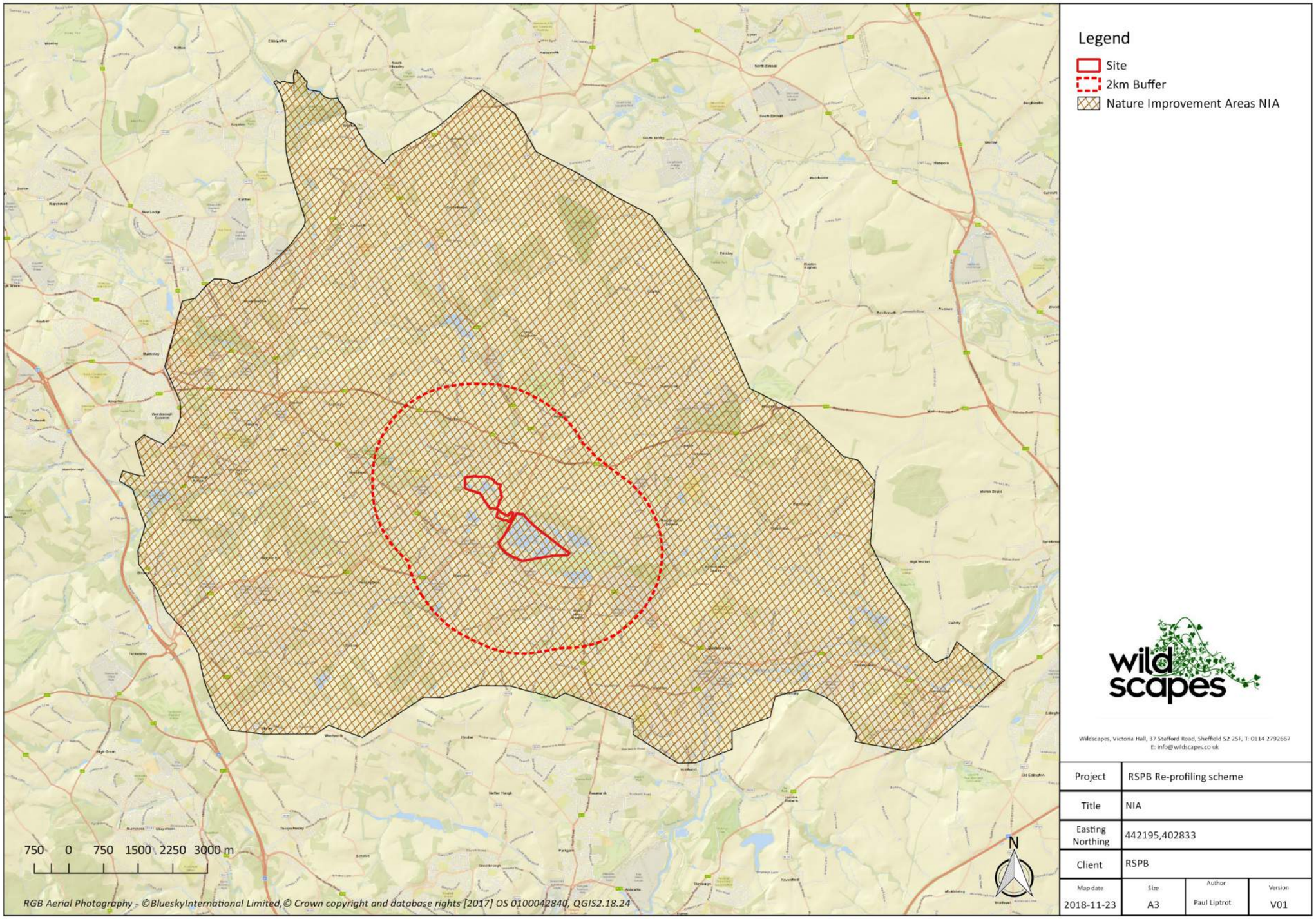


Figure 12-11 Nature Improvement Area

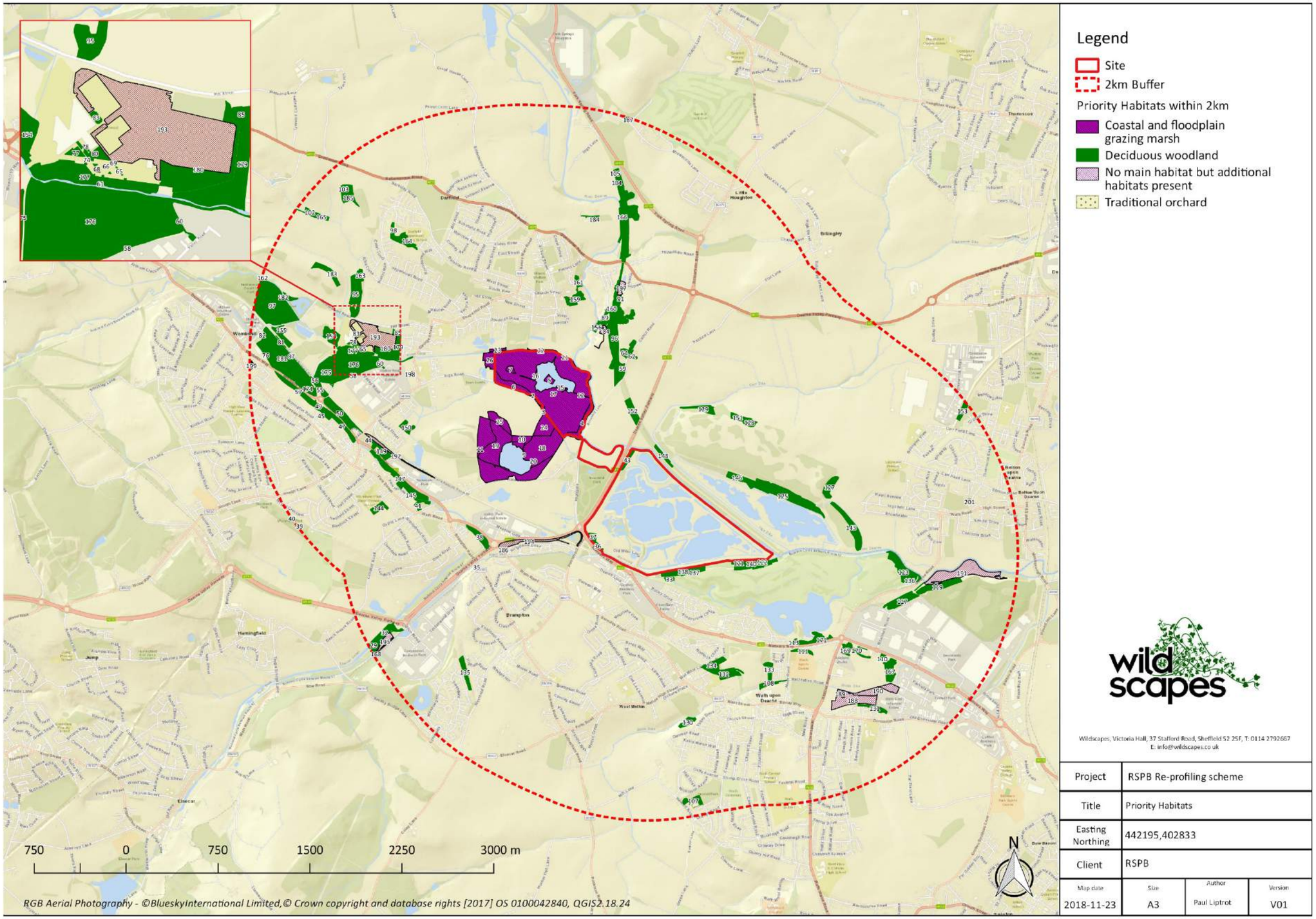


Figure 12-12 Priority Habitats with 2km

Table 12-1. Priority Habitat Compartments

Map Reference	Main Habitat Type	Source	Area (ha)	OS Grid Reference	Distance from Site (m)
1	Coastal and floodplain grazing marsh	Higher Level Stewardship	0.0	SE4200303252	0.0
4	Coastal and floodplain grazing marsh	Higher Level Stewardship	1.5	SE4199703241	0.0
5	Coastal and floodplain grazing marsh	Higher Level Stewardship	0.4	SE4173003592	0.0
6	Coastal and floodplain grazing marsh	Higher Level Stewardship	1.7	SE4143703538	0.0
7	Coastal and floodplain grazing marsh	Higher Level Stewardship	0.3	SE4141303677	0.0
12	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	0.0	SE4198603469	0.0
13	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	0.0	SE4184003501	0.0
14	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	0.0	SE4186703518	0.0
15	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	0.1	SE4182203532	0.0
16	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	0.1	SE4161703627	0.0
17	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	26.1	SE4172903546	0.0
21	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	0.1	SE4185603777	0.0
22	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	0.2	SE4165903832	0.0
26	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	1.1	SE4124303754	0.0
36	Deciduous woodland	National Forest Inventory 2014	0.2	SE4212502238	0.0
37	Deciduous woodland	National Forest Inventory 2014	0.3	SE4208602315	0.0
43	Deciduous woodland	National Forest Inventory 2014	0.5	SE4236402940	0.0
3	Coastal and floodplain grazing marsh	Higher Level Stewardship	0.2	SE4163903345	0.4
2	Coastal and floodplain grazing marsh	Higher Level Stewardship	0.0	SE4159603465	3.7
138	Deciduous woodland	National Forest Inventory 2014	1.3	SE4282002030	3.9
140	Deciduous woodland	National Forest Inventory 2014	1.4	SE4337702095	4.1
24	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	1.9	SE4168703206	6.3
18	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	5.6	SE4167103039	7.3
121	Deciduous woodland	National Forest Inventory 2014	0.0	SE4329602097	9.2
23	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	0.2	SE4130603837	14.4
122	Deciduous woodland	National Forest Inventory 2014	0.0	SE4346702107	15.3
139	Deciduous woodland	National Forest Inventory 2014	0.4	SE4340602065	34.7
194	No main habitat but additional habitats present		1.6	SE4157202274	35.0
137	Deciduous woodland	National Forest Inventory 2014	0.1	SE4291202022	38.8
33	Deciduous woodland	National Forest Inventory 2014	0.2	SE4271001967	44.9
148	Deciduous woodland	National Forest Inventory 2014	0.5	SE4265802974	47.6
11	Coastal and floodplain grazing marsh	Higher Level Stewardship	8.1	SE4132802950	160.6
96	Deciduous woodland	National Forest Inventory 2014	3.3	SE4226203933	169.0
152	Deciduous woodland	National Forest Inventory 2014	1.0	SE4240603340	194.8

Map Reference	Main Habitat Type	Source	Area (ha)	OS Grid Reference	Distance from Site (m)
10	Coastal and floodplain grazing marsh	Higher Level Stewardship	0.8	SE4150403109	195.6
196	No main habitat but additional habitats present		0.3	SE4216603990	213.3
25	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	1.4	SE4132403253	226.2
157	Deciduous woodland	National Forest Inventory 2014	2.4	SE4231104018	243.0
59	Deciduous woodland	National Forest Inventory 2014	0.2	SE4232703686	259.0
8	Coastal and floodplain grazing marsh	Higher Level Stewardship	0.4	SE4148203065	271.9
146	Deciduous woodland	National Forest Inventory 2014	0.8	SE4326102797	274.8
20	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	0.0	SE4159902931	292.1
19	Coastal and floodplain grazing marsh	The Distribution of Lowland Wet Grassland in England	4.5	SE4129103057	297.9
156	Deciduous woodland	National Forest Inventory 2014	0.3	SE4211304023	298.4
64	Deciduous woodland	National Forest Inventory 2014	0.3	SE4234103813	305.3
125	Deciduous woodland	National Forest Inventory 2014	2.8	SE4363302646	319.3
9	Coastal and floodplain grazing marsh	Higher Level Stewardship	0.1	SE4152202983	320.9
62	Deciduous woodland	National Forest Inventory 2014	0.2	SE4240403785	340.6
178	Deciduous woodland	National Forest Inventory 2014	0.3	SE4240203867	341.3
88	Deciduous woodland	National Forest Inventory 2014	0.0	SE4214504033	346.5
84	Deciduous woodland	National Forest Inventory 2014	0.0	SE4219803989	365.3
160	Deciduous woodland	National Forest Inventory 2014	0.6	SE4223804174	366.8
89	Deciduous woodland	National Forest Inventory 2014	0.3	SE4218404101	371.1
159	Deciduous woodland	National Forest Inventory 2014	1.0	SE4193904251	392.1
126	Deciduous woodland	National Forest Inventory 2014	1.5	SE4364702685	395.8
90	Deciduous woodland	National Forest Inventory 2014	0.0	SE4187404219	396.1
129	Deciduous woodland	National Forest Inventory 2014	0.8	SE4298503354	430.8
94	Deciduous woodland	National Forest Inventory 2014	0.1	SE4195304353	504.8
161	Deciduous woodland	National Forest Inventory 2014	0.3	SE4196604389	555.9
92	Deciduous woodland	National Forest Inventory 2014	0.0	SE4230204239	558.5
143	Deciduous woodland	National Forest Inventory 2014	1.9	SE4419102389	623.9
127	Deciduous woodland	National Forest Inventory 2014	1.0	SE4401602718	626.4
91	Deciduous woodland	National Forest Inventory 2014	0.0	SE4231004255	627.8
197	No main habitat but additional habitats present		0.4	SE4231504342	651.8
198	No main habitat but additional habitats present		0.1	SE4059203639	664.8
60	Deciduous woodland	National Forest Inventory 2014	0.2	SE4045903753	667.4
151	Deciduous woodland	National Forest Inventory 2014	0.5	SE4326703286	670.9
186	Deciduous woodland	National Forest Inventory 2014	0.0	SE4135502208	682.1
114	Deciduous woodland	National Forest Inventory 2014	0.0	SE4373901474	685.7
113	Deciduous woodland	National Forest Inventory 2014	0.1	SE4372301453	693.7
116	Deciduous woodland	National Forest Inventory 2014	0.1	SE4390401524	697.9
128	Deciduous woodland	National Forest Inventory 2014	0.5	SE4336103245	701.1
171	Deciduous woodland	National Forest Inventory 2014	0.6	SE4387901467	709.5
115	Deciduous woodland	National Forest Inventory 2014	0.2	SE4390301483	734.4

Map Reference	Main Habitat Type	Source	Area (ha)	OS Grid Reference	Distance from Site (m)
112	Deciduous woodland	National Forest Inventory 2014	0.0	SE4375101430	737.6
150	Deciduous woodland	National Forest Inventory 2014	0.5	SE4056203206	750.3
109	Deciduous woodland	National Forest Inventory 2014	0.0	SE4306101295	764.7
134	Deciduous woodland	National Forest Inventory 2014	1.3	SE4311601255	764.7
111	Deciduous woodland	National Forest Inventory 2014	0.3	SE4379901381	766.2
179	Deciduous woodland	National Forest Inventory 2014	1.1	SE4046203828	775.4
85	Deciduous woodland	National Forest Inventory 2014	0.2	SE4049503978	781.5
38	Deciduous woodland	National Forest Inventory 2014	1.0	SE4116002312	795.9
180	Deciduous woodland	National Forest Inventory 2014	0.9	SE4039203849	806.5
132	Deciduous woodland	National Forest Inventory 2014	0.9	SE4315301196	808.5
193	No main habitat but additional habitats present		4.4	SE4030803942	814.7
133	Deciduous woodland	National Forest Inventory 2014	0.5	SE4352301232	833.1
108	Deciduous woodland	National Forest Inventory 2014	0.5	SE4351901122	861.2
106	Deciduous woodland	National Forest Inventory 2014	2.6	SE4237704948	904.2
166	Deciduous woodland	National Forest Inventory 2014	2.9	SE4232304921	917.5
192	No main habitat but additional habitats present		0.7	SE4043003014	924.2
169	Deciduous woodland	National Forest Inventory 2014	0.3	SE4414401388	924.4
124	Deciduous woodland	National Forest Inventory 2014	0.4	SE4461902090	924.7
176	Deciduous woodland	National Forest Inventory 2014	5.7	SE4013403720	924.9
35	Deciduous woodland	National Forest Inventory 2014	0.0	SE4113702068	925.2
34	Deciduous woodland	National Forest Inventory 2014	0.0	SE4112402056	934.0
141	Deciduous woodland	National Forest Inventory 2014	0.3	SE4455402080	939.3
123	Deciduous woodland	National Forest Inventory 2014	0.9	SE4461902026	942.4
170	Deciduous woodland	National Forest Inventory 2014	0.6	SE4423701389	945.7
142	Deciduous woodland	National Forest Inventory 2014	0.4	SE4460502082	946.8
71	Deciduous woodland	National Forest Inventory 2014	0.0	SE4017003840	982.0
177	Deciduous woodland	National Forest Inventory 2014	0.8	SE4012703831	984.1
58	Deciduous woodland	National Forest Inventory 2014	0.2	SE4008103617	991.3
202	Deciduous woodland	National Forest Inventory 2014	0.3	SE4457801808	1000.5
117	Deciduous woodland	National Forest Inventory 2014	1.2	SE4460801788	1029.4
149	Deciduous woodland	National Forest Inventory 2014	0.8	SE4035903013	1029.6
99	Deciduous woodland	National Forest Inventory 2014	0.9	SE4050004753	1053.3
65	Deciduous woodland	National Forest Inventory 2014	0.0	SE4020803845	1068.6
136	Deciduous woodland	National Forest Inventory 2014	0.3	SE4466901957	1073.2
164	Deciduous woodland	National Forest Inventory 2014	0.4	SE4056904727	1084.1
147	Deciduous woodland	National Forest Inventory 2014	2.1	SE4051002788	1085.1
69	Deciduous woodland	National Forest Inventory 2014	0.0	SE4019403864	1088.0
70	Deciduous woodland	National Forest Inventory 2014	0.0	SE4018803864	1094.6
63	Deciduous woodland	National Forest Inventory 2014	0.0	SE4018503840	1096.2
184	Deciduous woodland	National Forest Inventory 2014	0.3	SE4209804902	1097.7
80	Deciduous woodland	National Forest Inventory 2014	0.1	SE4015103886	1100.8
66	Deciduous woodland	National Forest Inventory 2014	0.0	SE4017703856	1104.5

Map Reference	Main Habitat Type	Source	Area (ha)	OS Grid Reference	Distance from Site (m)
145	Deciduous woodland	National Forest Inventory 2014	0.2	SE4067202619	1109.0
61	Deciduous woodland	National Forest Inventory 2014	0.0	SE4016403815	1119.3
68	Deciduous woodland	National Forest Inventory 2014	0.0	SE4015503850	1121.4
100	Deciduous woodland	National Forest Inventory 2014	0.1	SE4207204926	1123.3
42	Deciduous woodland	National Forest Inventory 2014	0.3	SE4049902755	1124.5
83	Deciduous woodland	National Forest Inventory 2014	0.0	SE4015403970	1127.6
67	Deciduous woodland	National Forest Inventory 2014	0.0	SE4015403860	1127.9
44	Deciduous woodland	National Forest Inventory 2014	0.0	SE4025303103	1136.6
72	Deciduous woodland	National Forest Inventory 2014	0.0	SE4014503871	1138.6
73	Deciduous woodland	National Forest Inventory 2014	0.0	SE4014003871	1142.6
41	Deciduous woodland	National Forest Inventory 2014	0.3	SE4065902569	1145.6
75	Deciduous woodland	National Forest Inventory 2014	0.0	SE4013603893	1149.5
74	Deciduous woodland	National Forest Inventory 2014	0.0	SE4013203871	1150.8
78	Deciduous woodland	National Forest Inventory 2014	0.0	SE4012903902	1156.2
77	Deciduous woodland	National Forest Inventory 2014	0.1	SE4010603888	1156.9
50	Deciduous woodland	National Forest Inventory 2014	1.9	SE4001803322	1157.6
95	Deciduous woodland	National Forest Inventory 2014	2.1	SE4014804293	1159.5
158	Deciduous woodland	National Forest Inventory 2014	0.3	SE4015604252	1190.5
118	Deciduous woodland	National Forest Inventory 2014	0.0	SE4474701906	1193.3
130	Deciduous woodland	National Forest Inventory 2014	0.5	SE4285900802	1198.9
189	No main habitat but additional habitats present		0.3	SE4410201034	1202.2
110	Deciduous woodland	National Forest Inventory 2014	0.4	SE4447601313	1204.2
119	Deciduous woodland	National Forest Inventory 2014	1.3	SE4489601905	1210.2
163	Deciduous woodland	National Forest Inventory 2014	0.3	SE4018804445	1223.3
188	No main habitat but additional habitats present		2.9	SE4420400981	1230.5
47	Deciduous woodland	National Forest Inventory 2014	0.8	SE3998603250	1231.5
48	Deciduous woodland	National Forest Inventory 2014	0.4	SE3999303270	1234.5
191	No main habitat but additional habitats present		4.5	SE4509502018	1255.5
190	No main habitat but additional habitats present		1.6	SE4441001059	1265.9
120	Deciduous woodland	National Forest Inventory 2014	0.4	SE4495401946	1269.6
154	Deciduous woodland	National Forest Inventory 2014	1.3	SE3995003950	1272.5
167	Deciduous woodland	National Forest Inventory 2014	1.1	SE4450801217	1277.5
98	Deciduous woodland	National Forest Inventory 2014	0.0	SE4045804814	1297.8
175	Deciduous woodland	National Forest Inventory 2014	3.0	SE3990803656	1299.2
144	Deciduous woodland	National Forest Inventory 2014	0.6	SE4033802548	1343.8
55	Deciduous woodland	National Forest Inventory 2014	0.4	SE3985903513	1377.1
183	Deciduous woodland	National Forest Inventory 2014	1.0	SE3991704472	1380.0
131	Deciduous woodland	National Forest Inventory 2014	0.5	SE4438400916	1391.3
104	Deciduous woodland	National Forest Inventory 2014	0.0	SE4227905200	1393.7
135	Deciduous woodland	National Forest Inventory 2014	0.8	SE4104201210	1405.8
49	Deciduous woodland	National Forest Inventory 2014	0.1	SE3984603378	1430.2
45	Deciduous woodland	National Forest Inventory 2014	0.1	SE3986803300	1434.4

Map Reference	Main Habitat Type	Source	Area (ha)	OS Grid Reference	Distance from Site (m)
46	Deciduous woodland	National Forest Inventory 2014	0.0	SE3985003344	1449.4
56	Deciduous woodland	National Forest Inventory 2014	0.0	SE3981703591	1454.6
57	Deciduous woodland	National Forest Inventory 2014	1.3	SE3968303497	1457.9
52	Deciduous woodland	National Forest Inventory 2014	0.0	SE3982303502	1461.0
51	Deciduous woodland	National Forest Inventory 2014	0.0	SE3981903487	1465.0
53	Deciduous woodland	National Forest Inventory 2014	0.1	SE3980303498	1472.4
87	Deciduous woodland	National Forest Inventory 2014	0.3	SE3966903692	1490.8
174	Deciduous woodland	National Forest Inventory 2014	0.5	SE3975703520	1492.5
54	Deciduous woodland	National Forest Inventory 2014	0.3	SE3973503560	1496.8
181	Deciduous woodland	National Forest Inventory 2014	7.0	SE3954803769	1507.3
105	Deciduous woodland	National Forest Inventory 2014	0.0	SE4226605276	1532.2
97	Deciduous woodland	National Forest Inventory 2014	14.2	SE3933504275	1618.7
185	Deciduous woodland	National Forest Inventory 2014	0.7	SE4008905077	1626.3
201	Traditional orchard	AF/03c/433	0.1	SE4515802600	1640.7
86	Deciduous woodland	National Forest Inventory 2014	0.6	SE3955303937	1655.5
182	Deciduous woodland	National Forest Inventory 2014	0.6	SE3955004241	1664.0
93	Deciduous woodland	National Forest Inventory 2014	0.3	SE3961104261	1664.7
172	Deciduous woodland	National Forest Inventory 2014	0.6	SE4037301475	1685.0
31	Deciduous woodland	National Forest Inventory 2014	0.2	SE4042101538	1691.1
81	Deciduous woodland	National Forest Inventory 2014	0.0	SE3954003901	1702.7
155	Deciduous woodland	National Forest Inventory 2014	0.3	SE3954503999	1707.9
173	Deciduous woodland	National Forest Inventory 2014	1.0	SE4029001452	1731.1
32	Deciduous woodland	National Forest Inventory 2014	0.1	SE4038701534	1733.9
165	Deciduous woodland	National Forest Inventory 2014	0.4	SE3986904921	1736.8
103	Deciduous woodland	National Forest Inventory 2014	0.5	SE4007505146	1747.2
195	No main habitat but additional habitats present		1.3	SE4028001367	1784.8
76	Deciduous woodland	National Forest Inventory 2014	0.4	SE3941403795	1790.7
101	Deciduous woodland	National Forest Inventory 2014	0.0	SE3973604953	1840.3
102	Deciduous woodland	National Forest Inventory 2014	0.3	SE3977604958	1842.3
107	Deciduous woodland	National Forest Inventory 2014	0.6	SE4290400163	1842.8
153	Deciduous woodland	National Forest Inventory 2014	0.9	SE4511903376	1857.6
82	Deciduous woodland	National Forest Inventory 2014	0.0	SE3938703957	1885.1
200	Traditional orchard	AF/03c/432	0.2	SE4292000127	1891.2
79	Deciduous woodland	National Forest Inventory 2014	0.0	SE3935903900	1918.7
29	Deciduous woodland	National Forest Inventory 2014	0.1	SE4026601402	1933.2
30	Deciduous woodland	National Forest Inventory 2014	0.1	SE4012901293	1936.5
168	Deciduous woodland	National Forest Inventory 2014	0.8	SE4015701225	1951.2
27	Deciduous woodland	National Forest Inventory 2014	0.0	SE4032001368	1951.8
199	No main habitat but additional habitats present		0.1	SE3929403707	1967.0
39	Deciduous woodland	National Forest Inventory 2014	0.1	SE3966802410	1969.8
187	Deciduous woodland	National Forest Inventory 2014	1.0	SE4236805801	1970.0
28	Deciduous woodland	National Forest Inventory 2014	0.3	SE4026901346	1973.1

Map Reference	Main Habitat Type	Source	Area (ha)	OS Grid Reference	Distance from Site (m)
162	Deciduous woodland	National Forest Inventory 2014	0.4	SE3929904461	1983.2
40	Deciduous woodland	National Forest Inventory 2014	0.0	SE3962202462	1998.8

12.2 Appendix B – Environmental DNA Results – Wildscapes

Paul Liptrot Grad CIEEM
Wildscapes
Victoria Hall
37 Stafford Road

Jayne Wood
Project Manager
RSPB Dearne Valley and RSPB St Aidans
RSPB Dearne Valley nature reserve,
Old Moor Lane,
Wombwell, Barnsley,
S73 0YF

Dear Jayne Wood,

RE: Environmental DNA (eDNA) Sampling at Old Moor and Wombwell Ings

This letter is to provide the result of the eDNA Great Crested Newt Survey undertaken at the above location. Please refer to Table 12-2 below for survey dates and personal.

Table 12-2. Personal

Date	Waterbodies Sampled	Personal
10/5/2018 –Old Moor	28, 29, 30, 31, 32, 33, 34, 35 & 47.	Matthew Purkis* and Rebecca Davenport
11/5/2018–Old Moor	41, 42, 43, 44, 45	Matthew Purkis* and Rebecca Davenport
14/5/2018–Old Moor	36, 37, 38, 46, 48	Matthew Purkis* and Megan Burton
23/5/2018 – Wombwell Ings	WI1, WI2, WI3, WI3, WI4,	Matthew Purkis* Sara Blackburn

* Natural England Class 1 License holder Reference Number: 2016-20241-CLS-CLS

Methods

DNA sampling kits were provided by Fera Science Ltd. Sampling was carried out according to Biggs *et. al.* (2014). 1 kit was used per separate water body unless a water body exceeded 1

hectares in area in which 2 kits were used. Waterbodies which exceeded 2 hectares were sampled with 3 kits. Kits were refrigerated between collection and delivery for analysis, the analysis was carried out by Fera Science Ltd in accordance with Biggs et al. (2014).

Please refer to Table 12-3 and Figure 12-13 for waterbody details

Constraints

Waterbody 38 was not surveyed due to health and safety concerns; the banks were steep and inaccessible due to dense bramble and nettle.

An infiltration pond north of the A633 was also not surveyed because access could not be gained.

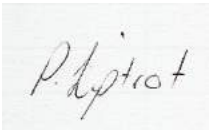
The sample for Waterbody 37A was inconclusive due to degradation within the sample. However, an additional sample was taken for this waterbody due to its size which returned a negative result.

Results

All of the valid samples returned a negative result for great crested newt (GCN) *Triturus cristatus* DNA, meaning that no evidence of great crested newt DNA presence was found within the waterbodies sampled. Please see the attached reports from Fera confirming this result.

I trust the above meets with your requirements, please feel free to contact me should you have any further enquiries.

Yours Sincerely,



Paul Liptrot

Ecologist

p.liptrot@wildsheffield.com

Tel: 0114 279 2667

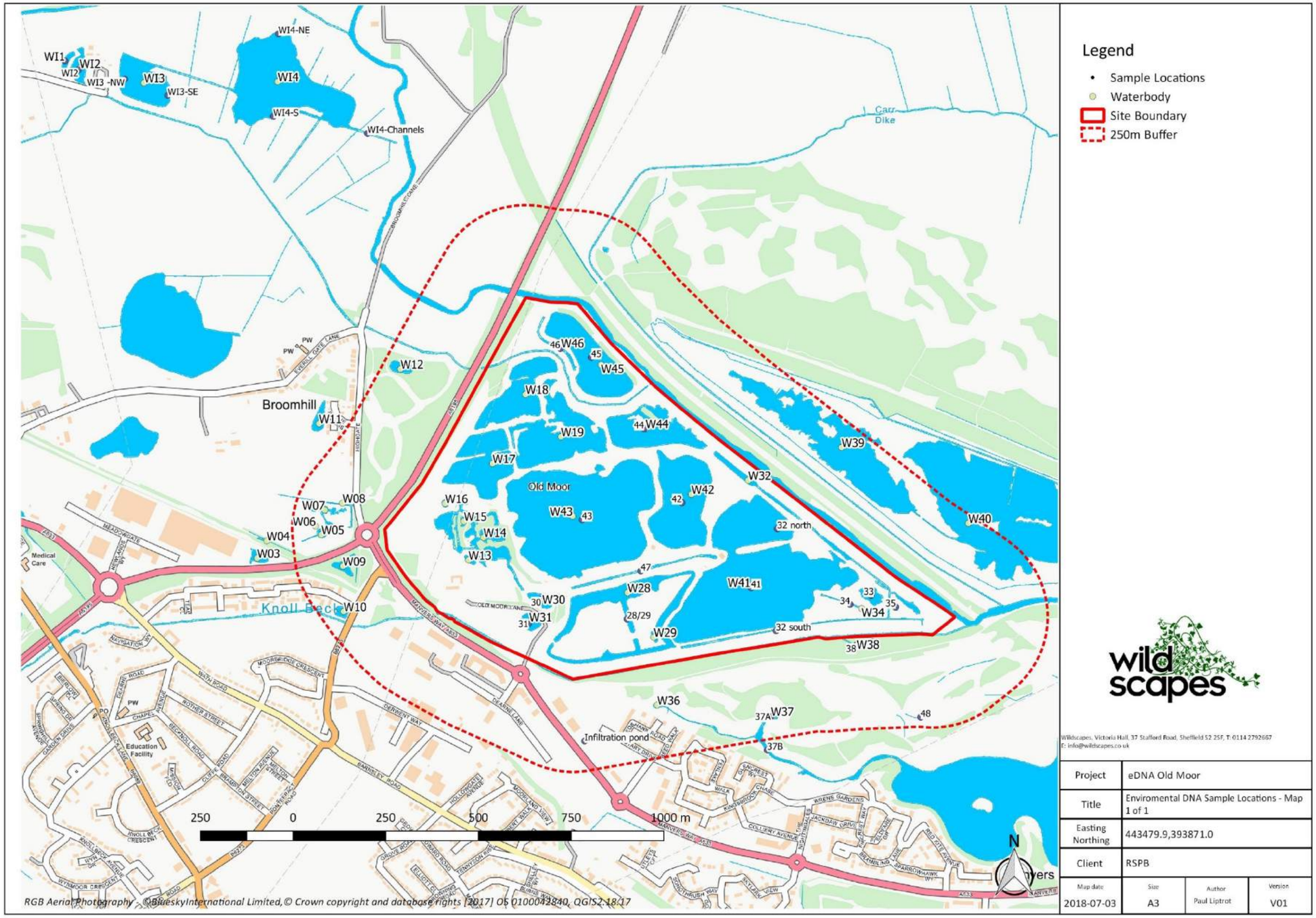


Figure 12-13.Sample Locations

Table 12-3 Enviromental DNA Waterbody Details

Sample Location	OS Grid Reference	Number Kit	Kit IDs	Survey Date	Surveyors	Percentage	Turbidity	Inflow Notes	Other Notes	
28/29	SE 42674 02163	3	S18-004233	10/05/2018	MP/RD	90	1	29 incorporated into 28 due to high water level	Black-headed gull nesting, coot, swan, tufted duck, and moorhen. No live fish seen but large dead carp found on bank	Negative
30	SE 42443 02217	1	S18-004220	10/05/2018	MP/RD	30	2	Connected to W31 via pipe (two way)	No fish seen, tufted duck present, largely covered in reeds	Negative
31	SE 42409 02150	1	S18-004231	10/05/2018	MP/RD	50	1	Connected to W30 via pipe (two way)	No fish or wildfowl seen	Negative
32 north	SE 43080 02406	1	S18-004235	10/05/2018	MP/RD	70	2	Standing water continuous with 33 and 35	Swan, mallard, moorhen	Negative
32 south	SE 43076 02131	1	S18-004224	10/05/2018	MP/RD	50	1	Inflow from 41 (flowing)		Negative
33	SE 43334 02227	1	S18-004234	10/05/2018	MP/RD	60	1	Standing water continuous between 33 and N part of 32	Coot, little grebe	Negative
34	SE 43277 02202	1	S18-004222	10/05/2018	MP/RD	100	1		Swan, mallard pair	Negative
35	SE 43400 02196	1	S18-004225	10/05/2018	MP/RD	90	1	Standing water connecting to N part of ditch W32	Marginal and submerged veg present	Negative
47	SE 42712 02292	1	S18-004223	10/05/2018	MP/RD	50	2		Only N side of ditch accessed, Moorhen seen, no fish seen, marginal and submerged vegetation present for much of length	Negative
41	SE 43009 02247	3	S18-004216	11/05/2018	MP/RD	85	5		Canada geese swans, coots, tufted duck, mallard	Negative
42	SE 42823 02476	2	S18-004227	11/05/2018	MP/RD	100	4	Connected by sluices to 43 (both directions of flow possible)	BHG colony, Canada geese	Negative
43	SE 42553 02431	3	S18-004245	11/05/2018	MP/RD	95	5	Connected by sluices to 42 (both directions of flow possible)	Many wildfowl, BHG, ducks and geese, bare banks on northern side, steep bank due to wind/wave action/erosion	Negative
44	SE 42721 02676	2	S18-004226	11/05/2018	MP/RD	80	2		Coot, little grebe, Gadwall	Negative
45	SE 42578 02868	2	S18-004228	11/05/2018	MP/RD	90	1	Water abstracted from River Dearne. this water body is the reservoir that feeds the rest of the reserve	Coot, tufted duck, Gadwall	Negative
36	SE 42700 09100	1	S18-004242	14/05/2018	MP/MB	50	3	Gently flowing east (towards pond 37)	Mallard seen	Negative
37A	SE 43062 01900	1	S18-004236	14/05/2018	MP/MB			Connected to 37B, inflow from 36	Largely covered by reeds	Inconclusive
37B	SE 43053 01809	1	S18-004241	14/05/2018	MP/MB	50	3	Connected to 37A, inflow from 36	Moorhen seen largely covered by reeds	Negative
38	SE 43293 02092	0		14/05/2018					Inaccessible, judged to be unsafe to access due to steep slope with dead branches covered by bramble and nettles	Negative

Sample Location	OS Grid Reference	Number Kit	Kit IDs	Survey Date	Surveyors	Percentage	Turbidity	Inflow Notes	Other Notes	
46	SE 42494 02892	1	S18-004237	14/05/2018	MP/MB	100	5		1 small fish seen, cattle drinking access	Negative
48	SE 43467 01898	1	S18-004247	14/05/2018	MP/MB	100	1	Wet ditches leading in and out but not connected to other surveyed ponds	Fish present	Negative
Infiltration pond	SE 42500 01800	0		14/05/2018					Fenced off with locked gate, steep vegetated bank surrounding	Negative
WI1	SE 41159 03668	1	S18-004239	23/05/2018	MP/SB	75	1	Inflow possible not visible :Strip connecting WI1 and WI2 covered with vegetation	1 medium sized fish seen	Negative
WI2	SE 41195 03644	1	S18-004246	23/05/2018	MP/SB	60	1			Negative
WI3 -NW	SE 41320 03619	2	S18-004358	23/05/2018	MP/SB	100	2		Coots and moorhen observed	Negative
WI3-SE	SE 41436 03575	2	S18-004358	23/05/2018	MP/SB	100	2			Negative
WI4-S	SE 41721 03519	3	S18-004354	23/05/2018	MP/SB	100	2	Several channels, some of which were dry. Wet channels were sampled using S18-004356	Lots of Wildfowl present- coots, moorhens, swans, lapwings, geese, ducks. Carp also seen	Negative
WI4-NE	SE 41734 03741	3	S18-004355	23/05/2018	MP/SB	100	2			Negative
WI4-Channels	SE 41974 03473	3	S18-004356	23/05/2018	MP/SB	100	2			Negative

DNA Analysis Report - Commercial in Confidence

Customer:	Sheffield Wildlife Trust
Address:	Victoria Hall 37 Stafford Road Sheffield South Yorkshire S2 2SF
Contact:	Paul Liptrot
Email:	p.liptrot@wildsheffield.com
Tel:	0114 263 4335
Report date:	24-May-2018
Order Number:	GCN18-0856
Samples:	Pond Water
Analysis requested:	Detection of Great Crested Newt eDNA from pond water.

Thank you for submitting your samples for analysis with the Fera eDNA testing service. The details of the analysis are as follows:

Method:
The method detects pond occupancy from great crested newts (GCN) using traces of DNA shed into the pond environment (eDNA). The detection of GCN eDNA is carried out using real time PCR to amplify part of the cytochrome 1 gene found in mitochondrial DNA. The method followed is detailed in Biggs J., et al, (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

The limits of this method are as follows: 1) the results are based on analyses of the samples supplied by the client and as received by the laboratory, 2) any variation between the characteristics of this sample and a batch will depend on the sampling procedure used. 3) the method is qualitative and therefore the levels given in the score are for information only, they do not constitute the quantification of GCN DNA against a calibration curve, 4) a 'not detected' result does not exclude presence at levels below the limit of detection.

The results are defined as follows:

Positive:	DNA from the species was detected.
eDNA Score:	Number of positive replicates from a series of twelve.
Negative:	DNA from the species was not detected; in the case of negative samples the DNA extract is further tested for PCR inhibitors and degradation of the sample.
Inconclusive:	Controls indicate degradation or inhibition of the sample, therefore the lack of detection of GCN DNA is not conclusive evidence for determining the absence of the species in the sample provided.

This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

CustomerReference	Fera Reference	GCN Detection	eDNA Score	Inhibition	Degradation
W46	S18-004237	Negative	0	No	No
W37A	S18-004236	Inconclusive	0	No	YES
W32	S18-004235	Negative	0	No	No
W33	S18-004234	Negative	0	No	No
W28+29	S18-004233	Negative	0	No	No
W28+29	S18-004232	Negative	0	No	No
W31	S18-004231	Negative	0	No	No
W28+29	S18-004230	Negative	0	No	No
W45	S18-004229	Negative	0	No	No
W45	S18-004228	Negative	0	No	No
W42	S18-004227	Negative	0	No	No
W44	S18-004226	Negative	0	No	No
W35	S18-004225	Negative	0	No	No
W32	S18-004224	Negative	0	No	No
W47	S18-004223	Negative	0	No	No
W34	S18-004222	Negative	0	No	No
W41	S18-004221	Negative	0	No	No
W30	S18-004220	Negative	0	No	No
W43	S18-004219	Negative	0	No	No
W41	S18-004218	Negative	0	No	No
W43	S18-004217	Negative	0	No	No
W41	S18-004216	Negative	0	No	No

The results indicate that eDNA for great crested newts was not detected in any of the samples submitted. However, with sample S18-004236 we detected degradation of the internal control. Therefore, due to the risk of any eDNA also being degraded resulting in a false negative, we have issued an inconclusive result.

Analysis was conducted in the presence of the following controls: 1) extraction blank, 2) appropriate positive and negative PCR controls for each of the TaqMan assays (GCN, Inhibition, and Degradation). All controls performed as expected.

This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

This test procedure was developed using research funded by the Department of Environment, Food and Rural Affairs.

Issuing officer: Steven Bryce
Tel: 01904 462 070
Email: e-dna@fera.co.uk

This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

DNA Analysis Report - Commercial in Confidence

Customer:	Sheffield Wildlife Trust
Address:	Victoria Hall 37 Stafford Road Sheffield South Yorkshire S2 2SF
Contact:	Paul Liptrot
Email:	p.liptrot@wildsheffield.com
Tel:	0114 263 4335
Report date:	29-May-2018
Order Number:	GCN18-0856
Samples:	Pond Water
Analysis requested:	Detection of Great Crested Newt eDNA from pond water.

Thank you for submitting your samples for analysis with the Fera eDNA testing service. The details of the analysis are as follows:

Method:
The method detects pond occupancy from great crested newts (GCN) using traces of DNA shed into the pond environment (eDNA). The detection of GCN eDNA is carried out using real time PCR to amplify part of the cytochrome 1 gene found in mitochondrial DNA. The method followed is detailed in Biggs J., et al, (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

The limits of this method are as follows: 1) the results are based on analyses of the samples supplied by the client and as received by the laboratory, 2) any variation between the characteristics of this sample and a batch will depend on the sampling procedure used. 3) the method is qualitative and therefore the levels given in the score are for information only, they do not constitute the quantification of GCN DNA against a calibration curve, 4) a 'not detected' result does not exclude presence at levels below the limit of detection.

The results are defined as follows:

Positive:	DNA from the species was detected.
eDNA Score:	Number of positive replicates from a series of twelve.
Negative:	DNA from the species was not detected; in the case of negative samples the DNA extract is further tested for PCR inhibitors and degradation of the sample.
Inconclusive:	Controls indicate degradation or inhibition of the sample, therefore the lack of detection of GCN DNA is not conclusive evidence for determining the absence of the species in the sample provided.

This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

DNA Analysis Report - Commercial in Confidence

CustomerReference	Fera Reference	GCN Detection	eDNA Score	Inhibition	Degradation
W48	S18-004247	Negative	0	No	No
W43	S18-004245	Negative	0	No	No
W44	S18-004244	Negative	0	No	No
W36	S18-004242	Negative	0	No	No
W37B	S18-004241	Negative	0	No	No
W42	S18-004240	Negative	0	No	No
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

The results indicate that eDNA for great crested newts was not detected in any of the samples submitted. Analysis was conducted in the presence of the following controls: 1) extraction blank, 2) appropriate positive and negative PCR controls for each of the TaqMan assays (GCN, Inhibition, and Degradation). All controls performed as expected.

This test procedure was developed using research funded by the Department of Environment, Food and Rural Affairs.

Issuing officer: Steven Bryce
Tel: 01904 462 070
Email: e-dna@fera.co.uk

This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

DNA Analysis Report - Commercial in Confidence

Customer:	Sheffield Wildlife Trust
Address:	Victoria Hall 37 Stafford Road Sheffield South Yorkshire S2 2SF
Contact:	Paul Liptrot
Email:	p.liptrot@wildsheffield.com
Tel:	0114 263 4335
Report date:	29-Jun-2018
Order Number:	GCN18-0856
Samples:	Pond Water
Analysis requested:	Detection of Great Crested Newt eDNA from pond water.

Thank you for submitting your samples for analysis with the Fera eDNA testing service. The details of the analysis are as follows:

Method:
The method detects pond occupancy from great crested newts (GCN) using traces of DNA shed into the pond environment (eDNA). The detection of GCN eDNA is carried out using real time PCR to amplify part of the cytochrome 1 gene found in mitochondrial DNA. The method followed is detailed in Biggs J., et al, (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

The limits of this method are as follows: 1) the results are based on analyses of the samples supplied by the client and as received by the laboratory, 2) any variation between the characteristics of this sample and a batch will depend on the sampling procedure used. 3) the method is qualitative and therefore the levels given in the score are for information only, they do not constitute the quantification of GCN DNA against a calibration curve, 4) a 'not detected' result does not exclude presence at levels below the limit of detection.

The results are defined as follows:

Positive:	DNA from the species was detected.
eDNA Score:	Number of positive replicates from a series of twelve.
Negative:	DNA from the species was not detected; in the case of negative samples the DNA extract is further tested for PCR inhibitors and degradation of the sample.
Inconclusive:	Controls indicate degradation or inhibition of the sample, therefore the lack of detection of GCN DNA is not conclusive evidence for determining the absence of the species in the sample provided.

This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

CustomerReference	Fera Reference	GCN Detection	eDNA Score	Inhibition	Degradation
WI1	S18-004239	Negative	0	No	No
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
WI2	S18-004246	Negative	0	No	No

The results indicate that eDNA for great crested newts was not detected in any of the samples submitted. Analysis was conducted in the presence of the following controls: 1) extraction blank, 2) appropriate positive and negative PCR controls for each of the TaqMan assays (GCN, Inhibition, and Degradation). All controls performed as expected.

This test procedure was developed using research funded by the Department of Environment, Food and Rural Affairs.

Issuing officer: Steven Bryce
Tel: 01904 462 070
Email: e-dna@fera.co.uk

This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

CustomerReference	Fera Reference	GCN Detection	eDNA Score	Inhibition	Degradation
WI 4 (S)	S18-004354	Negative	0	No	No
WI 4 (NE)	S18-004355	Negative	0	No	No
WI 4 - channels	S18-004356	Negative	0	No	No
WI 3 (NW)	S18-004358	Negative	0	No	No
WI 03 (SE)	S18-004359	Negative	0	No	No

The results indicate that eDNA for great crested newts was not detected in any of the samples submitted. Analysis was conducted in the presence of the following controls: 1) extraction blank, 2) appropriate positive and negative PCR controls for each of the TaqMan assays (GCN, Inhibition, and Degradation). All controls performed as expected.

This test procedure was developed using research funded by the Department of Environment, Food and Rural Affairs.

Issuing officer: Steven Bryce
Tel: 01904 462 070
Email: e-dna@fera.co.uk

This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

DNA Analysis Report - Commercial in Confidence

Customer:	Sheffield Wildlife Trust
Address:	Victoria Hall 37 Stafford Road Sheffield South Yorkshire S2 2SF
Contact:	Adele Harrison
Email:	a.harrison@wildsheffield.com
Tel:	01142792667
Report date:	29-Jun-2018
Order Number:	GCN18-0879
Samples:	Pond Water
Analysis requested:	Detection of Great Crested Newt eDNA from pond water.

Thank you for submitting your samples for analysis with the Fera eDNA testing service. The details of the analysis are as follows:

Method:
The method detects pond occupancy from great crested newts (GCN) using traces of DNA shed into the pond environment (eDNA). The detection of GCN eDNA is carried out using real time PCR to amplify part of the cytochrome 1 gene found in mitochondrial DNA. The method followed is detailed in Biggs J., et al, (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

The limits of this method are as follows: 1) the results are based on analyses of the samples supplied by the client and as received by the laboratory, 2) any variation between the characteristics of this sample and a batch will depend on the sampling procedure used. 3) the method is qualitative and therefore the levels given in the score are for information only, they do not constitute the quantification of GCN DNA against a calibration curve, 4) a 'not detected' result does not exclude presence at levels below the limit of detection.

The results are defined as follows:

Positive:	DNA from the species was detected.
eDNA Score:	Number of positive replicates from a series of twelve.
Negative:	DNA from the species was not detected; in the case of negative samples the DNA extract is further tested for PCR inhibitors and degradation of the sample.
Inconclusive:	Controls indicate degradation or inhibition of the sample, therefore the lack of detection of GCN DNA is not conclusive evidence for determining the absence of the species in the sample provided.

This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

DNA Analysis Report - Commercial in Confidence

CustomerReference	Fera Reference	GCN Detection	eDNA Score	Inhibition	Degradation
WI2 (North West)	S18-004357	Negative	0	No	No

The results indicate that eDNA for great crested newts was not detected in the sample submitted. Analysis was conducted in the presence of the following controls: 1) extraction blank, 2) appropriate positive and negative PCR controls for each of the TaqMan assays (GCN, Inhibition, and Degradation). All controls performed as expected.

This test procedure was developed using research funded by the Department of Environment, Food and Rural Affairs.

Issuing officer: Steven Bryce
Tel: 01904 462 070
Email: e-dna@fera.co.uk

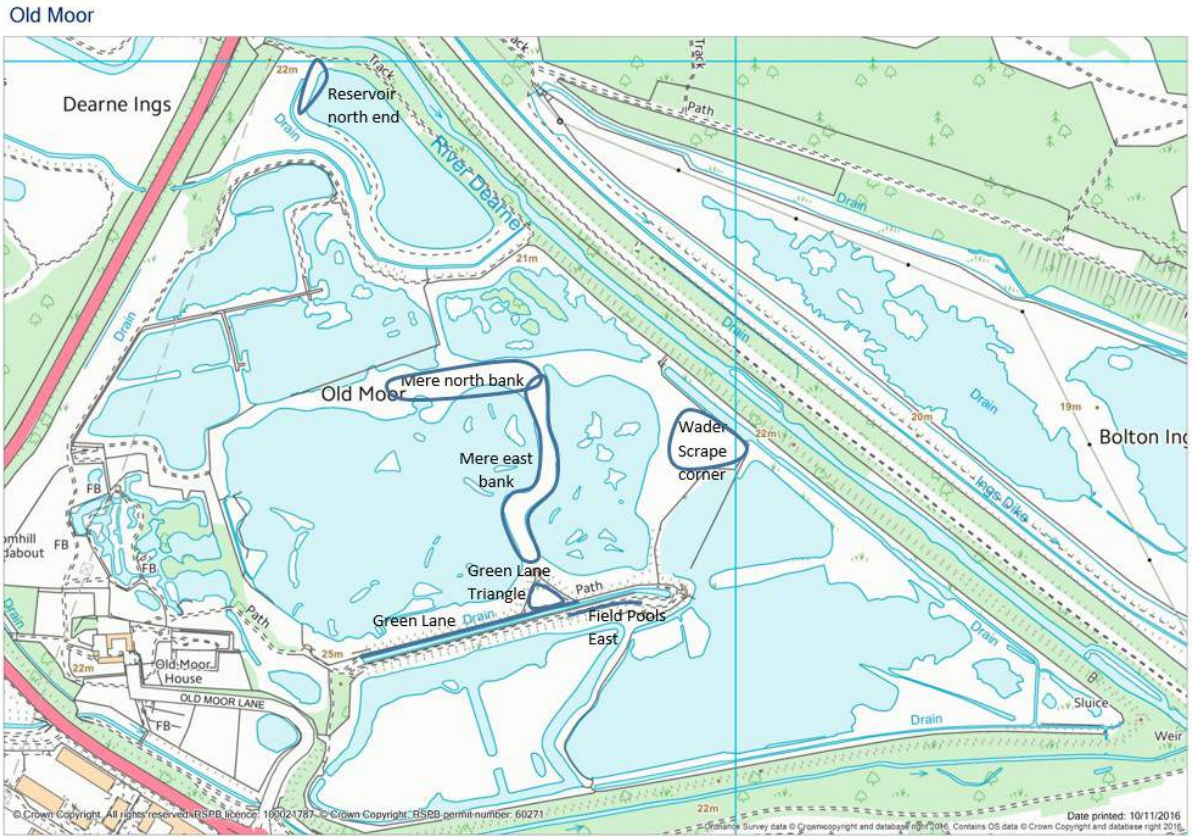
This test report may not be reproduced except in full, without the written approval of Fera. Fera hereby excludes all liability for any claim, loss, demands or damages of any kind whatsoever (whether such claims, loss, demands or damages were foreseeable, known or otherwise) arising out of or in connection with the preparation of any technical or scientific report , including without limitation, indirect or consequential loss or damage; loss of actual or anticipated profits (including loss of profits on contracts); loss of revenue; loss of business; loss of opportunity; loss of anticipated savings; loss of goodwill; loss of reputation; loss of damage to or corruption of data; loss of use of money or otherwise, and whether or not advised of the possibility of such claim, loss demand or damages and whether arising in tort (including negligence), contract or otherwise. This statement does not affect your statutory rights. Nothing in this disclaimer excludes or limits Fera liability for: (a) death or personal injury caused by Fera's negligence (or that of its employees, agents or directors); or (b) the tort of deceit; [or (c) any breach of the obligations implied by Sale of Goods Act 1979 or Supply of Goods and Services Act 1982 (including those relating to the title, fitness for purpose and satisfactory quality of goods);] or (d) any liability which may not be limited or excluded by law (e) fraud or fraudulent misrepresentation. The parties agree that any matters are governed by English law and irrevocably submit to the non-exclusive jurisdiction of the English courts.

12.3 Appendix C – RSPB Survey Reports

12.3.1 Dearne Valley Project Botanical Survey

On 16 May 2018 Dr Tim Melling assisted by Heather Bennett surveyed eight areas where vegetation would be affected by earth moving for wildlife habitat creation as part of the Dearne Valley Project. The purpose was to ensure that no rare or notable plants would be affected. All of the areas that might be affected were surveyed in their entirety, and abundance was scored using a DAFOR scale (Dominant, Abundant, Frequent, Occasional, Rare).

There are no UK BAP Priority species, nor any rare or notable species.



Map 1 Old Moor (Areas 1-6)

Area 1

Wader scrape spit and Northern edge of the large lagoon.

Species List: Area 1 Mere East Bank and Mere North Bank		
Scientific Name	**Common Name**	**Frequency**
Plantago lanceolata	Ribwort Plantain	A
Poa annua	Annual Meadow-grass	A

Cirsium arvense	Creeping Thistle	F
Achillea millefolium	Yarrow	F
Lotus corniculatus	Bird's-foot Trefoil	F
Leucanthemum vulgare	Oxeye daisy	F
Bellis perennis	Daisy	F
Centaurea nigra	Knapweed	F
Veronica serpyllifolia	Thyme-leaved Speedwell	F
Poa pratensis	Smooth Meadow-grass	F
Alopecurus pratensis	Meadow Foxtail	F
Holcus lanatus	Yorkshire-fog	F
Dactylis glomerata	Cock's-foot	F
Cirsium arvense	Creeping Thistle	F
Agrostis stolonifera	Creeping Bent	F
Rumex crispus	Curled Dock	F
Urtica dioica	Nettle	F
Potentilla anserina	Silverweed	F
Anthriscus sylvestris	Cow Parsley	F
Cynosurus cristatus	Crested Dog's-tail	O
Deschampsia cespitosa	Tufted Hair-grass	O
Festuca rubra	Red Fescue	O
Cerastium fontanum	Common Mouse-ear	O
Holcus lanatus	Yorkshire-fog	O
Juncus effusus	Soft Rush	O
Cirsium vulgare	Spear Thistle	O
Prunella vulgaris	Selfheal	O
Ranunculus repens	Creeping Buttercup	O
Primula veris	Cowslip	O
Mentha aquatica	Water Mint	O
Myosotis discolor	Changing Forget-me-not	O
Trifolium pratense	Red Clover	O
Trifolium repens	White Clover	O
Cerastium fontanum	Common Mouse-ear	O
Cirsium vulgare	Spear Thistle	O
Rumex obtusifolius	Broad-leaved Dock	O
Persicaria amphibia	Amphibious Bistort	O
Ranunculus acris	Meadow Buttercup	O
Rubus fruticosus agg.	Bramble	O
Cardamine pratensis	Cuckooflower	O
Senecio jacobaea	Ragwort	O
Senecio vulgaris	Groundsel	O
Taraxacum officinale agg.	Dandelion	O
Poa trivialis.	Rough Meadow-grass	O
Rumex acetosa	Common Sorrel	O
Prunella vulgaris	Selfheal	O
Anthoxanthum odoratum	Sweet Vernal-grass	O
Sanguisorba officinalis	Great Burnet	O
Juncus effusus	Soft Rush	O
Crataegus monogyna	Hawthorn	R
Cytisus scoparius	Broom	R
Daucus carota	Wild Carrot	R
Rhinanthus minor	Yellow-rattle	R
Ulex europaeus	Gorse	R
Odontites verna	Red Bartsia	R
Lotus uliginosus	Greater Bird's-foot Trefoil	R
Trifolium dubium	Lesser Trefoil	R
Lathyrus pratensis	Meadow Vetchling	R
Solanum dulcamara	Bittersweet	R
Salix caprea	Goat Willow	R
Galium palustre	Marsh Bedstraw	R
Lychnis flos-cuculi	Ragged Robin	R
Rorippa palustris	Marsh Yellow-cress	R
Viola tricolor	Wild Pansy	R
Ranunculus bulbosa	Bulbous Buttercup	R
Artemisia absinthinum	Wormwood	R
Veronica arvensis	Field Speedwell	R
Anagallis arvensis	Scarlet Pimpernel	R

Potentilla reptans	Creeping Cinquefoil	R
Lycopus europaeus	Gypsywort	R
Polygonum aviculare	Knotgrass	R
Rosa canina agg.	Dog Rose	R
Rumex acetosella	Sheep's Sorrel	R
Plantago major	Greater Plantain	R
Tanacetum vulgare	Tansy	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Species List: Area 2 Wader Scrape

Scientific Name	Common Name	Frequency
Poa annua	Annual Meadow-grass	A
Plantago lanceolata	Ribwort Plantain	F
Lotus corniculatus	Bird's-foot Trefoil	F
Holcus lanatus	Yorkshire-fog	F
Alopecurus pratensis	Meadow Foxtail	F
Alopecurus geniculatus	Marsh Foxtail	F
Dactylis glomerata	Cock's-foot	F
Agrostis stolonifera	Creeping Bent	F
Centaurea nigra	Knapweed	F
Urtica dioica	Nettle	F
Rumex crispus	Curled Dock	F
Achillea millefolium	Yarrow	F
Cirsium arvense	Creeping Thistle	F
Anthoxanthum odoratum	Sweet Vernal-grass	O
Poa trivialis.	Rough Meadow-grass	O
Trifolium pratense	Red Clover	O
Veronica serpyllifolia	Thyme-leaved Speedwell	O
Bellis perennis	Daisy	O
Festuca rubra	Red Fescue	O
Ranunculus acris	Meadow Buttercup	O
Taraxacum officinale agg.	Dandelion	O
Prunella vulgaris	Selfheal	O
Barbarea vulgaris	Wintercress	R
Luzula campestris	Field Woodrush	R
Briza media	Quaking-grass	R
Ranunculus bulbosa	Bulbous Buttercup	R
Rumex acetosa	Common Sorrel	R
Heracleum sphondylium	Hogweed	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Species List: Area 3 Green Lane

Scientific Name	Common Name	Frequency
Rosa canina agg.	Dog Rose	F
Centaurea nigra	Knapweed	F
Crataegus monogyna	Hawthorn	F
Betula pubescens	Downy Birch	F
Poa trivialis.	Rough Meadow-grass	F
Poa pratensis	Smooth Meadow-grass	F
Luzula campestris	Field Woodrush	F
Holcus lanatus	Yorkshire-fog	F
Lotus corniculatus	Bird's-foot Trefoil	F

Vicia sativa	Common Vetch	F
Ulex europaeus	Gorse	F
Rubus fruticosus agg.	Bramble	F
Galium aparine	Cleavers	F
Cirsium arvense	Creeping Thistle	F
Urtica dioica	Nettle	F
Poa annua	Annual Meadow-grass	F
Agrostis stolonifera	Creeping Bent	F
Cardamine hirsuta	Hairy Bittercress	F
Sambucus nigra	Elder	F
Rosa arvensis	Field Rose	F
Dactylis glomerata	Cock's-foot	F
Cerastium fontanum	Common Mouse-ear	O
Prunella vulgaris	Selfheal	O
Cirsium vulgare	Spear Thistle	O
Epilobium montanum	Broad-leaved Willowherb	O
Taraxacum officinale agg.	Dandelion	O
Leucanthemum vulgare	Oxeye daisy	O
Solanum dulcamara	Bittersweet	O
Galeopsis tetrahit	Common Hemp-nettle	O
Acer campestre	Field Maple	O
Sambucus nigra	Elder	O
Cytisus scoparius	Broom	O
Tanacetum vulgare	Tansy	O
Anthriscus sylvestris	Cow Parsley	O
Rosa rugosa	Rose species	O
Salix fragilis	Crack Willow	R
Dryopteris filis-mas	Male Fern	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Species List: Area 4 Triangle

Scientific Name	Common Name	Frequency
Rosa canina agg.	Dog Rose	F
Rosa arvensis	Field Rose	F
Viburnum opulus	Guelder-rose	F
Crataegus monogyna	Hawthorn	F
Ulex europaeus	Gorse	F
Plantago lanceolata	Ribwort Plantain	F
Poa pratensis	Smooth Meadow-grass	F
Lotus corniculatus	Bird's-foot Trefoil	F
Trifolium pratense	Red Clover	F
Leucanthemum vulgare	Oxeye daisy	F
Vicia sativa	Common Vetch	F
Dactylis glomerata	Cock's-foot	F
Salix cinerea	Grey Willow	F
Juncus effusus	Soft Rush	F
Cardamine pratensis	Cuckooflower	F
Ranunculus acris	Meadow Buttercup	F
Rubus fruticosus agg.	Bramble	F
Anthoxanthum odoratum	Sweet Vernal-grass	F
Deschampsia cespitosa	Tufted Hair-grass	F
Festuca rubra	Red Fescue	F
Rumex obtusifolius	Broad-leaved Dock	F
Acer campestre	Field Maple	O

Sambucus nigra	Elder	O
Aster novae-belgiae	Michaelmas-daisy	O
Cytisus scoparius	Broom	O
Tanacetum vulgare	Tansy	O
Anthriscus sylvestris	Cow Parsley	O
Rosa rugosa	Rose species	O
Salix fragilis	Crack Willow	O
Daucus carota	Wild Carrot	O
Taraxacum officinale agg.	Dandelion	O
Carex flacca	Glaucous Sedge	O
Rhamnus cathartica	Buckthorn	R
Vicia hirsuta	Hairy Tare	R
Dryopteris filis-mas	Male Fern	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Species List: Area 5 Field Pools Bank

Scientific Name	Common Name	Frequency
Crataegus monogyna	Hawthorn	A
Ulex europaeus	Gorse	A
Hippophae rhamnoides	Sea Buckthorn	F
Rosa canina agg.	Dog Rose	F
Centaurea nigra	Knapweed	F
Lotus corniculatus	Bird's-foot Trefoil	F
Cornus sanguinea	Dogwood	F
Plantago lanceolata	*Ribwort Plantain*	F
Rubus fruticosus agg.	Bramble	F
Poa pratensis	Smooth Meadow-grass	F
Leucanthemum vulgare	Oxeye daisy	F
Holcus lanatus	Yorkshire-fog	F
Poa annua	Annual Meadow-grass	F
Daucus carota	Wild Carrot	O
Cerastium fontanum	Common Mouse-ear	O
Cirsium arvense	Creeping Thistle	O
Equisetum arvense	Common Horsetail	O
Senecio jacobaea	Ragwort	O
Achillea millefolium	Yarrow	O
Vicia sativa	Common Vetch	O
Vicia hirsuta	Hairy Tare	O
Salix cinerea	Grey Willow	O
Prunus spinosa	*Blackthorn*	O

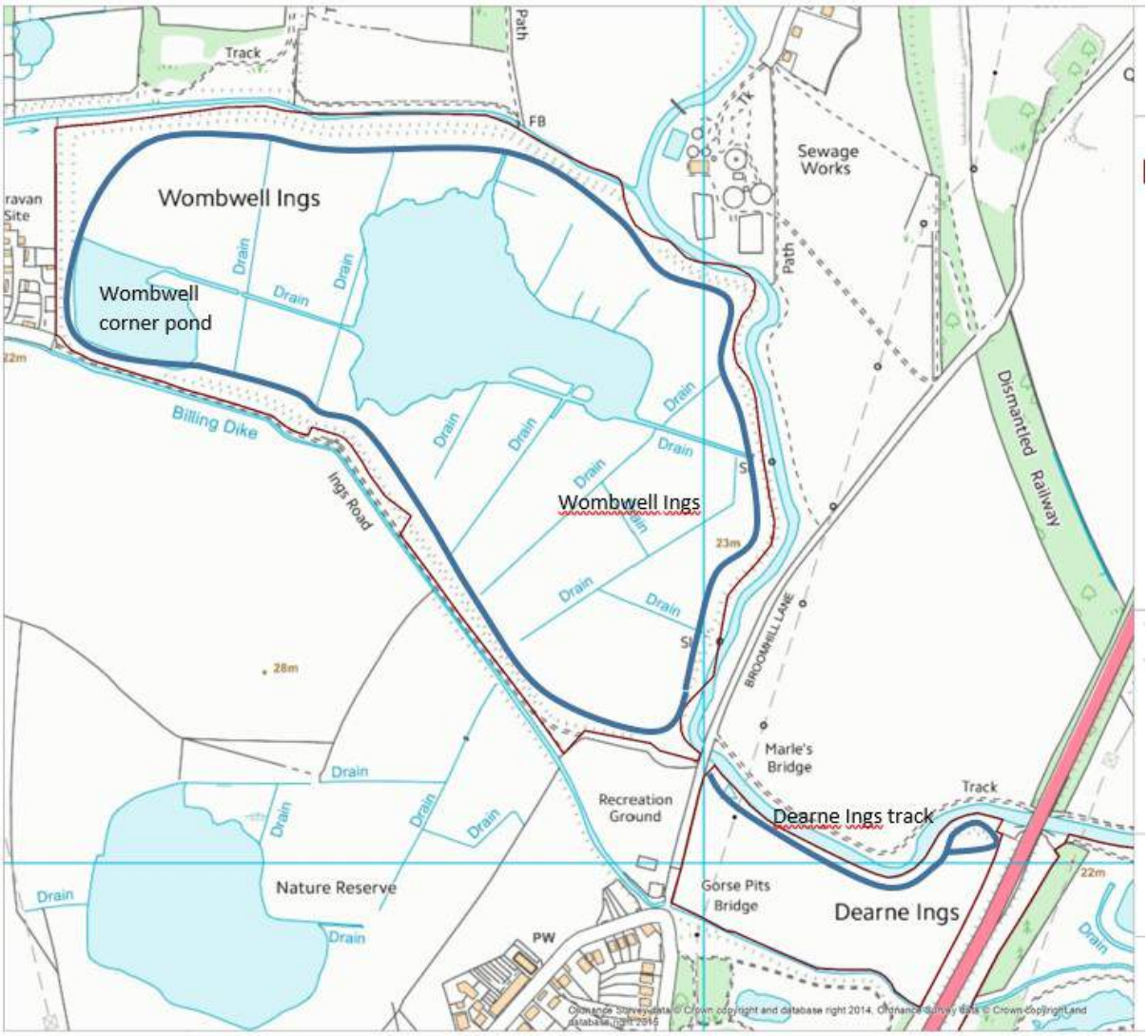
D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Species List: Area 6 Reservoir North End

Scientific Name	Common Name	Frequency
Phragmites australis	Reed	A
Plantago lanceolata	Ribwort Plantain	F
Anthoxanthum odoratum	Sweet Vernal-grass	F

Dactylis glomerata	Cock's-foot	F
Poa pratensis	Smooth Meadow-grass	F
Deschampsia cespitosa	Tufted Hair-grass	F
Festuca rubra	Red Fescue	F
Trifolium pratense	Red Clover	F
Trifolium repens	White Clover	F
Lotus corniculatus	Bird's-foot Trefoil	F
Luzula campestris	Field Woodrush	F
Leucanthemum vulgare	Oxeye daisy	F
Primula veris	Cowslip	F
Equisetum arvense	Common Horsetail	F
Epilobium hirsutum	Great Willowherb	F
Rumex crispus	Curled Dock	F
Cardamine pratensis	Cuckooflower	F
Juncus effusus	Soft Rush	F
Salix cinerea	Grey Willow	F
Scrophularia nodosa	Common Figwort	F
Anthriscus sylvestris	Cow Parsley	F
Vicia sativa	Common Vetch	O
Cerastium fontanum	Common Mouse-ear	O
Holcus lanatus	Yorkshire-fog	O
Achillea millefolium	Yarrow	O
Betula pubescens	Downy Birch	O
Cardamine flexuosa	Wavy Bittercress	O
Lycopus europaeus	Gypsywort	O
Ranunculus repens	Creeping Buttercup	O
Lotus uliginosus	Greater Bird's-foot Trefoil	O
Alnus glutinosa	Alder	O
Rumex acetosa	Common Sorrel	O
Trifolium dubium	Lesser Trefoil	O
Rosa canina agg.	Dog Rose	O
Urtica dioica	Nettle	O
Cirsium arvense	Creeping Thistle	O
Salix fragilis	Crack Willow	O
Vicia cracca	Tufted Vetch	O
Heracleum sphondylium	Hogweed	R
Lathyrus pratensis	Meadow Vetchling	R
Angelica sylvestris	Wild Angelica	R
Alisma plantago-aquatilis	Water-plantain	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare



Map 2 Dearne Ings and Wombwell Ings (Areas 7 & 8)

Species List: Area 7 Dearne Ings and access track from Wombwell		
Scientific Name	**Common Name**	**Frequency**
Galium aparine	Cleavers	F
Urtica dioica	Nettle	F
Tanacetum vulgare	Tansy	F
Anthriscus sylvestris	Cow Parsley	F
Heracleum sphondylium	Hogweed	F
Cirsium arvense	Creeping Thistle	F
Deschampsia cespitosa	Tufted Hair-grass	F
Dactylis glomerata	Cock's-foot	F
Poa pratensis	Smooth Meadow-grass	F
Lathyrus pratensis	Meadow Vetchling	F
Chamerion angustifolium	Rosebay Willowherb	F
Taraxacum officinale agg.	Dandelion	F
Plantago lanceolata	Ribwort Plantain	F
Cirsium vulgare	Spear Thistle	F
Trifolium pratense	Red Clover	F
Ranunculus repens	Creeping Buttercup	F
Rubus fruticosus agg.	Bramble	F
Poa trivialis.	Rough Meadow-grass	F

Bromus sterilis	Barren Brome	F
Vicia sativa	Common Vetch	O
Centaurea nigra	Knapweed	O
Cerastium fontanum	Common Mouse-ear	O
Trifolium dubium	Lesser Trefoil	O
Medicago lupulina	Black Medick	O
Equisetum arvense	Common Horsetail	O

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Species List: Area 8 Wombwell Ings

Scientific Name	Common Name	Frequency	
Alopecurus pratensis	Meadow Foxtail	D	
Cirsium arvense	Creeping Thistle	A	
Trifolium pratense	Red Clover	A	
Trifolium repens	White Clover	A	
Poa annua	Annual Meadow-grass	A	
Ranunculus acris	Meadow Buttercup	A	
Ranunculus repens	Creeping Buttercup	A	
Centaurea nigra	Knapweed	A	
Dactylis glomerata	Cock's-foot	F	
Bromus hordeaceus	Soft Brome	F	
Poa pratensis	Smooth Meadow-grass	F	
Poa trivialis.	Rough Meadow-grass	F	
Alopecurus geniculatus	Marsh Foxtail	F	
Plantago lanceolata	Ribwort Plantain	F	
Sanguisorba officinalis	Great Burnet	F	
Bellis perennis	Daisy	F	
Agrostis stolonifera	Creeping Bent	F	
Luzula campestris	Field Woodrush	F	
Holcus lanatus	Yorkshire-fog	O	
Urtica dioica	Nettle	O	
Rumex crispus	Curled Dock	O	
Rumex obtusifolius	Broad-leaved Dock	O	
Rumex acetosa	Common Sorrel	O	*Plantago*
major	Greater Plantain	O	
Juncus inflexus	Hard Rush	O	
Senecio jacobaea	Ragwort	O	
Lotus corniculatus	Bird's-foot Trefoil	O	
Lotus uliginosus	Greater Bird's-foot Trefoil	O	
Capsella bursa-pastoris	Shepherd's-purse	O	
Matricaria discoidea	Pineappleweed	O	
Crataegus monogyna	Hawthorn	O	
Trifolium media	Zigzag Clover	O	
Cardamine pratensis	Cuckooflower	O	
Festuca rubra	Red Fescue	O	
Potentilla anserina	Silverweed	O	
Lathyrus pratensis	Meadow Vetchling	O	
Achillea millefolium	Yarrow	R	
Heracleum sphondylium	Hogweed	R	
Ficaria verna	Lesser Celandine	R	
Trifolium dubium	Lesser Trefoil	R	
Equisetum arvense	Common Horsetail	R	
Anthriscus sylvestris	Cow Parsley	R	

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

12.3.2 Hedgerows

Part of the Heritage Lottery Fund Project will be to re-invigorate the current Green Lane Trail at Old Moor. The path currently sits between a high scrub covered bank created around 20 years ago, and a ditch, behind which lies a mature hedge which is over 50 years old (see map below). The project here will remove the top of the banking, this will allow views over the Mere by visitors walking along the path and create a more immersive experience. The aim is then to create a return path on the other side of the mature hedge, effectively creating a loop trail.

The only mature hedge on old moor is that which runs parallel to the current Green Lane Trail, sitting between the Mere and Field Pools. This hedge pre-dates the creation of the Old Moor nature reserve making it over 50 years old, likely close to 100 years old. As such, this hedge will not be touched as part of the Green Lane Trail works within the HLF project. To ensure no damage occurs to this mature hedge, whilst taking down the banks on either side, the digger will work from the outside of the bank.

The banks are covered with scrub with the main species being gorse, dog rose, hawthorn and bramble along with some self-set willow and birch (see species lists below from a recent Phase 1 survey). This was planted by Barnsley Council around 1997 when they took over management of the newly created reserve. Because a large proportion of this will be removed, the RSPB will be mitigating by creating a similar gorse rich hedge to benefit displaced breeding birds such as Linnet and Lesser Whitethroat which are the main species to breed in this area.

The only other hedge to be effected by the HLF project is a hawthorn hedge running between the existing and overflow car parks. Again, this hedge was planted by Barnsley Council around 20 years ago, and breeding tree sparrows occupy this area. A mixed native hedge was been planted on the other side of the overflow car park three years ago, so once this reaches maturity should already compensate for what will be lost as part of the car park works.

Species List: Area 3 Green Lane

Scientific Name	Common Name	Frequency
Rosa canina agg.	Dog Rose	F
Centaurea nigra	Knapweed	F
Crataegus monogyna	Hawthorn	F
Betula pubescens	Downy Birch	F
Poa trivialis.	Rough Meadow-grass	F
Poa pratensis	Smooth Meadow-grass	F
Luzula campestris	Field Woodrush	F
Holcus lanatus	Yorkshire-fog	F
Lotus corniculatus	Bird's-foot Trefoil	F
Vicia sativa	Common Vetch	F
Ulex europaeus	Gorse	F
Rubus fruticosus agg.	Bramble	F
Galium aparine	Cleavers	F
Cirsium arvense	Creeping Thistle	F
Urtica dioica	Nettle	F
Poa annua	Annual Meadow-grass	F
Agrostis stolonifera	Creeping Bent	F
Cardamine hirsuta	Hairy Bittercress	F
Sambucus nigra	Elder	F
Rosa arvensis	Field Rose	F

Dactylis glomerata	Cock's-foot	F
Cerastium fontanum	Common Mouse-ear	O
Prunella vulgaris	Selfheal	O
Cirsium vulgare	Spear Thistle	O
Epilobium montanum	Broad-leaved Willowherb	O
Taraxacum officinale agg.	Dandelion	O
Leucanthemum vulgare	Oxeye daisy	O
Solanum dulcamara	Bittersweet	O
Galeopsis tetrahit	Common Hemp-nettle	O
Acer campestre	Field Maple	O
Sambucus nigra	Elder	O
Cytisus scoparius	Broom	O
Tanacetum vulgare	Tansy	O
Anthriscus sylvestris	Cow Parsley	O
Rosa rugosa	Rose species	O
Salix fragilis	Crack Willow	R
Dryopteris filis-mas	Male Fern	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Species List: Area 5 Field Pools Bank

Scientific Name	Common Name	Frequency
Crataegus monogyna	Hawthorn	A
Ulex europaeus	Gorse	A
Hippophae rhamnoides	Sea Buckthorn	F
Rosa canina agg.	Dog Rose	F
Centaurea nigra	Knapweed	F
Lotus corniculatus	Bird's-foot Trefoil	F
Cornus sanguinea	Dogwood	F
Plantago lanceolata	*Ribwort Plantain*	F
Rubus fruticosus agg.	Bramble	F
Poa pratensis	Smooth Meadow-grass	F
Leucanthemum vulgare	Oxeye daisy	F
Holcus lanatus	Yorkshire-fog	F
Poa annua	Annual Meadow-grass	F
Daucus carota	Wild Carrot	O
Cerastium fontanum	Common Mouse-ear	O
Cirsium arvense	Creeping Thistle	O
Equisetum arvense	Common Horsetail	O
Senecio jacobaea	Ragwort	O
Achillea millefolium	Yarrow	O
Vicia sativa	Common Vetch	O
Vicia hirsuta	Hairy Tare	O
Salix cinerea	Grey Willow	O
Prunus spinosa	*Blackthorn*	O

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Green Lane


Digger will work from the outside of the bank to ensure no damage to the mature central hedge
Mature hedge down the centre remains unchanged
Bank and scrub lowered to allow views onto the Mere
Green Lane
Return loop path
Digger will work from the outside of the bank to ensure no damage to the mature central hedge
© Crown Copyright. All rights reserved. RSPB licence: 100021787.
Ordnance Survey data © Crown copyright and database right 2018. Contains OS data © Crown Copyright and database right 2018
Date printed: 31/07/2018

12.3.3 Mammal survey report

Introduction

As part of the Heritage Lottery Fund project "Giving Nature a Home in the Dearne", the sites of RSPB Old Moor and Wombwell Ings will be subject to some large scale habitat works. This work could impact the surrounding environs which the RSPB has worked hard to create and protect, and could impact on some of the species on each of these reserves. This report shows that each of these sites has been surveyed regularly over the last 5 years for mammal species, and highlights the ways in which the RSPB propose to minimise disturbance to any known mammal species on these reserves. The report concludes that during the surveys carried out by the trained warden team, there have been no recent signs of either Otter (*Lutra lutra*), or Badger (*Meles meles*). However, survey work carried out alongside the South Yorkshire Bat Group, has shown that Old Moor nature reserve is used as a foraging and roosting site for several Bat species.

Methodology

Desk Study

There are several historical records for both Otter and Badger within the Dearne Valley reserve network, which show that both species have used this area.

Only two records are present for Otter within the RSPB Dearne Valley reserve network. The most recent was a dead otter which was found on Wombwell Ings in March 2016. This individual was not found freshly dead, it appeared to have been pulled from the river, and showed signs of multiple injuries. The body was sent to Cardiff University for post mortem. The team at Cardiff concluded "Very unusual pattern of injuries, shots to head seem most likely explanation. Possibly mercy killing following a non-fatal road traffic accident. Injuries to ribcage and lungs consistent with road traffic collision." With no roads immediately adjacent to Wombwell Ings, this statement suggests that the animal in question was unlikely to have been on the reserve at the time of death, but most likely was brought downstream by the river and washed up on Wombwell Ings.

Prior to this, the only other record for the area was in 2010 during a Yorkshire Wildlife Trust led training event on mammal surveying when an otter spraint was found alongside the River Dearne. Dave Waddington, one of the Dearne Valley reserve wardens attended this training and has since been observing the river for any further signs (see below Field Surveys).

Table 12-4. Otter at Dearne Valley*

Date	Recorder	Count	Feature	Grid Ref	Comments
21/03/2016	Karen Williams	1	DEARNE VALLEY COMPARTMENT - Wombwell Ings	SE42050345	Dead otter reported by member of public. Site visited by Karen Williams and body retrieved. Appeared to be a young female. Signs of interference but cause of death unclear. May have arrived on site from further upstream. Arrangements made to send body to Cardiff University

18/03/2010	Yorkshire Wildlife Trust	Y	DEARNE VALLEY - WOMBWELL INGS	SE42050358	Otter spraint found alongside River Dearne

*Includes all records from datasets managed by the selected reserve, which are not linked to an off-reserve recording area

There was an Otter sightings list for 2015 passed on to the RSPB by the Environment Agency which showed two records close the Old Moor and Wombwell Ings reserves (see table below).

Table 12-5. Otter Sightings

ID	Location	Grid Ref	Date	Time	Total No	Adults	Dead or alive	Notes
3726	River Dearne, Wath upon Dearne, Rotherham, Yorkshire	SE 43 02	09-Feb-15	22:00:00	1	1	Alive	Gill stripped fish on river bank downstream a few weeks ago. Otter seen last night swimming in off-cut of river into Manvers Lake.
3744	River Dove, near Barnsley, South Yorkshire	SE	22-Feb-15	11:30:00	1	1	Alive	None

Again for badger only two historical records exist. One is for Old Moor, and one for Little Houghton Marsh (another RSPB reserve further upstream on the River Dearne corridor), both in 2003. Again, training was given as part of the aforementioned YWT mammal surveying training event, and since then several members of the team have had subsequent training to survey and monitor Badger.

Table 12-6 Badger at Dearne Valley

Date	Recorder	Count	Feature	Grid Ref	Comments
01/01/2003		Y	RSPB RESERVE COMPARTMENT - Little Houghton		
01/01/2003		Y	DEARNE VALLEY COMPARTMENT - Old Moor		

Includes all records from datasets managed by the selected reserve, which are not linked to an off-reserve recording area

Bats

There are several survey results for bats on RSPB Old Moor prior to 2013. In 2010 a dissertation project was carried out by a student to look at bat species using the reserve using bat detectors. See Apprendix 1 for a list of species and locations. During 2012 a trained member of staff at Old Moor, Benjamin Whitworth, carried out surveys on Old Moor (see Appendix 2 for list of species and locations).

Field Study

Otter

All members of the Warden team are experienced ecologists who spend 7 days a week on the Dearne Valley reserves. Dave Waddington took part in the 2010 Yorkshire Wildlife Trust mammal survey and monitoring training, and since then has regularly checked all of the Dearne Valley RSPB reserves for any signs. He has passed this knowledge on to the other members of the team who also check for signs on a regular basis. More recently, the RSPB interns have undergone training on mammal surveying and monitoring with the Mammal Society and the Wildlife Trusts. An even more concerted effort has gone in to finding any signs of mammal activity over the last 18 months, to ensure that the HLF project would not be disrupting any of these species.

It is known that Otter have used the River Dearne as a spraint was found during the training that took place at Old Moor in 2010. However, since then no further signs have been found. The RSPB, alongside the Dearne Valley Green Heart, installed an Otter holt on the river just off the RSPB Edderthorpe Flash reserve. Cameras were also put up to see if the holt was used. There has been no footage of an otter here or any sign of anything using the holt.

Within the HLF project work area, the river Dearne bank is walked almost daily, usually by Dave Waddington, or another member of staff. There are several spots along the river with muddy banks that clearly show footprints, such as mink, but no otter prints have been seen in these locations. This year in particular the team have paid close attention for any signs of otter along the river, or anywhere across the reserve, but no signs of Otter have been found.

The warden team also have up to 12 remote cameras out across the reserve all through the year. These camera's do pick up mammals such mink and fox, as well as weasels, rabbits and birds. These have all been picked up on the cameras both in the water and over land, during both night and day and take both photographs and video images, so we are confident these camera's would pick up an Otter of there were one on site. No Otter has ever been recorded on one of these cameras.

There are also up to 8 mink traps out across Old Moor. These traps are located in areas that are likely to be used by this species, which would also most likely be the same route for Otter to come out of the river, or to get on to site (see map). There are several along the river Dearne, the reedbeds and along the dikes that feed the site from the river. These traps are checked daily, and are checked for any signs of mink or otter around them.

Badger

As stated above all members of staff, and more recently RSPB interns, are trained to look for mammal signs. There have been no recent badger sightings on Wombwell and none since 2003 on Old Moor, probably due to there being no real habitat for them on either of these reserves. There have been no sign of badgers either such as latrines, runs in any likely places, earthed sets, hair or footprints. There is also a thriving hedgehog population, particularly on Old Moor, which suggests that there are no badgers in the area.

Again, camera traps are put out across the reserve and have not picked up badgers, and any muddy patches are checked by interns for footprints as one of their projects and no badger (or otter) prints have been found.

Each of our satellite sites also have volunteer satellite site wardens who walk the perimeters several times a week. These volunteers are all keen naturalists and report any interesting records of wildlife to us, no sightings or evidence of badger activity have been reported by these volunteers.

One of the satellite sites as mentioned in the desktop study records, Little Houghton Marsh, does have active badger sets just outside the reserve boundary in the banking and these are regularly monitored by the warden staff. These sets are well outside of the HLF project work area however, but does show that the team have in depth knowledge around monitoring this species.

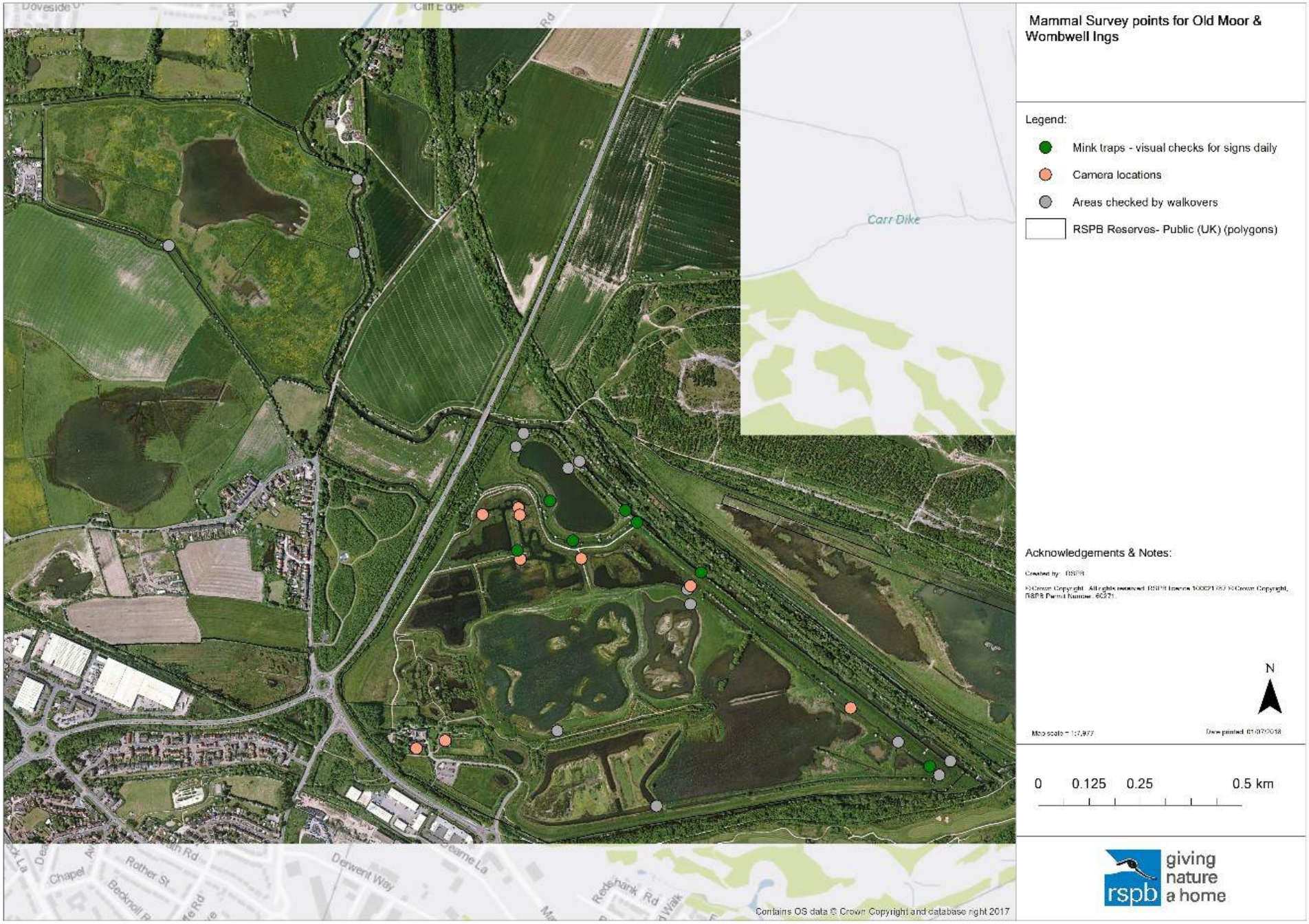


Figure 12-14 Mammal Survey points

Bats

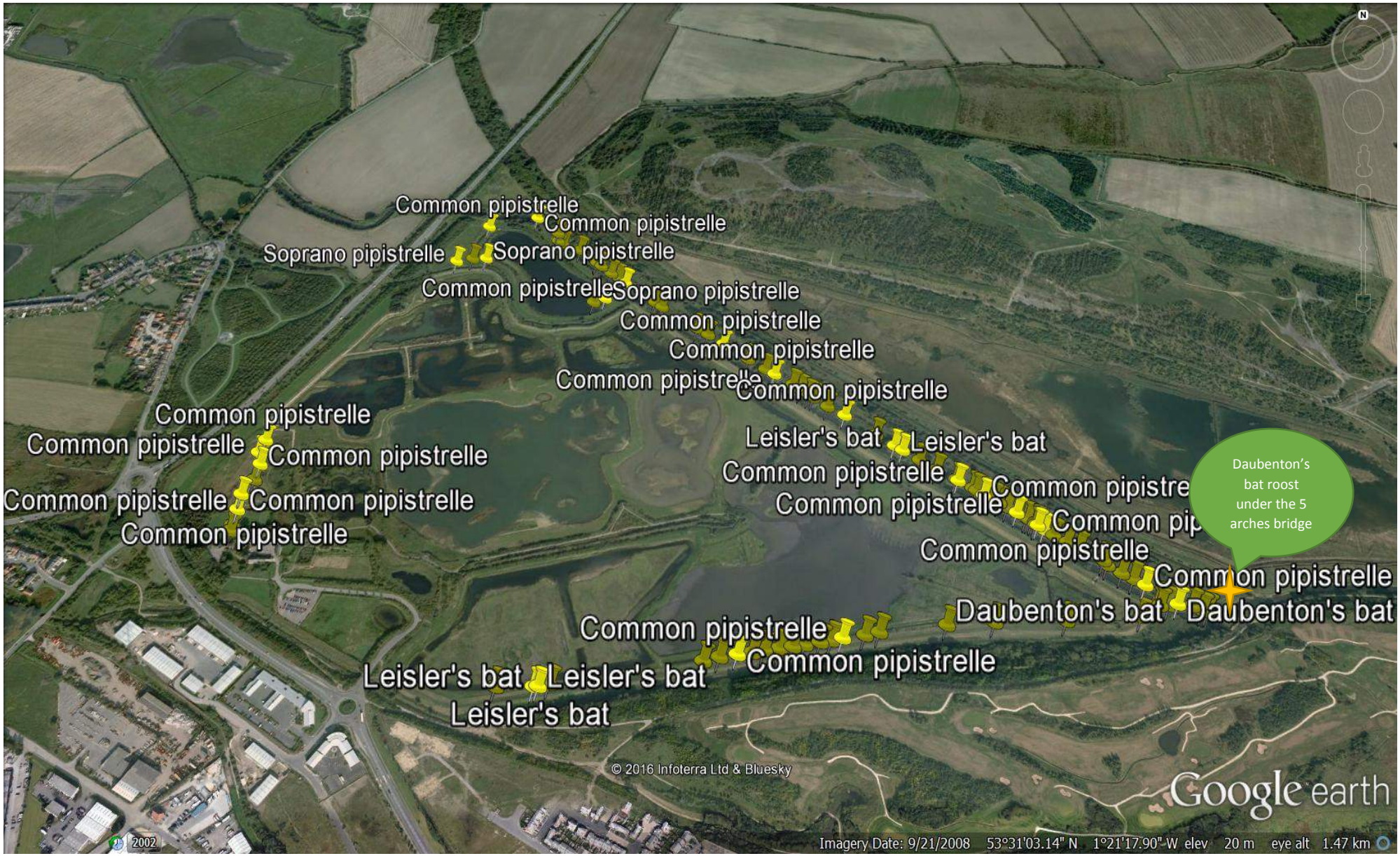
Bats are well documented as using the Old Moor reserve with several surveys being carried out over the last few years by the site team alongside two ecological consultants who were part of South Yorkshire Bat Group. The surveys were mainly carried out to see if the site was being used by Nathusius' Pipistrelle (*Pipistrellus nathusii)*. There were no records of this particular species but other species were recorded either using a bat detector or roosting in boxes put up around Old Moor. The main Visitor Centre building, the roof of the residential volunteer accommodation which forms part of the old Farmhouse, and the Family Hide, were checked for roosting bats but there were none found. There was also no evidence of any bat activity.

See the table below for a list of species recorded and a map of the locations where these bats were recorded.

Table 1: Bat species recorded during 2016 and 2017 by SYBC ecologists.

DATE	SPECIES RECORDED	BAT DETECTOR	BOXES
16.04.2016	Soprano pipistrelle	x	
	Common pipistrelle	x	
	Leisler's bat	x	
	Daubenton's bat	x	
12.06.2016	Soprano pipistrelle	x	x
	Common pipistrelle	x	x
14.12.2016	Soprano pipistrelle		x
	Common pipistrelle		x
17.04.2017	Soprano pipistrelle	x	x
	Common pipistrelle	x	x
	Nyctalus sp. (noctule)	x	
08.07.2017	Soprano pipistrelle		x
	Common pipistrelle		x

All of the bats recorded were either foraging (over water or along hedgerows), or were found roosting in some of the bat boxes which had been put up by the warden team at Old Moor. There are few large trees on the reserves which would provide suitable roosting locations. Several larger trees were checked for roosting bats but none found. Most trees which seemed suitable have had boxes installed, and are checked regularly, and this will continue in the run up and during the work being carried out as part of this project. However, most of these are away from the work areas, the closest boxes to the work areas have not had any bat species using them so far. Historically there is a record of a large Daubenton's Bat roost under the bridge alongside the River Dearne between Old Moor and Bolton Ings (as marked on map 1), known locally as the five arches bridge. Daubenton's bat have been observed using the same site more recently by the Dearne Valley Warden team.


Common pipistrelle
Common pipistrelle
Soprano pipistrelle
Soprano pipistrelle
Common pipistrelle
Soprano pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Leisler's bat
Leisler's bat
Common pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Common pipistrelle
Daubenton's bat
Daubenton's bat
Common pipistrelle
Common pipistrelle
Leisler's bat
Leisler's bat
Leisler's bat
Daubenton's bat roost under the 5 arches bridge
© 2016 Infoterra Ltd & Bluesky
Google earth
2002
Imagery Date: 9/21/2008 53°31'03.14" N 1°21'17.90" W elev 20 m eye alt 1.47 km

Conclusion and Mitigation

Otter

It is clear that Otter do use the River Dearne, though it would appear to be a rare occurrence due to little evidence being found of Otter activity, particularly along the banks of the river. This suggests that Otter do occasionally use the River Dearne corridor, but do not inhabit areas immediately around either Old Moor or Wombwell Ings. The evidence suggests that any Otter on the River Dearne do not come on to either of the reserves, with little activity on the river itself, and no activity or evidence on either of the reserves themselves despite being checked regularly by a variety of methods.

The work proposed by the HLF project will not directly impact the River Dearne, and with no evidence of Otter using the actual reserves, it is concluded that Otter will not be affected by this project.

Badger

Despite historical records, there is no evidence to suggest that badger currently use either Old Moor or Wombwell Ings. There is no suitable habitat on either of these reserves for badgers, and as such there appears to be no activity such as sets, runs, latrines or prints typical of badger behaviour. Alongside this hedgehog surveys on Old Moor suggest a thriving population, also indicative of little or no badger activity in the area.

Bats

Old Moor in particular is a well surveyed site, and bats do use the area to both roost and forage. The assumption is that Wombwell Ings is used by the same bat species to forage, though there is no suitable roosting sites on the reserve.

The work proposed by the HLF project will not take place during the night, and therefore will not directly impact the foraging activities of any bats using the reserves. Roost sites will not be impacted by the work. The Visitor Centre was found not to contain any bat activity, and the bat species which were closest to the buildings were in boxes installed by the RSPB, which are not in the immediate vicinity of the work taking place in this area so will not be affected.

Overall, although some foraging areas may be lost in the project, such as the removal of the gorse hedge along the Green Lane bank, there was more evidence to suggest bats were using the trees along the River Dearne and the meadow to the west of the Visitor Centre for foraging, and these will both be unaffected by the work taking place. However, there will be gorse hedgerows replanted elsewhere as mitigation for the removal of part of the Green Lane hedge. The other main foraging area was over the water, and this habitat will be being improved, and therefore in the long term the work carried out in the HLF project should positively impact the bat species in the area

Appendix 1

August	Date	Saprono Pipistrelle	Common Pipistrelle	Daubentons	Noctule	Recorder
Hedgerows (GR SE423023)	20/08/2010	0	4	0	0	Lianna Stodgen, Kate thorpe
River (GR SE430025)	20/08/2010	0	3	3	0	Lianna Stodgen, Kate thorpe
Reedbeds (GR SE 425 027)	27/08/2010	0	1	1	4	Lianna Stodgen, Kate thorpe
Open water (GR SE425 024)	27/08/2010	1	4	4	2	Lianna Stodgen, Kate thorpe
September			**Common Pipistrelle**	**Daubentons**	**Noctule**	
Hedgerows (GR SE423023)	15/09/2010		5	0	1	Lianna Stodgen, Kate thorpe, Chris Moore
River (GR SE430025)	15/09/2010		5	7	2	Lianna Stodgen, Kate thorpe, Chris Moore
Reedbeds (GR SE 425 027)	16/09/2010		2	0	2	Lianna Stodgen, Chris Moore
Open water (GR SE425 024)	16/09/2010		1	3	2	Lianna Stodgen, Chris Moore
October			**Common Pipistrelle**	**Daubentons**	**Noctule**	
Hedgerows (GR SE423023)	19/10/2010		2	0	0	Lianna Stodgen, Kate thorpe, Chris Moore
River (GR SE430025)	19/10/2010		2	1	0	Lianna Stodgen, Kate thorpe, Chris Moore
Reedbeds (GR SE 425 027)	20/10/2010		0	0	2	Lianna Stodgen, Kate thorpe, Chris Moore
Open water (GR SE425 024)	20/10/2010		2	0	0	Lianna Stodgen, Kate thorpe, Chris Moore
November			**Common Pipistrelle**	**Daubentons**	**Noctule**	
Hedgerows (GR SE423023)	03/11/2010		2	0	0	Lianna Stodgen, Kate thorpe, Chris Moore, mel heyworth
River (GR SE430025)	03/11/2010		2	0	0	Lianna Stodgen, Kate thorpe, Chris Moore, mel heyworth
Reedbeds (GR SE 425 027)	04/11/2010		0	0	1	Lianna Stodgen, Kate thorpe, Chris Moore, mel heyworth
Open water (GR SE425 024)	04/11/2010		2	1	0	Lianna Stodgen, Kate thorpe, Chris Moore, mel heyworth

Appendix 2

Record No	Date of Record	Location	Grid or Post Code	Species	No of Species	Type Activity	Method	Recorded by
1	06/04/2012	RSPB Old Moor (Visitor Centre)	SE 42225 02280	Common Pip	6	Roost Exit	Visual/Bat Detector	Ben Whitworth
2	06/04/2012	RSPB Old Moor (Visitor Car Park/TPT)	SE 42225 02280	Brown Long Eared	1	Foraging	Bat Detector/ Sonagram	Ben Whitworth
3	06/04/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	2	Foraging	Bat Detector/Visual	Ben Whitworth
4	06/04/2012	RSPB Old Moor (Wildlife Ponds)	SE 42225 02280	Daubenton's	4	Foraging	Bat Detector/Visual	Ben Whitworth
5	13/04/2012	RSPB Old Moor (Visitor Centre)	SE 42225 02280	Common Pip	5	Foraging	Bat Detector	Ben Whitworth
6	13/04/2012	RSPB Old Moor (Hide Path > Family Hide)	SE 42225 02280	Sop Pip	2	Foraging	Bat Detector	Ben Whitworth
7	13/04/2012	RSPB Old Moor (Reed Beds/Meadow)	SE 42225 02280	Noctule	2	Foraging	Bat Detector	Ben Whitworth
8	20/04/2012	RSPB Old Moor (Reed Beds/Meadow)	SE 42225 02280	Noctule	1	Foraging	Bat Detector	Ben Whitworth
9	27/04/2012	RSPB Old Moor (Visitor Centre/Hide Path)	SE 42225 02280	Common Pip	6	Foraging	Bat Detector	Ben Whitworth
10	27/04/2012	RSPB Old Moor (Mere)	SE 42225 02280	Daubenton's	5	Foraging	Bat Detector/Visual	Ben Whitworth
11	27/04/2012	RSPB Old Moor (TPT)	SE 42225 02280	Brown Long Eared	1	Foraging	Bat Detector/Visual	Ben Whitworth
				April	35			
12	11/05/2012	RSPB Old Moor (Visitor Centre/Hide Path)	SE 42225 02280	Common Pip	4	Foraging	Bat Detector	Ben Whitworth
13	11/05/2012	RSPB Old Moor (Mere)	SE 42225 02280	Daubenton's	3	Foraging	Bat Detector	Ben Whitworth
14	11/05/2012	RSPB Old Moor (Reed Beds/Meadow)	SE 42225 02280	Noctule	2	Foraging	Bat Detector	Ben Whitworth
15	11/05/2012	RSPB Old Moor (Staff Car Park)	SE 42225 02280	Sop Pip	1	Foraging	Bat Detector	Ben Whitworth

Record No	Date of Record	Location	Grid or Post Code	Species	No of Species	Type Activity	Method	Recorded by
16	19/05/2012	RSPB Old Moor (Visitor Centre)	SE 42225 02280	Common Pip	6	Roost Exit	Visual/Bat Detector	Ben Whitworth
17	30/05/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	2	Foraging	Visual/Bat Detector	Ben Whitworth
				May	18			
18	06/06/2012	RSPB Old Moor (TPT/Visitor Car Park)	SE 42225 02280	Brown Long Eared	1	Foraging	Visual/Bat Detector	Ben Whitworth
19	06/06/2012	RSPB Old Moor (Visitor Centre/Hide Path)	SE 42225 02280	Common Pip	5	Foraging	Bat Detector/Visual	Ben Whitworth
20	06/06/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	2	Foraging	Bat Detector/Visual	Ben Whitworth
21	20/06/2012	RSPB Old Moor (Visitor Centre)	SE 42225 02280	Common Pip	4	Foraging	Bat Detector/Visual	Ben Whitworth
22	29/06/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	1	Foraging	Bat Detector/Visual	Ben Whitworth
23	13/06/2012	RSPB Old Moor (Reed Beds/Meadow)	SE 42225 02280	Noctule	2	Foraging	Visual/Bat Detector	Ben Whitworth
24	13/06/2012	RSPB Old Moor (Visitor Centre)	SE 42225 02280	Common Pip	5	Foraging	Visual/Bat Detector	Ben Whitworth
25	13/06/2012	RSPB Old Moor (TPT/Visitor Car Park)	SE 42225 02280	Brown Long Eared	1	Foraging	Visual/Bat Detector	Ben Whitworth
26	13/06/2012	RSPB Old Moor (Mere)	SE 42225 02280	Daubenton's	4	Foraging	Visual/Bat Detector	Ben Whitworth
27	29/06/2012	RSPB Old Moor (Hide Path > Family Hide)	SE 42225 02280	Common Pip	6	Foraging	Visual/Bat Detector	Ben Whitworth
28	29/06/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	1	Foraging	Visual/Bat Detector	Ben Whitworth
				June	32			
29	04/07/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	2	Foraging	Visual/Bat Detector	Ben Whitworth
30	04/07/2012	RSPB Old Moor (Mere)	SE 42225 02280	Daubenton's	4	Foraging	Visual/Bat Detector	Ben Whitworth

Record No	Date of Record	Location	Grid or Post Code	Species	No of Species	Type Activity	Method	Recorded by
31	04/07/2012	RSPB Old Moor (Visitor Centre/Hide Path)	SE 42225 02280	Common Pip	2	Foraging	Visual/Bat Detector	Ben Whitworth
32	27/07/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	1	Foraging	Visual/Bat Detector	Ben Whitworth
33	27/07/2012	RSPB Old Moor (Visitor Centre/Hide Path)	SE 42225 02280	Common Pip	2	Foraging	Visual/Bat Detector	Ben Whitworth
				July	11			
34	17/08/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	1	Foraging	Visual/Bat Detector	Ben Whitworth
35	17/08/2012	RSPB Old Moor (Visitor Centre/Hide Path)	SE 42225 02280	Common Pip	4	Foraging	Visual/Bat Detector	Ben Whitworth
36	31/08/2012	RSPB Old Moor (Hide Path > Family Hide)	SE 42225 02280	Sop Pip	1	Foraging	Visual/Bat Detector	Ben Whitworth
37	31/08/2012	RSPB Old Moor (TPT/Visitor Car Park)	SE 42225 02280	Brown Long Eared	1	Foraging	Visual/Bat Detector	Ben Whitworth
38	31/08/2012	RSPB Old Moor (Visitor Centre/Hide Path)	SE 42225 02280	Common Pip	4	Foraging	Visual/Bat Detector	Ben Whitworth
39	31/08/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	1	Foraging	Visual/Bat Detector	Ben Whitworth
				August	12			
40	28/09/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	1	Foraging	Visual/Bat Detector	Ben Whitworth
41	28/09/2012	RSPB Old Moor (Visitor Centre/Hide Path)	SE 42225 02280	Common Pip	5	Foraging	Visual/Bat Detector	Ben Whitworth
42	28/09/2012	RSPB Old Moor (Mere)	SE 42225 02280	Daubenton's	6	Foraging	Visual/Bat Detector	Ben Whitworth
				September	12			
43	10/10/2012	RSPB Old Moor (Reed Beds)	SE 42225 02280	Noctule	1	Foraging	Visual/Bat Detector	Ben Whitworth
44	26/10/2012	RSPB Old Moor (Mere)	SE 42225 02280	Daubenton's	4	Foraging	Visual/Bat Detector	Ben Whitworth
				October	5			

Record No	Date of Record	Location	Grid or Post Code	Species	No of Species	Type Activity	Method	Recorded by

Total 125

12.3.4 Old Moor Breeding Bird Survey 2018

Methodology

Survey followed the BTO's Common Bird Census (CBC). Near daily recording visits were made throughout the breeding season (March to end June). Relevant bird activity was noted and used to build a picture of the relevant numbers – either breeding pairs, territories or nests.

Surveyors – Dave Waddington, Heather Bennett and Karen Williams. The surveyors are all RSPB warden staff, experienced in the CBC technique and were supervised by Dave Waddington, who has been recording the birds at Old Moor on a yearly basis for several decades. Staff had relevant licences for schedule one species.

The following summarises the results of the surveys. An illustrative, spatial representation for a selection of species is set out in maps 1-3.

SPECIES	CODE	PAIRS/NESTS /TERRITORIES	TOTAL
Barn owl	BO	3 nests in boxes	3
Bearded tit	BR	1 pair in the reedbeds	1
Bittern	Bi	2 booming males, 3 nests, 12 fledged young	3
Blackbird	B.	20 territories	20
Blackcap	BC	12 territories	12
Black headed gull	BH	2500 pairs	2500
Blue tit	BT	12 territories	12
Bullfinch	BF	8 territories	8
Buzzard	BZ	Display was noted over the site	0
Canada Goose	CG	15 pairs	15
Carrion Crow	C.	3 pairs	3
Cetti's Warbler	CW	2 territories	2
Chaffinch	CH	9 territories	9
Chiffchaff	CC	17 singing males	17
Collared Dove	CD	Present	0
Common Gull	CM	One adult summered	0
Common Tern	CN	2 pairs	2
Coot	CO	30 pairs	30
Dunnock	D.	12 territories	12
Gadwall	GA	56 pairs. 21 broods noted by the end of June	56
Garden Warbler	GW	1 territory	1
Garganey	GY	Male regularly recorded but no evidence of breeding	0
Goldfinch	GO	8 territories	8
Grasshopper Warbler	GH	A poor year with none recorded	0
Great Crested grebe	GC	4 pairs	4
Great Tit	GT	12 pairs	12
Green Woodpecker	G.	1 territory covering the reserve, but nested off site	1
Greenfinch	GR	16 territories	16
Grey Wagtail	GI	1 pair, on the edge of the site at the '5 arches' bridge	1
Greylag Goose	GJ	12 pairs	12
House Martin	HM	Regularly fed over the site, nested elsewhere	0
House Sparrow	HS	Regularly fed over the site, nested elsewhere	0
Jackdaw	JD	Regularly recorded on the reserve, no nesting pairs	0
Jay	J	1 pair	1
Kestrel	K.	1 pair	1

SPECIES	CODE	PAIRS/NESTS /TERRITORIES	TOTAL
Kingfisher	KF	2 pairs nested adjacent to the reserve on the R. Dearne and regularly fed on site	2
Lapwing	L	7 pairs nested on the Field Pools	7
Lesser Black Backed Gull	LB	3 nests on the Mere/Wader Scrape	3
Lesser Whitethroat	LW	3 territories	3
Linnet	LI	8 territories	8
Little Grebe	LG	25 pairs	25
Long-tailed Tit	LT	3 pairs	3
Magpie	MG	3 nests	3
Mallard	MA	At least 19 pairs	19+
Meadow Pipit	MP	1 territory on Field Pools	1
Mediterranean Gull	MU	1 pair bred on the Mere	1
Mistle Thrush	M.	1 pair	1
Moorhen	MH	25 pairs	25
Mute Swan	MS	4 pairs and up to 50 non breeding birds	4
Oystercatcher	OC	3 pairs	3
Pheasant	PH	Present but not recorded in detail	0
Pied Wagtail	PW	No territories on the reserve but birds fed on site	0
Pochard	P	12 pairs produced 8 broods	12
Redshank	RK	3 pairs nested on the Field Pools	3
Reed Bunting	RB	At least 35 territories	35+
Reed Warbler	RW	At least 80 territories in the reedbeds	80+
Robin	R.	15 territories	15
Sand Martin	SM	7 pairs bred in the artificial bank (18 in 2017)	7
Sedge Warbler	SW	14 territories	14
Shelduck	SU	3 pairs	3
Shoveler	SV	6 pairs	6
Skylark	S.	1 territory	1
Snipe	SN	2 drumming birds	2
Song Thrush	ST	6 territories	6
Sparrowhawk	SH	1 pair	1
Starling	SG	Fed on site but no breeding territories	0
Stock Dove	SD	6 pairs, all in nest boxes	6
Swallow	SL	Birds regularly recorded feeding over the site	0
Swift	SI	Birds regularly recorded feeding over the site	0
Tawny Owl	TO	1 pair	1
Teal	T.	Present but no evidence of breeding	0
Tree Sparrow	TS	8 pairs	8
Tufted Duck	TU	25 pairs	25
Water Rail	WA	15-20 territories, hard to census in deep reed	20
Whitethroat	WH	6 territories	6
Willow Tit	WT	No pairs bred this year with no records between 18th March and 15th June.	0
Willow Warbler	WW	15 territories	15
Wood Pigeon	WP	Present throughout	-
Wren	WR	Present in good numbers but not specifically mapped	-
Yellow Wagtail	YW	Recorded but no territories	0
Yellowhammer	Y.	Overwintering birds present into the Spring but no evidence of breeding	0

Discussion

Several species would be affected by the work on green lane. This habitat is important for Linnet, Lesser Whitethroat, Dunnock and wintering Willow Tit.

Breeding birds within 50 metres of Green Lane path in associated habitat

GARDEN WARBLER	1 PAIR
Lesser Whitethroat	2 pairs
Whitethroat	2 pairs
Blackcap	4 pairs
Sedge Warbler	3 pairs
Reed warbler	6 pairs
Willow warbler	7 pairs
Chiffchaff	5 pairs
Song thrush	2 pairs
Dunnock	8 pairs
Robin	6 pairs
Linnet	7 pairs
Goldfinch	2 pairs
Bullfinch	3 pairs
Total	**58 pairs**

Work on the Mere, Field Pools and Wader Scrape will not impact upon any of the species and should lead to increases in the number of breeding birds, especially waders, gulls and terns.

12.3.5 Fish Report

Old Moor contains a healthy fish population that has been regularly surveyed via electrofishing. The adjacent River Dearne is also frequently surveyed by the Environment Agency.

In the early years, after the site's creation, no fish were introduced and populations were left to establish on their own. Up to 2007, the fish population was low but extensive flooding from the Dearne and Bulling Dyke in that year introduced a number of large carp (*Cyprinidae* sp.) into the wetland system. These dominated the fish assemblage and an electrofishing survey in 2009 revealed a fish biomass per hectare of just 1.5kg.

From 2011 onwards a programme of removal of the large carp and introduction of smaller fish, more suited to the habitat (and to aid the establishment of Bittern as a breeding species) was undertaken. At the same time, a project was undertaken to re-establish European Eel (*Anguilla anguilla*) on the River Don complex and around 90,0000 elvers were introduced into Old Moor and neighbouring reserves.

The fish population is now healthy and 15 species have been recorded.

Common Bream, *Abramis brama*
European Eel, *A. anguilla*
Crucian Carp, *Carassius carassius*
Common Carp, *Cyprinus carpio*
Pike, *Esox Lucius*
Three-spined Stickleback, *Gasterosteus aculeatus*
Nine-spined Stickleback, *Pungitius pungitius*
Dace, *Leuciscus leuciscus*
Perch, Perca fluviatilis
Minnow, Phoxinus phoxinus
Roach, *Rutilus rutilus*
Rudd, *Scardinius erythrophthalmus*
Chub, *Squalius cephalus*
Tench, Tinca tinca

The most recent transect surveys by ecology staff from RSPB Headquarters in October 2015 revealed the following general fish abundance (and a biomass of 14kg per hectare):

SPECIES	COUNT	TOTAL WEIGHT (G)	BIOMASS (KG/HA)
3-spined Stickleback	1	1	0.01
Common Carp	1	11	0.13
European Eel	7	625	7.27
Perch	1	8	0.09
Roach	10	162	1.88
Rudd	14	167	1.94
Tench	9	242	2.81
Total	**43**	**1216**	**14.14**

This species mix is representative of the whole site. Fish densities are at their highest in the reedbed cells (areas not affected by the proposed work) but are still significant in the Mere and Field Pools. The wader scrape has a more significant seasonal drawdown and smaller outer ditch and therefore is

more prone to fish predation in the later summer. The fish population is therefore less dense here but the species mix is still present.

12.3.6 Other Mammal Species

27 species of mammal have been recorded on the Dearne Valley reserves.

Wood Mouse
European Water Vole
Roe Deer
Hedgehog
Brown Hare
Otter
Badger
Harvest Mouse
Field Vole
Stoat
Weasel
Bank Vole
Daubenton's Bat
Water Shrew
American Mink
Leisler's Bat
Noctule Bat
European Rabbit
Common Pipistrelle
Soprano Pipistrelle
Brown Long-eared Bat
Brown Rat
Grey Squirrel
Common Shrew
Pygmy Shrew
Mole
Red Fox

Other than those specifically covered earlier, the others of note would be Harvest Mouse and Water Shrew.

Harvest Mouse

There are two historic records from Old Moor. There are no records from Wombwell Ings and the site is not considered to be suitable for this species.

Table 12-7. Harvest Mouse records

DATE	RECORDER	COUNT	FEATURE	GRID REF	COMMENTS
2005		Present	DEARNE VALLEY - Old Moor		
23/09/2012	Steve Rutherford	1	DEARNE VALLEY - Old Moor	SE4202	In mammal trap

In 2014/15 the Dearne Valley Green Heart Nature Improvement Area commissioned a survey by Sheffield City Council Ecology Unit of several sites in the Barnsley area, including RSPB Old Moor. The site was surveyed on 27 January 2015 by Liz Harding, Richard Harris, Michael Senkins and Chris Smith from the Ecology Unit.

Several suitable areas were searched including the whole of the Green Lane area. However, no nests were found here, despite there being suitable *Phalaris* grass habitat. Despite this, the survey did note two potential nest sites in this area.

The far end of Wath Ings contains suitable habitat and this was where all of the records were concentrated – in areas dominated by *Phalaris* with structural support from the occasional bramble patch.

Table 12-8. Harvest Mouse Presence (27/01/18)

Grid Reference	Notes
SE4303702498	**1** nest in *Phalaris* growing adjacent common reed, at the water's edge.
SE4307602469	**1** nest, in *Phalaris.*
SE4305002486	**1** nest, in *Phalaris* and common reed.
SE4308402463	**1** nest, in *Phalaris*
SE4312902398	**2** nests, in *Phalaris.*
SE4317102352	**4** nests, in *Phalaris* and bramble.
SE4319902365	**4** nests, in *Phalaris* and bramble.

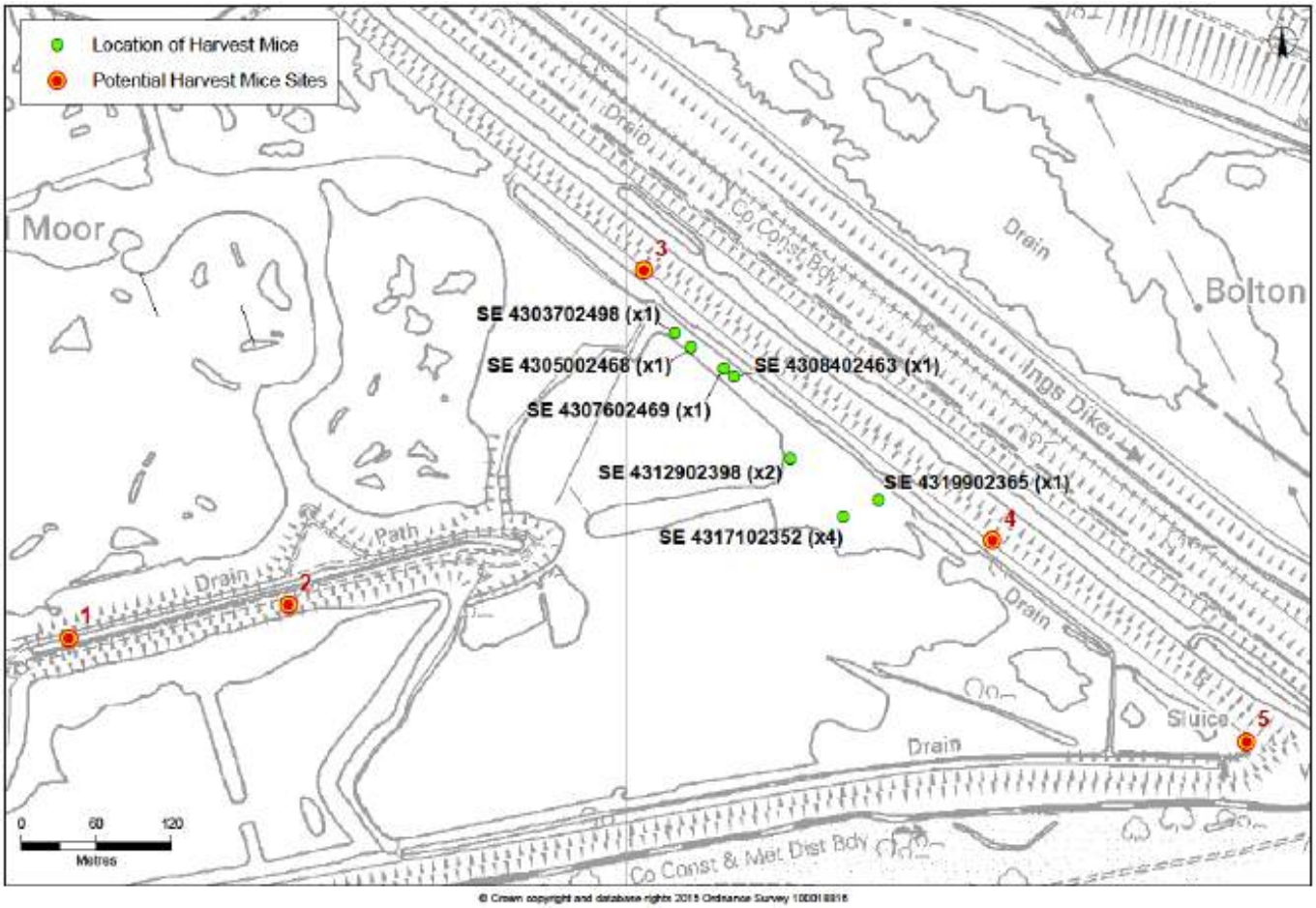


Figure 12-15 Harvest mouse plan

The survey indicates that whilst there is suitable habitat in the Green Lane area, the main population is present at the far end of Wath Ings – an area that will not be affected by the proposed work.

Water Shrew

Water shrews are generally solitary, each maintaining its own territory, although they frequently live in close proximity to each other in burrows in a favoured area of stream-bank. There are no records from Wombwell Ings and six records from Old Moor. No specific surveying has been done for this species although it is possible that the species could be picked up during other mammal surveying, especially through the use of camera traps.

Table 12-9. Water Shrew Records

DATE	RECORDER	COUNT	FEATURE	COMMENTS
01/01/2003		Present	Old Moor	
12/05/2006	Jason Middleton	Individual	Old Moor - Green Lane Ditch	swam across ditch
18/09/2012	Member of Public	Individual	Old Moor - Wildlife Ponds Area	swan across pond
03/04/2013	Matthew Capper	Individual	Old Moor - Wildlife Ponds	
27/08/2017	Sightings Book	Individual	Old Moor - Near Wader Scrape	
03/05/2017	Sightings Book	Individual	Old Moor - Wildlife Ponds	

Most of the records are centred on the wildlife ponds but there are single records from Green Lane and near to the Wader Scrape (which could also be Green Lane), both areas that will be affected by the proposed work.

12.3.7 Water Voles at Old Moor and Wombwell Ings

Water voles are actively monitored across the RSPB reserves in the Dearne Valley and also recorded whilst we are surveying for mink with footprint rafts and trail cameras. Ditches are also closely monitored during dragonfly surveys and evidence of water vole noted. In addition to this the reserves have a high number of visitors and and we receive anecdotal reports from them.

Methodology since 2009

Rafts are made using polystyrene screwed between two pieces of plywood then numbered.

Rafts are put out in focussed areas decided by the team, each year the Wildlife Pond and Green Lane are surveyed, sometimes reedbeds if possible and we focus on one or two satellite sites to gather a broad overview of water vole distribution.

At each site, rafts are placed at 40-50m intervals along the edge of the water and their locations recorded on a map or with GPS. They are baited with three small pieces of apple and then, later in the week, checked for signs of water vole activity.

Rafts are checked twice a week, for up to four weeks. On each visit to the rafts, fresh apple is provided and any old pieces removed; evidence of feeding (when there was chewed apple, or no apple left on the raft or nearby,) droppings and latrines were recorded.

On the final day of recording, a more intense search of the area is conducted for further field signs, such as, feeding plant remains, food piles, burrows, tracks, and runways. This is not always possible due to accessibility issues and time constraints. On the final day, notes are also taken on the habitat at each raft position. The weather, and changes to water levels were also noted over the course of the survey.

This survey is part of the recording that our interns do each year, after initial training and help with raft placement they continue with the bulk of the surveying. This can mean that data is better in some years than others but the overall trend is what I would expect to find.

Other Evidence

We have included sightings from the reserve team in these results and have tried to follow these up with a baited raft survey, however it seems sightings are often animals feeding or dispersing rather than an indication of a breeding territory.

Remote cameras are in use over much of the reserve and occupy a range of positions throughout the year. These cameras often pick up bank vole, field mouse, water shrew and other small mammals so it can be assumed they would record any water vole in the area.

We have a number of clay footprint rafts in use across the valley, these are floating tunnels with a wet clay base. These are used primarily in areas where cameras would not be practical and have recorded a range of mammal including water voles. These tunnels are checked weekly and the clay refreshed.

Satellite Sites

In recent years this method of water vole surveying has been rolled out to other sites in the Dearne Valley, particularly Gypsy Marsh, Adwick Washlands and Edderthorpe Flash

Results

Raft evidence is used as a starting point for a more in depth survey, so that some areas are surveyed more in depth, often with the use of trail cameras to confirm the presence of water vole.

Example survey sheet attached

Old Moor – organised surveys have been carried out since 2009 between May and October. Surveys have focussed on Green Lane ditch, the Wildlife Ponds area, the pond behind family hide Wath Ings ditch ("swimming pool dyke")

Results summary

2009 – Two confirmed territories in pond behind family hide

2010 – No Evidence of water voles in the ditch on Green Lane, at least three territories identified in the Wildlife Ponds.

2011 – One territory in Reedbed pond behind family hide, and two confirmed territories in wildlife pond areas. Mink print found near rafts in many areas.

2012 – No territories confirmed

2013 – No territories confirmed

2014 – No evidence of water voles in Green Lane ditch, one territory in swimming pool dyke and 2+ territories in the Wildlife Ponds. Confirmed sighting of water vole swimming in mere. Evidence of mink in all areas surveyed.

2015 – Water voles picked up by remote cameras in reedbeds, evidence of water vole found in wildlife ponds. No signs of activity recorded in Green lane ditch.

2016 –No evidence of water vole found during survey. Confirmed sighting by DMW Green Lane ditch. Evidence of mink in all areas surveyed. Mink present on river banks, Bulling Dyke, reedbeds and Wath Ings ditch.

2017 – Evidence of water vole found in reedbeds in September, no confirmed water vole territories found on site. Mink present on river banks, in reedbeds and in Wath Ings ditch.

2018 – No evidence of water vole found in Green Lane ditch, or Wath Ings ditch. Good evidence of one territory in Wildlife Ponds area, reedbeds not surveyed.

Wombwell Ings was surveyed in 2010, 2014, 2017 & 2018. Each year between six and eight visits to site were made and the raft methodology outlined above was used.

Results summary –

2010 there was some evidence of water vole activity in Bulling Dyke and on the Northern edge of the corner pond (signs of feeding amongst the phragmites).

2014 no confirmed evidence of water vole, signs of mink in Bulling Dyke juncus getting thick at the Northern edge of the corner pond. Some rafts went missing during survey period.

2017 no evidence of water vole, mink present in Bulling Dyke and River Dearne and elsewhere on site. Little evidence of any small mammals. Runs (probably made by dogs in phragmites)

2018 – no evidence of water vole, signs of mink in Bulling Dyke and River Dearne. No evidence of any small mammals. Some rafts went missing during survey.

Survey Limitations

Reedbeds are under surveyed due to disturbance that would be caused to schedule one breeding birds. Any surveying of the reedbed is done from late July onwards and this is not believed to be the

best time to record water vole as many of the young have dispersed or been predated. Wombwell Ings tricky to survey due to ‘interference’ with rafts.

Summary

Signs of water voles are steadily decreasing in all areas of the reserve, this coupled with an increase in mink numbers (now being controlled at Old Moor) and the increasing density of ditch vegetation creating a predator shadow paint a bleak picture. The site with the highest levels of water voles is Adwick Washland which has a significantly shorter spring and summer sward and many of the ditches have a more gentle gradient.



Figure 12-16. Old Moor water vole Raft Locations

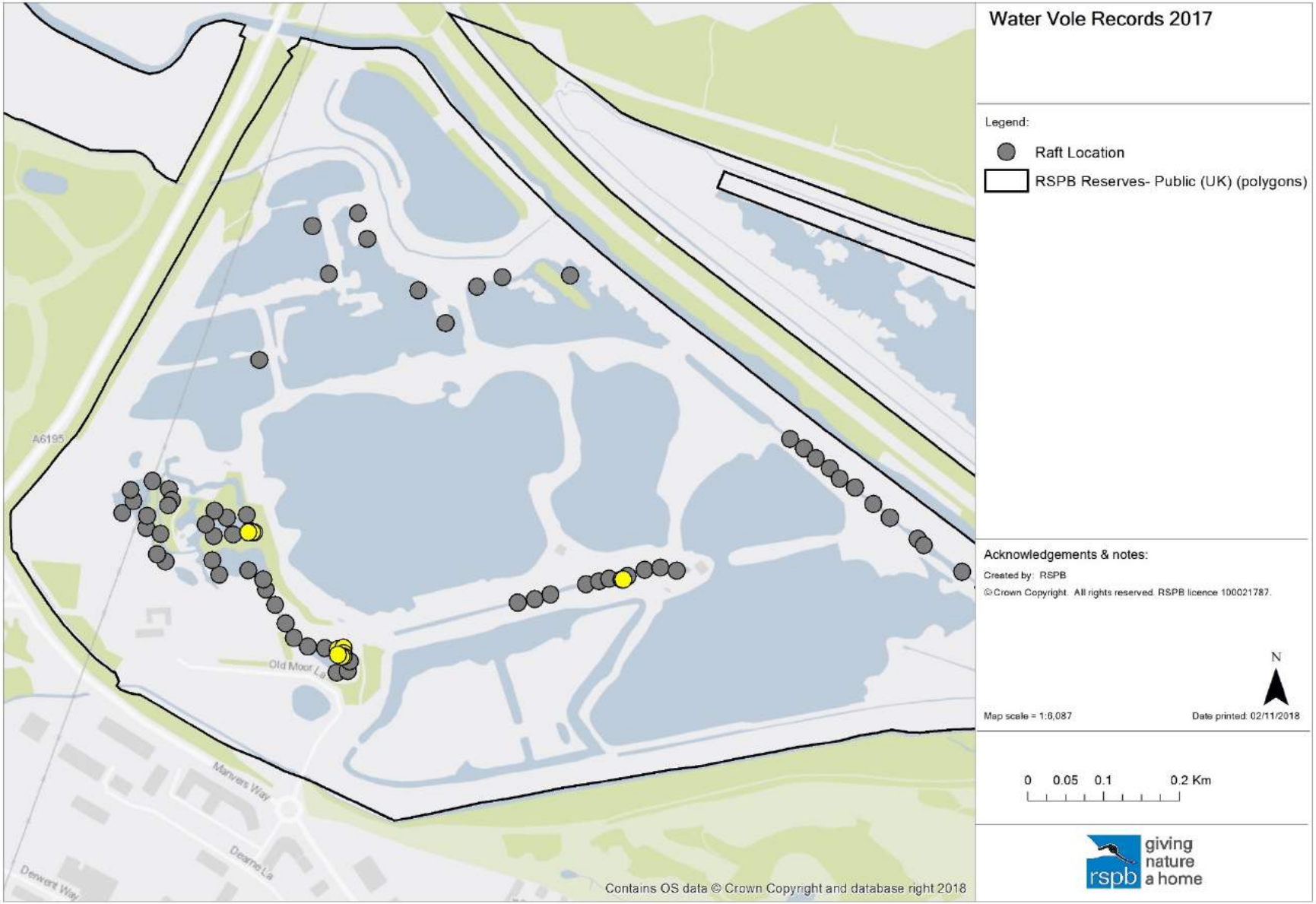


Figure 12-17. Water Vole Records 2017

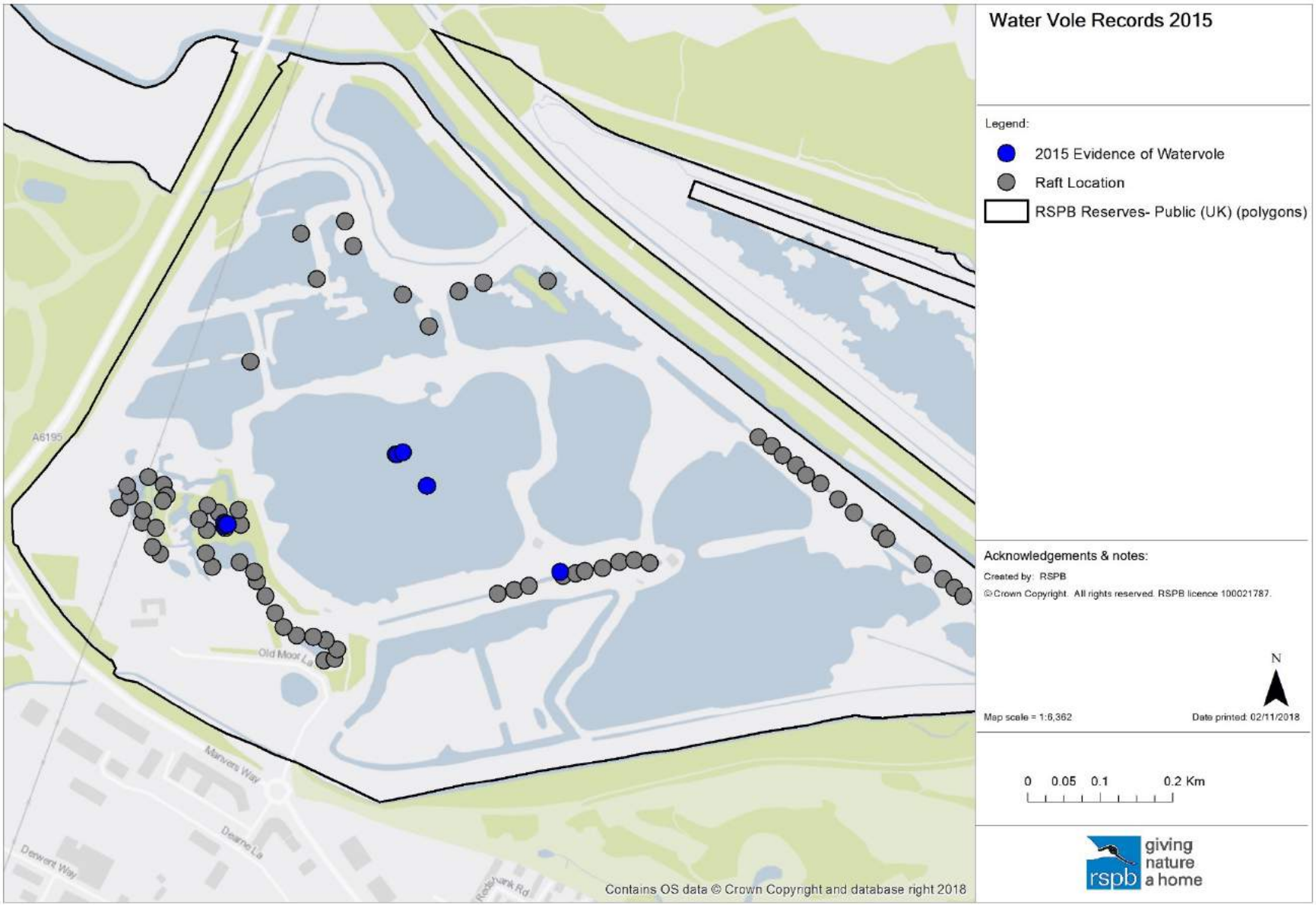


Figure 12-18. Water Vole Records 2015

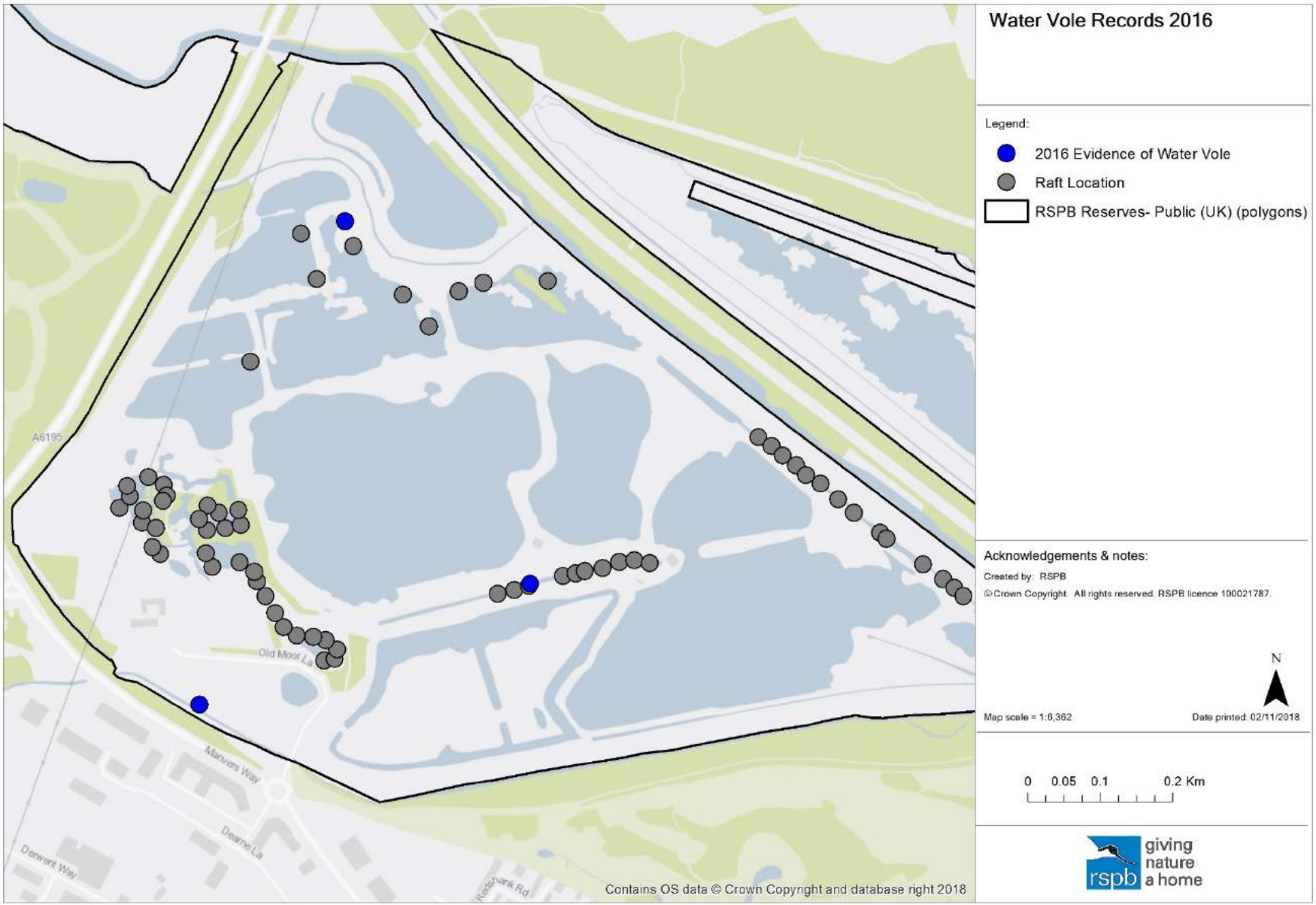


Figure 12-19. Water Vole Records 2016



Figure 12-20. Water Vole Records 2017

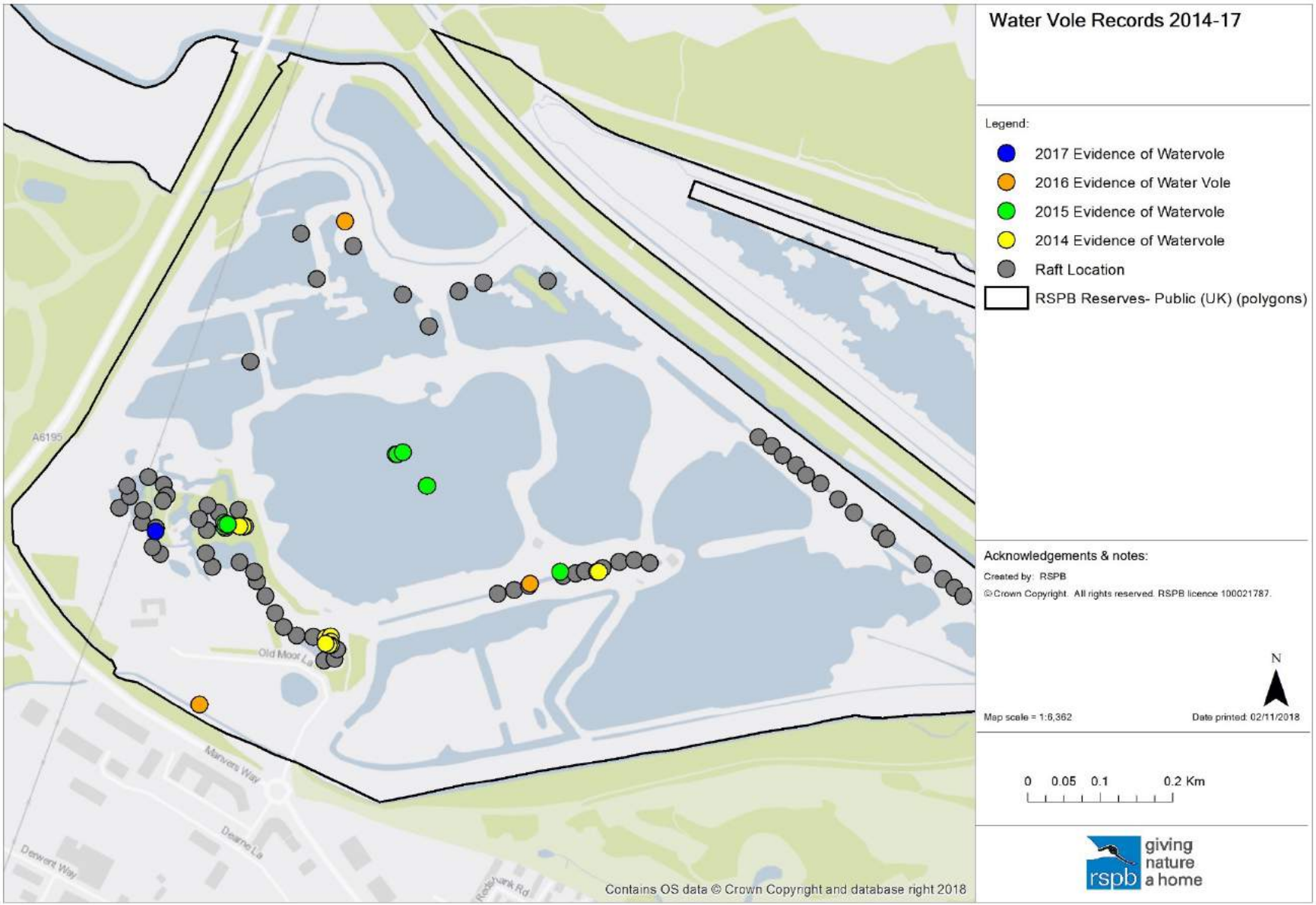


Figure 12-21. Water Vole Records 2014 -17



Figure 12-22. Raft Location Wombwell Ings

12.3.8 Middleton Bell Ecology - Earth works and removal of scrub at Old Moor Letter 2018

Middleton Bell Ecology
33 Wilthorpe Road
Barnsley
S75 1JA

Tel 01226 286282
Mobile 07774 845266
peter@middletonbellecology.co.uk
www.middletonbellecology.co.uk

11th October 2018

Dave Waddington
RSPB Old Moor Warden

Dear Dave

Earth works and removal of scrub at Old Moor

An assessment of the likely impacts on foraging bats resulting from the proposed removal of scrub at Old Moor Wetlands Nature Reserve was commissioned by RSPB Warden David Waddington on the 15th September 2018 at the request of Barnsley Metropolitan Borough Council (BMBC).

A walkover survey of the site was not undertaken as the prior knowledge of the site by Peter Middleton MCIEEM was considered sufficient to inform this letter report.

The RSPB propose to undertake earth works to the existing earth bunds bordering The Mere and The Field Pool that will result in the removal of areas of scrub. These scrub covered earth bunds run parallel with a footpath, an ancient hedgerow and a drain (see Figure 1). The bunds were planted with a variety of species by BMBC at the inception of the nature reserve in the 1990s, none of which are of local provenance, species present include gorse *Ulex europaeus*, broom *Cytisus scoparius*, hawthorn *Crataegus monogyna*, sea buckthorn *Elaeagnus rhamnoides* and dwarf willow *Salix heraccea*.

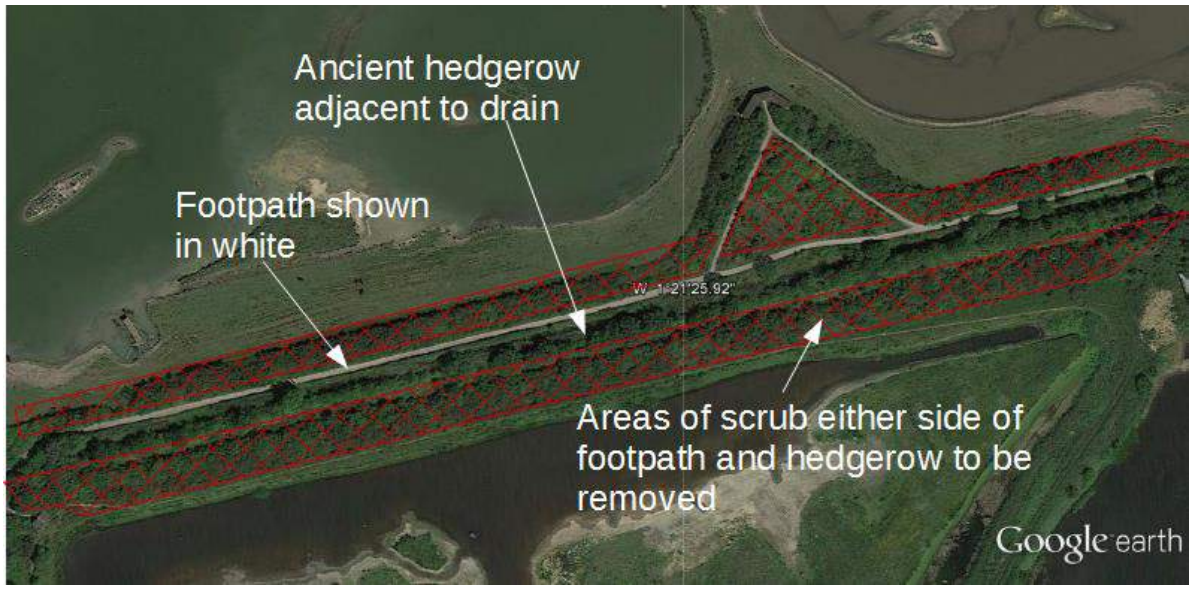
South Yorkshire Bat Group have in the past deployed static bat detectors at various locations on the reserve. The results of these static surveys showed that most, if not all of the locally occurring bat species are found foraging on site, however, visual inspections of buildings and site bat boxes have recorded only relatively low numbers of pipistrelle bats roosting on site.

The main features that are likely to attract foraging bats to this area of the reserve are considered to be the drain and ancient hedgerow, with the adjacent scrub increasing the foraging resource in this area. Following scrub removal, the integrity of this linear feature will be maintained through retention of the drain and

hedgerow. Consequently it is highly likely this linear feature will remain a foraging and commuting route through the site for bats. This area of the site is dark and will remain so following the scrub removal. Consequently the scrub is not required in this area in order to provide a dark corridor for bats.

It is considered that impacts associated with the scheme is highly unlikely to result in impacts to bats of importance at greater than the site level. In addition, the proposed earth works will include the creation of a second ditch/drain between the path and a lower height earth bund bordering The Mere. The new ditch/drain further enhances the foraging habitat for bats on site.

Figure 1. Areas of scrub to be removed, as indicated by red hatching



Yours Sincerely

Peter Middleton MCIEEM

Giving Nature a Home in the Dearne

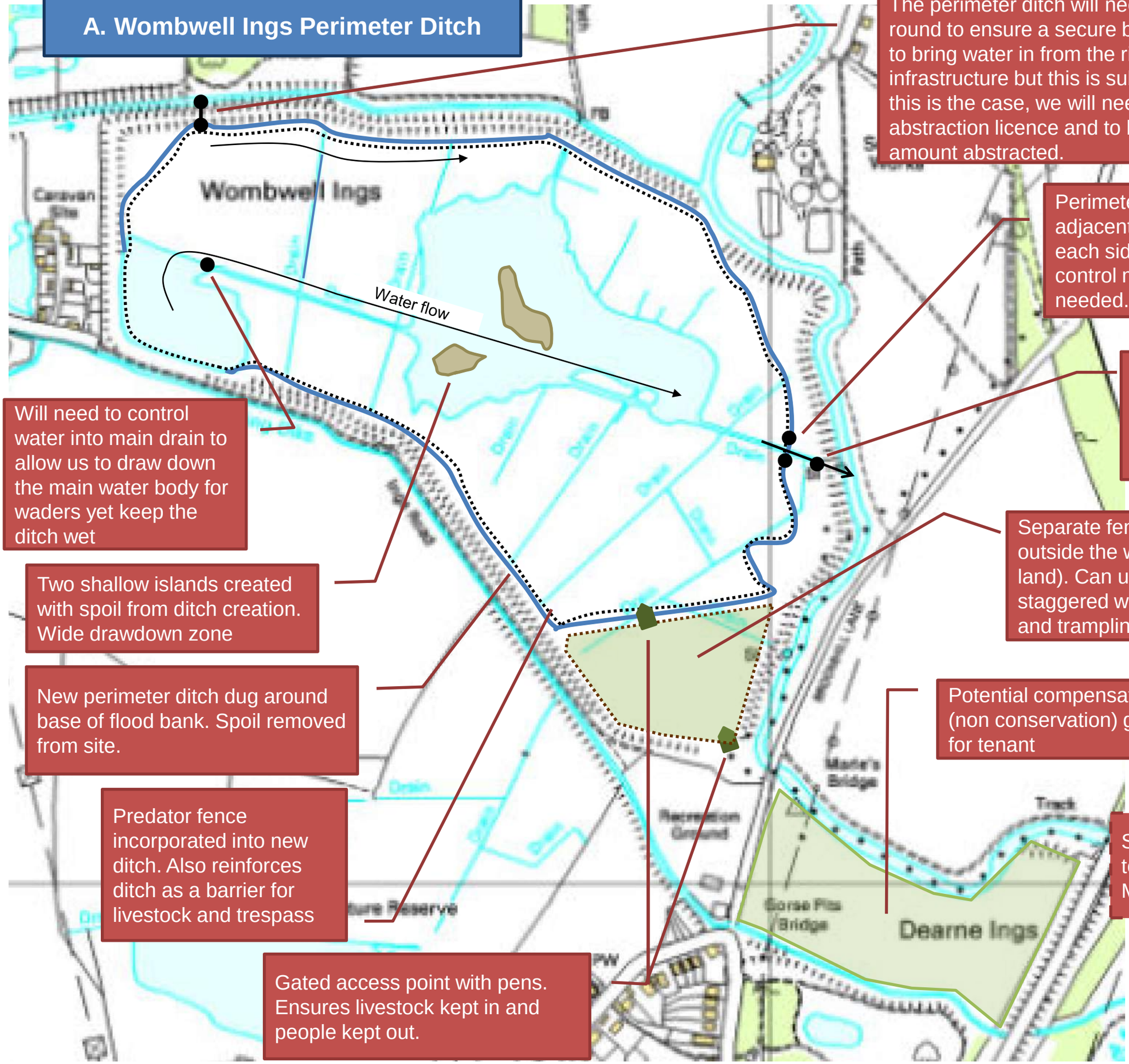
Habitat Works at RSPB Old Moor and Wombwell Ings

Brief for the appointment of a design consultant

Associated Slides

These are provided purely for illustration to inform the designs and allow the contractor to see the outcomes the RSPB hopes to achieve. It is for the contractor to create and indemnify the final designs

A. Wombwell Ings Perimeter Ditch



The perimeter ditch will need to be kept wet year round to ensure a secure barrier. One option may be to bring water in from the river Dove with associated infrastructure but this is subject to confirmation. If this is the case, we will need to obtain an abstraction licence and to be able to measure the amount abstracted.

Perimeter ditch will stop adjacent to the main drain on each side. Some sort of control mechanism may be needed.

Water can circulate around the site and the main sluice returns water to the Dearne.

Will need to control water into main drain to allow us to draw down the main water body for waders yet keep the ditch wet

Two shallow islands created with spoil from ditch creation. Wide drawdown zone

New perimeter ditch dug around base of flood bank. Spoil removed from site.

Predator fence incorporated into new ditch. Also reinforces ditch as a barrier for livestock and trespass

Gated access point with pens. Ensures livestock kept in and people kept out.

Separate fenced grazing cell above outside the wet ditch (due to height of land). Can use this to put horses on in a staggered way to manage spring sward and trampling of nests better.

Potential compensation (non conservation) grazing for tenant

Spoil from project moved to the reservoir on Old Moor

Old Moor Work Programme locations



Key:

B Reedbed on the Mere

C New wader habitat on the Mere

D Pool and Sand Martin Bank on Green Lane

E Improved Water Control on Wader Scrape

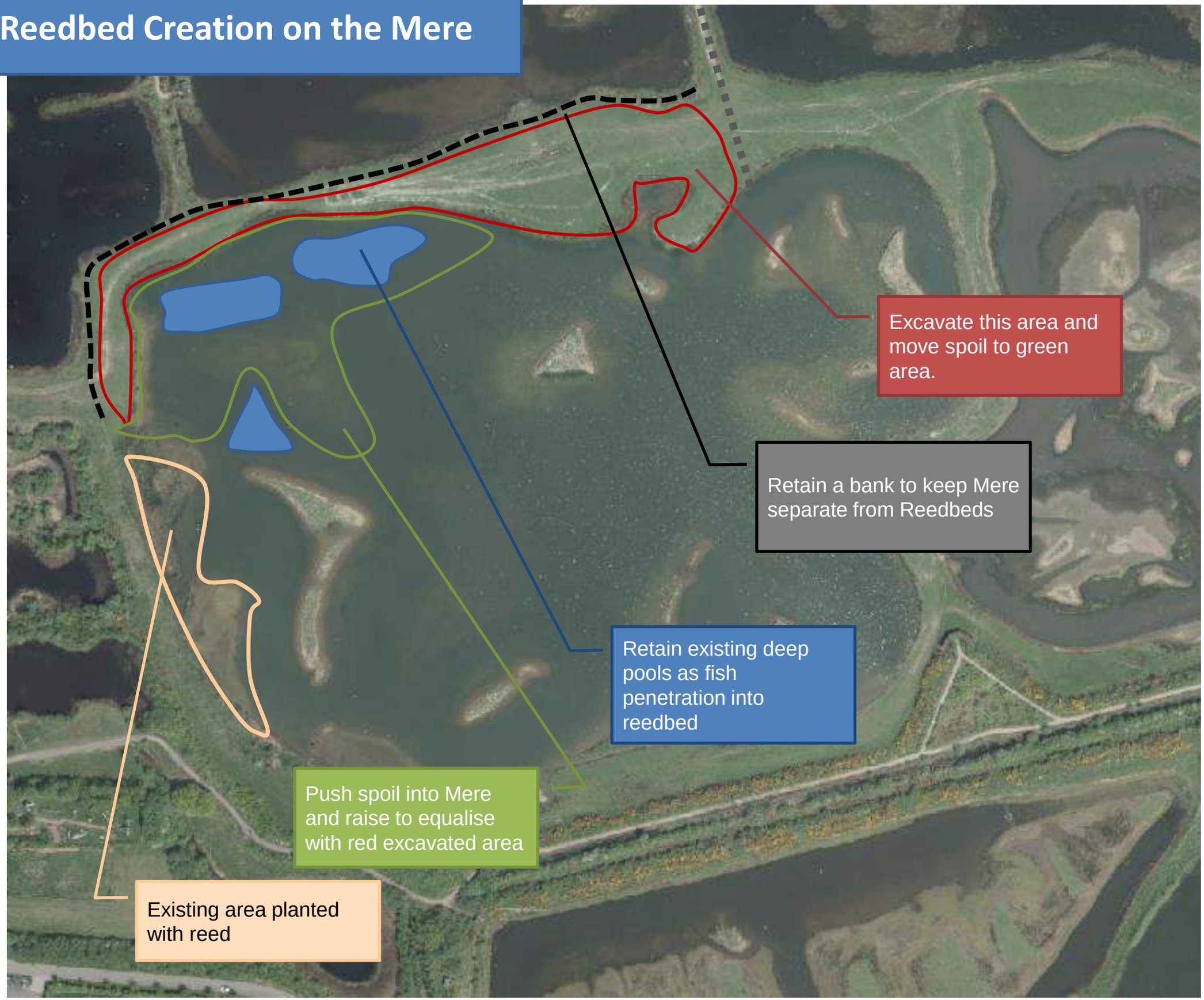
F Re-profiling Wader Scrape

G Re-profiling Field Pools

H Willow Pool Heronry

I Green Lane Circular Walk

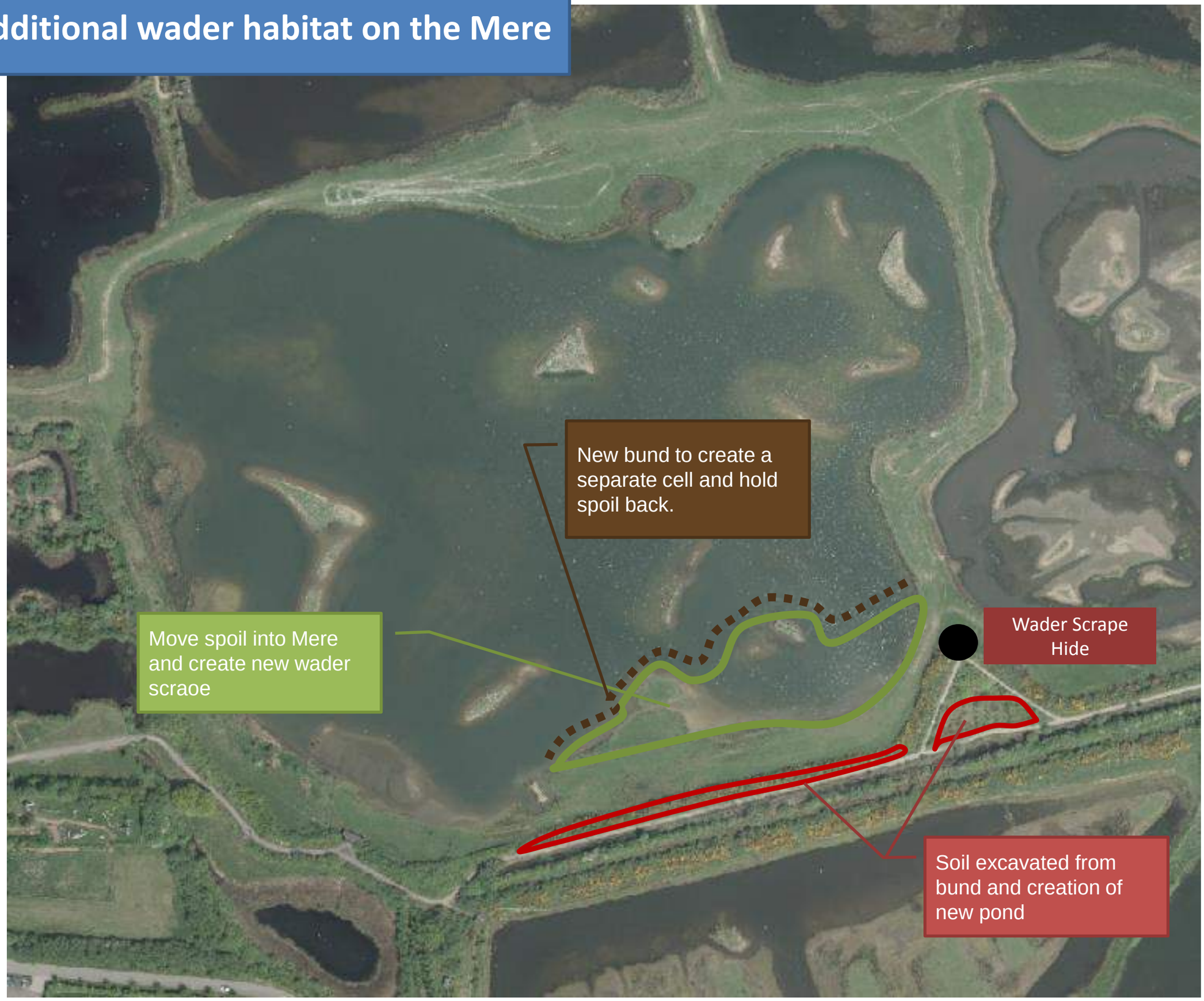
B. Reedbed Creation on the Mere



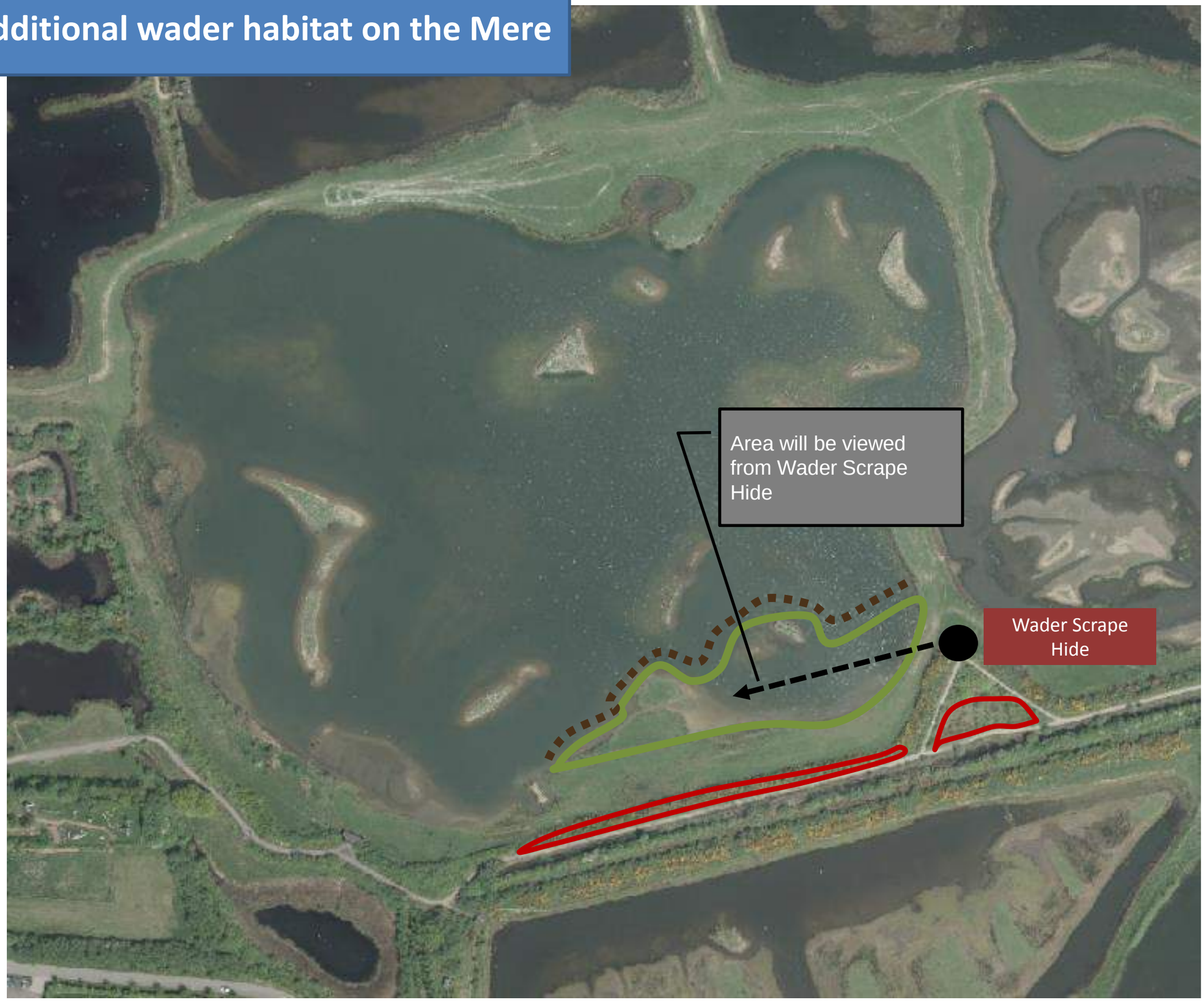
B. Reedbed Creation on the Mere



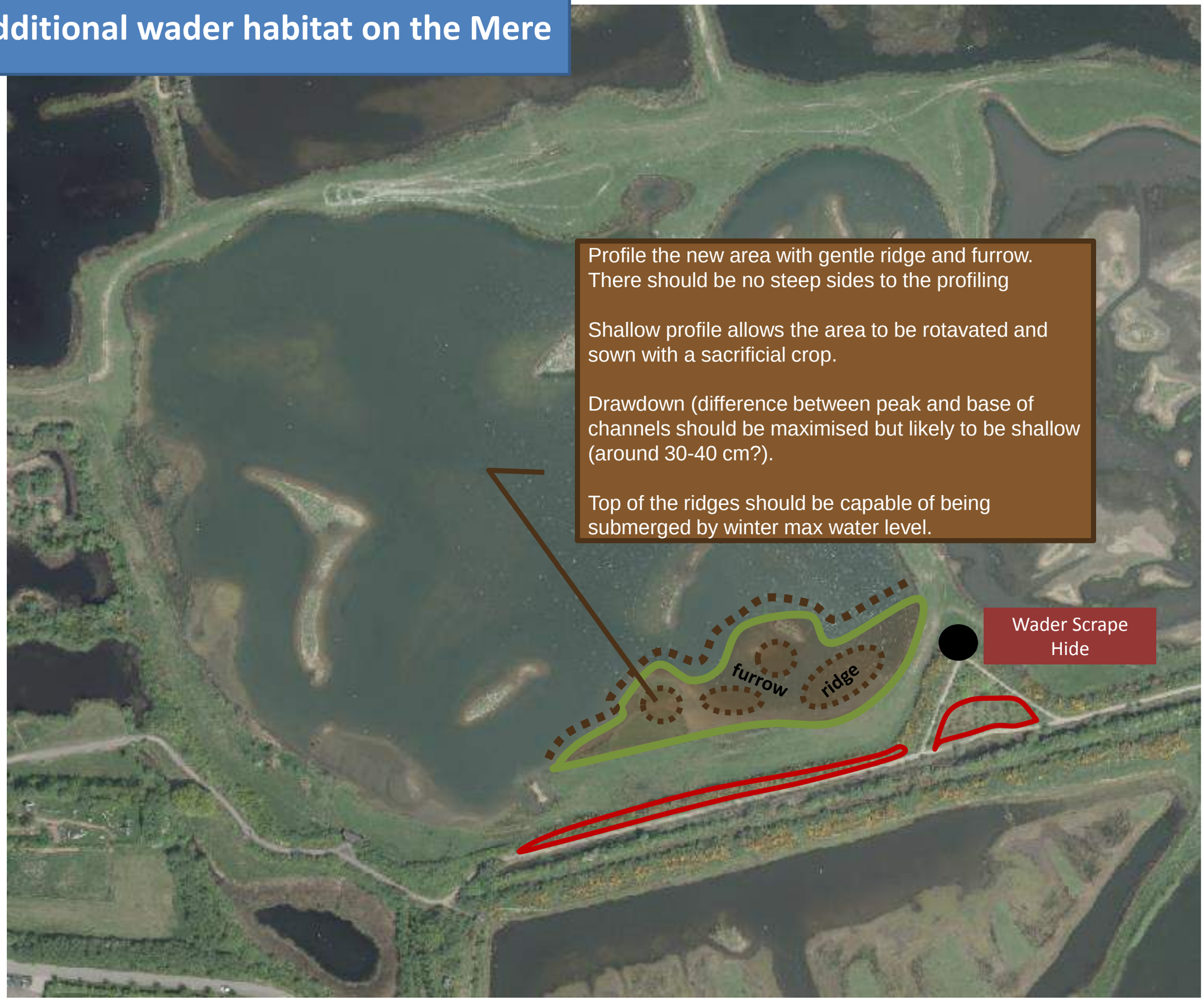
C. Additional wader habitat on the Mere



C. Additional wader habitat on the Mere



C. Additional wader habitat on the Mere



D. Pond on Green Lane

Will need to excavate down to the level of Green Lane ditch so that the pond becomes an extension from the ditch.

Ditch should therefore be quite deep and this will ensure it does not have reeds encroach all the way across. If possible, sides should be relatively steep also to allow people to peer into the edge.

Path along southern edge will be completely removed.

Excavate this area.

Green Lane Ditch

D. Pond on Green Lane



E. Improved water control for Wader Scrape

1. Water can be brought into the Mere direct from the gravity feed from the R. Dearne.

2. However, water levels on Wader Scrape can only be managed by bringing water in via the Mere. This is cumbersome, has a time lag and means the Mere is affected every time we add water to the Wader Scrape.

3. There are two pipes, one with penstock connecting the Mere that can be controlled to let water in to Wader Scrape. However, they are in the middle of the site and therefore time consuming to operate and cause disturbance to visitors and birds every time we operate them.

Dearne Ings
Old Moor
River Dearne
Drain
Track
Path
Workings
Bolt
Ings Dike
Sluice
Broomhill oundabout
Network Ctr
Works
FB
22m
21m
20m
19m

Sluice / Penstock

Pipe (400 & 150mm)

Acknowledgements & Notes:

Created by: RSPB

© Crown Copyright. All rights reserved. RSPB licence 100021787 © Crown Copyright, RSPB Permit Number: 60271.

N

Map scale = 1:4,742

Date printed: 11/08/2016

0 0.075 0.15 0.3 km

Ordnance Survey data © Crown copyright and database right 2016, Contains OS data © Crown Copyright and database right 2016

rspb giving nature a home

E. Improved water control for Wader Scrape

5. New connection allows water to go direct to Wader Scrape. Allows direct control of this cell for the first time

4. Independent management of the Mere and Wader Scrape. Is required so may require control structures. Water can be controlled quicker and without disturbance to birds or visitors.

Sluice / Penstock

Pipe (400 & 100mm)

Acknowledgements & Notes:

Created by: RSPB

© Crown Copyright. All rights reserved. RSPB licence 100021787 © Crown Copyright, RSPB Permit Number: 60271.

N

Map scale = 1:4,742

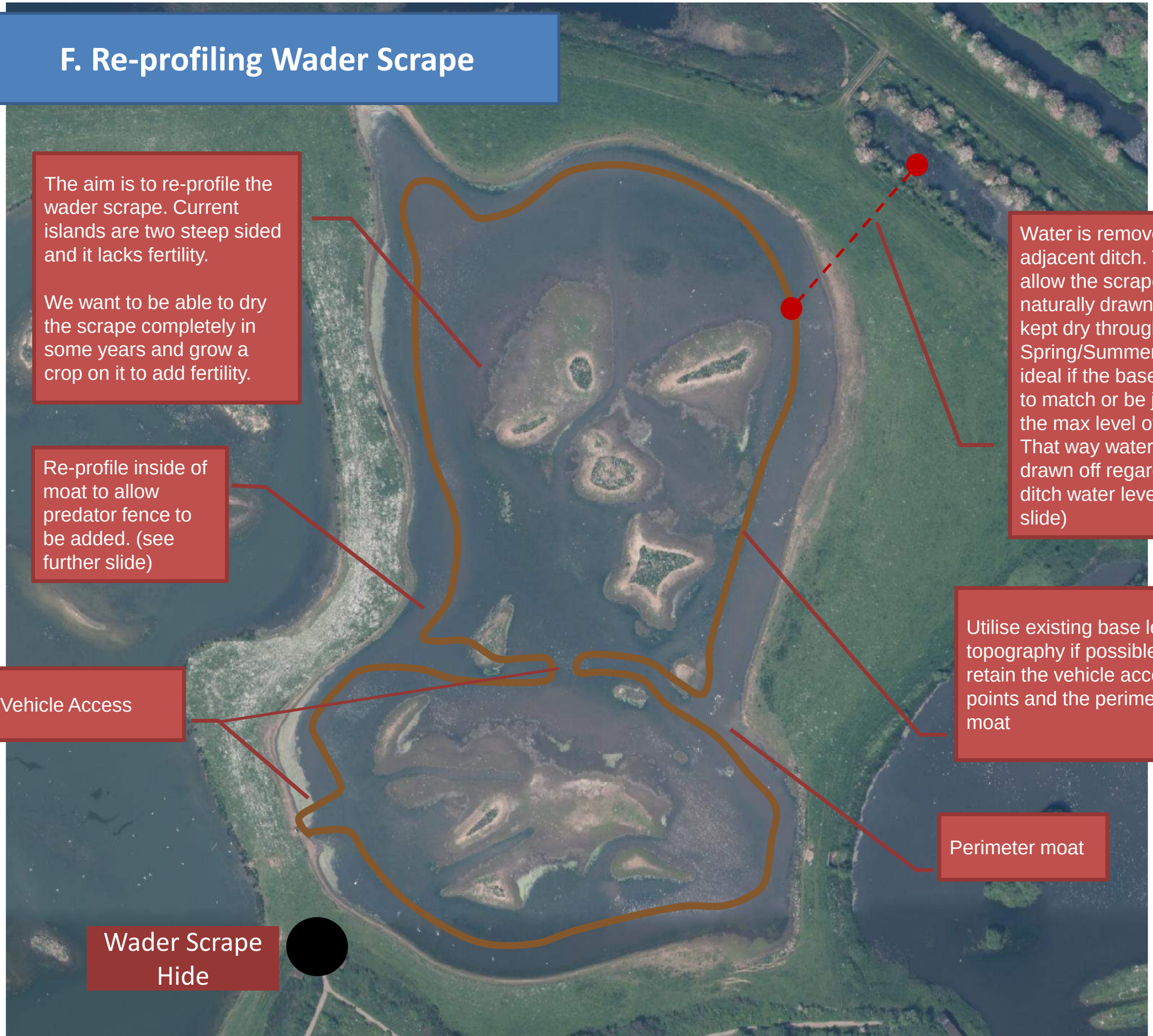
Date printed: 11/08/2016

0 0.075 0.15 0.3 km

Ordnance Survey data © Crown copyright and database right 2016, Contains OS data © Crown Copyright and database right 2016

giving nature a home

F. Re-profiling Wader Scrape



The aim is to re-profile the wader scrape. Current islands are two steep sided and it lacks fertility.

We want to be able to dry the scrape completely in some years and grow a crop on it to add fertility.

Re-profile inside of moat to allow predator fence to be added. (see further slide)

Water is removed into the adjacent ditch. Therefore, to allow the scrape to be naturally drawn down and kept dry through the Spring/Summer it would be ideal if the base level were to match or be just above the max level of this ditch. That way water can be drawn off regardless of the ditch water levels. (see next slide)

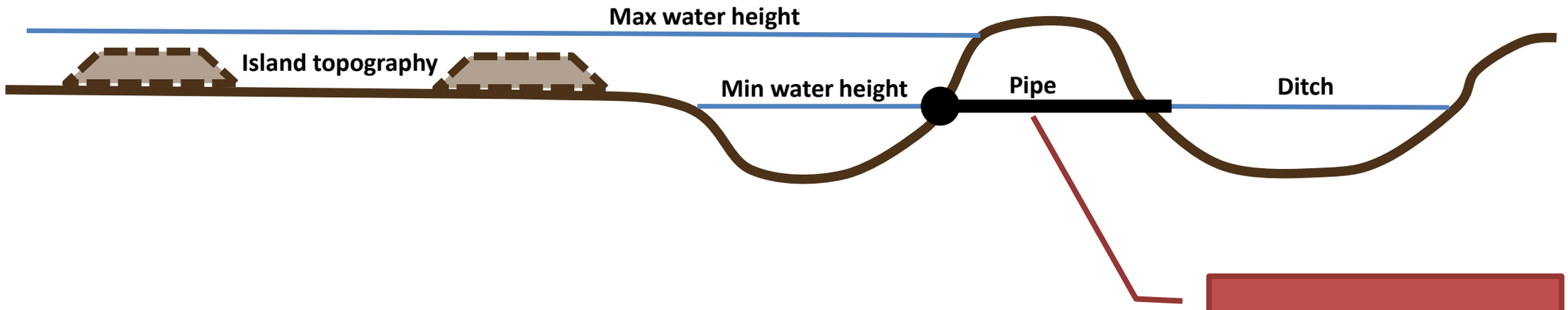
Utilise existing base level topography if possible and retain the vehicle access points and the perimeter moat

Vehicle Access

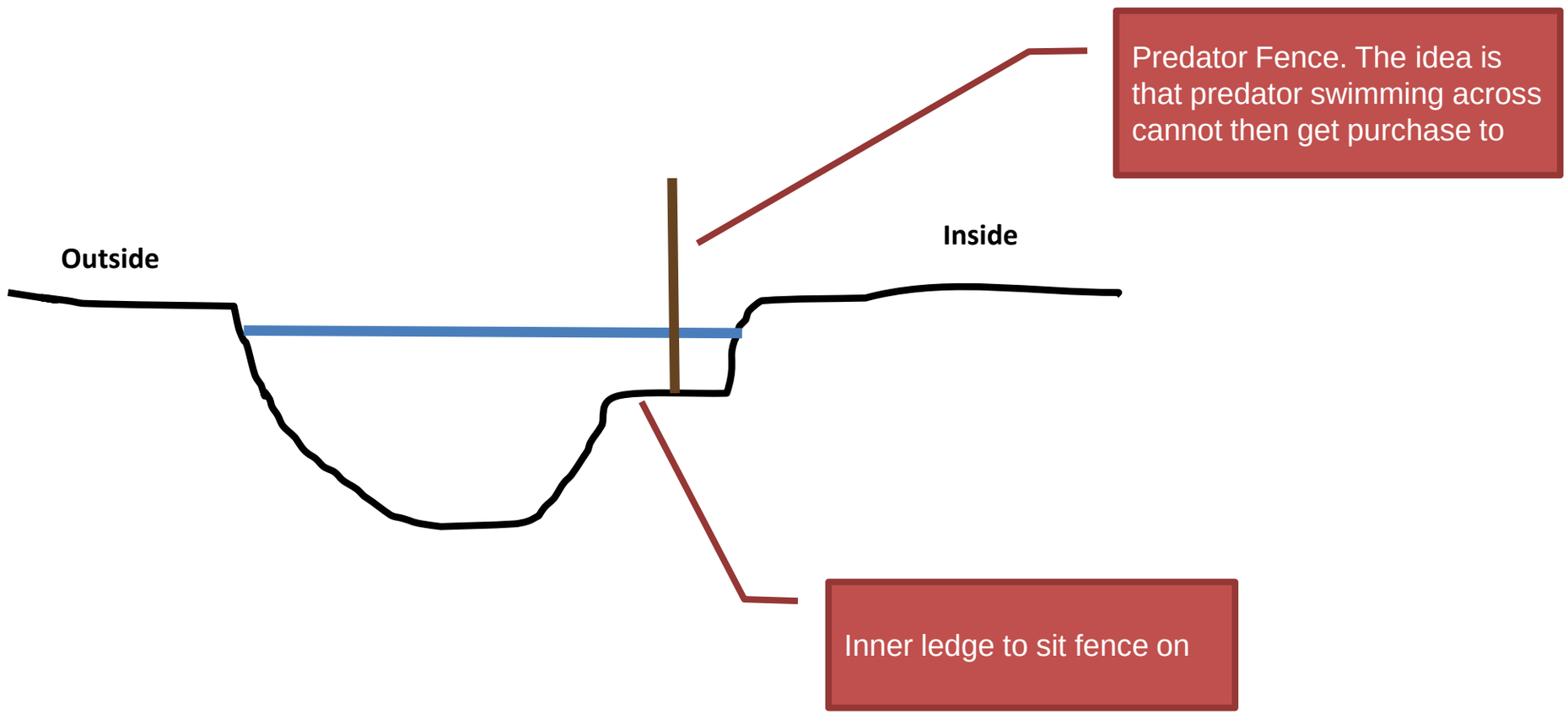
Perimeter moat

Wader Scrape Hide

Possible design principle – matching base level of scrape to adjacent ditch



Possible design for predator fence on Wader Scrape



F. Re-profiling Wader Scrape



F. Re-profiling Wader Scrape



F. Re-profiling Wader Scrape

Create a left to right series of islands and channels (along the lines of ridge and furrow) with channels every ca 50m.

Channels align to the sight line identified from the hide in the previous illustration



F. Re-profiling Wader Scrape

Islands should gently slope with a wide drawdown zone.

Two or three will be covered in gravel

Islands should be able to be fully flooded in winter to suppress vegetation and allow later drawdown in Spring.

Island outlines are purely illustrative. They should have profiles that are aligned to the contours, have shallow bays and inlets and not be steep sided



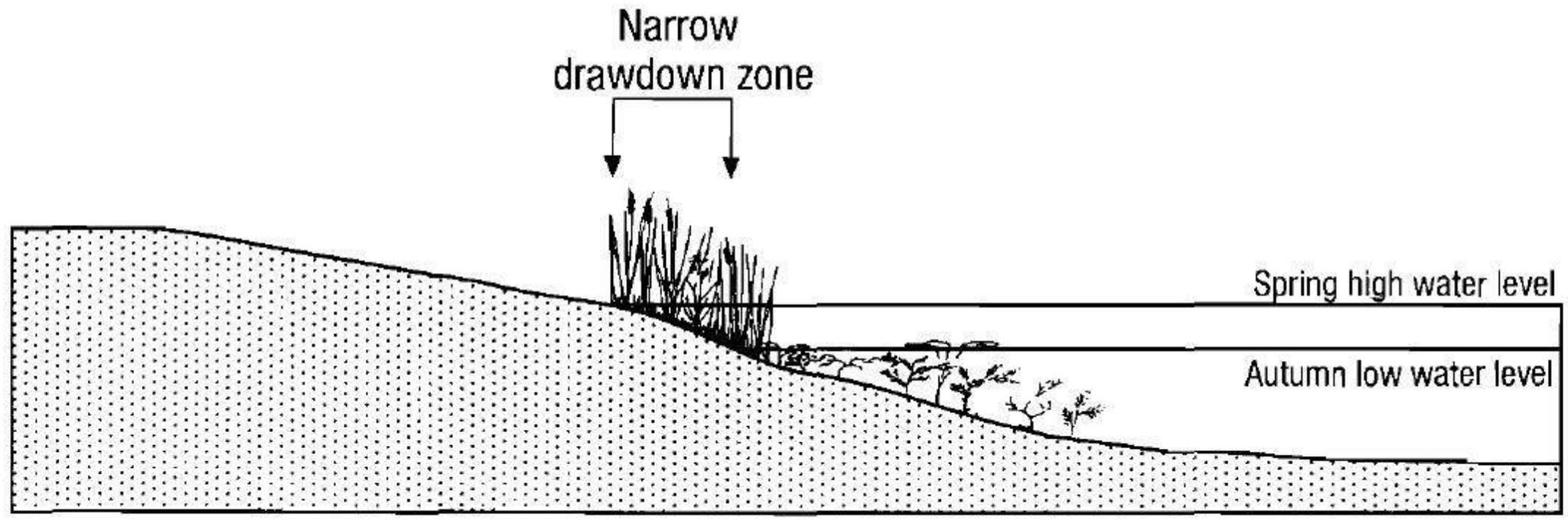
Drawdown (difference between top of islands and base level) should be maximised as much as possible

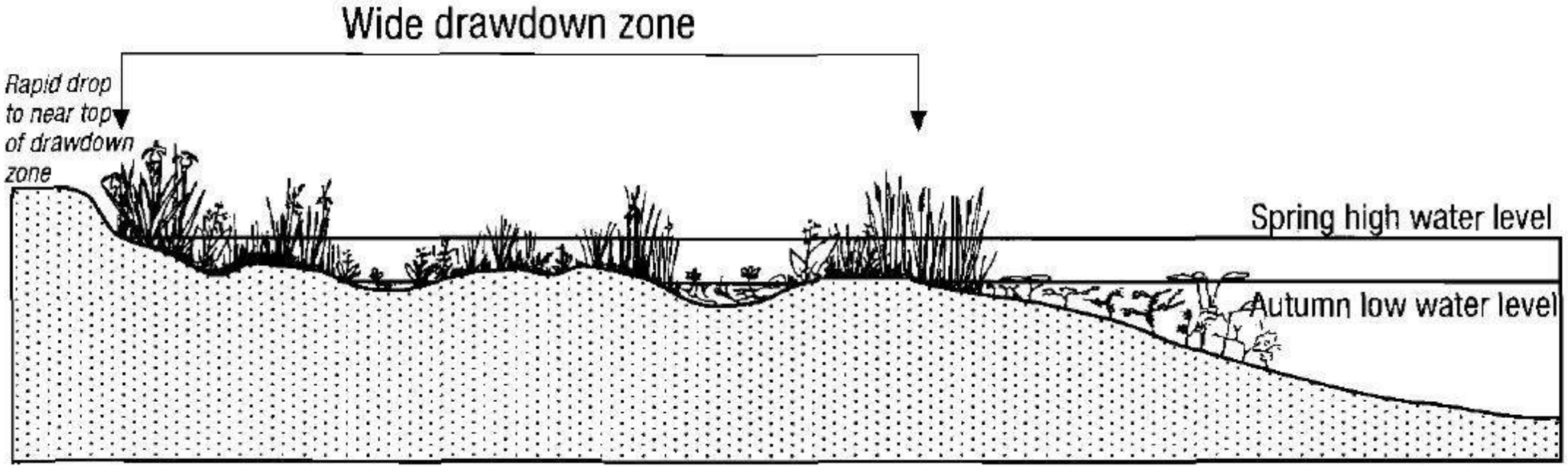
Topography should allow large areas of the scrape to be rotavated and sown with a sacrificial crop.

If possible, create a large late season feeding area at an intermediate height to bring birds as close to the hide as possible

Wader Scrape Hide

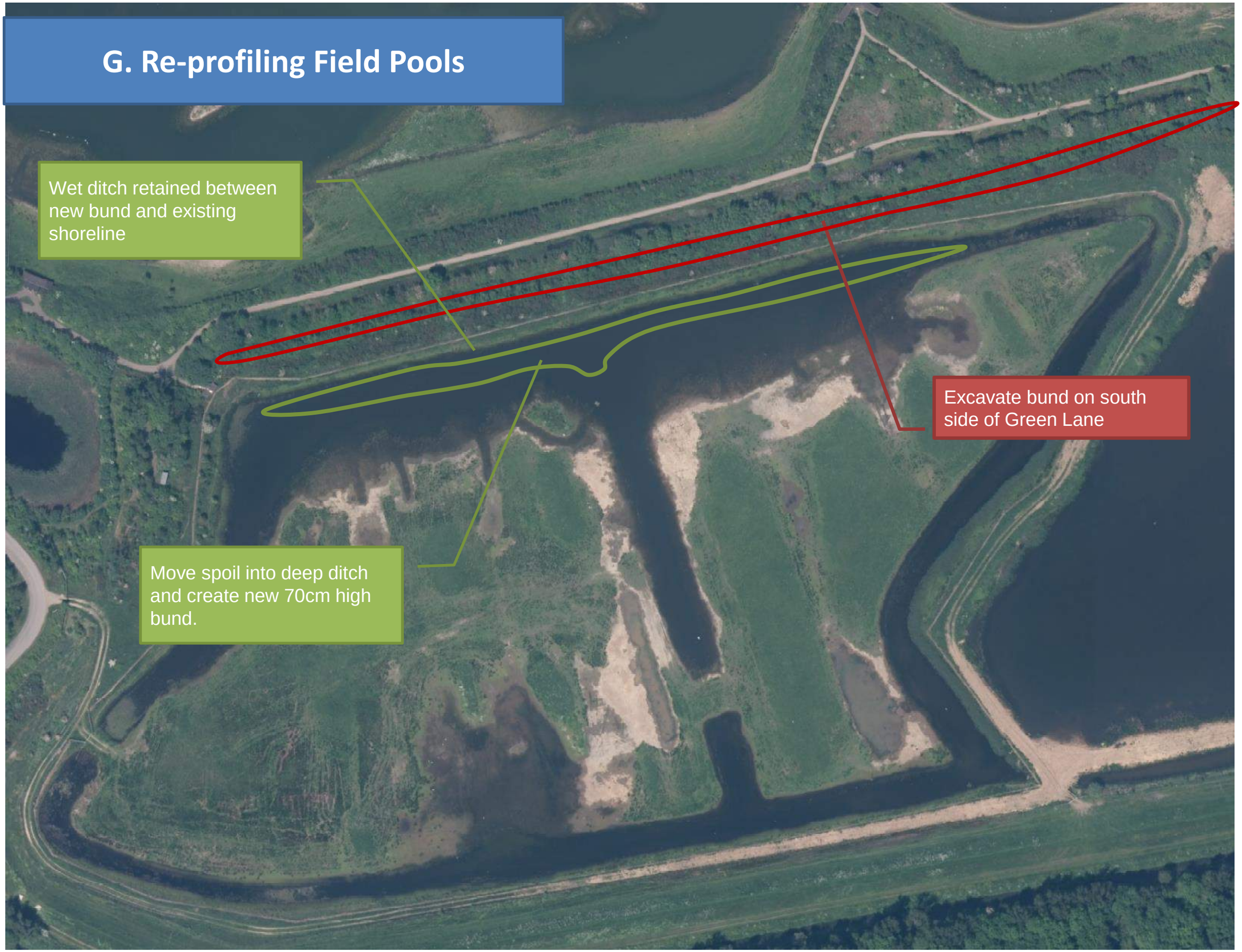
Island Profile – What is wide drawdown zone..



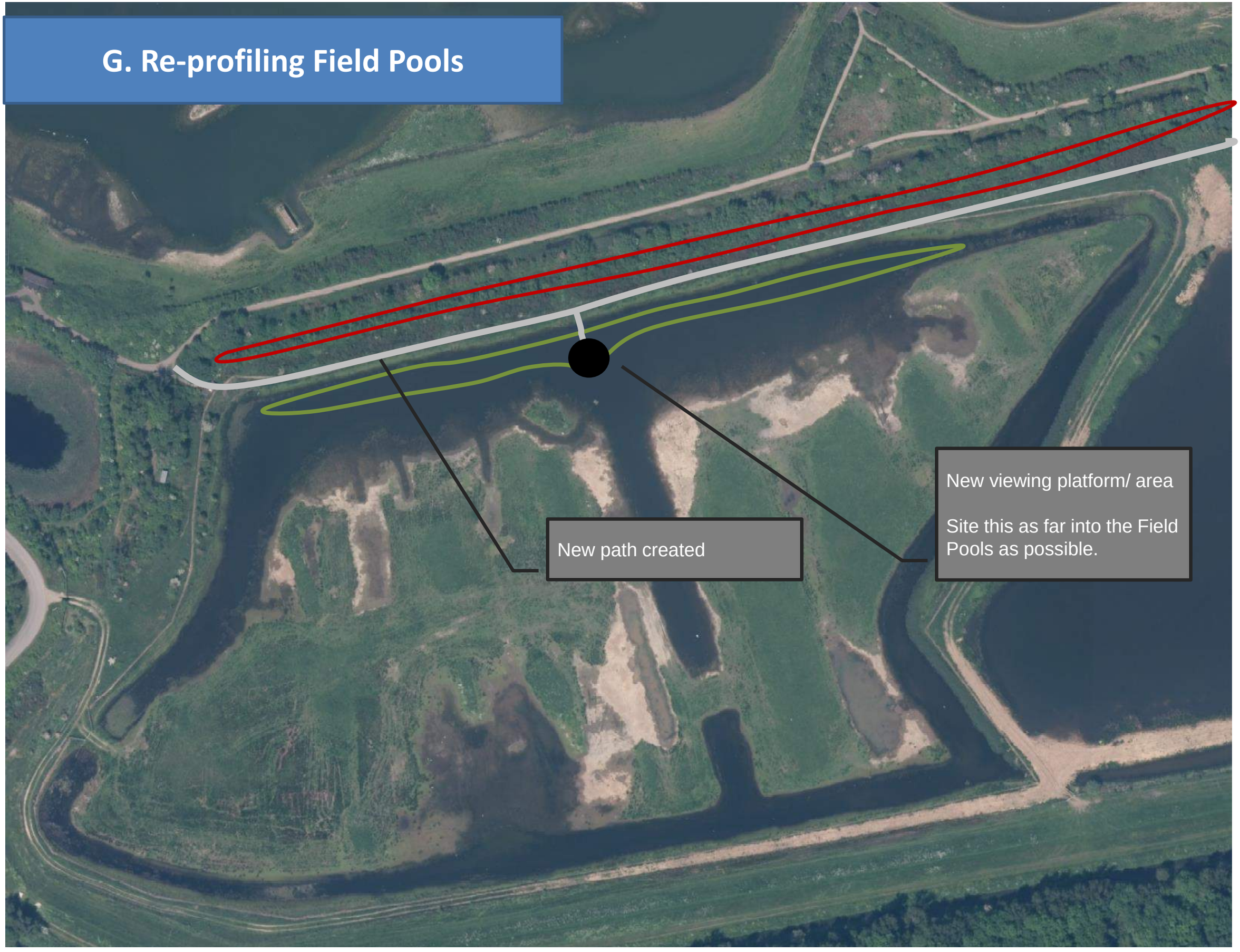


Pond Action

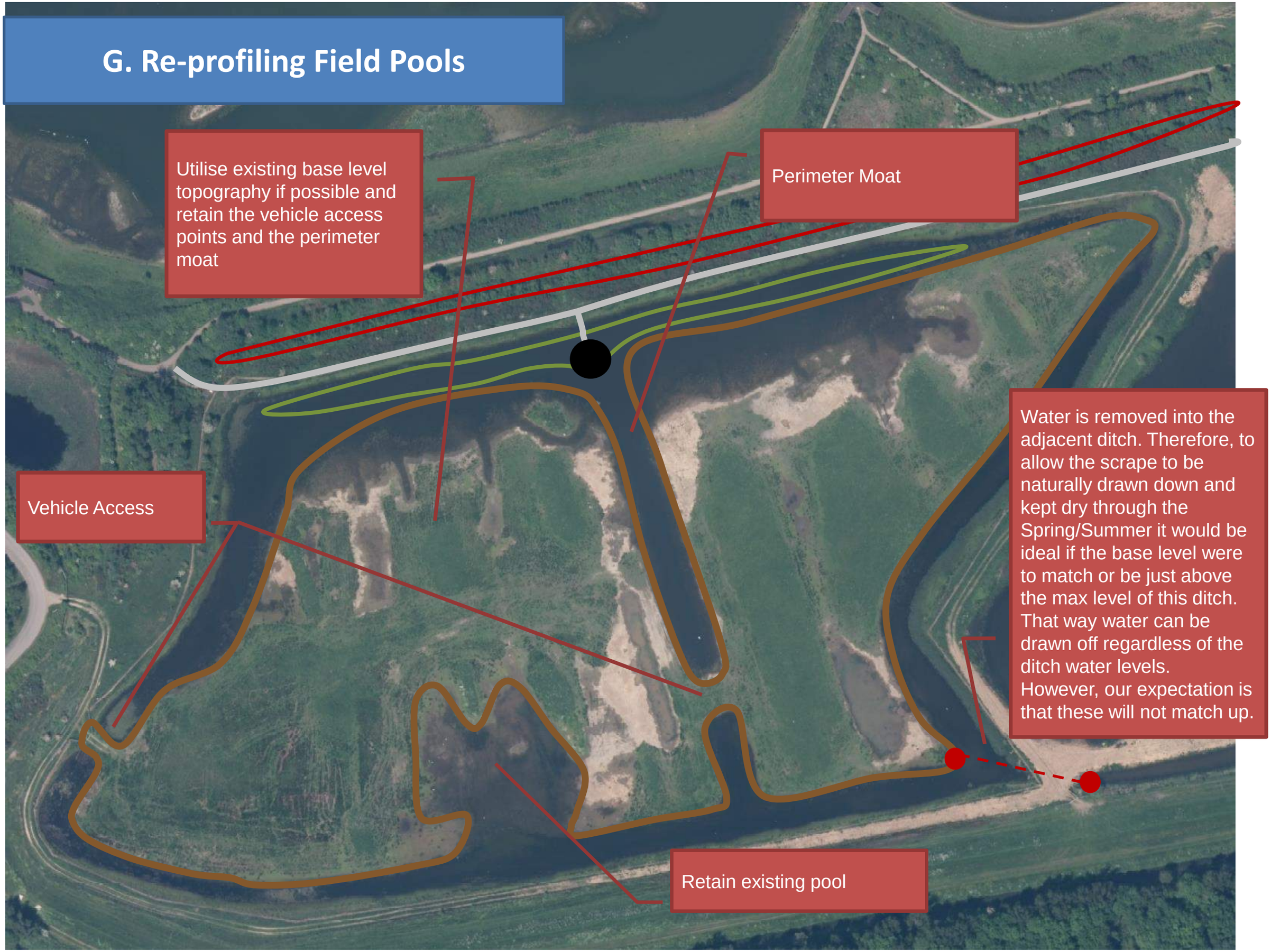
G. Re-profiling Field Pools



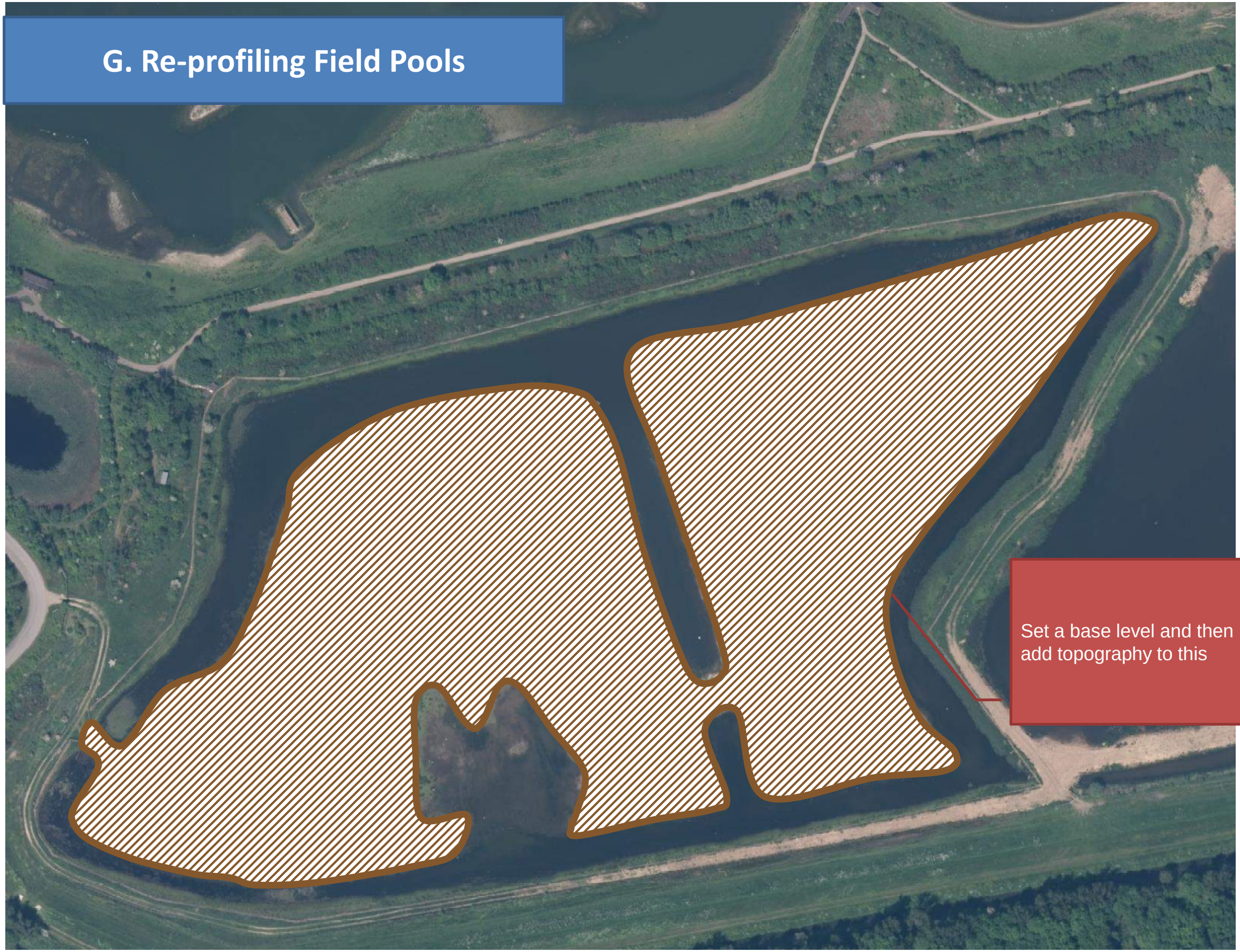
G. Re-profiling Field Pools



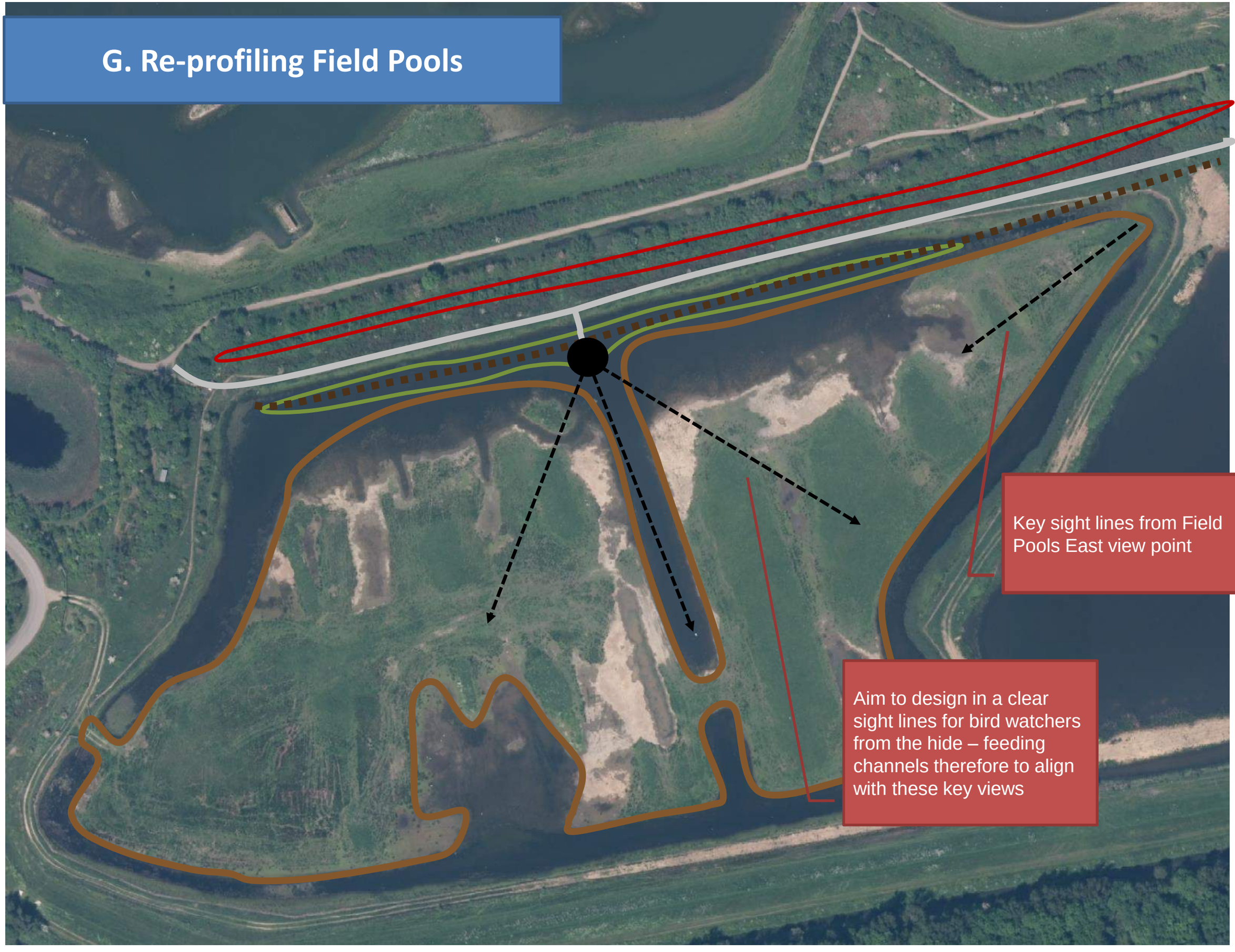
G. Re-profiling Field Pools



G. Re-profiling Field Pools



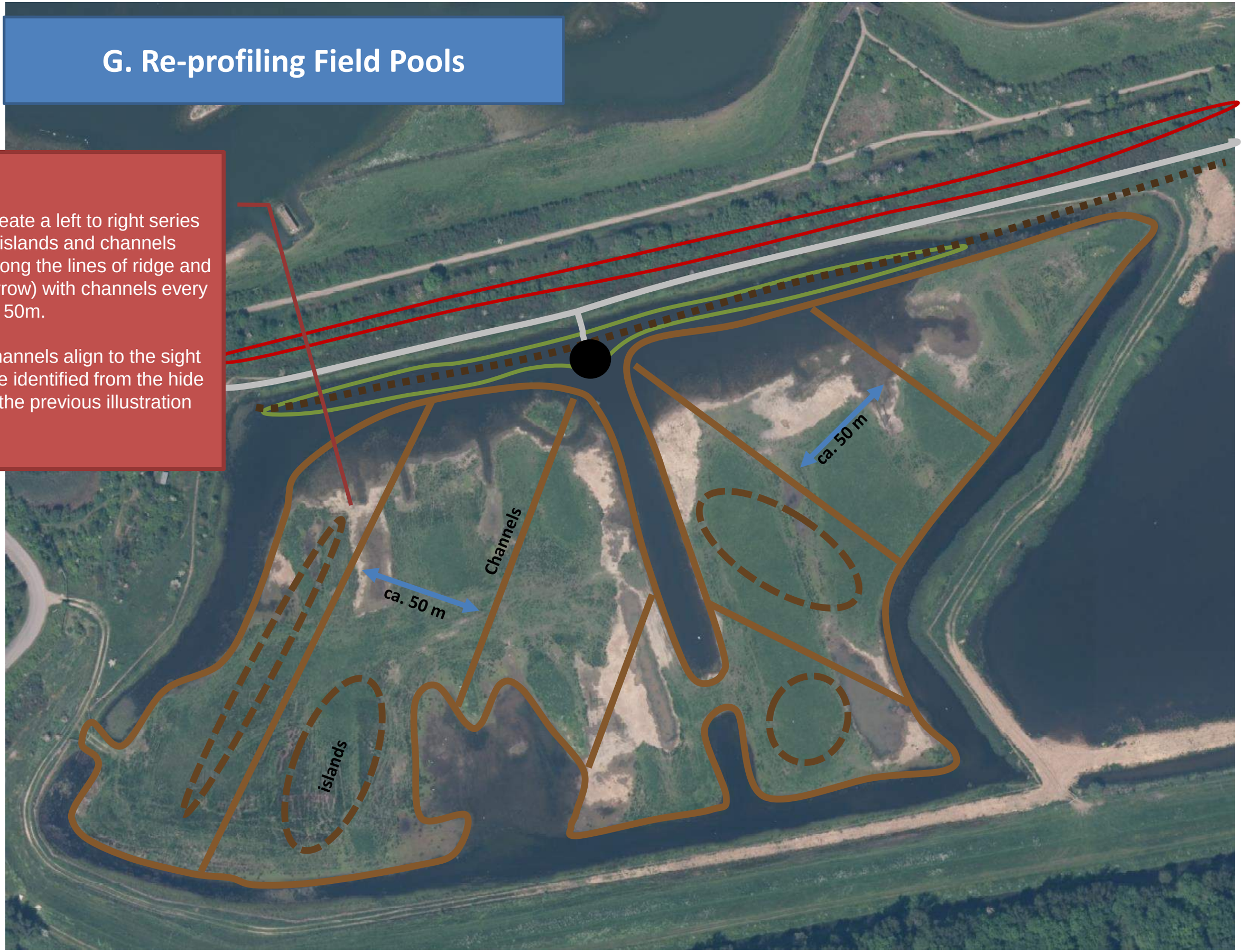
G. Re-profiling Field Pools



G. Re-profiling Field Pools

Create a left to right series of islands and channels (along the lines of ridge and furrow) with channels every ca 50m.

Channels align to the sight line identified from the hide in the previous illustration



G. Re-profiling Field Pools

Islands should gently slope with a wide drawdown zone.

Two or three will be covered in gravel

Islands should be able to be fully flooded in winter to suppress vegetation and allow later drawdown in Spring.

Island outlines are purely illustrative. They should have profiles that are aligned to the contours, have shallow bays and inlets and not be steep sided

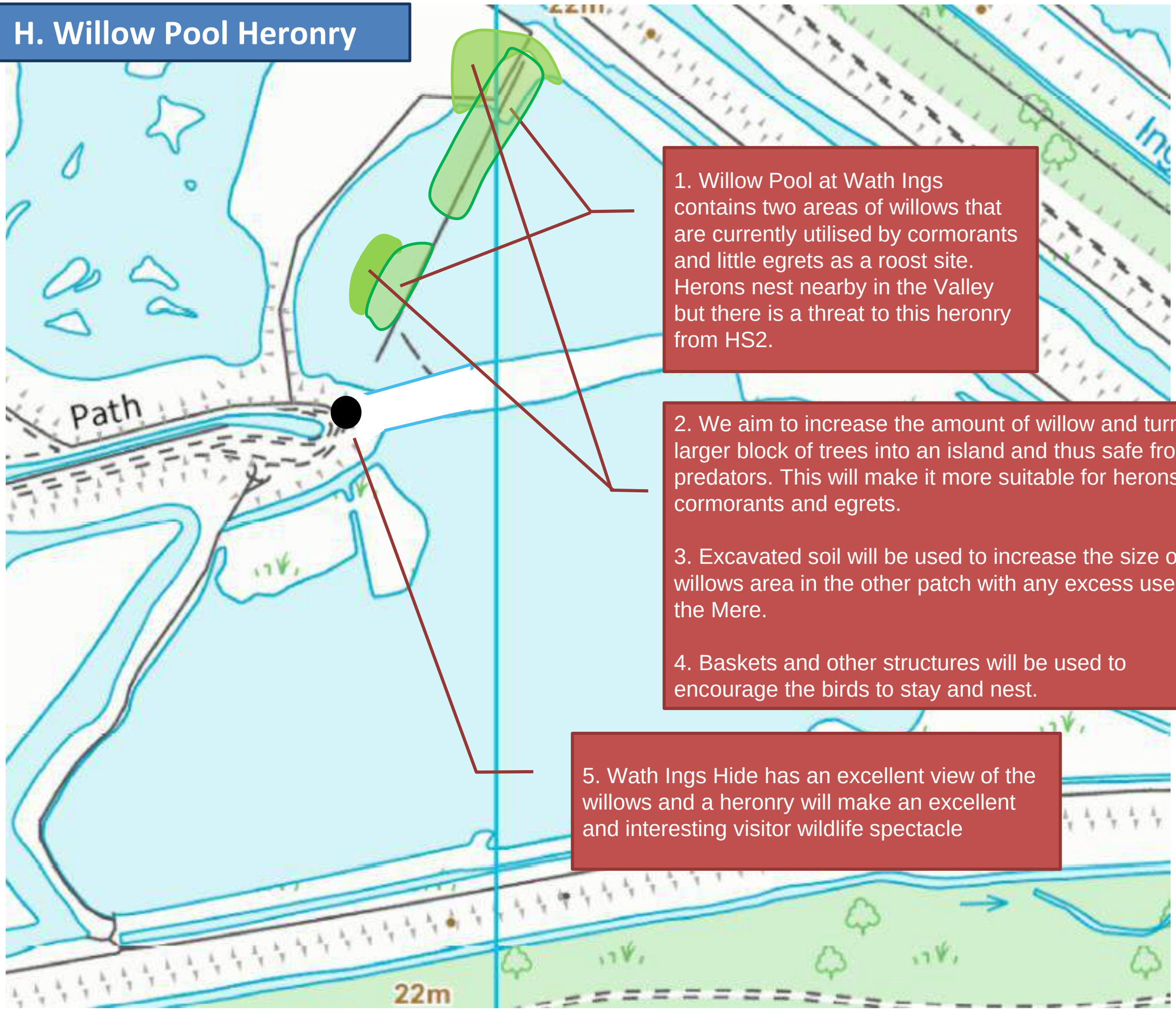


Drawdown (difference between top of islands and base level) should be maximised as much as possible

Create a large late season feeding area at an intermediate height to bring birds as close to the hide as possible

Topography should allow large areas of the scrape to be rotavated and sown with a sacrificial crop.

H. Willow Pool Heronry



1. Willow Pool at Wath Ings contains two areas of willows that are currently utilised by cormorants and little egrets as a roost site. Herons nest nearby in the Valley but there is a threat to this heronry from HS2.

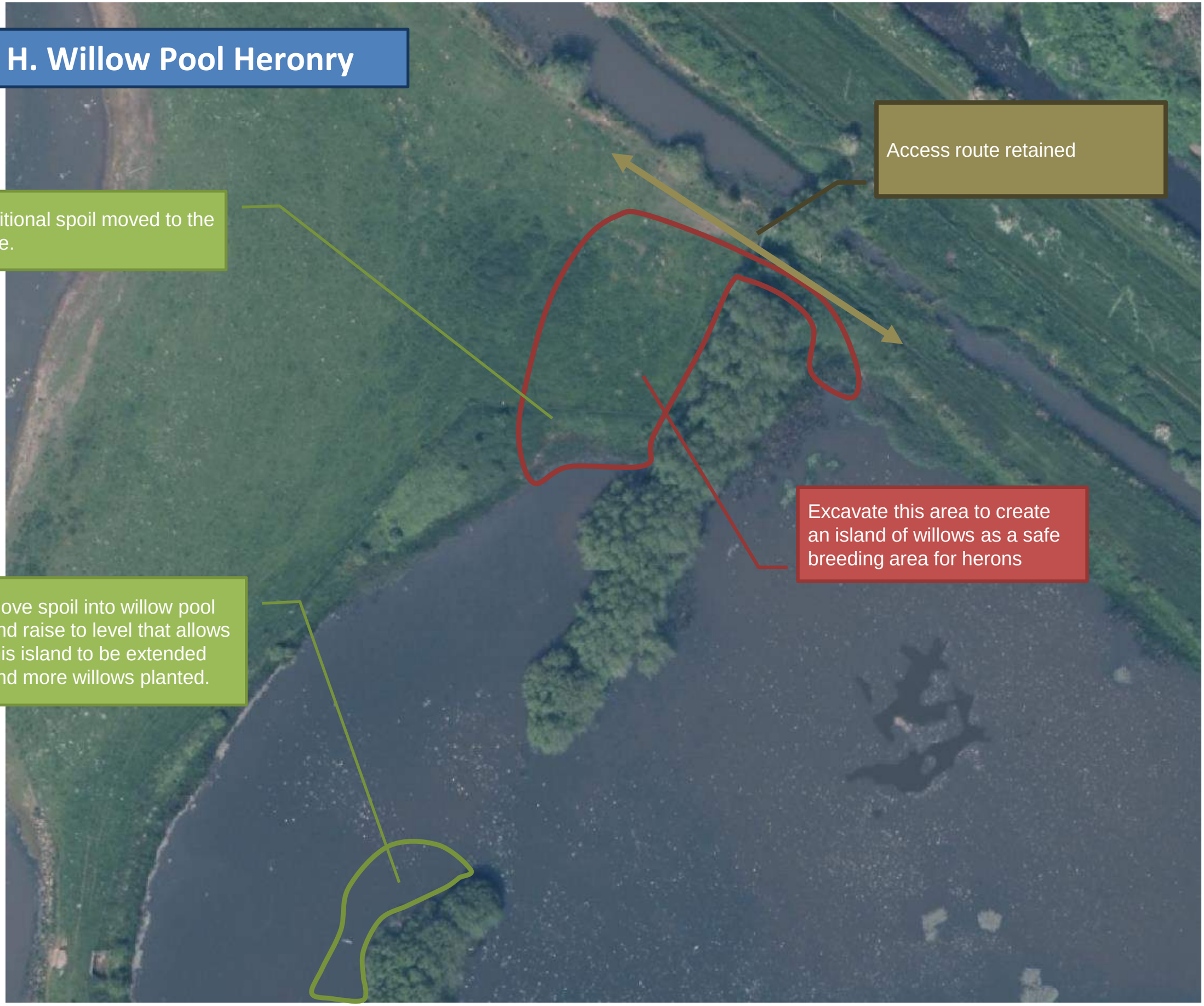
2. We aim to increase the amount of willow and turn the larger block of trees into an island and thus safe from predators. This will make it more suitable for herons, cormorants and egrets.

3. Excavated soil will be used to increase the size of the willows area in the other patch with any excess used on the Mere.

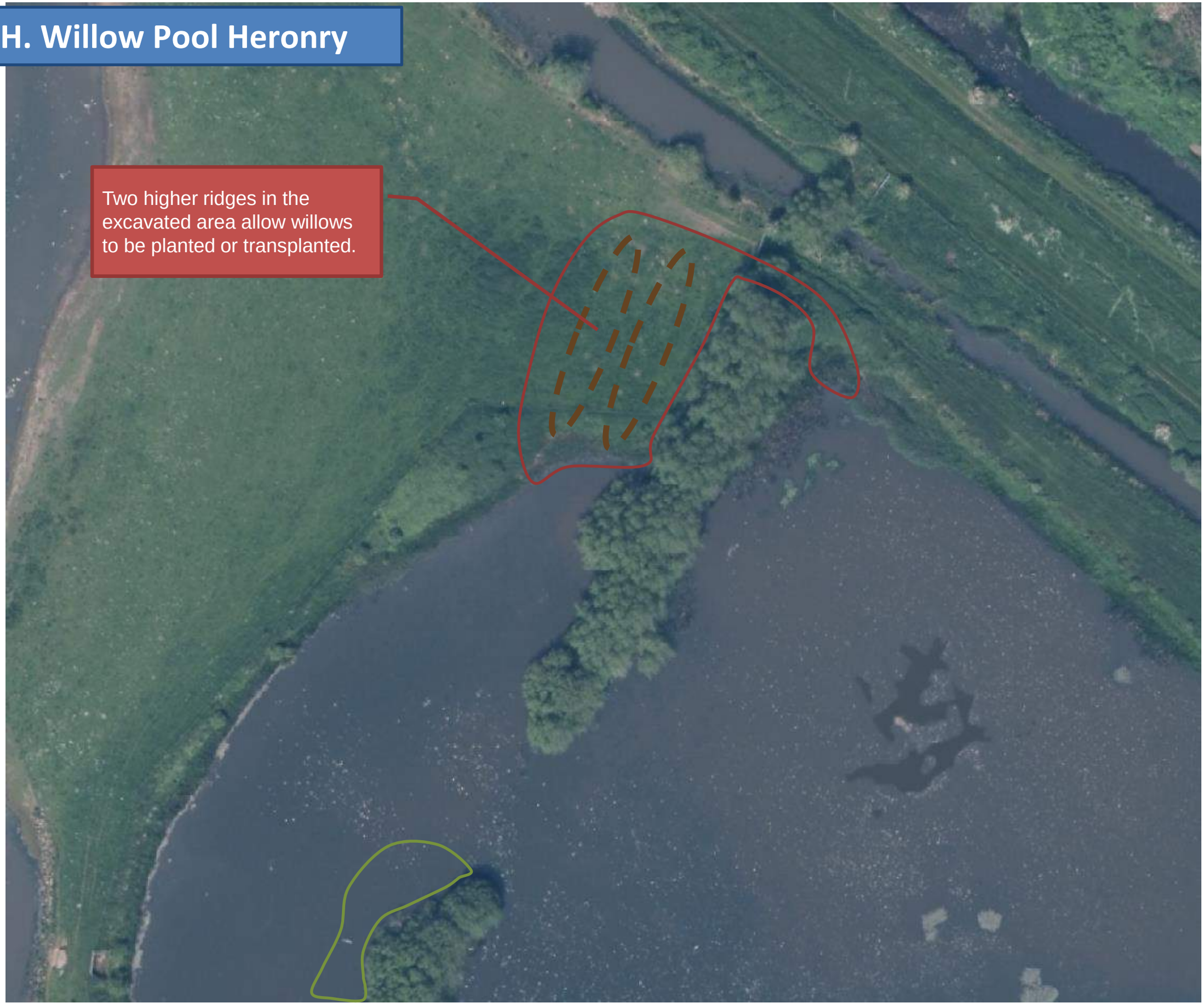
4. Baskets and other structures will be used to encourage the birds to stay and nest.

5. Wath Ings Hide has an excellent view of the willows and a heronry will make an excellent and interesting visitor wildlife spectacle

H. Willow Pool Heronry



H. Willow Pool Heronry



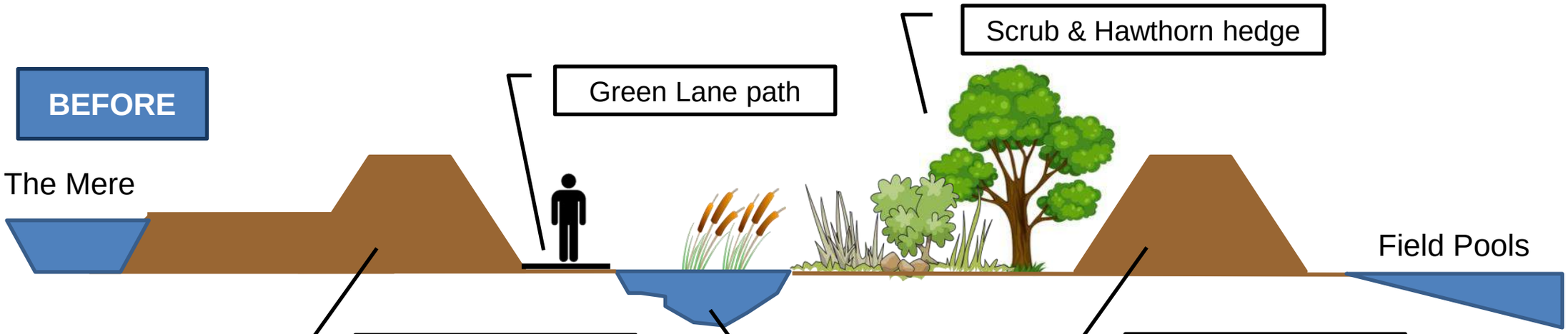
H. Willow Pool Heronry



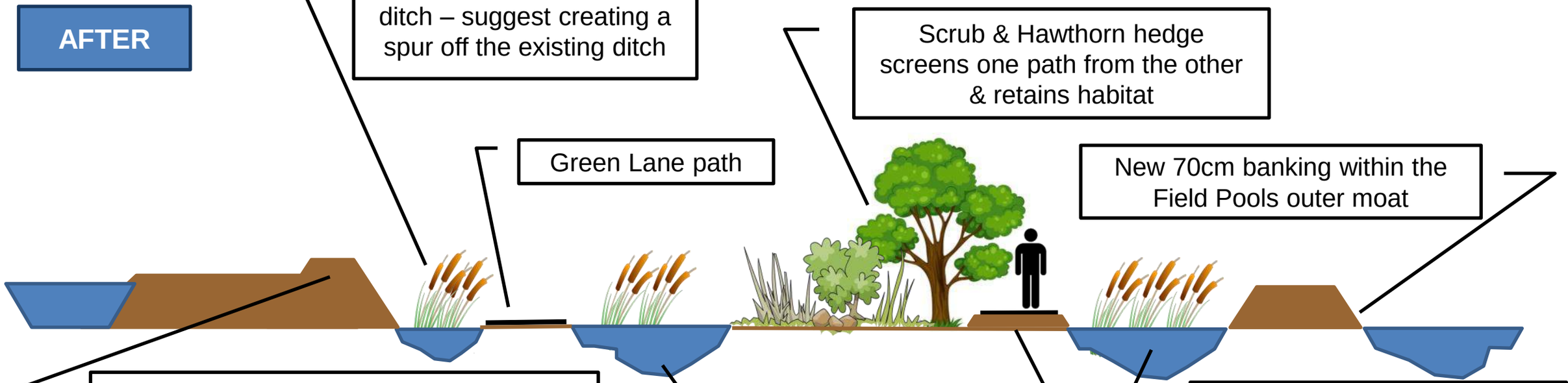
I. Creation of a circular walk

Current feel is constrained and “tunnel like”. 2m bunds create predator shadow and are overkill in screening people from the birds

BEFORE



AFTER



Overall feel is more open and connected to the reserve and landscape with greater interest

RSPB Dearne Valley Reserves

Old Moor Hydrology

Key:

- Reserve Boundary
- Inlet/Outlet to River
- Electric Pump
- Wind Pump
- EA Storm Drain
- Sluice / Penstock
- Pipe (400 & 100mm)
- One way Pipe
- EA Spillway
- Water Body
- Water Flow

Acknowledgements:

Reproduced from the digital Ordnance Survey map by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office.
©Crown Copyright. All rights reserved.
RSPB licence 100021787

Notes:

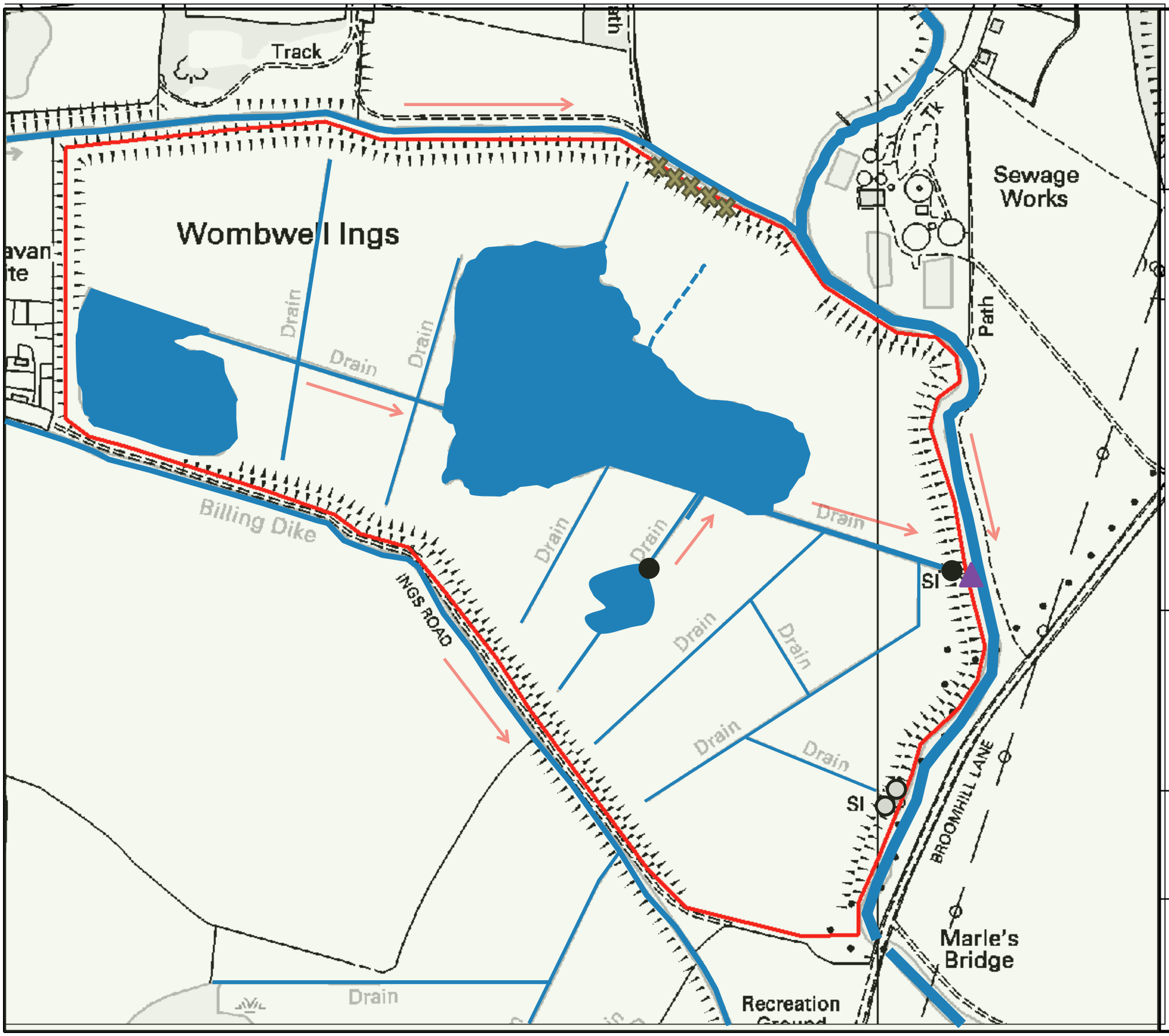
Scale: 1 : 5,000

N

Data Sourced from Ordnance Survey

RSPB Dearne Valley Reserves

Wombwell Ings Hydrology



Key:

- Reserve Boundary
- Inlet/Outlet to River
- EA Storm Drain
- Sluice / Penstock
- EA Spillway
- Water Body
- Water Flow

Acknowledgements:

Reproduced from the digital Ordnance Survey map by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office.
©Crown Copyright. All rights reserved.
RSPB licence 100021787

Notes:

Scale:
1cm = 0.04km

N

Data Sourced from Ordnance Survey

RSPB Dearne Valley Reserves

Old Moor – Fixed Assets / Constraints

Key:

- Reserve Boundary
- National Grid Overhead Lines
- Yorks Water pipeline
- EA Storage Res Bank

Crassula present across the site but not surveyed

Acknowledgements:

Reproduced from the digital Ordnance Survey map by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office.
©Crown Copyright. All rights reserved.
RSPB licence 100021787

Notes:

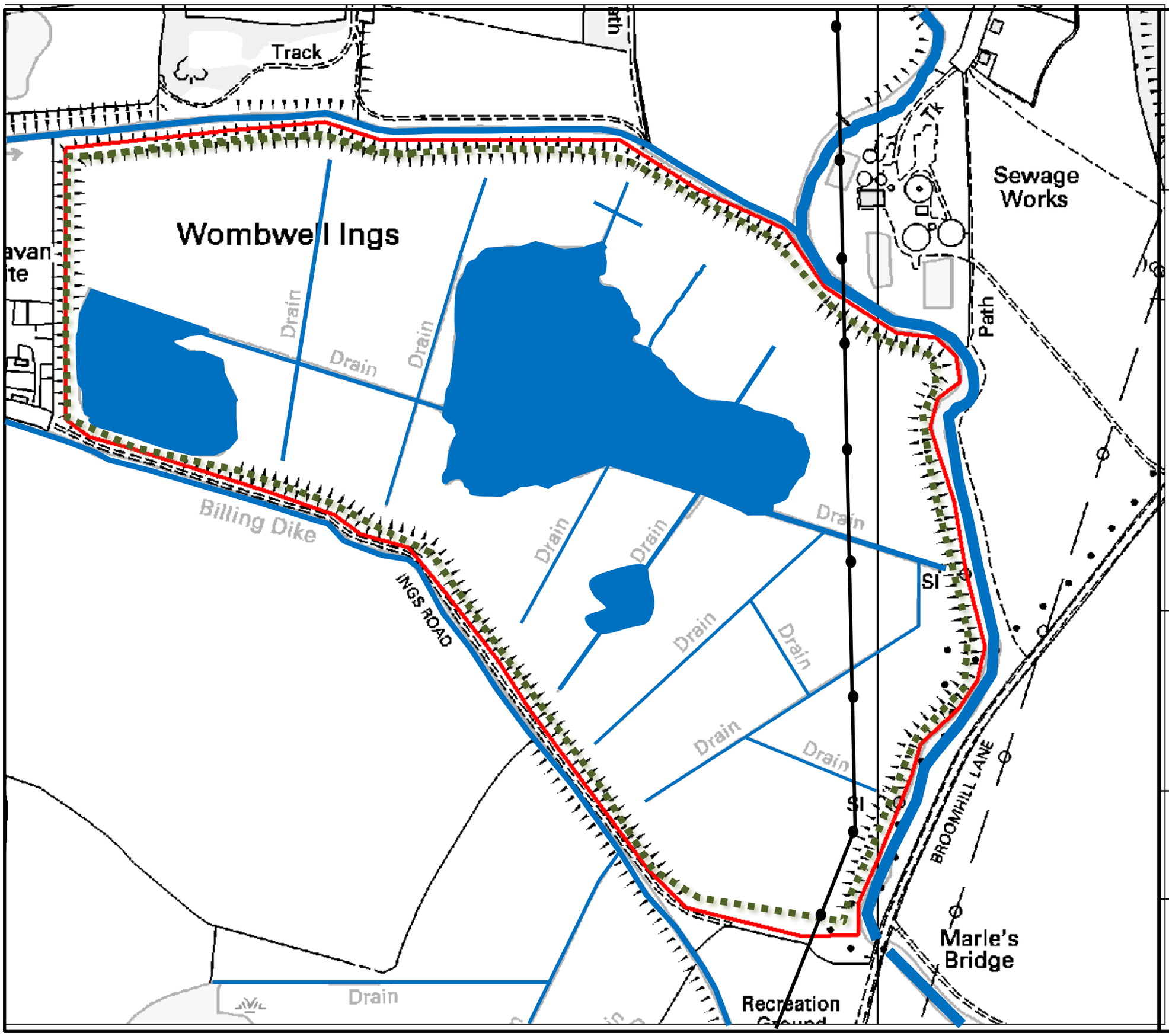
Scale: 1: 5,000

N

Data Sourced from Ordnance Survey

RSPB Dearne Valley Reserves

Wombwell - Fixed assets / constraints



Key:

- Reserve Boundary
- Water Body
- Electricity Pylon
- EA Flood Bank

Acknowledgements:

Reproduced from the digital Ordnance Survey map by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office.
©Crown Copyright. All rights reserved.
RSPB licence 100021787

Notes:

Scale:
1cm = 0.04km

N

Data Sourced from Ordnance Survey

RSPB Dearne Valley Reserves

Access and Rights of Way at Wombwell Ings & Gypsy Marsh

Key:

Public Bridleways

Public Footpaths

RSPB reserve boundary

Trans-Pennine Trail

Notes:

1:10,000

Scale on A4 paper

Acknowledgements:

Created by: Sharolyn Parnham 17 July 2013

Reproduced from the digital Ordnance Survey map by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. ©Crown Copyright. All rights reserved. RSPB licence 100021787

0 0.1 0.2 Miles

giving nature a home