The Sizewell C Project

6.13 Additional Ecology Survey Reports (September 2021) Part 1 of 2

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Planning Act 2008
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2021 Ecology Survey Update at Deadline 7 Part 1 of 2

CONTENTS

TABLES

None Provided.

PLATES

None Provided.

FIGURES

None Provided.

APPENDICES

Part One

Part Two

1 INTRODUCTION

1.1.1 This report has been prepared to include the reporting associated with the ecological survey work undertaken in 2021 and submitted to examination at Deadline 7. The appendices included within this report are:

- **Appendix A:** 2021 Bittern Survey Report (Confidential)
- **Appendix B:** 2021 Barn Owl Survey Report (Confidential)
- **Appendix C:** 2021 Aquatic Invertebrates Survey Report
- **Appendix D:** Associated Development Site Great Crested Newt Survey Report
- **Appendix E:** 2021 Two Village Bypass Bat Roost Assessment Report
- **Appendix F**: 2021 Bat Crossing Point Surveys Report 1
- **Appendix G:** 2021 Two Village Bypass Bat Backtracking Survey Report 1
- **Appendix H:** 2021 Two Village Bypass Dormouse Survey Report 1
- **Appendix I:** 2021 Saxmundham to Leiston Branch Line Ecology Walkover Report
- **Appendix J:** 2021 Northern Park and Ride Breeding Bird Survey Report
- **Appendix K:** 2021 Southern Park and Ride Breeding Bird Survey Report
- **Appendix L:** 2021 Freight Management Facility Breeding Bird Survey Report

2 2021 BITTERN SURVEY REPORT (CONFIDENTIAL)

2.1.1 The **2021 Bittern Survey Report** has been prepared following an incidental recording of Eurasian bittern (Botaurus stellaris) on the 29th April 2021. The surveys consisted of five dusk and dawn surveys were undertaken by an experienced ornithologist and survey assistant from 26th May 2021 to 17th June 2021. A full copy of the survey report is included in **Appendix A**.

3 2021 BARN OWL SURVEY REPORT (CONFIDENTIAL)

3.1.1 The **2021 Barn Owl Survey Report** presents the findings of barn owl inspection surveys undertaken on 27th and 28th July 2021 on the main development site, two village bypass and Sizewell link road sites of the proposed Sizewell C Project. A full copy of the report is included in **Appendix B**.

4 2021 AQUATIC INVERTEBRATES SURVEY REPORT

4.1.1 The **2021 Aquatic Invertebrates Survey Report** has been prepared following aquatic macro invertebrate surveys in spring 2021 at the main development site and two village bypass site. A full copy of the report is included in **Appendix C**.

5 ASSOCIATED DEVELOPMENT SITE GREAT CRESTED NEWT SURVEY REPORT

5.1.1 The **2021 Associated Development Site Great Crested Newt Survey Report** has been prepared to summarise great crested newt surveys on the northern park and ride, two village bypass, Sizewell link road, Yoxford, Green rail route and the Saxmundham to Leiston branch line sites between March and June 2021. It includes details of Habitat Suitability Index assessment/ eDNA sampling and populations surveys (as appropriate).

5.1.2 Great crested newt were recorded within the red line boundary of northern park and ride and Sizewell link road and within 500m of northern park and ride, Sizewell link road, green rail route and the Saxmundham to Leiston branch line. No GCN were recorded within 500m of two village bypass and Yoxford.

5.1.3 A full copy of the report is included in **Appendix D**.

6 2021 TWO VILLAGE BYPASS PRELIMINARY BAT ROOST ASSESSMENT REPORT

6.1.1 The **2021 Two Village Bypass Preliminary Bat Roost Assessment Report** has been prepared in response to a request for further information by the Examining Authority (ExA) dated 18 June 2021 [PD-027] and as detailed in [REP4-006]. Of the 18 buildings surveyed, eight were assessed as having high suitability, five as moderate, four as low and one as negligible. A full copy of the report is included in **Appendix E**.

7 2021 BAT CROSSING POINT SURVEYS REPORT 1

7.1.1 The **2021 Bat Crossing Point Survey Report 1** provides outlines the results of the initial 2021 bat crossing point surveys conducted between May and July on the Sizewell C Project's Sizewell link road, two village bypass and main development site. Six of the nine crossing points surveys on the two village bypass site, six of the 14 crossing points surveys on the Sizewell link road site and one of the three crossing points on the main development site recorded either high levels of bat activity or rarer species of bat. A full copy of the report is included in **Appendix F**.

8 2021 TWO VILLAGE BYPASS BAT BACKTRACKING SURVEY REPORT 1

8.1.1 The **2021 Two Village Bypass Bat Backtracking Survey Report 1** outlines the results of the 2021 woodland backtracking surveys conducted on the Sizewell C two village bypass site. The surveys were undertaken of Pond Wood, Nuttery Belt and Foxburrow Wood. A full copy of the report is included in **Appendix G**.

9 2021 TWO VILLAGE BYPASS DORMOUSE SURVEY REPORT 1

9.1.1 The **2021 Two Village Bypass Dormouse Survey Report 1** is included in **Appendix H**.

10 2021 SAXMUNDHAM TO LEISTON BRANCH LINE ECOLOGY WALKOVER REPORT

10.1.1 The **2021 Saxmundham to Leiston Branch Line Ecology Walkover Report** has been prepared to summarise the findings of a survey which was undertaken to assess the nature conservation importance of the habitats potentially affected by the railway upgrades. The survey identifies the presence, or potential presence, of important ecological features (which includes habitats, species and ecosystems) within the study area. Suitable mitigation and enhancement are proposed where necessary with cross reference to existing documentation made where appropriate. A full copy of the report is included in **Appendix J**.

11 2021 NORTHERN PARK AND RIDE BREEDING BIRD SURVEY REPORT

11.1.1 The **2021 Northern Park and Ride Breeding Bird Survey Report** has been prepared to summarise the surveys took place between 22nd April 2021 and 8th June 2021, following a designated transect to record the breeding bird assemblage, numbers and spatial distribution. The results of the 2021 surveys are largely consistent with those identified in the desk study [APP-364] results and do not affect the conclusions of the **Volume 3**, **Chapter 7** of the **ES** [APP-363]. A full copy of the report is included in **Appendix J**.

12 2021 SOUTHERN PARK AND RIDE BREEDING BIRD SURVEY REPORT

12.1.1 The **2021 Southern Park and Ride Breeding Bird Survey Report** has been prepared to summarise the surveys took place between 21st April and 8th June 2021, following a designated transect to record the breeding bird assemblage, numbers and spatial distribution. The results of the 2021 surveys are largely consistent with those identified in the desk study [APP-395] results and do not affect the conclusions of the **Volume 4**, **Chapter 7** of the **ES** [APP-394]. A full copy of the report is included in **Appendix K**.

13 2021 FREIGHT MANAGEMENT FACILITY BREEDING BIRD SURVEY REPORT

13.1.1 The **2021 Freight Management Facility Breeding Bird Survey Report** has been prepared to summarise the surveys took place between 21st April 2021 and 8th June 2021, following a designated transect to record the breeding bird assemblage, numbers and spatial distribution. The results of the 2021 surveys are largely consistent with those identified in the desk study [APP-524] results and do not affect the conclusions of the **Volume 8**, **Chapter 7** of the **ES** [APP-523]. A full copy of the report is included in **Appendix L**.

APPENDIX A: 2021 BITTERN SURVEY REPORT (CONFIDENTIAL)

APPENDIX B: 2021 BARN OWL SURVEY REPORT (CONFIDENTIAL)

APPENDIX C: 2021 AQUATIC INVERTEBRATES SURVEY REPORT

CONTENTS

TABLES

FIGURES

APPENDICES

1 SUMMARY

1.1.1 APEM Ltd were commissioned in August 2020 to undertake aquatic macroinvertebrate surveys to supplement the existing baseline for invertebrate assemblages supported by habitats within the Sizewell C main development site. This survey updated previous surveys at Sizewell undertaken by AMEC in 2009 and Arcadis in 2015 detailed in [APP-231]. Further surveys were undertaken in 2021, covering a similar extent to those on the main development site in 2020 [AS-036] and expanded to include surveys of waterbodies within one of the Associated Development sites, namely the two village bypass which crosses the River Alde floodplain 9.7km west of the main development site.

1.1.2 Initial surveys of the main development site undertaken in August 2020 were undertaken in accordance with the Common Standards Methodology (CSM) developed by Natural England [AS-036], but following comment by the Environment Agency (EA) in February 2021 the scope was altered to the Water Framework Directive (WFD) standard methodology for the spring and autumn 2021 surveys.

1.1.3 During the spring 2021 surveys, few uncommon species were found in the samples. However, the Nationally Endangered Norfolk Hawker dragonfly (*Aeshna isosceles*) was confirmed as breeding in a ditch adjacent to, but outside of the main development site, within Sizewell Marshes Site of Special Scientific Interest (SSSI).

1.1.4 During the spring 2021 surveys, few species with narrowly restricted niche requirements were found which resulted in the 'Unfavourable condition' assessment of the Specific Assemblage Types (SAT) identified according to the Pantheon tool but further data will be added following the September 2021 survey.

1.1.5 This report covers the results of the Spring 2021 survey. Surveys will continue as part of Sizewell C Co. monitoring, the next being due to take place in September 2021.

2 INTRODUCTION

2.1.1 Initial surveys undertaken in August 2020 were undertaken in accordance with the Common Standards Methodology (CSM) developed by Natural England, but following comment by the Environment Agency (EA) in February 2021 the scope was altered to the Water Framework Directive (WFD) standard methodology.

2.1.2 The August 2020 survey [AS-036] using the CSM method produced a limited species list with no additional uncommon species that were not represented in the Spring data presented here, so are not reported in this document.

2.1.3 This report presents the results of the Spring 2021 surveys within the main development site and two village bypass site. Surveys will continue as part of Sizewell C Co. monitoring, the next being due to take place in September 2021.

3 METHODS

3.1 Site selection and Description

3.1.1 A summary table of sample locations and grid references for the main development site and two village bypass sites are given in **Table 3.1** and **Table 3.2** respectively. Detailed descriptions of each site including photographs are locating in **Table A. 1** and **Table A. 2**, **Appendix A**. Survey sites are displayed on **Figure 1** (main development site) and **Figure 2** (two village bypass).

Table 3.1 Summary of macroinvertebrates and water quality sampling site locations – Main Development Site

Site	Area name/no.	Site name/ description	Grid reference	Survey date
1	Area 1	Ditch 1, nr bridge (Leiston Drain)	TM 4735 6451	28/05/2021
2	Area 1	Ditch 2, In woodland (Leiston Drain)	TM 4700 6443	29/05/2021
3	Area 1	Ditch 3, outside woodland	TM 4694 6441	29/05/2021
4	Area 1	Ditch 4, additional ditch	TM 4687 6443	29/05/2021
5	Area 2	Ditch 1	TM 4698 6382	28/05/2021
6	Area 2	Ditch 2	TM 4691 6381	28/05/2021
7	Area 2	Ditch 3	TM 4693 6355	28/05/2021
8	Area 3	Ditch 1 (Leiston Drain)	TM 4744 6472	27/05/2021
9	Area 1	Reedbed	TM 4709 6438	29/05/2021
10	Area 1	Wet woodland	TM 4697 6440	29/05/2021

Table 3.2 Summary of macroinvertebrate and water quality sampling site locations – Two Village Bypass

Site	Location	Grid reference	Survey date
1	Ditch 1 us Stratford St Mary	TM 3578 5977	27/05/2021
2	Ditch 2 ds Stratford St Mary	TM 3588 5971	27/05/2021
3	Alde us bridge	TM 3587 5964	27/05/2021
4	Alde ds bridge	TM 3585 5959	27/05/2021

3.2 Water quality

3.2.1 At each sampling location measurements of temperature, dissolved oxygen (DO), pH, conductivity and un-ionised ammonia (NH3) were taken using a YSI multi-parameter probe.

3.3 Field Sampling

3.3.1 At each sampling location, a detailed recording form was completed comprising water quality measurements, a diagram of the area sampled and any relevant observations on the state of the watercourse.

3.3.2 Macroinvertebrate sampling was carried out using a standard 1 mm mesh long-handled pond net. A 3-minute kick sample and additional 1-minute hand search was undertaken at each sampling site in accordance with standard methods used by the Environment Agency (2017).

3.4 Laboratory analysis

3.4.1 Macroinvertebrate samples were processed in the APEM laboratory following the standard methodology used by the Environment Agency (2014). The samples were washed in a 500µm sieve in a fume cupboard to rinse off all preservative and fine material prior to sorting. Small amounts of sample material were placed in flat, white trays and all macroinvertebrate animals were extracted.

3.4.2 Macroinvertebrates were identified to species level under a dissecting binocular microscope, using a range of identification keys published by the Freshwater Biological Association (FBA) and others. This facilitated the calculation of standard biotic pollution scores from the presence of certain indicator macroinvertebrates that are sensitive to pollution.

3.5 Biotic indices

3.5.1 The data were aggregated to pressure-specific indices: Average Score per Taxon (ASPT) and Number of Taxa (NTAXA), using the Whalley Hawkes Paisley Trigg (WHPT ASPT and WHPT NTAXA) method.

3.5.2 The WHPT method (UKTAG, 2014) is an index of overall biological quality using macroinvertebrates. WHPT ASPT and WHPT NTAXA are the current indices used to determine Water Framework Directive (WFD) classification for macroinvertebrates and are useful for enabling comparison of different locations. The higher the value of these indexes the higher the environmental quality is indicated.

3.5.3 The Community Conservation Index (CCI; Chadd & Extence, 2004) provides a standardised measure of the conservation value of macroinvertebrate communities at a site which can be compared across sites throughout Great Britain. CCI reflects both the rarity of the species found within each sample and the overall diversity of the sample. Since CCI was published some of the scores allocated to individual species have become outdated due to changes in species distribution knowledge. The CS (community score) species list used in the APEM database to generate CCI scores was aligned with the updated list that the Environment Agency uses in 2017 but further updates to reflect amended conservation status for some species is still required.

3.6 Pantheon

3.6.1 The species lists compiled from the sample analysis were analysed using Pantheon, an analytical tool developed by Natural England to aid assessment of the conservation value of habitats and evaluation of invertebrate (both terrestrial and aquatic) communities in the UK. Species are assigned to habitat and/or resource specific assemblages within three hierarchical categories:

3.6.2 **Biotope:** This division classifies species according to their affinity to a very broad habitat type such as ‘Wetland’ or ‘Tree-associated’ for aquatic species.

3.6.3 **Habitat:** This is an intermediate classification of more defined habitat such as ‘running water’ or ‘marshland’.

3.6.4 **Specific Assemblage Type (SAT):** This represents specific habitats of high conservation value because the species that are associated with them are highly sensitive to change. Examples of SATs are ‘reed fen and pools’ and ‘open water on disturbed mineral sediments’.

4 RESULTS

4.1 Species of Conservation Interest

a) Main Development Site

4.1.2 Few uncommon species were found in the samples from the Spring survey within the main development site. However, a single late instar specimen of the Nationally Endangered Norfolk Hawker dragonfly (*Aeschna isosceles*) was found in the sample collected at Site 7 (Area 2 - see photo, Appendix F). The Nationally Scarce Ornate Brigadier soldierfly (*Odontomyia ornata*) was present at two sampling sites in Area 1 (Sites 2 and 4). *Limnephilus politus*, a Nationally Scarce caddisfly, was found at Site 2. The beetle *Enochrus ochopterus*, found at Site 4, has a Conservation Score under the CCI system of 7 which equates to Nationally Notable but this has status has been downgraded in subsequent reviews (Foster 2010).

4.1.3 The samples collected at Sites 3 and 4 within Area 1 were the most species rich with each yielding 50 taxa. The wet woodland sample in Area 1 yielded the fewest taxa (14).

b) Two Village Bypass

4.1.4 The River Alde and ditch sites sampled within the two village bypass area did not produce any species of conservation concern with all species being relatively common and widespread in the UK.

4.1.5 The samples at Sites 1 and 2 produced 31 and 21 taxa respectively. The River Alde us bridge sample (Site 3) also produced 31 taxa with the downstream site (Site 4) yielding 18.

c) Full species lists

4.1.6 A full species list for all sites is shown for main development site and two village bypass in **Appendix B** and **C** respectively.

4.2 Pantheon Output

a) Main Development Site

4.2.2 The species list for each Area within the main development site were combined and inputted into Pantheon for analysis. The output indicated that the Reported Condition for the main development site area as a whole was in ‘Unfavourable condition’ for each of the two SATs recognized, specifically W314 ‘red fen and pools’ and W211 ‘Open water on disturbed sediments’.

b) Two Village Bypass

4.2.3 No SATS were identified within the two village bypass area.

4.3 Biotic Indices

4.3.1 A summary of the macroinvertebrate laboratory counts for the 3-minute kick samples is given in **Table 4.1**. A detailed list of macroinvertebrates recorded during laboratory analysis is given in **Table B. 1** and **Table C. 1** in **Appendix B** and **C**.

Table 4.1 Biotic scores for macroinvertebrate samples

Development area	Site no.	Location	WHPT		CCI
			NTaxa	ASPT	
Main Development Site	1	Area 1 Ditch 1 (Leiston Drain)	19	3.88	5.50
	2	Area 1 Ditch 2 (Leiston Drain)	18	4.11	4.33
	3	Area 1 Ditch 3	29	4.21	25.50
	4	Area 1 Ditch 4	30	4.34	32.63
	5	Area 2 Ditch 1	23	4.10	10.22
	6	Area 2 Ditch 2	30	4.30	11.11
	7	Area 2 Ditch 3	25	4.13	39.23
	8	Area 3 Ditch 1 (Leiston Drain)	25	3.85	5.88
	9	Reedbed	18	3.90	4.75
	10	Wet woodland	11	3.15	1.33
Two Village Bypass	1	Two village bypass Ditch 1 us Stratford St Mary	19	3.87	5.12
	2	Two village bypass Ditch 2 ds Stratford St Mary	16	4.41	13.57
	3	Alde us bridge	18	4.99	4.59

	4	Alde ds	12	4.32	4.00

4.4 WHPT indices

a) Main Development Site

4.4.2 WHPT ASPT was fairly similar among the ditch sites generally just exceeding an ASPT of 4 with two sites (Site 1 and Site 5) just below 4. These scores are suggestive of moderate water quality. The reedbed site ASPT was 3.90 with the wet woodland site scoring slightly lower at 3.15. Macroinvertebrate family richness was quite high at most ditch sites and was reflected in the NTaxa scores reaching 30 at two sites (Site 6 and Site 4).

b) Two Village Bypass

4.4.3 ASPT in the two ditch sites were comparable to the main development site scores. ASPT tended higher in the Alde samples, particularly at the u/s bridge site with 4.99 but this is expected in more riverine habitats compared to slack flow ditch sites.

4.5 Community Conservation Index

a) Main Development Site

4.5.2 CCI varied quite markedly between sites, with the highest score of 39.23 (equating to 'Very high conservation value') at Site 7 but some other sites with scores falling in the 'Low' or 'Moderate' categories.

b) Two Village Bypass

4.5.3 The two Alde sites returned low CCI scores that indicated 'low conservation value'. Site 2 produced a score of 13.57 reflecting 'Fairly high conservation value'.

4.6 Water Quality Measurements

4.6.1 Water quality readings taken at each sampling site are summarised in **Table 4.2**. Unfortunately, some information is missing due to misplaced datasheets.

4.6.2 Dissolved oxygen concentrations were fairly low but consistent between sites with the exception of the very low reading at main development Site 2. Ammonia concentrations were within the expected range for slow flowing bodies with extensive vegetation, with measurements approximating to

0.50 mg/l at the two village bypass sites and varying between 0.59 mg/l and 0.82 mg/l at the main development site.

Table 4.2 Water quality measurements

Development area	Site no.	Location	Dissolved oxygen		Ammonia	Specific Conductivity	pH
			DO (%)	DO(mg/l)	NH4-N(mg/l)	µS/cm	
Main development Site	1	Area 1 Bridge	31.4	3.58	0.75	1083	8.58
	2	Area 1 Ditch, In woodland	1.9	0.21	0.59	1037	-
	3	Area 1 Ditch, outside woodland	-	-	-	-	-
	4	Area 1, additional ditch	-	-	-	-	-
	5	Area 2 Ditch 1	29	3.24	0.82	1214	7.97
	6	Area 2 Ditch 2	31.4	3.58	0.75	1083	8.68
	7	Area 2 Ditch 3	-	-	-	-	-

	8	Area 3 Ditch 1	29.9	3.36	0.72	1006	7.50
	9	Reedbed	-	-	-	-	-
	10	Wet woodland	-	-	-	-	-
Two Village Bypass	1	TVB Ditch 1 us Stratford St Mary	23.8	2.75	0.50	1001	7.21
	2	TVB Ditch 2 ds Stratford St Mary	28	2.21	0.52	1036	7.21
	3	Alde us bridge	24.8	2.80	0.49	988	7.22
	4	Alde ds	23.8	2.71	0.45	984	7.22

5 DISCUSSION

5.1.1 This is an interim report based on the Spring 2021 survey. A final summary of the macroinvertebrate assemblages and assessment of condition of the SATs in the survey areas will be undertaken following the Autumn survey due to take place in early September 2021. Assessment using Pantheon requires a combined species list from two seasons of survey data so the Pantheon analysis undertaken using the Spring 2021 data should be regarded as indicative. Comparison with previous studies (undertaken in 2009 [APP-231] and 2015 [APP-231] on behalf of EDF by AMEC and Arcadis respectively) will be completed following the September 2021 survey as part of Sizewell C Co.'s continuing monitoring programme.

5.1.2 Although many of the ditch sites were quite species rich and scored highly in terms of the CCI assessment system, few macroinvertebrate species of conservation concern were found in the Spring samples. One notable exception was the confirmation that the Nationally Endangered Norfolk Hawker dragonfly is breeding within Sizewell Marshes SSSI with a single late instar nymph found at Site 7. This site is adjacent, although outside of, the main development site.

5.1.3 Few species with narrowly restricted niche requirements were found which resulted in the 'Unfavourable condition' assessment of the SATs identified according to the Pantheon tool but as previously mentioned further data will be available following the September 2021 survey.

5.1.4 In terms of water quality, the WHPT scores were generally indicative of moderate status with little variation between sites and it is probable that elevated nutrient levels are affecting ecological quality, which is reflected in extensive Lemna (duckweed) mats in several ditch sections. The sample from the wet woodland site in the main development site (Site 10) was species poor with only common taxa present.

5.1.5 No species of conservation concern were recorded at two village bypass and initial Pantheon analysis did not record any SATs. Site 2 produced a CCI score that indicated fairly high conservation value. This site was located on a ditch just outside the red line boundary that fed into the River Alde.

5.1.6 The survey results do not alter the conclusions of the assessments of the impacts of the Sizewell C proposals on invertebrates which were presented in the Environmental Statement in 2020 [AS-033 and APP-425].

REFERENCES

Ref. 1 AMEC (2014). Sizewell. 2009 Invertebrate report [APP-231]

Ref. 2 Chadd, R and Extence, C., 2004. The conservation of freshwater Macroinvertebrate populations: a community-based classification scheme.

Ref. 3 Environment Agency (2014) *Freshwater macro-invertebrate analysis of riverine samples*. EA Operational Instruction 024_08, issued 28 January 2014.

Ref. 4 Environment Agency (2017) *Freshwater macro-invertebrate sampling in rivers.* EA Operational Instruction 018_08, issued 01 March 2017.

Ref. 5 Foster, G.N., 2010. A review of the scarce and threatened coleoptera of Great Britain Part (3): Water beetles of Great Britain. Species Status 1. Peterborough: Joint Nature Conservation Committee.

Ref. 6 Hyder Consulting (2015). Sizewell C Ecological Support :Sizewell C Invertebrate Surveys 2014 [APP-231]

Ref. 7 UKTAG (2014) *UKTAG River Assessment Method Benthic Invertebrate Fauna. Invertebrates (General Degradation):* Whalley, Hawkes, Paisley & Trigg (WHPT) metric in River Invertebrate Classification Tool (RICT). Stirling, UK.

APPENDIX A: MAIN DEVELOPMENT SITE AND TWO VILLAGE BYPASS SITE PHOTOGRAPHS

Table A. 1 Main Development Site Site description and photographs

Main development site Site name and description	Photograph
Site 1 Area 1: Ditch 1 (Leiston Drain) The water surface of the ditch at this sampling site was almost completely covered in Lemna sp. Water depth was approximately 30 cm with a channel width of 5m.	

Main development site Site name and description	Photograph
Site 2 Area 1: Ditch 2 (Leiston Drain) This ditch at this site was located within woodland. There was limited marginal emergent vegetation but fairly extensive surface mats of Lemna sp. Channel width was approximately 5m with water depth of 60cm.	

Main development site Site name and description	Photograph
Site 3 Area 1: Ditch 3 The ditch sampling site was within an open area adjacent to woodland. Some Lemna sp was present with emergent reeds. Water depth was approximately 30cm with a channel width of 4m.	

Main development site Site name and description	Photograph
Site 4 Area 1: Ditch 4 This was an open site with minimal shading. Some in channel patches of emergent macrophyte were present. The channel was about 3m wide with a water depth of 40cm.	

Main development site Site name and description	Photograph
Site 5 Area 2: Ditch 1 This site had open water with Lemna sp present and marginal stands of Phragmites with bankside trees present. Channel width was 4m with a water depth of 60cm.	

Main development site Site name and description	Photograph
Site 6 Area 2: Ditch 2 This site was moderately shaded with bankside trees. Channel width was 5m with a water depth of 60cm. Substrate was entirely silt.	

Main development site Site name and description	Photograph
Site 7 Area 2: Ditch 3 This site had a fairly open channel with sparse stands of Phragmites sp. present.	

Main development site Site name and description	Photograph
Site 8 Area 3: Ditch 1 (Leiston Drain) This site had marginal stands of Phragmites sp. and other emergent macrophytes with the water surface largely covered in Lemna sp. Channel width was approximately 4.5m with a water depth of 45cm.	

Main development site Site name and description	Photograph
Site 9 Area 1: Reedbed This site had dense stands of Phragmites sp, on a silt substrate. Water depth was about 25cm	

Main development site Site name and description	Photograph
Site 10 Area 1: wet woodland The water depth at this wet woodland site was approximately 10cm. In between the trees were emergent clumps of vegetation.	

Table A. 2 Two Village Bypass Site description and photographs

Two Village Bypass Site name and description	Photograph
Site 1 Ditch 1: us Stratford St Mary This site was densely vegetated with emergent macrophytes. The channel was about 3.5m wide with a water depth of approximately 15cm	

Two Village Bypass Site name and description	Photograph
Site 2 Ditch 2: ds Stratford St Mary This site was mainly densely vegetated with emergent macrophytes but with short section of open water upstream of the ditch confluence with the River Alde. Channel width was about 3.5m with a water depth of approximately 10cm.	

Two Village Bypass Site name and description	Photograph
Site 3 River Alde: us bridge This site had areas of open water with tall stands of Phragmites spp. present. Channel width was about 5.5m and water depth was an average of 40cm. Substrate was entirely silt.	

Two Village Bypass Site name and description	Photograph
Site 4 River Alde: ds bridge This site was fairly open with sparse stands of emergent macrophyte. The water was quite turbid. Channel width was about 4.5m and water depth was an average of 40cm. Substrate was entirely silt.	

APPENDIX B: MACROINVERTEBRATE RAW DATA – MAIN DEVELOPMENT SITE SITES

Table B. 1 Main Development Site invertebrate species list

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	Area 1	Area 1	Area 1	Area 1	Area 2	Area 2	Area 2	Area 3	Area 1	Area 1
Site name	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 1	Ditch 2	Ditch 3	Ditch 1	Reedbed	Wet woodland
Taxa name										
Acroloxus lacustris					10			3		
Aedes sp.									1	
Aeshna cyanea	1									
Aeshna isosceles							1			
Aeshnidae						1				
Agabus group						1				
Agrypnia varia							1			

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	Area 1	Area 1	Area 1	Area 1	Area 2	Area 2	Area 2	Area 3	Area 1	Area 1
Site name	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 1	Ditch 2	Ditch 3	Ditch 1	Reedbed	Wet woodland
heteroclita			1		1					
Anacaena limbata		1	1			1		4		
Anisus vortex	1		10	3	9	2	4	34		
Asellidae		16							16	
Asellus aquaticus	24	7	12	1	5	4		148	14	6
Athripsodes aterrimus							2			
Bithynia tentaculata	3	13	60	49	28	10	116	124		
Brachytron pratense				4						
Caenis horaria				1		1				
Caenis robusta							28			
Cataclysta lemnata	12		10	1	31	20		41	3	3

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	Area 1	Area 1	Area 1	Area 1	Area 2	Area 2	Area 2	Area 3	Area 1	Area 1
Site name	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 1	Ditch 2	Ditch 3	Ditch 1	Reedbed	Wet woodland
Ceratopogonidae	11	1	6	5		12		1		
Chaoborus pallidus										1
Chironomidae	4	16	110	96	28	264	112	591	35	216
Cladocera			28	4	1	4			4	
Cloeon dipterum	1	3	160	159	41	96	21		2	1
Coenagrion puella			14	64	19	41	3			
Coenagrion puella/pulchellum			25	7	2		25			
Coenagrionidae				3		17				
Collembola	1	1		1	1			16		
Copepoda			16		4		1		16	

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	**Area 1**	**Area 1**	**Area 1**	**Area 1**	**Area 2**	**Area 2**	**Area 2**	**Area 3**	**Area 1**	**Area 1**
Site name	**Ditch 1**	**Ditch 2**	**Ditch 3**	**Ditch 4**	**Ditch 1**	**Ditch 2**	**Ditch 3**	**Ditch 1**	**Reedbed**	**Wet woodland**
Coquillettidia richiardii					4	2				
Crangonyx pseudogracilis/floridanus	72	13	19	14	16	20	4	187	80	140
Dendrocoelum lacteum		1						5	1	
Dixella amphibia						1				
Dixella autumnalis				2						
Dixella sp.				19	3					
Dryops sp.				1						
Dugesia lugubris/polychroa		1	1	2			2	19		
Dytiscus sp.			1		2	2	1	3		
Elodes sp.		1								

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	Area 1	Area 1	Area 1	Area 1	Area 2	Area 2	Area 2	Area 3	Area 1	Area 1
Site name	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 1	Ditch 2	Ditch 3	Ditch 1	Reedbed	Wet woodland
Enochrus coarctatus				1						
Enochrus ochropterus				1						
Enochrus testaceus			1			1		1		
Erpobdella octoculata	1		4	5	3	1		1		
Erpobdella testacea								1		
Ferrissia wautieri			3	3						
Gammarus pulex		7	8							
Gammarus pulex/fossarum			2							
Gammarus sp.		12								
Glossiphonia paludosa				2						

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	**Area 1**	**Area 1**	**Area 1**	**Area 1**	**Area 2**	**Area 2**	**Area 2**	**Area 3**	**Area 1**	**Area 1**
Site name	**Ditch 1**	**Ditch 2**	**Ditch 3**	**Ditch 4**	**Ditch 1**	**Ditch 2**	**Ditch 3**	**Ditch 1**	**Reedbed**	**Wet woodland**
Gyraulus crista			27	12		6	16			
Haliplus flavicollis	1			1						
Haliplus fluviatilis			1							
Haliplus sp.			1			1				
Helius sp.						1		3		
Helophorus brevipalpis			1							
Hesperocorixa linnaei						10	3			
Hesperocorixa sahlbergi					2					
Hippeutis complanatus				1	12	19	3	2		
Hydracarina			32	2		4	5			
Hydrobius fuscipes		1	1	1				5	3	

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	**Area 1**	**Area 1**	**Area 1**	**Area 1**	**Area 2**	**Area 2**	**Area 2**	**Area 3**	**Area 1**	**Area 1**
Site name	**Ditch 1**	**Ditch 2**	**Ditch 3**	**Ditch 4**	**Ditch 1**	**Ditch 2**	**Ditch 3**	**Ditch 1**	**Reedbed**	**Wet woodland**
Hydrometra stagnorum					1					
Hydrophilidae				1						
Hydroporus angustatus		1							1	
Hydroporus memnonius								1		
Hydroporus palustris	1	1								
Hydroporus sp.		1								
Hygrotus inaequalis						1				
Hyphydrus ovatus					1	2	3			
Ilybius/Agabus sp.					5					
Ilyocoris cimicoides			1	3		7	5			
Ischnura elegans			1	6		3	1		1	

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	Area 1	Area 1	Area 1	Area 1	Area 2	Area 2	Area 2	Area 3	Area 1	Area 1
Site name	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 1	Ditch 2	Ditch 3	Ditch 1	Reedbed	Wet woodland
Leptocerus tineiformis			1	1						
Libellula quadrimaculata						1				
Libellulidae			1							
Limnephilus decipiens							1			
Limnephilus flavicornis		18								
Limnephilus lunatus					2			4		
Limnephilus marmoratus			1	3		3	4	8	1	1
Limnephilus politus		1								
Limnephilus sp.	1		1							1
Microcara testacea	1		43	46	296	252	36		2	
Noterus clavicornis			1	2		7		1		

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	Area 1	Area 1	Area 1	Area 1	Area 2	Area 2	Area 2	Area 3	Area 1	Area 1
Site name	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 1	Ditch 2	Ditch 3	Ditch 1	Reedbed	Wet woodland
Notonecta sp.			1	1						
Ochthebius minimus			1							
Odontomyia ornata			1	6						
Odontomyia sp.	1			19		13	6			
Oligochaeta	3					5	4	1	2	10
Physa fontinalis					1		2	2		
Physella sp.	5							2	4	1
Pisidium sp.	1	7	5	148	6	40	11	40		
Planorbarius corneus	1		5	7	20	5	340	10		
Planorbis carinatus		1	25	28	9		28	11		
Planorbis planorbis			8	60					9	9

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	Area 1	Area 1	Area 1	Area 1	Area 2	Area 2	Area 2	Area 3	Area 1	Area 1
Site name	Ditch 1	Ditch 2	Ditch 3	Ditch 4	Ditch 1	Ditch 2	Ditch 3	Ditch 1	Reedbed	Wet woodland
Planorbis sp.					2			2		
Plea minutissima			3	18			2	1		
Polycelis nigra/tenuis		7	1			1	1	19	2	
Proasellus meridianus					2					
Psychodidae				1				5		
Pyrrhosoma nymphula			1			1				
Radix balthica	2	2	34	5	9	8	73	31	10	7
Radix sp.			308	112					4	
Scirtidae								11		
Sphaerium corneum		2	2	4	1					
Sphaerium sp.						1				

Site no.	1	2	3	4	5	6	7	8	9	10
Survey Area	**Area 1**	**Area 1**	**Area 1**	**Area 1**	**Area 2**	**Area 2**	**Area 2**	**Area 3**	**Area 1**	**Area 1**
Site name	**Ditch 1**	**Ditch 2**	**Ditch 3**	**Ditch 4**	**Ditch 1**	**Ditch 2**	**Ditch 3**	**Ditch 1**	**Reedbed**	**Wet woodland**
Stagnicola palustris			5	4	1		5	45	9	2
Stratiomyidae			10		12			5		3
Succineidae					7	11	1	3		
Tabanidae							1		1	
Tabanus sp.					3	1				
Valvata cristata	5	8		7	32	12	11	26		
Valvata piscinalis		1								
Vanoyia tenuicornis					1	1				
No. of taxa	**22**	**27**	**50**	**50**	**39**	**46**	**37**	**39**	**23**	**14**

APPENDIX C: MACROINVERTEBRATE RAW DATA – TWO VILLAGE BYPASS SITES

Table C. 1 Two Village Bypass Invertebrate species list

Site no.	1	2	3	4
Site Description	**Ditch 1**	**Ditch 2**	**Alde us bridge**	**Alde ds bridge**
Taxa name				
Agabus paludosus	1			
Agabus sp.	3			
Anacaena limbata	5			
Asellidae	22	4		
Asellus aquaticus	188		2	
Baetis atlanticus/rhodani			2	
Baetis buceratus/vernus			9	
Baetis rhodani			1	
Baetis sp.			7	
Baetis vernus		26	2	
Bathyomphalus contortus	1			
Bithynia tentaculata			1	1
Caenis luctuosa/macrura			1	
Calopteryx splendens			1	
Centroptilum luteolum			4	4
Ceratopogonidae		16		
Chaetopteryx villosa			1	

Site no.	1	2	3	4
Site Description	**Ditch 1**	**Ditch 2**	**Alde us bridge**	**Alde ds bridge**
Chironomidae	1524	392	216	16
Collembola	4	8		
Copepoda	1			
Crangonyx pseudogracilis/floridanus	84	1		
Dendrocoelum lacteum	4			
Diptera				1
Dixa nebulosa	3	11		
Dixella amphibia				
Dugesia sp.	1			
Elmis aenea			1	
Elodes sp.	1	1	2	
Gammarus pulex	6	4	36	3
Gammarus pulex/fossarum			40	5
Gammarus sp.		51		
Glossiphonia complanata			1	
Habrophlebia fusca			2	
Halesus radiatus			9	4
Haliplus lineatocollis				2
Helius sp.		1		
Helophorus brevipalpis	1			

Site no.	1	2	3	4
Site Description	**Ditch 1**	**Ditch 2**	**Alde us bridge**	**Alde ds bridge**
Helophorus grandis	1			
Hemerodromia sp.			1	
Hydracarina			1	2
Hydroptila sp.			1	
Ilybius/Agabus sp.	11	1		
Libellulidae	1			
Limnephilus lunatus	73	28	28	14
Limnephilus sp.	103	75	13	8
Lymnaea stagnalis				1
Oligochaeta		92	20	4
Ostracoda	4			1
Oxycera/Vanoyia sp.			1	
Oxyethira sp.		1		
Physa fontinalis	38			2
Pilaria sp.				1
Pisidium sp.	36	15	46	2
Polycelis nigra/tenuis	80		1	
Proasellus meridianus	14	16	2	
Pyrrhosoma nymphula	13			
Radix balthica	6			
Sericostoma personatum				1

Site no.	1	2	3	4
Site Description	**Ditch 1**	**Ditch 2**	**Alde us bridge**	**Alde ds bridge**
Simuliidae			1	
Sphaerium corneum			2	
Stagnicola palustris	1			
Succineidae	3	7		
Valvata cristata	144	1		
Vanoyia tenuicornis		3		
No. of taxa	31	21	31	18

APPENDIX D: PANTHEON OUTPUT – HABITATS & RESOURCES MAIN DEVELOPMENT SITE

Habitats & resources: ISIS specific assemblage types

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
wetland	acid & sedge peats	reed-fen & pools	2	2	▲1000	2 NS; 1 EN; 1 Section 41 Priority Species; 1 Legal Protection	2	W314	Unfavourable (2 of 11 species)
wetland	marshland	open water on disturbed mineral sediments	1	2	▲100			W211	Unfavourable (1 of 6 species)

first prev 1 next last

Showing records 1 to 2 of 2

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Habitats & resources: broad biotopes

Broad biotope	No. of species	% representation	SQI	Conservation status	Species with conservation status
wetland	62	2	139	3 NS; 1 DD; 1 EN; 1 Section 41 Priority Species; 1 Legal Protection	4
tree-associated	3	<1	▲100		

first prev 1 next last

Showing records 1 to 2 of 2

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Habitats & resources: habitats

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
wetland	marshland	46	6	1 DD	107	1
wetland	acid & sedge peats	16	1	3 NS; 1 EN; 1 Section 41 Priority Species; 1 Legal Protection	250	3
wetland	lake	7	6	1 NS	▲143	1
tree-associated	shaded woodland floor	3	<1		▲100	
wetland	running water	3	<1		▲100	
wetland	wet woodland	3	1		▲100	
tree-associated	wet woodland	3	1		▲100	

first prev 1 next last

Showing records 1 to 7 of 7

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APPENDIX E: PANTHEON OUTPUT – HABITATS & RESOURCES TWO VILLAGE BYPASS

Habitats & resources: ISIS specific assemblage types

Broad biotope	Habitat	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Code	Reported condition
No information available									

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Habitats & resources: broad biotopes

Broad biotope	No. of species	% representation	SQI	Conservation status	Species with conservation status
wetland	27	<1	111	1 DD	1

first prev 1 next last

Showing records 1 to 1 of 1

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Habitats & resources: habitats

Broad biotope	Habitat	No. of species	% representation	Conservation status	SQI	Species with conservation status
wetland	marshland	15	2	1 DD	120	1
wetland	running water	12	1		⚠100	
wetland	lake	5	4		⚠100	
wetland	acid & sedge peats	2	<1		⚠250	

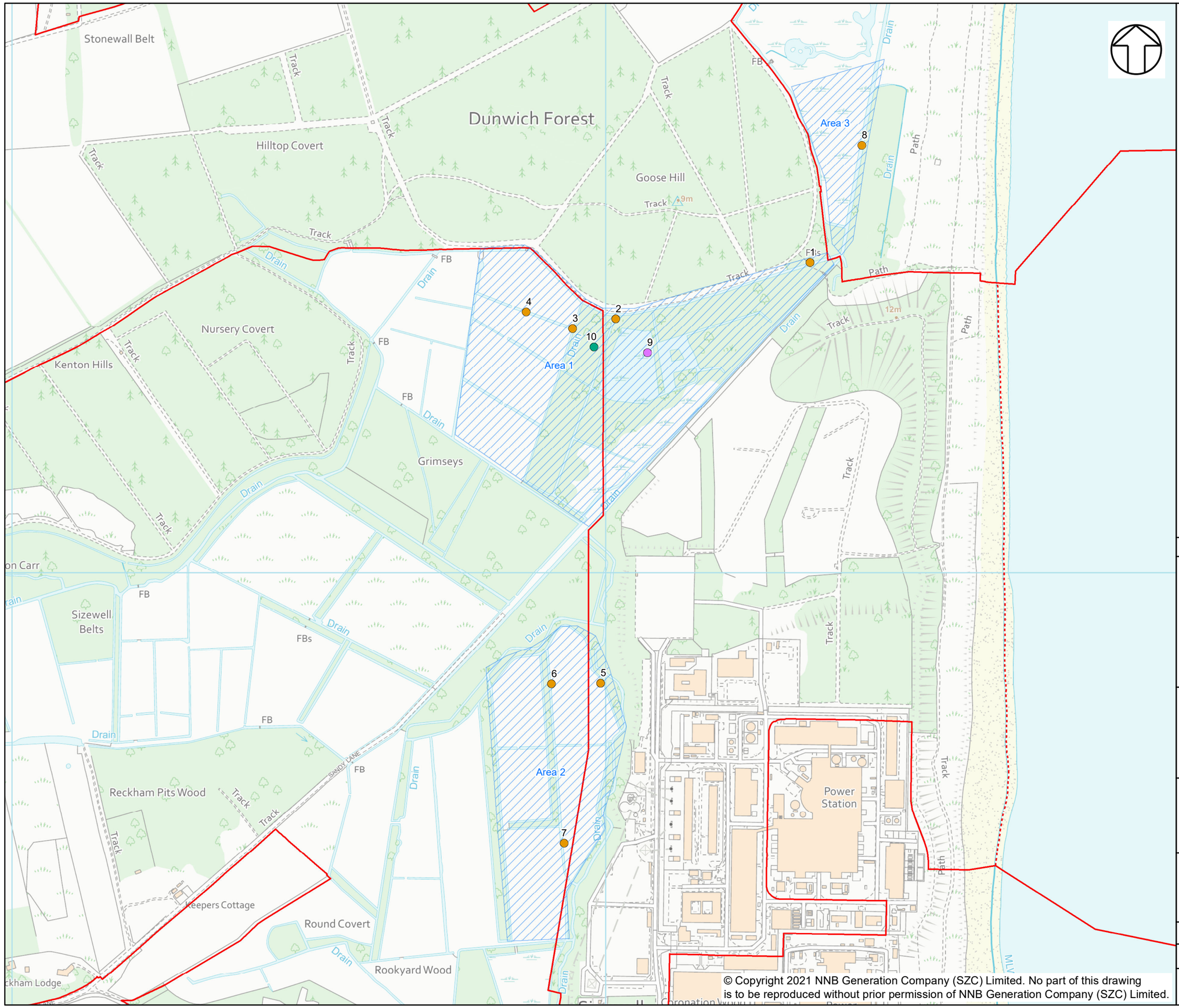
first prev 1 next last

Showing records 1 to 4 of 4

APPENDIX F: NORFOLK HAWKER – AREA 2: DITCH 3

Plate 1: Dorsal View

Plate 2: Ventral view of mask



NOTES

KEY

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE

AQUATIC INVERTEBRATE SAMPLING LOCATION

- DITCH
- REEDBED
- WET WOODLAND
- SURVEY AREA

NOT PROTECTIVELY MARKED

SizewellC
Doing the power of good for Britain
EDF CGN

DOCUMENT:
SZC 2021 AQUATIC INVERTEBRATE SURVEYS

DRAWING TITLE:
MDS SURVEY AREAS AND SAMPLE SITES

DRAWING NO:
FIGURE 1

DATE:	DRAWN:	SCALE :	REV:
AUG 2021	R.C.	1:6,000 @A3	01

SCALE BAR
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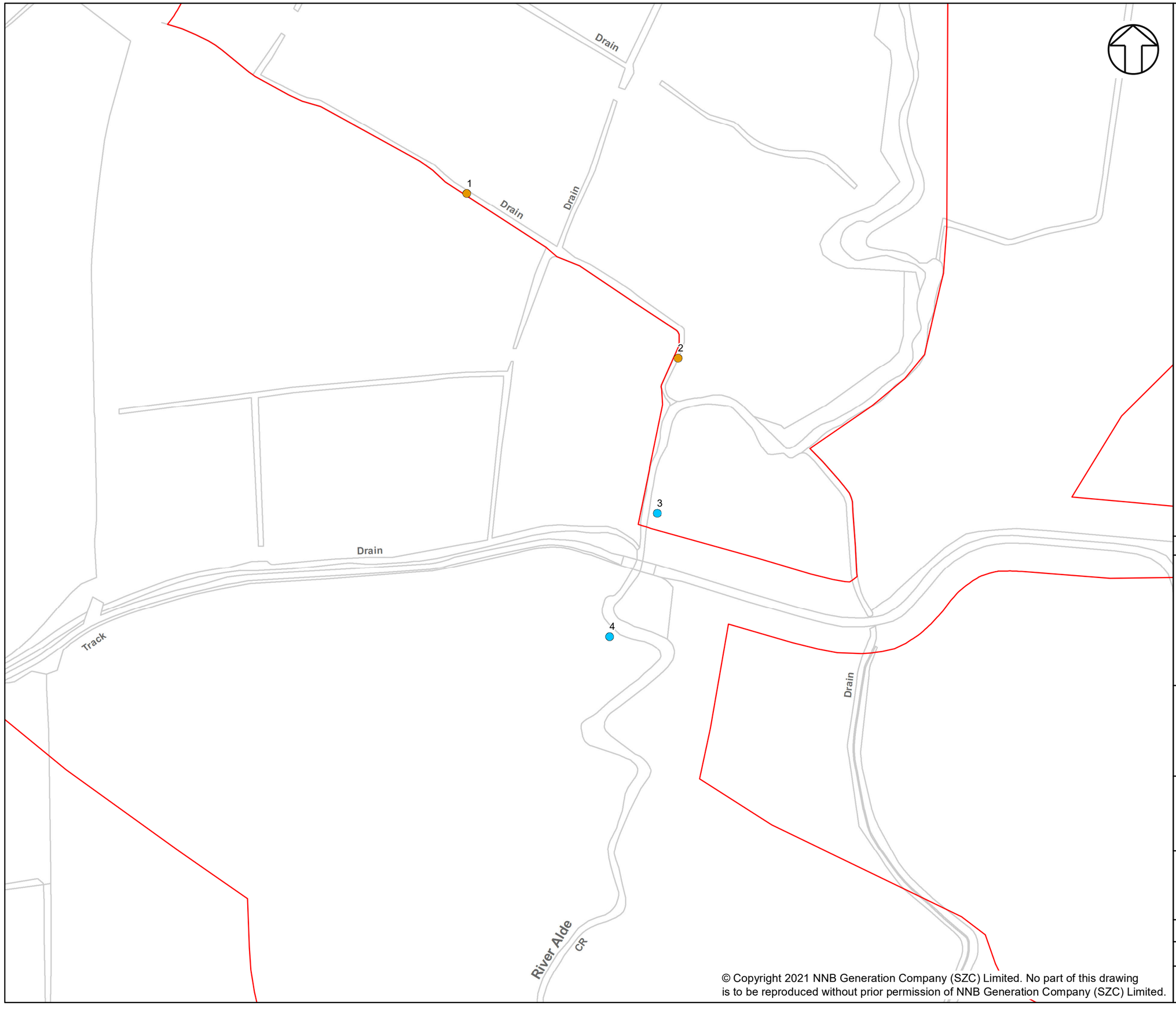

NOTES

KEY

DEVELOPMENT SITE BOUNDARY

AQUATIC INVERTEBRATE SAMPLING LOCATION

DITCH

RIVER

NOT PROTECTIVELY MARKED

SizewellC
Doing the power of good for Britain
EDF CGN

DOCUMENT:
SZC 2021 AQUATIC INVERTEBRATE SURVEYS

DRAWING TITLE:
TVB SAMPLE SITES

DRAWING NO:
FIGURE 2

DATE:	DRAWN:	SCALE :	REV:
AUG 2021	R.C.	1:1,500 @A3	01

SCALE BAR
0 10 20 30 40 50 M

APPENDIX D: ASSOCIATED DEVELOPMENT SITE GREAT CRESTED NEWT SURVEY REPORT

CONTENTS

TABLES

PLATES

None Provided.

FIGURES

APPENDICES

None Provided.

1 INTRODUCTION

1.1.1 Great Crested Newt (great crested newt) (*Triturus cristatus*) surveys have been previously undertaken on the Sizewell C Associated Development Sites as part of baseline data collection to inform the requirement for and preparation of draft protected species licences to be submitted to Natural England. These are described in **Table 1.1**.

Table 1.1 Previous great crested newt surveys on the Associated Development Sites

Site	Previous surveys	great crested newt presence within AD Site survey area
Northern park and ride	population surveys in 2015, eDNA in 2019 and HSI in 2020	Present
Southern park and ride	population surveys in 2014, HSI and eDNA surveys in 2020	Absent
Two village bypass	HSI and eDNA surveys in 2019	Absent
Sizewell link road	HSI and eDNA in 2019	Present
Yoxford	HSI and eDNA in 2019	Indeterminate, considered absent
Freight management facility	HSI surveys in 2019	Considered absent
Green rail route	HSI and population surveys in 2014 and eDNA in 2016	Present
Saxmundham to Leiston Branch Line	Desk study in 2016	Assumed present

1.1.2 Surveys were undertaken in 2021 to provide further information regarding great crested newt presence and population size within and around the Associated Development Sites where great crested newt have been recorded previously and to provide information to support licensing where previous surveys could not collect data due to constraints, such as lack of access.

2 METHODOLOGY

2.1 Desk Study

2.1.1 An evaluation of the following documents was undertaken to review the great crested newt surveys carried out to date on the Associated Development Sites and to inform pond locations for surveying in 2021:

- Sizewell C Environment Statement, Volume 3: Northern Park and Ride, Chapter 7: Terrestrial Ecology and Ornithology, Appendix 7A [APP-364];
- Sizewell C Environment Statement, Volume 4: Southern Park and Ride, Chapter 7: Terrestrial Ecology and Ornithology, Appendix 7A [APP-395];
- Sizewell C Environment Statement, Volume 5: Two Village Bypass, Chapter 7: Terrestrial Ecology and Ornithology, Appendix 7A [APP-426];
- Sizewell C Environment Statement, Volume 6: Sizewell Link Road, Chapter 7: Terrestrial Ecology and Ornithology, Appendix 7A [APP-462];
- Sizewell C Environment Statement, Volume 7: Yoxford Roundabout, Chapter 7: Terrestrial Ecology and Ornithology, Appendix 7A [APP-495];
- Sizewell C Environment Statement, Volume 8: Freight Management Facility, Chapter 7: Terrestrial Ecology and Ornithology, Appendix 7A [APP-524];
- Sizewell C Environment Statement, Volume 9: Rail, Chapter 7: Terrestrial Ecology and Ornithology, Appendix 7A [APP-556];
- Sizewell C 2020 Ecology Survey Report – Northern Park and Ride [AS-036];

- Sizewell C 2020 Ecology Survey Report – Southern Park and Ride [AS-036]; and
- Sizewell C 2020 Ecology Survey Report – Green Rail Route [AS-259].

2.1.2 Ponds were selected for survey in 2021 if they fit the following criteria:

A) great crested newt were recorded as present through previous population or eDNA surveys.

B) If they were recorded as dry in previous surveys.

C) If no access was granted during previous surveys.

D) If no surveys were previously undertaken or if ponds need resurveying due to recent change in scope.

2.1.3 Ponds were scoped out of survey in 2021 if they fit the following criteria:

E) great crested newt were recorded as absent through eDNA surveys undertaken in 2019 or 2020.

F) If they were recorded as defunct in previous surveys.

G) If they were scoped out for great crested newt during the detailed ES assessments.

2.2 Field Survey

a) Habitat Suitability Index assessment/ eDNA sampling

2.2.2 A Habitat Suitability Index (HSI) assessment was undertaken to assess the potential suitability for supporting breeding great crested newt of all ponds selected for survey in 2021 that fit Criteria B-D above. HSI information for ponds that fit Criteria A was collated from previous surveys (2019-2020).

2.2.3 The methodology followed the method outlined in the Amphibian and Reptile Groups of the UK (ARG UK) Advice Note 5: Great Crested Newt Habitat Suitability Index (Ref 1).

2.2.4 An egg search was undertaken during the HSI assessment to determine if great crested newt were present and breeding within the pond. These searches followed survey guidelines outlined in the Great Crested Newt Conservation Handbook (Ref 2).

2.2.5 If no great crested newt egg was found and the pond contained water, eDNA sampling was undertaken to determine if great crested newt DNA was present within each pond following sampling methodologies detailed in Biggs *et al.* (Ref 3). Analysis of eDNA samples was undertaken by ADAS.

2.2.6 The HSI and eDNA surveys were undertaken by suitably trained ecologists with at least one person per team of two holding a Natural England great crested newt level 1 class licence (CL08) between 15th April 2021 and 23rd June 2021.

b) Population surveys

2.2.7 Population surveys were undertaken at all ponds that fit Criteria A (paragraph 2.1.2) and ponds that fit Criteria B-D (paragraph 2.1.2) where eggs were found or eDNA surveys returned a positive result.

2.2.8 These surveys comprised of six visits to each pond between 29th March 2021 and 23rd June 2021, with up to three visits being undertaken during mid-April to mid-May, where possible. These surveys were undertaken following the recommendations in the Great Crested Newt Conservation Handbook (Ref 2) using the techniques described in **Table 2.1**.

Table 2.1 great crested newt population survey techniques

great crested newt survey Technique	Description
Bottle trapping	Traps deployed in ponds in the late afternoon, left overnight and collected early the following morning. Any newts or other amphibians recorded (species, sex, life stage) and released.
Torchlight search	A high-powered torch was used to search for great crested newt after sunset. Torch survey results are subject to high variation due to weather conditions, and so were only carried out under the following conditions: night-time air temperature >5°C, no/little wind, no rain.
Egg search	A visual check of submerged vegetation for great crested newt eggs carried out in daylight either prior to setting bottle traps or during their retrieval in the morning. If great crested newt eggs were recorded during the HSI assessment or as soon as great crested newt eggs were confirmed as present during population surveys, no further egg searches were undertaken on subsequent visits.

Sweep netting	Undertaken only if the pond was unsuitable to deploy traps or egg searching was not feasible, due to a lack of suitable vegetation, for example. A stout net was swept through vegetation in the pond to catch great crested newt.

2.2.9 Population surveys were not undertaken at ponds within 250m of the Saxmundham to Leiston branch line as presence/absence data from eDNA surveys is considered to be sufficient to inform the requirement for a protected species licence.

2.3 Limitations and Assumptions

a) Weather constraints

2.3.2 The 2021 survey season was constrained due to abnormal weather conditions which restricted great crested newt surveys being undertaken as temperatures fell outside of those recommended in the guidance. April began settled, but soon turned very cold, and a notable feature throughout the month was the number of air frosts (Ref 4). May began very unsettled and unseasonably cold, with frosts in many places (Ref 5) with East Anglia exposed to the coldest May in 25 years (Ref 6). This resulted in night-time temperatures frequently below 5 degrees with conventional surveys cancelled on the following weeks:

- W/C 5th April 2021 (6th – 9th);
- W/C 12th April 2021 (12th – 14th);
- W/C 19th April 2021 (19th, 21st – 23rd); and
- W/C 4th May 2021 (4th – 7th).

2.3.3 Natural England's guidance states that three visits should be undertaken between mid-April and mid-May (Ref 7) however due to the conditions and the number of ponds that required survey only two ponds received three survey visits during this time. Twenty-eight ponds received two visits during this window and 17 ponds were received one visit during this window. Of the ponds which received one visit during this window, nine were also constrained by access only being granted from the 13th of May and conventional surveys were suspended at one pond as conditions became unsuitable.

b) Dry ponds

2.3.4 Where ponds were found to be dry during the survey season, they were considered to be unsuitable for breeding great crested newt and therefore great crested newt were considered to be absent from these ponds.

c) eDNA Surveys

2.3.5 eDNA analysis can produce false positive or false negative results. Evidence suggests false negatives, which can occur in ponds that are only used intermittently by newts, are more likely to occur than false positives. As great crested newt are well known to use some ponds, especially small ones, for foraging only (non-breeding ponds), they may only visit sporadically during the spring and summer, increasing the chance that the

timing of an eDNA survey would not coincide with the presence of newts, thereby producing a false negative. False negatives may also occur when there is a small population of newts (especially in large ponds), and the amount of eDNA in the sample is below the detectable level.

2.3.6 Certain environmental factors can also affect the detectability of eDNA. eDNA breaks down significantly more quickly in samples taken from areas with no shading compared to heavily shaded areas, which could result in eDNA being undetected. In addition, the presence of algae or sediment in samples can inhibit the eDNA lab test and result in an indeterminate result. Effort was made to reduce the amount of algae and sediment collected within a sample.

2.3.7 There is also a considerable risk of contaminating the pond sample by bringing in great crested newt DNA in mud and water from other areas on boots and survey equipment. DNA can remain on surfaces even after they have been dried and can persist in soil for many years. There are recorded examples of eDNA cross-contaminating pond water samples from surveyor's boots. This limitation was reduced by cleaning and disinfecting equipment and boots thoroughly after each survey.

3 RESULTS

3.1.1 A total of 155 ponds were selected for further survey in 2021 and 68 ponds were scoped out of further survey based on the pond selection criteria described in paragraph 2.1.2. **Table 3.1** provides a breakdown of the pond selection by associated development site and selection criteria.

Table 3.1 Numbers of ponds scoped in and out of the 2021 survey for each associated development Site

	Ponds scoped in for 2021 survey					Ponds scoped out of 2021 survey			
Site	**Criteria A**	**Criteria B**	**Criteria C**	**Criteria D**	**Total**	**Criteria E**	**Criteria F**	**Criteria G**	**Total**
Northern Park and Ride	2	0	9	0	**13**	0	1	10	**11**
Southern Park and Ride	0	0	0	0	**0**	2	0	4	**6**
Two Village Bypass	0	0	6	7	**14**	6	1	8	**14**
Sizewell Link Road	14	18	55	11	**97**	8	7	1	**16**
Yoxford	0	0	8	1	**9**	0	0	2	**2**
Freight Management Facility	0	0	0	0	**0**	0	0	2	**2**
Green Rail Route	3	0	5	5	**14**	6	0	7	**13**
Saxmundham to Leiston Branch Line	0	1	3	23	**27**	0	0	0	**0**
Total					**158**[1]				**68**

Selection Criteria
Criteria A – great crested newt recorded as present through previous survey.
Criteria B – Pond recorded dry in previous surveys.
Criteria C – No access granted during previous surveys.
Criteria D – No surveys have been undertaken or pond requires re-survey due to scope change.
Criteria E – great crested newt recorded as absent through surveys undertaken in 2019-2020.
Criteria F – Ponds recorded as defunct in previous surveys.
Criteria G – Ponds scoped out during ES Assessments.

[1] This total has been altered to account for 6 ponds which fall within the survey buffer of two associated development Sites; four within the green rail route and Branch Line buffer and two within the survey buffers of Sizewell link road and Yoxford.

3.1.2 No ponds were scoped in for survey on southern park and ride or freight management facility and therefore these two sites are not discussed further.

3.1.3 The results of the field survey are outlined below for each site where ponds were scoped in for further survey.

3.1.4 Where some ponds are located within close proximity to each other and there is the presence of good habitat connectivity and the absence of barriers between ponds, there is reasonable certainty that there is regular interchange of great crested newt between ponds and as such, great crested newt from these ponds are considered to form a metapopulation. Potential metapopulations are highlighted for each site.

3.1 Northern Park and Ride

3.1.1 A total of 24 ponds are located within the northern park and ride red line boundary and 500m study area, displayed on **Figure 1**. Of these, 11 were scoped out for further survey in 2021 due to the following rationale:

- Pond 225 was classified as defunct during surveys in 2020.
- Ten ponds were separated from the northern park and ride site by the A12, a busy A road defined in parts by high kerbs and drainage gullies. Motivation for great crested newt to cross this barrier from the east, should they be present, is likely to be low due to the suboptimal terrestrial habitat present within the northern park and ride site and as such these ponds are considered to be terrestrially isolated from potential impacts arising from the proposals.

3.1.2 13 ponds were selected for survey in 2021. **Table 3.2** provides a summary of the results of the 2021 survey. Detailed results, including HSI information, full population survey results and analysis of constraints are contained within the **Northern Park and Ride Great Crested Newt Licence Application** (Doc Ref. 6.4 7A.5(A)).

Table 3.2 Northern Park and Ride great crested newt survey results summary (Green indicates great crested newt presence)

Pond ID	Status	HSI score	great crested newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P078	Pond	Average	No	Positive	Yes	12	Medium	
P083	Pond	Below Average	No	Negative	No			

Pond ID	Status	HSI score	great crested newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P084	Pond	Poor	No	Negative	No			
P085	Pond	Poor	No	Negative	No			
P086								No access
P087								No access
P217	Pond	Average	Yes	N/A	Yes	47	Medium	No bottle trapping
P218	Pond	Average	Yes	N/A	Yes	9	Small	No bottle trapping
P219	Pond	Average	Yes	N/A	Yes	2	Small	No bottle trapping , High vegetation cover on four visits
P220	Pond	Poor	No	Positive	No		Assumed Small	No population survey undertaken due to no access until June.
P221	Pond	Poor	No	Positive	No		Assumed Small	No population survey undertaken due to no access until June.
P226	Pond	Poor	No	Negative	No			
P227	Pond	Below Average	No	Positive	Yes	0	Small	High turbidity on five visits

3.1.3 The results show that great crested newt were recorded as present within seven ponds. Population surveys were undertaken at five ponds however were constrained on some ponds due to sub-optimal survey conditions at pond 219 and 227 and the presence of water shrew at P217, P218 and P219 which prevented bottle trapping. Despite the lack of bottle trapping at P217 and P218 conditions were favourable for torching so the results are

considered robust Furthermore eggs were found in P217 – P219 which confirms breeding. Pond 220 and 221 were only subjected to eDNA survey due to late access preventing population surveys from commencing. Population size is assumed small at these ponds due to the HSI score being poor and the adjacent ponds only supporting small populations.

3.1.4 The northern park and ride great crested newt populations are considered to form a metapopulation, described in **Table 3.3**.

Table 3.3 Potential NPR great crested newt Metapopulations

Metapopulation	Ponds	Potential metapopulation size and rationale
NPR01	P078, P217, P218, P219, P220, P221	Medium – surveys were constrained as bottle trapping was stopped after visit one, however the HSI scores suggest that these ponds may not be suitable to support large populations

3.1.5 Pond 227 is not considered to be part of this metapopulation on the basis that it is 750m away with minimal connecting habitat. It may be part of another metapopulation with ponds to the north however data is not available to confirm this.

3.2 Two Village Bypass

3.2.1 A total of 28 ponds are located within the two village bypass red line boundary and 500m study area, displayed on **Figure 2**. Of these, 14 were scoped out due to the following rationale:

- Seven ponds (P024, P101, P102, P155, P156, P157 and P207) were separated from the two village bypass site by the A12, a busy A road defined in parts by high kerbs and drainage gullies. Motivation for great crested newt to cross this barrier from the north, should they be present, is likely to be low due to the suboptimal terrestrial habitat present within the two village boundary site and as such these ponds are considered to be terrestrially isolated from potential impacts arising from the proposals.
- Ponds P022, P077, P098, P162, P196, P197 and P205 were surveyed in 2019. The results of this survey are considered current and accurate so further survey on these ponds was deemed unnecessary.

3.2.2 Of the ponds selected for further survey:

- Ponds P099, P100, P097, P200, P201, P202 and P203 were not surveyed in 2019 due to access restrictions.
- Ponds P198, P199 and P232 were surveyed in 2019 (all eDNA negative) however were surveyed again due to their proximity to the un-surveyed ponds above.
- Pond P233 was not identified during surveys in 2019.

Table 3.4 Two Village Bypass great crested newt survey results summary

Pond ID	Status	HSI score	great crested newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P026								No access
P097	Defunct							
P099	Pond	Poor	No	Negative	No			
P100	Pond	Poor	No	Negative	No			
P198	Pond	Below Average	No	Negative	No			
P199	Pond	Good	No	Negative	No			
P200	Pond	Average	No	Negative	No			
P201	Pond	Good	No	Negative	No			
P202	Pond	Good	No	Negative	No			
P203	Pond	Poor	No	Negative	No			
P204	Pond	Below Average	No	Negative	No			
P208								No access
P232	Pond	Below Average	No	Negative	No			
P233	Pond	Poor	No	Negative	No			

3.2.3 Habitats within the survey area are suitable for great crested newt, particularly around the Farnham Hall area with blocks of woodland, hedgerows and rough grassland connecting many of the ponds in this location. However, the results show that no great crested newt presence was recorded within the two village bypass survey area. This reflects the results of surveys undertaken in 2019 in which no great crested newt presence was recorded. great crested newt are therefore considered absent from the two village bypass survey area.

3.3 Sizewell Link Road

3.3.1 A total of 113 ponds are located within the Sizewell link road red line boundary and 500m study area, displayed on **Figure 3**. Of these, 16 were scoped out of further survey in 2021 due to the following rationale:

- Ponds P125, P127, P128, P138, P141, P149 and P224 were recorded as defunct during surveys in 2019 so were not revisited in 2021.
- Surveys on ponds P038, P046, P060, P108, P109, P115, P151 and P160 in 2019 returned a negative eDNA result. These results were considered current and accurate, so these ponds were not revisited in 2021.
- P122 was scoped out for further survey as it was a swimming pool in a garden and considered unsuitable for great crested newt.

3.3.2 Ninety-seven ponds were selected for survey in 2021. **Table 3.5** provides a summary of the results of the 2021. Detailed results, including HSI information, full population survey results and analysis of constraints are contained within the **Sizewell Link Road Great Crested Newt Licence Application** (Doc Ref. 6.7 7A.5 (A)).

3.3.3 The survey coverage was more extensive than surveys undertaken in 2019 due to wider available access and the use of conventional surveys on the ponds that returned a positive eDNA result, where possible.

Table 3.5 Sizewell Link Road great crested newt survey results summary (green indicates great crested newt presence, orange indicates assumed great crested newt presence)

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P001	Dry							
P005	Dry							
P010	Pond	Below Average	No	Negative				See great crested newt Licence
P011	Pond	Poor	No	Negative				See great crested newt Licence
P031	Pond	Good	No	Negative assumed present			Assumed small	See great crested newt Licence
P032	Pond	Average	Yes	Positive	Yes	0	Assumed small	See great crested newt Licence
P033	Pond	Poor	No	Negative				See great crested newt Licence
P034								No access – assumed absent
P035	Pond	Poor	No	Positive	Yes	0	Assumed small	See great crested newt Licence
P036	Pond	Good	Yes	Positive	Yes	3	Assumed medium	See great crested newt Licence

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P037								No access – assumed absent
P038								No access – assumed absent
P039	Pond	Below Average	No	Negative				See great crested newt Licence
P040	Pond	Good	No	Negative assumed present			Assumed small	See great crested newt Licence
P041	Pond	Average	No	Positive	Yes	0	Assumed small	See great crested newt Licence
P042	Pond	Below Average	No	Negative assumed present			Assumed small	See great crested newt Licence
P043	Pond	Below Average	No	Positive	Yes	0	Assumed small	See great crested newt Licence
P044	Pond	Average	No	Negative				See great crested newt Licence
P045	Pond	Poor	No	Positive	Yes	0	Assumed small	See great crested newt Licence

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P047	Pond	Poor	No	Negative				See great crested newt Licence
P048	Pond	Average	Yes	Negative	Yes	58	Medium	See great crested newt Licence
P049	Pond	Excellent	Yes	Positive	Yes	17	Medium	See great crested newt Licence
P050	Defunct							
P051	Pond	Below Average	No	Positive	Yes	5	Small	See great crested newt Licence
P052	Pond	Average	Yes	Positive	Yes	0	Assumed small	See great crested newt Licence
P053	Pond	Good	No	Positive	Yes	0	Assumed small	See great crested newt Licence
P057	Pond	Below Average	Yes	Positive	Yes	1	Assumed medium	See great crested newt Licence
P058	Pond	Below Average	No	Positive	Yes	1	Small	See great crested newt Licence
P059	Pond	Below Average	No	Negative				See great crested newt Licence

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P061	Pond	Poor	Yes	Positive	Yes	1	Small	See great crested newt Licence
P062	Pond	Good	No	Positive			Assumed medium	See great crested newt Licence
P063	Dry	Poor						
P064	Pond	Good	Yes	Positive	Yes	16	Medium	See great crested newt Licence
P065							Unknown - assumed present	No access
P066	Pond	Good	Yes	Positive	Yes	37	Medium	See great crested newt Licence
P067	Pond	Average	Yes	Eggs found	Yes	9	Assumed medium	See great crested newt Licence
P068	Pond	Good	No	Negative assumed present			Assumed small	See great crested newt Licence
P069							Unknown - assumed present	Unknown - assumed present
P079	Pond	Excellent	Yes	Positive	Yes	29	Medium	See great crested newt Licence
P080	Dry							

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P081	Pond	Excellent	No	Positive	Yes	10	Medium	See great crested newt Licence
P082	Pond	Average	No	Positive	Yes	0	Assumed small	See great crested newt Licence
P096	Defunct							
P103	Pond	Average	No	Negative				See great crested newt Licence
P104							Unknown - assumed present	No access
P105	Pond	Poor	No	Negative				See great crested newt Licence
P107	Pond	Below Average	Yes	Positive	Yes	1	Small	See great crested newt Licence
P114								No access
P116	Pond	Poor	No	Negative				See great crested newt Licence
P117	Pond	Poor	No	Negative				See great crested newt Licence
P118	Pond	Below Average	No	Negative				See great crested newt Licence

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P119	Pond	Below Average	No	Positive	Yes	0	Assumed small	See great crested newt Licence
P120	Pond	Poor	Yes	Positive	Yes	2	Small	See great crested newt Licence
P121	Pond	Average	Yes	Positive	Yes	3	Small	See great crested newt Licence
P123	Pond	Average	Yes	Positive	Yes	14	Medium	See great crested newt Licence
P124	Pond	Average	No	Positive			Assumed small	See great crested newt Licence
P126	Pond	Poor	Yes	Positive	Yes	40	Medium	See great crested newt Licence
P129	Defunct							
P130	Pond	Average	No	Positive	Yes	3	Small	See great crested newt Licence
P131	Pond	Average	No	Negative				See great crested newt Licence
P132								No access – assumed absent

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population on survey undertaken	Peak Count	Population Size	Constraints to survey
P133	Defunct							
P134	Pond	Average	No	Negative				See great crested newt Licence
P135	Pond	Poor	Yes	Positive	Yes	0	Assumed small	See great crested newt Licence
P136	Pond	Average	No	Positive	Yes	0	Assumed small	See great crested newt Licence
P137	Pond	Excellent	Yes	Positive	Yes	5	Assumed medium	See great crested newt Licence
P139	Dry							
P140	Pond	Good	Yes	Positive	Yes	3	Assumed medium	See great crested newt Licence
P142							Unknown - assumed present	No access
P143	Pond	Below Average	Yes	Positive	Yes	5	Small	See great crested newt Licence
P144							Unknown - assumed present	No access
P145	Pond	Poor	No	Negative			Assumed small	See great crested newt Licence

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
				assumed present				
P146							Unknown - assumed present	No access
P147							Unknown - assumed present	No access
P148	Pond	Excellent	No	Negative assumed present			Unknown	No access
P150								No access – assumed absent
P152	Defunct							
P153	Pond	Below Average	No	Negative				See great crested newt Licence
P158	Defunct							
P163	Pond	Average	No	Positive	Yes	1	Small	See great crested newt Licence
P164	Pond	Average	Yes	Positive	Yes	2	Small	See great crested newt Licence

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P165	Dry	Poor						
P166	Pond	Poor	No	Positive	Yes	3	Small	See great crested newt Licence
P167	Pond	Poor	No	Positive	Yes	0	Small	See great crested newt Licence
P168	Dry	Poor						
P169	Defunct							
P170								No access
P171	Pond	Good		Negative assumed present			Assumed medium	See great crested newt Licence
P172	Pond	Excellent	Yes	Eggs found			Assumed medium	See great crested newt Licence
P210	Pond	Poor		Positive	Yes	1	Small	See great crested newt Licence
P211	Pond	Average		Positive	Yes	0	Assumed small	See great crested newt Licence
P212							Unknown - assumed present	No access

Pond ID	Status	HSI score	Great Crested Newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P213							Unknown - assumed present	No access
P214	Pond	Below Average		Negative				See great crested newt Licence
P215	Pond	Below Average	Yes	Positive	Yes	3	Small	See great crested newt Licence
P216	Dry	Poor						
P222								No access

3.3.4 The results show that great crested newt are present within suitable habitat throughout much of the Sizewell link road survey area. great crested newt were recorded present within 41 ponds and great crested newt presence is assumed in a further 15 ponds resulting in a total of 55 great crested newt ponds within 500m of Sizewell link road. Of these ponds, 17 contained or were assumed to contain a medium population, 31 contained or were assumed to contain a small population and 9 were considered unknown, due to lack of information.

3.3.5 Seven ponds were within the Sizewell link road site. Of these, five are great crested newt ponds (P036, P041, P119, P120 and P164) , one was dry (P165) and great crested newt were considered absent from the other (P046).

3.3.6 The Sizewell link road great crested newt populations are considered to form the following metapopulations, summarised in **Table 3.6.** Detailed description and justification for metapopulation selection is described within the **Sizewell Link Road Great Crested Newt Licence Application** (Doc Ref. 6.7 7A.5(A)).

Table 3.6 Potential Sizewell link road great crested newt Metapopulations

Metapopulation	Ponds	Potential metapopulation size and rationale summary
SLR01	P031, P032, P035, P104, P040, P041, P042, P043, P107, P068	Small - due to peak count of oneand small population and and small population size class in surveyed ponds.
SLR02	P036, P045, P048, P067, P079, P119, P120, P121, P123, P124, P166, P167	Medium – due to a peak count of 77, the presence of ponds with medium populations and availability of linking terrestrial habitat between the ponds.
SLR03	P062, P064, P065, P066 P126, P164, P171, P172, P215	Medium – due to a peak count of 56, the presence of ponds with medium populations and availability of linking terrestrial habitat between the ponds.
SLR04	P051, P052, P053, P058, P081, P082, P135, P136,	Medium – due to a peak count of 11, the presence of ponds with medium populations, availability of linking terrestrial habitat between the ponds

Metapopulation	Ponds	Potential metapopulation size and rationale summary
	P137, P140, P142, P143, P144, P145, P146, P147, P148, P163, P210, P211, P212, P213	through an extensive hedgerow network and rough grassland and the proximity of these ponds to the great crested newt populations at Theberton Woods County Wildlife Site (CWS) (<250m).

3.3.7 Some of the metapopulations described above are close to one another. For instance, the pond at the east edge of Metapopulation SLR02 (P036) is 480m from the closest pond in Metapopulation SLR03 (P164) however, once travel through potential connecting habitat is accounted for, the distance amounts to 740m. This is considered sufficient distance to assume that this is the likely boundary between Metapopulation SLR03 and SLR04.

3.3.8 Habitats that support metapopulation SLR04 are contiguous with Theberton Woods CWS. This CWS supports a significant population of great crested newt. It is likely that there is movement of individuals from this metapopulation into the population at Theberton Woods and vice versa.

3.3.9 Pond P049, P057, P061, and P130 were not considered to fall within any metapopulation due to the lack of proximity to other great crested newt ponds.

3.4 Yoxford Roundabout

3.4.1 A total of 11 ponds are located within the Yoxford site boundary and 500m study area, displayed on **Figure 4**. Of these, 2 were scoped out of further survey in 2021 due to the following rationale:

- P073 and P074 are separated from the Yoxford development site by the A12, a busy A road that is considered to form a substantial barrier to any great crested newt populations associated with these ponds.

3.4.2 Nine ponds were selected for survey in 2021, **Table 3.7** provides a summary of the results of the 2021 survey.

Table 3.7 Yoxford great crested newt survey results summary (orange indicates great crested newt assumed presence)

Pond ID	Status	HSI score	great crested newt	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey

			Eggs found					
P070								No access – assumed presence
P071								No access
P072								No access – assumed presence
P075								No access – assumed presence
P110								No access – assumed presence
P111								No access – assumed presence
P112								No access – assumed presence
P113								No access
P223	Pond	Poor	No	Indeterminate	Yes	0	N/A	Population surveys suspended after visit two

3.4.3 The results of the 2021 great crested newt survey at Yoxford were heavily constrained by restricted access to ponds south and east of the proposed development. The terrestrial habitats between the ponds to the south consist of Woodpasture and Parkland Priority Habitat (Ref 8) which is of value to great crested newt and provide good connectivity. Presence in these ponds is therefore assumed, with the exception of P071 due to its large size and the likelihood of presence of fish and waterfowl. Access was granted to P223, which lies adjacent to the red line boundary, however eDNA results were indeterminate and the HSI poor due to the use of this pond as a farm slurry pit. Population surveys were suspended as conditions were deemed to become more unsuitable for great crested newt as the survey progressed. It is therefore assumed that great crested newt are absent from P223.

3.5 Green Rail Route

3.5.1 A total of 20 ponds are located within the green rail route site boundary and 500m study area, displayed on **Figure 5**. Of these, six were scoped out for further survey in 2021 due to the following rationale:

- Pond P002, P003, P006 and P016 were surveyed in 2020. The results of this survey are considered current and accurate so further survey on these ponds was deemed unnecessary.
- Pond P028 was scoped out of surveys in 2020 as aerial maps showed it to be a swimming pool.
- Pond 029 was classified as defunct during surveys in 2020.

3.5.2 An additional seven pond locations that were identified for survey in 2014 were scoped out in the ES [APP-555] on the basis that there were no ponds present in 2014, or in recent history, at these locations. These locations were included on **Volume 9**, **Chapter 7**, **Figure 7.4** of the **ES** [APP-557] but are not included in this report.

3.5.3 Fourteen ponds were selected for survey in 2021. **Table 3.8** provides a summary of the results of the 2021 survey. Detailed results, including HSI information, full population survey results and analysis of constraints are contained within the **Green Rail Route Great Crested Newt Licence Application** (Doc Ref. 9.93).

Table 3.8 Green Rail Route great crested newt survey results summary (green indicates great crested newt presence)

Pond ID	Status	HSI score	great crested newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P004	Pond	Good	Yes	Positive	Yes	69	Medium	Water level had dropped by visit five and was dry on visit six
P017								No access
P018								No access
P023	Pond	Poor	No	Negative				
P025	Pond	Good	No	Negative				
P026								No access

Pond ID	Status	HSI score	great crested newt Eggs found	eDNA result	Population survey undertaken	Peak Count	Population Size	Constraints to survey
P027	Pond	Poor	No	Negative				
P029								No access
P030	Pond	Excellent	Yes	Positive	Yes	76	Medium	
P036	Pond	Average	No	Positive			Assumed small	
P054	Pond	Average	No	Negative				
P055	Pond	Average	Yes	Positive	Yes	6	Assumed medium	20% of the bank was surveyed due to dense scrub. Peak count extrapolated upwards to account for this
P056	Pond	Poor	No	Negative				
P230								No access

3.5.4 Four pounds within the survey area were recorded as great crested newt ponds with two containing medium population, one where the population size was assumed medium and one with population size assumed small, due to the Average HSI score.Ponds within the green rail route survey area, particularly P004 and P030 which support medium populations, are not considered to be part of a metapopulation with other ponds due to the lack of great crested newt ponds in proximity to these (>350) and the unsuitable connecting habitat (largely arable) between these two ponds and others <500m.

3.6 Saxmundham to Leiston Branch Line

3.6.1 A total of 27 ponds are located within 250m of the Saxmundham to Leiston branch site boundary. A 250m study area was applied to this scheme instead of the 500m used for other sites due to the nature of the proposed works, which consist of ballast cleaning, rail track replacement and an increase in rail traffic. Unlike other associated developments sites, many of the ponds (22/27) have not been surveyed before so all were scoped into 2021 surveys. Five ponds; P015, P023, P026, P036 and P230 fall within

the survey buffers of grain rail route and the main development site respectively.

3.6.2 Surveys along the Saxmundham to Leiston branch line consisted of HSI/eDNA only, as discussed in paragraph 2.2.9. **Table 3.9** provides a summary of the results of the 2021 survey.

Table 3.9 Branch Line great crested newt survey results summary (Green indicates great crested newt presence, orange indicates assumed great crested newt presence)

Pond ID	Status	HSI score	great crested newt Eggs found	eDNA result	Constraints to survey
P015	Dry	Poor			
P020	Pond	Average	No	Positive	
P021	Pond	Good	No	Positive	
P023	Pond	Poor	No	Negative	
P026					No access
P036	Pond	Good	Yes	Positive	
P176	Pond	Average	No	Negative	
P177	Pond	Poor	No	Negative	
P178	Pond	Average	No	Positive	
P179	Pond	Poor	Yes	Positive	
P180	Pond	Below Average	No	Positive	
P181	Pond	Poor	Yes	Positive	
P182					No access
P183	Pond	Good	No	Positive	
P184					No access
P185	Pond	Good	No	Positive	
P186	Pond	Average	No	Positive	
P187					No access
P188					No access
P189					No access
P190					No access
P191					No access
P192					No access
P193					No access
P194					No access
P195					No access
P230					No access

3.6.3 The results show that great crested newt are present within ponds along the length of the Saxmundham to Leiston branch line survey area. great crested newt were recorded as present within 10 of the ponds surveyed.

Access was not granted to 13 ponds however as a precaution, great crested newt are considered present in all of these except P230 which is isolated within a garden more than 250m from the nearest pond.

3.6.4 The railway track itself does not contain suitable breeding habitat however this section of railway is rarely used by trains and contained suitable hibernacula and could therefore be used as a wildlife corridor for great crested newt movement or for sheltering and hibernating great crested newt.

3.6.5 The Saxmundham to Leiston branch line great crested newt populations are considered to form the potential metapopulations displayed in **Table 3.10**.

Table 3.10 Potential Branch Line great crested newt Metapopulations

Metapopulation	Ponds	Potential metapopulation size and rationale
BL01	P020, P021	Assumed medium – Due to the Good HSI score of P021
BL02	P179, P180, P181	Assumed small – Due to the Poor – Below Average HSI scores of all ponds
BL03	P182, P183, P184, P185	Assumed medium – Due to the Good HSI scores of P183 and P185.
BL04	P186, P187, P188, P190, P191, P192, P193, P194, P195	Assumed small – due to the Average HSI score of P186

3.6.6 The metapopulations considered above do not include P178 and P189. These two ponds are >400m from the closest great crested newt (or assumed great crested newt) pond and lack suitable connecting habitat meaning great crested newt movement from these ponds to others within the 250m buffer is unlikely.

4 CONCLUSION

4.1.1 Great crested newt surveys were undertaken on northern park and ride, two village bypass, Sizewell link road, Yoxford, Green rail route and the Saxmundham to Leiston branch line in 2021 to provide further information on great crested newt distribution and abundance across the associated development Sites to inform species licensing. Southern park and ride and freight management facility were not subjected to further surveys due to the absence of great crested newt within these developments.

4.1.2 great crested newt were recorded within the red line boundary of northern park and ride and Sizewell link road and within 500m of northern park and ride, Sizewell link road, green rail route and the Saxmundham to Leiston branch line, as shown in **Table 4.1**. No great crested newt were recorded within 500m of two village bypass and Yoxford. Great crested newt are assumed to be within 500m of Yoxford.

Table 4.1 great crested newt recorded and assumed presence within each AD Site subject to survey in 2021

AD Site	great crested newt recorded present	great crested newt assumed present	great crested newt present within RLB	Number of identified metapopulations
Northern Park and Ride	7	0	1	1
Two Village Bypass	0	0	0	0
Sizewell Link Road	41	16	5	4
Yoxford	0	6	0	1 (assumed)
Green Rail Route	4	0	0	
Saxmundham to Leiston Branch Line	10	12	0	4
Total	**61**[2]	**34**	**6**	**10**

4.1.3 Ten metapopulations were recorded within the associated development Sites. These consisted of small to medium (assessed and assumed)

[2] Total has been altered to account for P036, a GCN pond, that falls within GRR and the Branch Line.

metapopulations. No large populations or metapopulations were recorded during 2021 surveys.

4.1.4 Suffolk is known to have a high population of great crested newt, particularly in the north-east of the county, where there is a higher abundance of ponds (Ref 9). The results of the 2021 great crested newt survey reflect this and show a widespread distribution of this species throughout the landscape north and north-west of Leiston.

4.1.5 The surveys undertaken for great crested newts in 2021 provide up to date distribution and population information to enable the submission of draft licenses for this species to be submitted to Natural England. The surveys do not change the assessments presented in the ES for any of the sites or the mitigation that is to be deployed in relation to this species.

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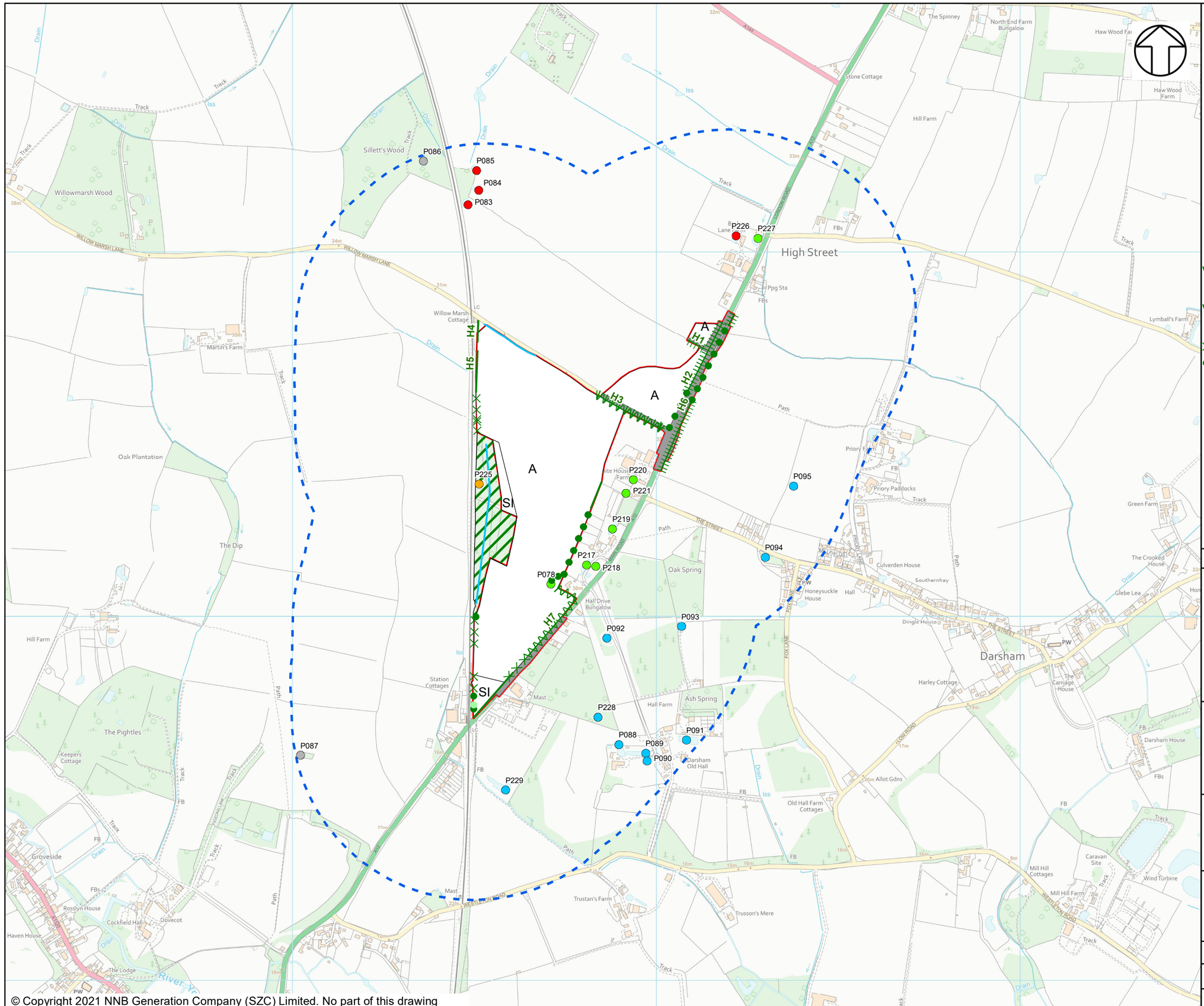

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- GCN ABSENT
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- PONDS SCOPED OUT
- NO ACCESS
- SCATTERED BROADLEAVED TREES
- MIXED WOODLAND PLANTATION
- HEDGE WITH TREES - SPECIES-POOR
- INTACT HEGDE - SPECIES RICH
- INTACT HEGDE - SPECIES POOR
- HEDGE WITH TREES - NATIVE SPECIES-RICH
- RUNNING WATER
- SCATTERED SCRUB
- SCATTERED BRAODLEAVED TREES
- BROADLEAVED WOODLAND - PLANTATION
- HARDSTANDING
- A CULTIVATED/DISTURBED LAND-ARABLE
- SI POOR SEMI-IMPROVED GRASSLAND
- STANDING WATER

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NORTHERN PARK AND RIDE GCN SURVEY RESULTS

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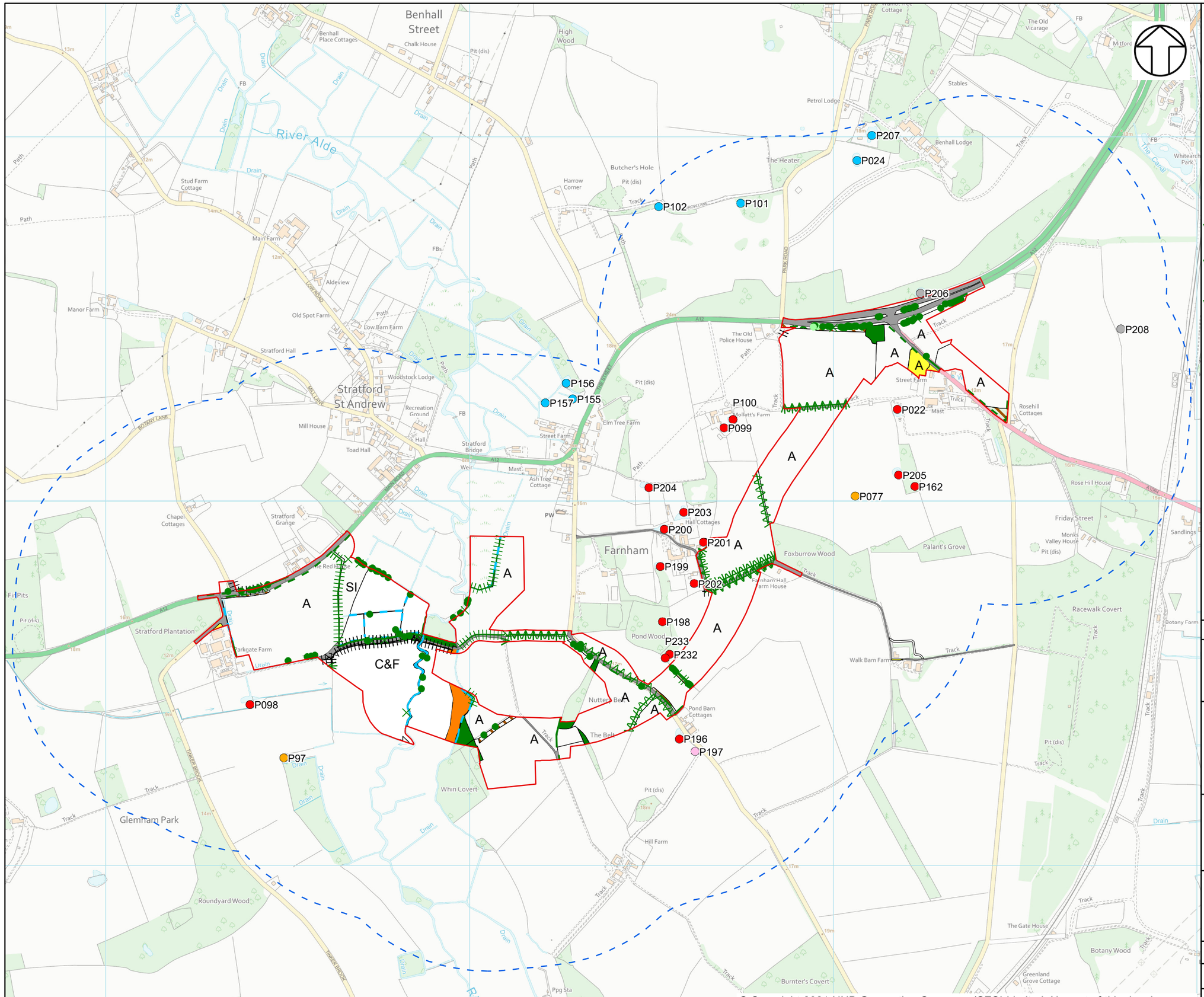

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- SCATTERED CONIFEROUS TREES
- SCATTERED SCRUB
- STANDING WATER
- RUNNING WATER
- INTACT HEDGE - NATIVE SPECIES-RICH
- INTACT HEDGE - SPECIES-POOR
- DEFUNCT HEDGE - NATIVE SPECIES-RICH
- DEFUNCT HEDGE - SPECIES-POOR
- HEDGE WITH TREES - NATIVE SPECIES-RICH
- HEDGE WITH TREES - SPECIES-POOR
- FENCE
- DRY DITCH
- BROADLEAVED WOODLAND - SEMI-NATURAL
- SCRUB - DENSE/CONTINUOUS
- SI NEUTRAL GRASSLAND - SEMI-IMPROVED
- SI POOR SEMI-IMPROVED GRASSLAND
- OTHER TALL HERB AND FERN - RUDERAL
- C&F COASTAL AND FLOODPLAIN
- DITCH
- RUNNING WATER
- HARD STANDING
- A CULTIVATED/DISTURBED LAND - ARABLE
- A CULTIVATED/DISTURBED LAND - AMENITY GRASSLAND
- INTRODUCED SHRUB

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TWO VILLAGE BYPASS GREAT CRESTED NEWT SURVEY RESULTS

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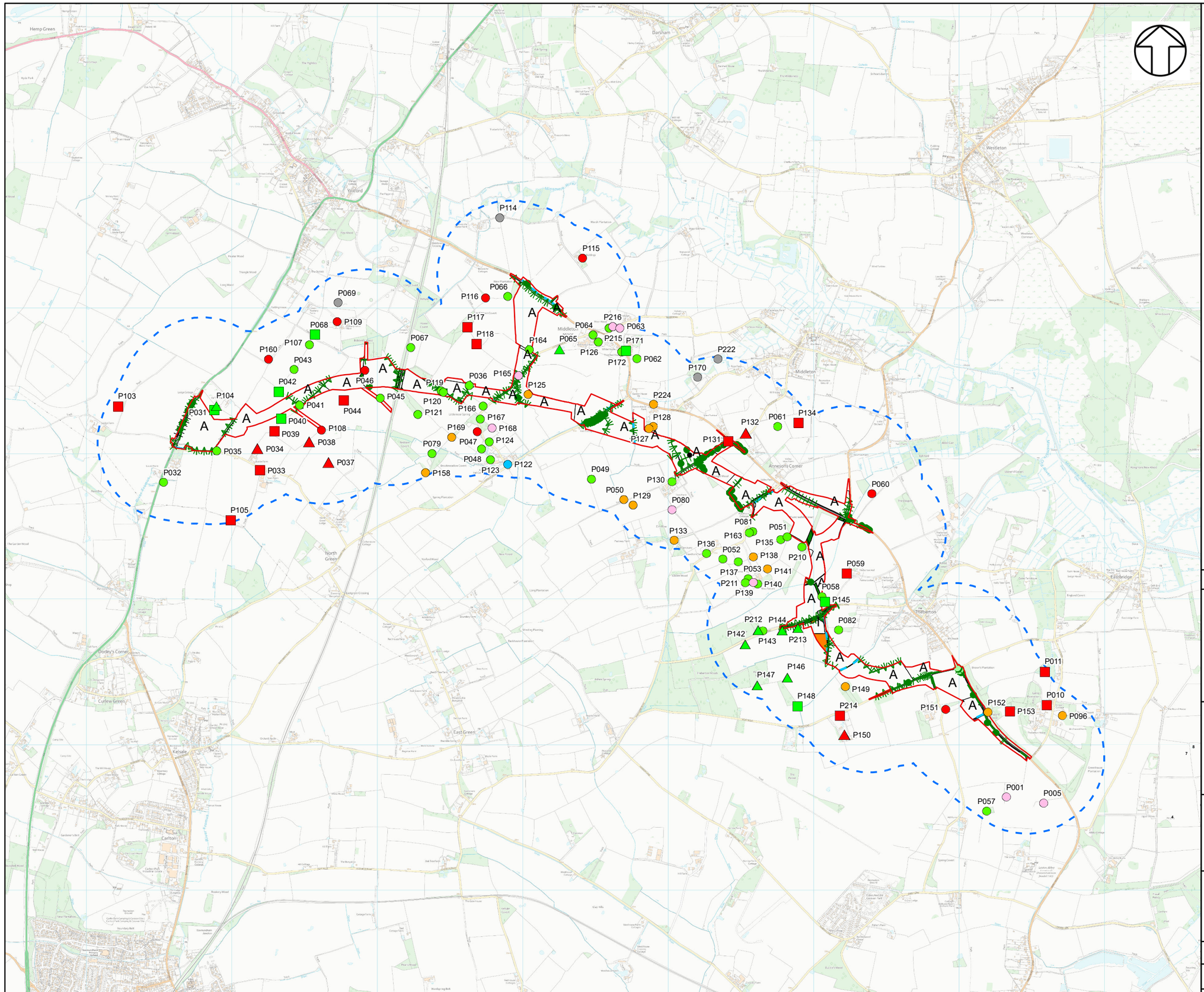

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- GCN ASSUMED PRESENT - EDNA CONSTRAINTS
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- DRY DITCH
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- DEFUNCT HEDGE - SPECIES-POOR
- EARTH BANK
- FENCE
- HEDGE WITH TREES - NATIVE SPECIES-RICH
- HEDGE WITH TREES - SPECIES-POOR
- INTACT HEDGE - NATIVE SPECIES-RICH
- INTACT HEDGE - SPECIES-POOR
- RUNNING WATER
- SCATTERED BRODEAVED PARKLAND
- SCATTERED SCRUB
- ARABLE
- AMENITY GRASSLAND
- BROADLEAVED WOODLAND - SEMI-NATURAL
- BROADLEAVED WOODLAND - PLANTATION
- BUILDINGS
- HARDSTANDING
- IMPROVED GRASSLAND
- NEUTRAL GRASSLAND - SEMI-IMPROVED
- POOR SEMI-IMPROVED GRASSLAND
- RUNNING WATER
- SCRUB - DENSE/CONTINUOUS
- STANDING WATER
- OTHER TALL HERB AND FERN - RUDERAL

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SIZEWELL LINK ROAD GREAT CRESTED NEWT SURVEY RESULTS

PAGE 1 OF 4

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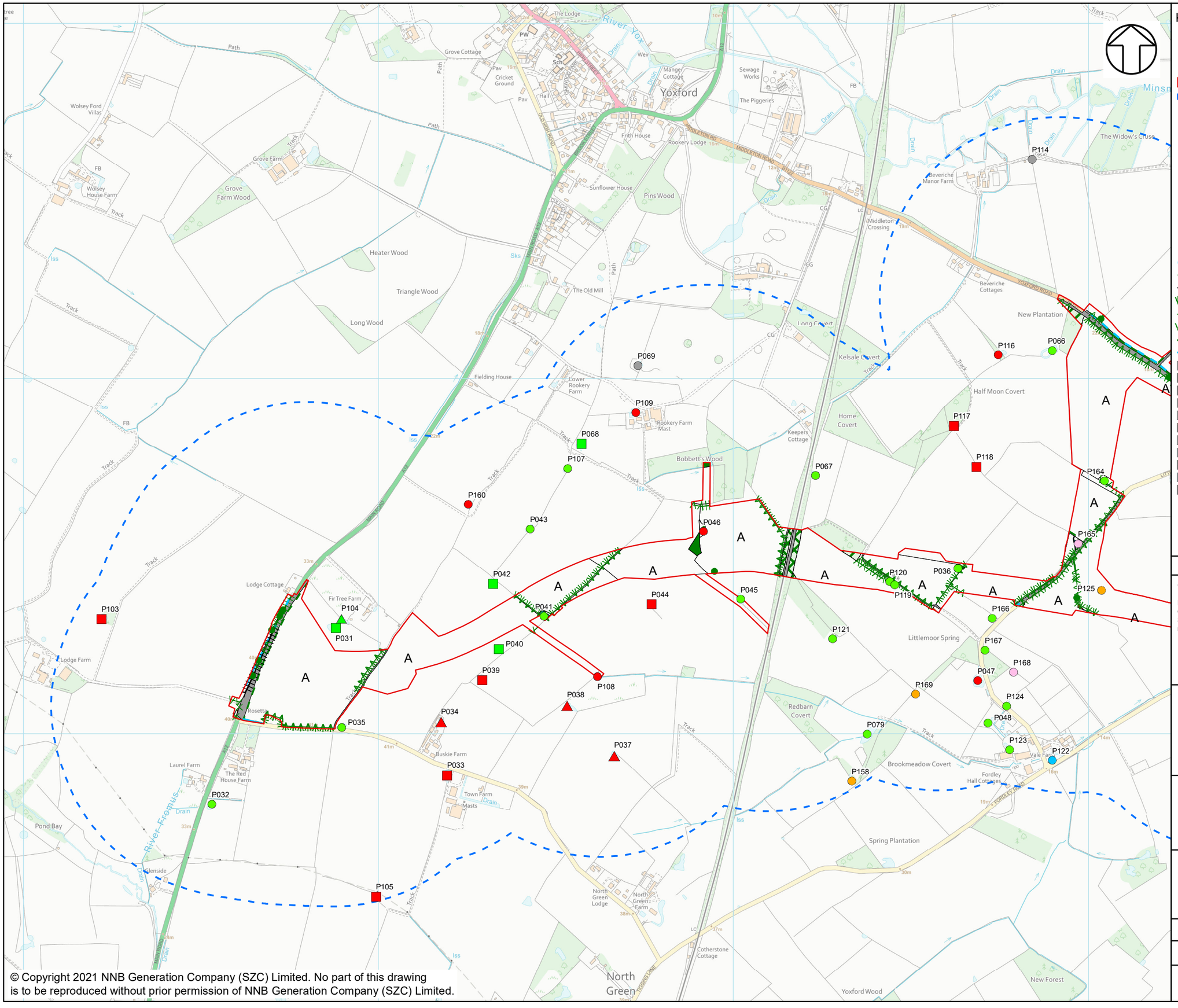

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- RUNNING WATER
- ARABLE
- BROADLEAVED WOODLAND - SEMI-NATURAL
- BROADLEAVED WOODLAND - PLANTATION
- HARDSTANDING
- IMPROVED GRASSLAND
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- POOR SEMI-IMPROVED GRASSLAND
- RUNNING WATER
- SCRUB - DENSE/CONTINUOUS
- STANDING WATER
- OTHER TALL HERB AND FERN - RUDERAL

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PAGE 2 OF 4

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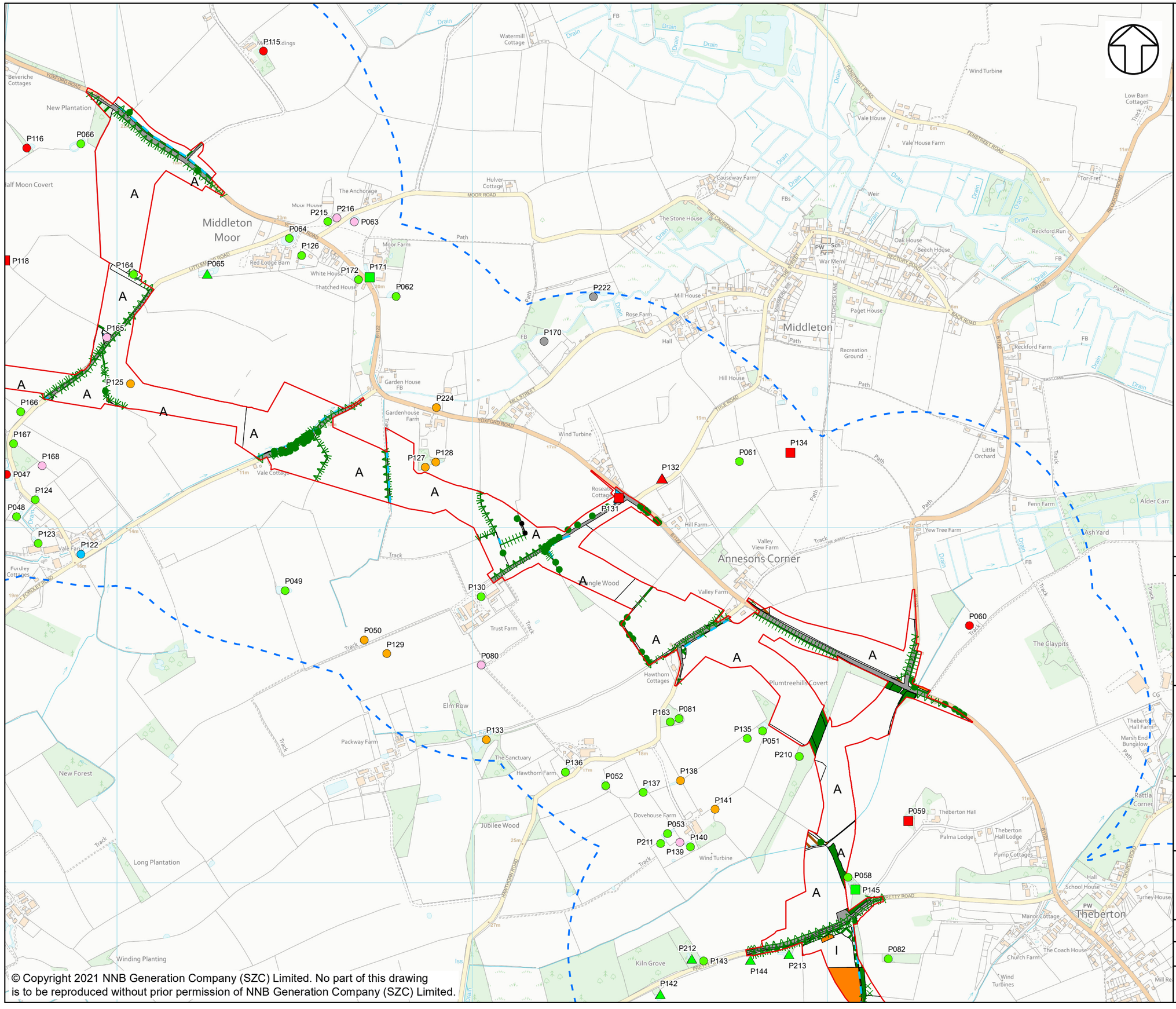

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PAGE 3 OF 4

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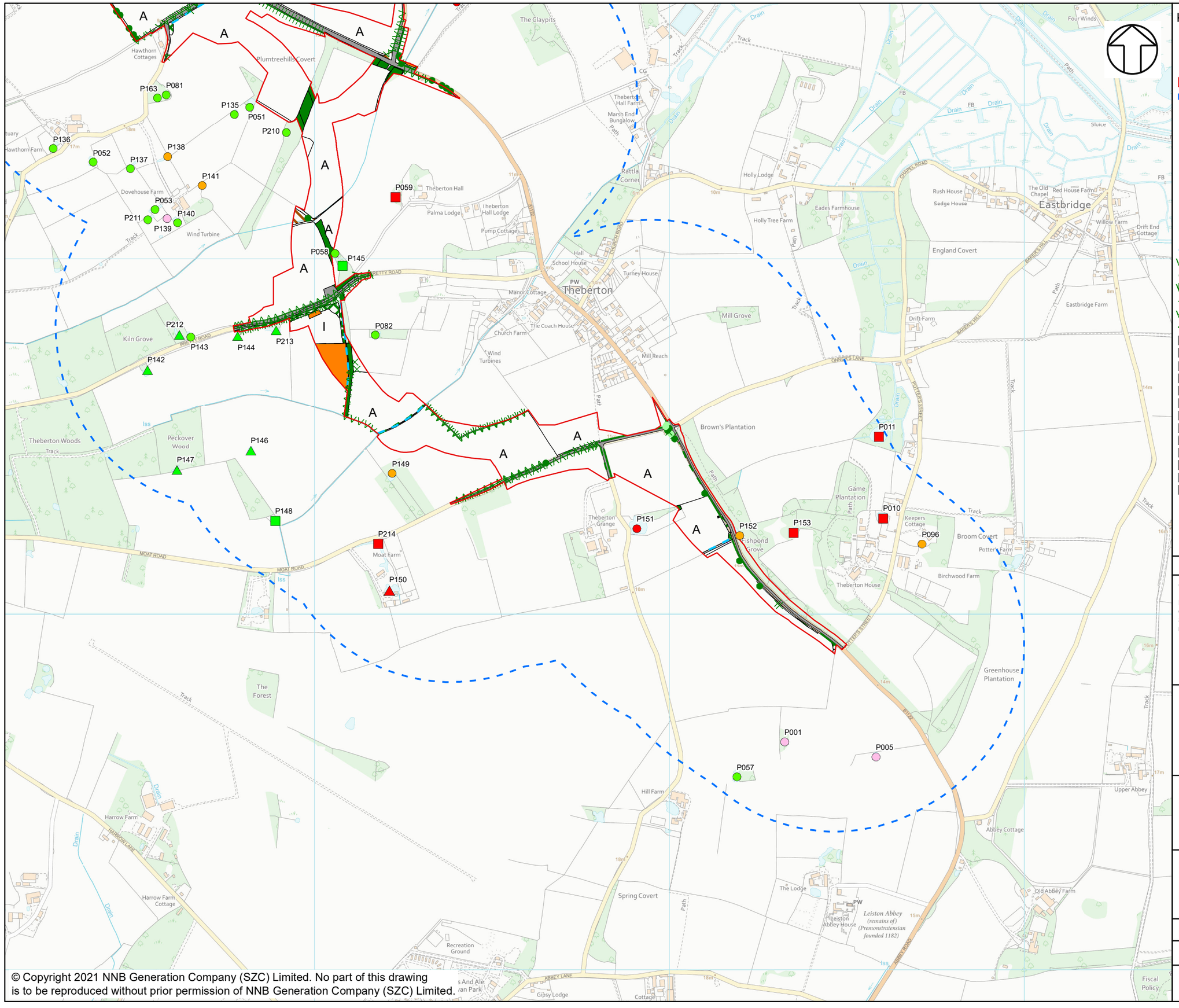

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- SCATTERED SCRUB
- ARABLE
- AMENITY GRASSLAND
- BROADLEAVED WOODLAND - SEMI-NATURAL
- BUILDINGS
- HARDSTANDING
- IMPROVED GRASSLAND
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- POOR SEMI-IMPROVED GRASSLAND
- SCRUB - DENSE/CONTINUOUS
- STANDING WATER
- OTHER TALL HERB AND FERN - RUDERAL

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PAGE 4 OF 4

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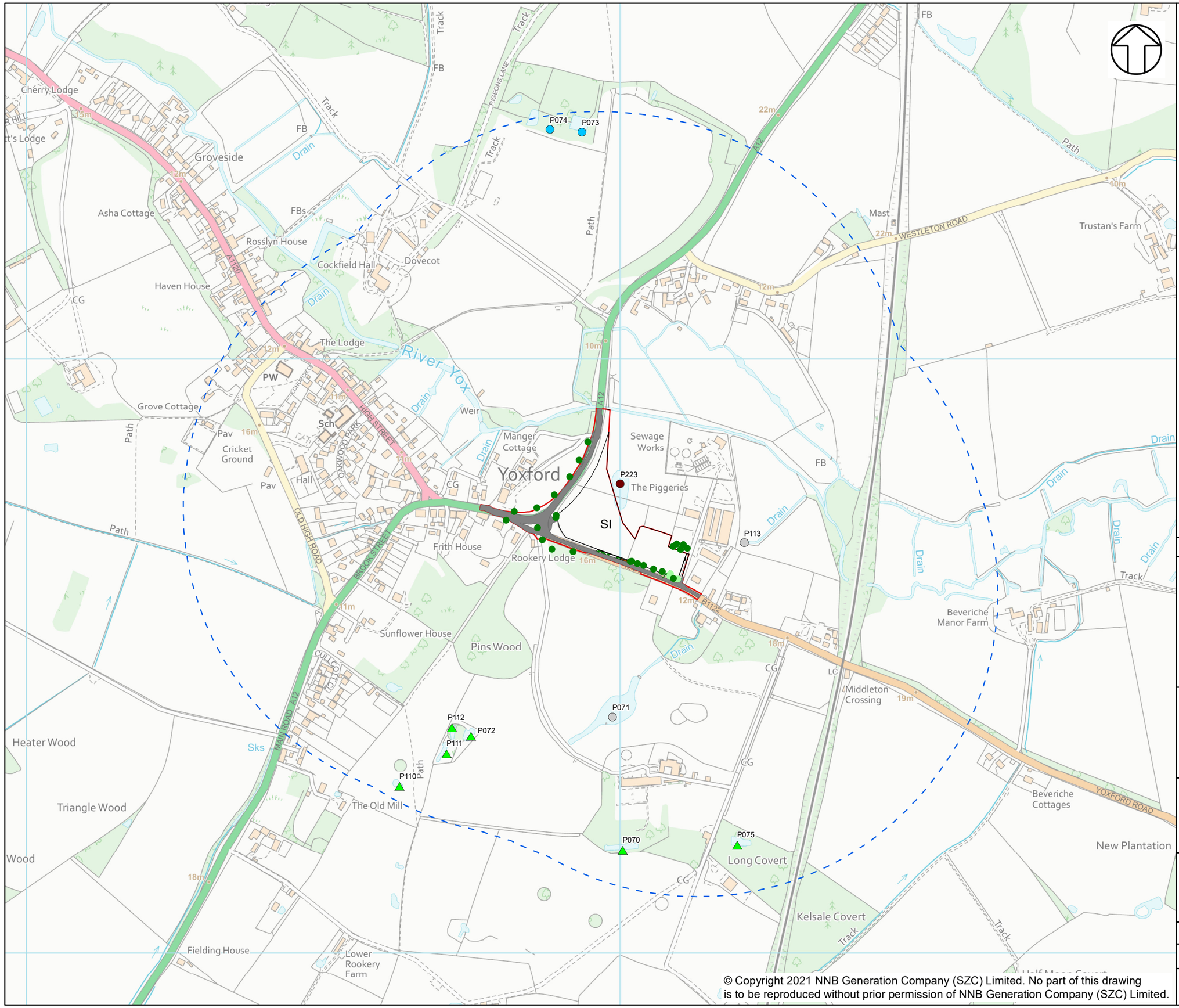

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- CONIFEROUS PARKLAND/SCATTERED TREES
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- HARDSTANDING
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- DEFUNCT HEDGE - SPECIES-POOR
- FENCE
- I IMPROVED GRASSLAND
- A CULTIVATED/DISTURBED LAND - ARABLE

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GREEN RAIL ROUTE GCN SURVEY RESULTS

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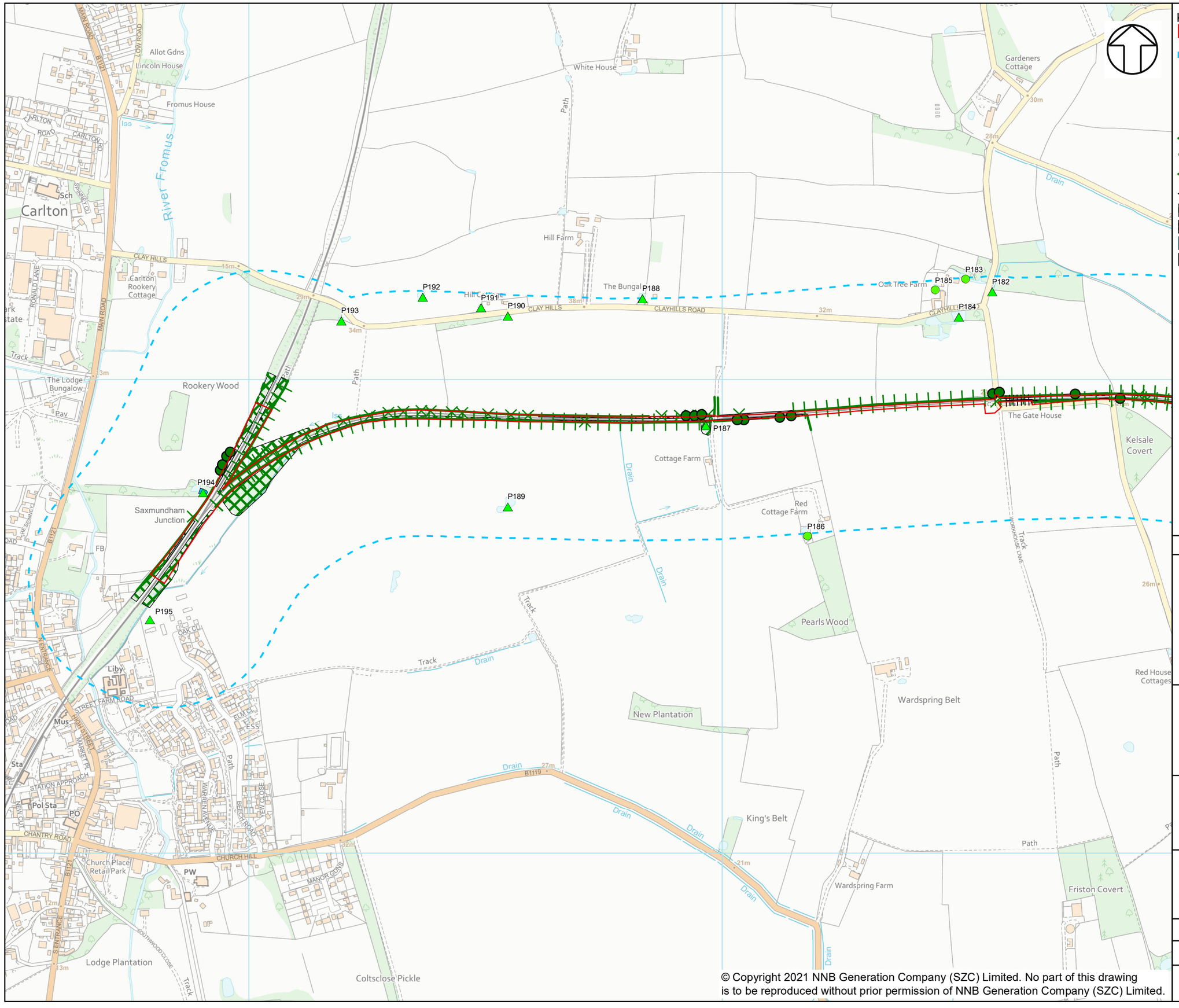

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- SPECIES-POOR DEFUNCT HEDGE
- SPECIES-POOR HEDGE AND TREES
- FENCE
- DENSE/CONTINUOUS SCRUB
- POOR SEMI-IMPROVED GRASSLAND
- STANDING WATER
- BUILDINGS

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PAGE 1 OF 3

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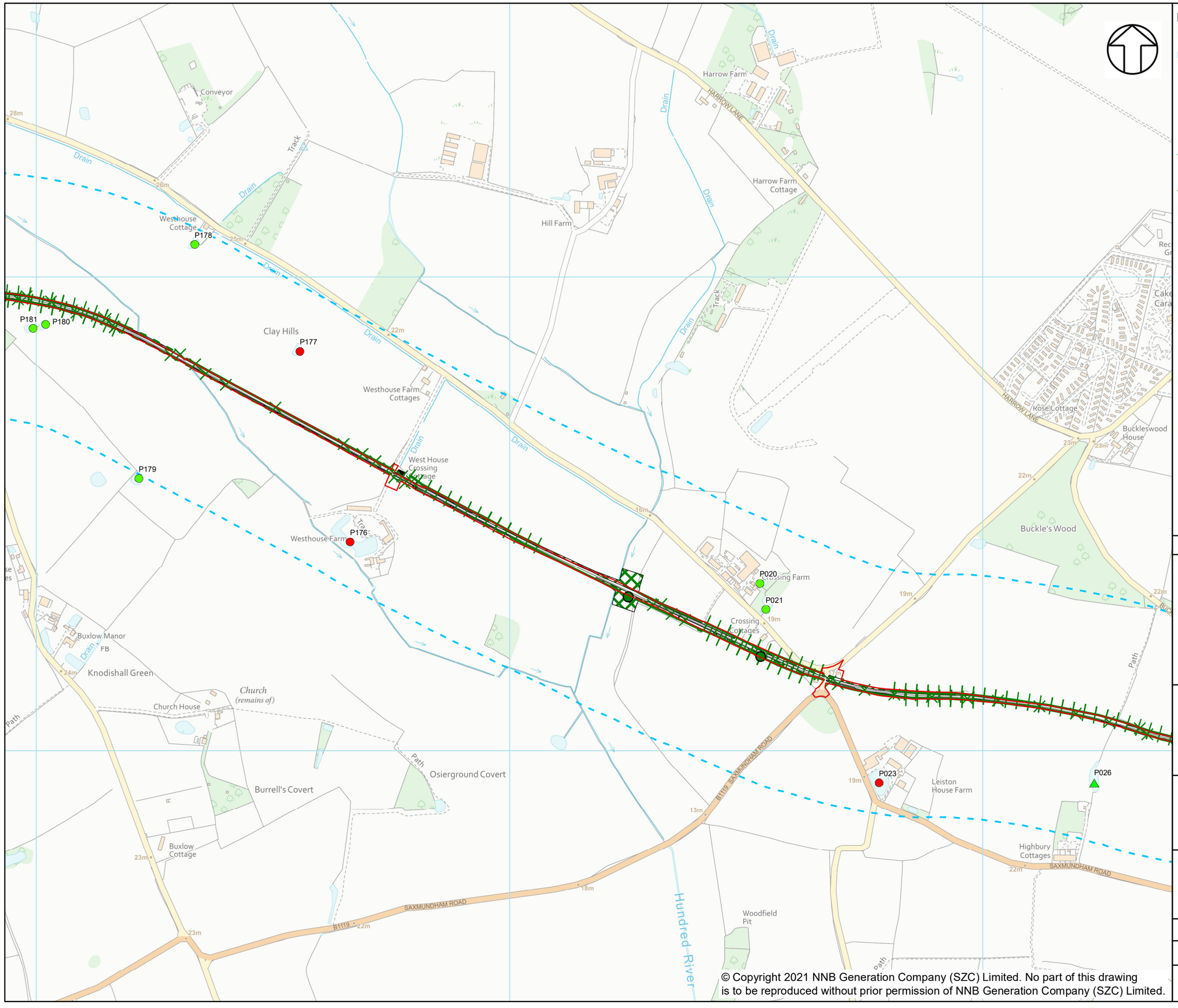

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- DENSE/CONTINUOUS SCRUB
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- BUILDINGS

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BRANCH LINE GREAT CRESTED NEWT SURVEY RESULTS

PAGE 2 OF 3

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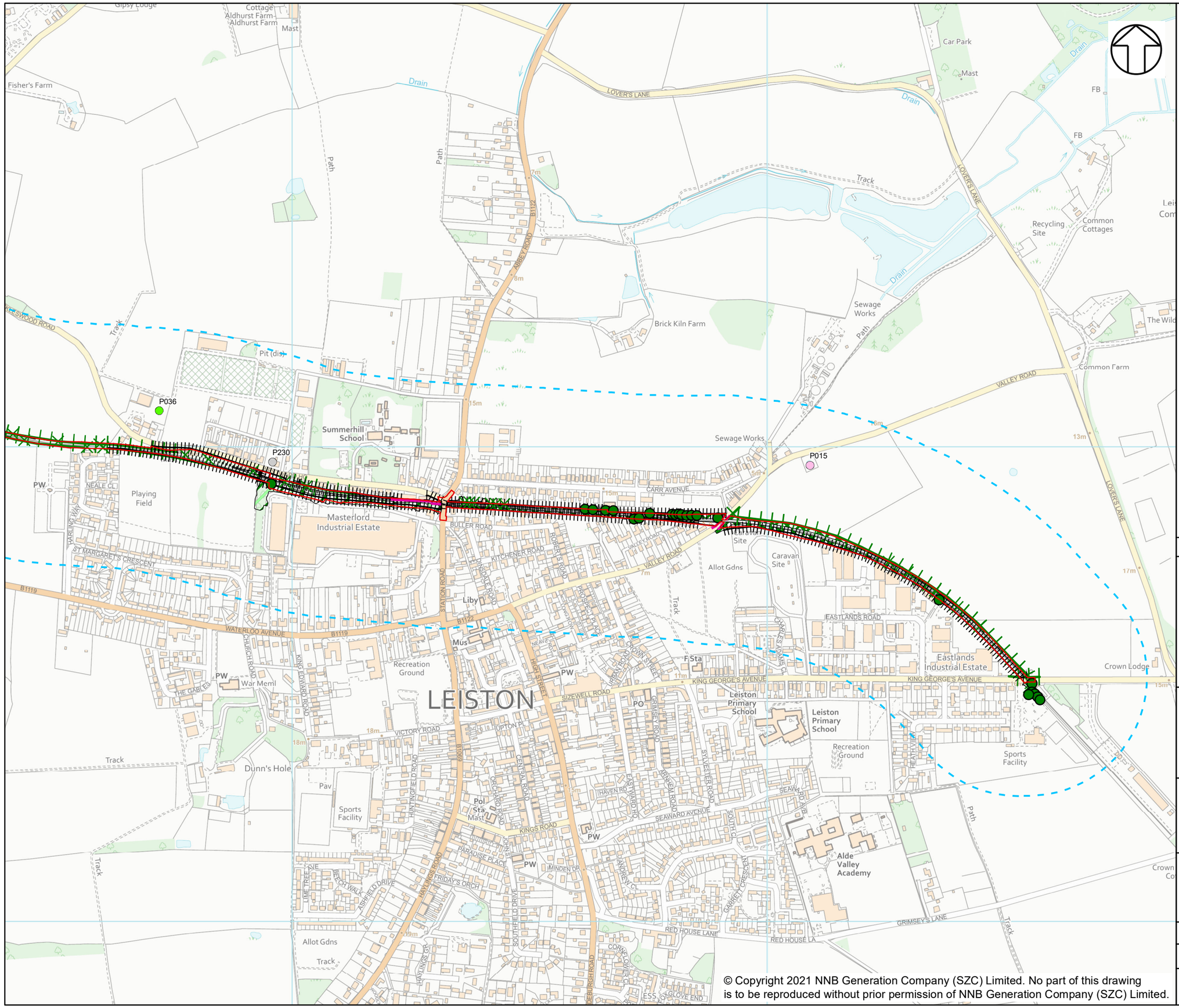

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BRANCH LINE GREAT CRESTED NEWT SURVEY RESULTS

PAGE 3 OF 3

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APPENDIX E: 2021 TWO VILLAGE BYPASS BAT ROOST ASSESSMENT REPORT

CONTENTS

TABLES

FIGURES

1 INTRODUCTION

1.1 Overview

1.1.1 This document outlines the results of the August 2021 surveys conducted of the buildings situated within the grounds of Farnham Hall. These buildings are located within land immediately adjacent to the site boundary of two village bypass, one of the Sizewell C Project's Associated Development sites.

1.1.2 The buildings in this area have not previously been assessed, and these surveys have been undertaken in response to a request for further information by the Examining Authority (ExA) dated 18 June 2021 [PD-027] and as detailed in [REP4-006].

1.2 Site Location and Surrounding Area

1.2.1 Farnham Hall and associated buildings (central grid reference approximately TM 36581 59883) are located adjacent to the north-western section of the two village bypass site boundary, and south-east of Farnham village in Suffolk. The survey area and locations of each building surveyed are presented in **Figure 1**.

1.2.2 The survey area comprised eighteen buildings, including Farnham Hall and additional farmhouse complexes.

2 METHODOLOGY

2.1 Bat Roost Assessment

2.1.1 Roost assessments were undertaken on 17th and 18th August 2021 by two ecologists. The lead surveyor has 30 years of experience as an ecologist and extensive experience in conducting similar surveys and other bat surveys of buildings.

2.1.2 A systematic search was conducted of the exterior of Buildings 1 – 16 and Building 18 (access to Building 17 was not possible), using binoculars and high-powered torches, to identify external crevices and any potential to support roosting bats, considering potential roost features (PRFs) and access points and any evidence of roosting, such as droppings, staining, odour, scratch marks or live/dead bats.

2.1.3 The assessment was undertaken following good practice guidelines for preliminary bat roost assessments (Ref. 1) and buildings were assessed using the guidance in **Table 2-1**.

Table 2-1: Guidelines for assessing the potential suitability of structures to support roosting bats based on the presence of features[1]

Suitability	Description of Roosting Feature
Negligible	Negligible habitat features on tree likely to be used by roosting bats.
Low	A structure with one or more PRFs that could be used by individual bats opportunistically. However, these PRFs do not provide enough space shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be used for maternity or hibernation).
Moderate	A structure with one or more PRFs that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but are unlikely to support a roost of high conservation status.
High	A structure with one or more PRFs that are obviously suitable for use by larger numbers of bats on a more regular

[1] Table details from Table 4.1 of Bat Surveys For Professional Ecologists: Good Practice Guidelines

Suitability	Description of Roosting Feature
	basis and potentially for longer periods of time due to their size, shelter, protection conditions and surrounding habitat.

2.1.4 Based on the features present and the location of the buildings, the potential for different types of bat roost to be present was also considered.

2.1.5 For the purposes of this survey , potential roost types were grouped as follows, with descriptions as defined by the Bat Conservation Trust (Ref. 1):

- Maternity (breeding roost) – where female bats give birth and raise their young to independence.
- Summer roosts, to include:
  - Transitional roosts – used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.
  - Satellite roosts – an alternative roost found near the main nursery colony used by a few individual breeding females to small groups of breeding females throughout the breeding season.
  - Night roosts – a place where bats rest or shelter in the night but are rarely found in the day. May be used by a single individual on occasion or it could be used regularly by the whole colony.
  - Day roosts – a place where individual bats, non-breeding females or small groups of males, rest or shelter in the day but are rarely found by night in the summer.
- Mating roosts – where mating takes place from late summer and can continue through winter.
- Hibernation – where bats may be found individually or together during winter. They have a constant cool temperature and high humidity.

2.1.6 It should be noted that where a potential roost type is assigned to structures this is an estimation based on the features visible and without knowing the extent of cavities etc.

2.1.7 In addition, many structures have the potential to support a number of different roost types.

2.2 Limitations

2.2.1 All inspections conducted were external, and no internal searches were conducted for any of the buildings.

2.2.2 Full external access was not possible for Building 17, however, as a precautionary measure and based on what was visible, it has been assessed as having high suitability. Similarly, there was no access to the rear of Buildings 13 and 16.

3 RESULTS

3.1.1 The results are summarised in **Table 3-1** below:

Table 3-1: Building Bat Roost Suitability Summary

Bat Roost Suitability	Number of Buildings	Building References
Negligible	1	8
Low	4	5, 6, 7, 18
Moderate	5	2, 3, 4, 9, 10
High	8	1, 11, 12, 13, 14, 15, 16, 17

3.1.2 Full results of the building assessments are summarised in **Table 3-2** and illustrated on **Figure 1**.

Table 3-2: Building bat roost suitability and description of potential roost features (PRFs)

Building number	Grid Reference	Description of features	Overall Bat Roosting Potential	Potential Roost Type
1	TM3659859899	1.01 Gaps under roof tiles. 1.02 Gaps under eaves which appears to go straight into roof space. 1.03 Missing mortar between bricks. 1.04 Hole in soffit board. 1.05 Holes in 2x bricks that lead into the wall space. 1.06 Many gaps under terracotta tiles. 1.07 Hole under eaves at southern corner of roof. 1.08 Gaps under many tiles. 1.09 Three holes under eaves above large window, unable to assertain depth. 1.10 Hole in brick.	High.	All roost types.
2	TM 36583 59894	2.01 Many gaps under tiles, wood cladding on the inside and there is likely to be a space between this and the tiles.	Moderate	All roost types.
3	TM 36628 59879	3.01 Many gaps under tiles. 3.02 Gaps around small hatch door at west gable end.	Moderate	All roost types.

Building number	Grid Reference	Description of features	Overall Bat Roosting Potential	Potential Roost Type
4	TM 36612 59881	4.01 Many gaps under tiles.	Moderate	All roost types.
5	TM 36583 59913	5.01 Gaps under tiles but no internal space. 5.02 Holes and gaps in timber struts, birds' nest in one. 5.03 Gaps around edge of cladding at west gable end.	Low	All roost types.
6	TM 36566 59904	6.01 Gaps under tiles, however no roof space.	Low	All roost types except hibernation.
7	TM 36547 59987	7.01 No roof space and generally open and airy, but some low potential behind internal boarding and facias.	Low	All roost types except hibernation.
8	TM 36548 59975	No suitable features identified.	Negligible	N/A
9	TM 36549 59967	9.01 Gaps under tiles and asbestos. Some felt inside which provided roost potential, 1.5m high, low suitability.	Low, however this has been	All roost types

Building number	Grid Reference	Description of features	Overall Bat Roosting Potential	Potential Roost Type
			upgraded to moderate, as the homeowner stated that there are confirmed bats in the building.	except hibernation.
10	TM 36557 59942	10.01 Many gaps under tiles on roof, 1.5m+ high, moderate suitability. 10.02 Gap above garage door, 1.5m high, east-facing, low suitability. 10.03 Gap between facia board and wall, 1.5m high, south-facing, moderate suitability. 10.04 Hole next to window, provides direct access into the garage, 1m high, west-facing, low suitaility. 10.05 Gap between facia board and wall with possible space behind, 2m high, west-facing, moderate suitability.	Moderate	All roost types except hibernation.
11	TM 36587 59930	11.01 Some gaps under tiles, 4m+ high, high suitability.	High	All roost types.

Building number	Grid Reference	Description of features	Overall Bat Roosting Potential	Potential Roost Type
		11.02 Hole under eaves, potentially leading into roof space, 4m high, high suitability.		
12	TM 36549 59861	12.01 Many gaps under tiles on roof of garage and house, 4m+ high, with high suitability. 12.02 Gap at soffit-chimney interface, south-facing, 7m high, moderate suitability. 12.03 Holes in all ridge tiles, 9m high, moderate suitability. 12.04 Bay window and porch, several gaps under terracotta tiles and gap at southern end under flashing, 2m high moderate suitability. 12.05 Gaps above garage doors, north-facing, 2m high, low suitability. 12.06 Chimneys with small holes in brickwork, cobwebs and potential access via cowl, low suitability. 12.07 Hole between soffit and fascia corner above garage, east-facing, 4m high, low suitability.	High	All roost types.
13	TM36547 59856	13.01 Difficult to see roof area, but many roof structures that are likely to provide access points, 4m high, high suitability. 13.02 Ivy covered wall, may cover access features, north-facing, low suitability.	High	All roost types.

Building number	Grid Reference	Description of features	Overall Bat Roosting Potential	Potential Roost Type
		13.03 Air vent into house on small wall at the side of the building where it adjoins property 4. North-east facing, 5m high, low suitability.		
14	TM 36622 59809	14.01 Many gaps under tiles, 2m+ high, north-facing, with high suitability. 14.02 Broken window panes with possible dropping seen on inside of window ledge, 1m high, north-facing, moderate suitability. 14.03 Broken soffit board, 2m high, north-facing, high suitability. 14.04 Missing hanging tile, with gap behind, east-facing, 2m high, low suitability. 14.05 Gap above door, east-facing, 1.5m high, moderate suitability.	High	All roost types.
15	TM 36605 59861	15.01 Many gaps under tiles, 4m+ high, high suitability. 15.02 Possible nest boxes under soffit (wooden structure that may be bat or bird boxes), south-facing, 4m high, negligible / low suitability. 15.03 Gap under ridge tile, 4m high, south-facing, moderate suitability. 15.04 Hole between brickwork and Tudor-style timber front, 2m high, south-east facing, low suitability.	High	All roost types.

Building number	Grid Reference	Description of features	Overall Bat Roosting Potential	Potential Roost Type
16	TM 36578 59847	16.01 Gaps and broken tiles all over the roof, high suitability. 16.02 6 air vents, some appear to have internal mesh grills, but some appear corroded and broken, 2m+ high, north-facing, high suitability. 16.03 Further air vents on the southern side of the building, 4m highm south-facing, with high suitability.	High	All roost types.
17	TM 36576 59819	No access to building, from the closest view-point, it appeared to have some bat potential in accordance with most of the other buildings in this complex.	High (precautionary)	Unknown – assume all roost types.
18	TM 36585 59870	18.01 Gaps above garage doors, west-facing, 2m high, low suitability.	Low – although no access for internal inspection so may be negligble.	All roost types except hibernation and maternity.

4 SUMMARY

4.1.1 Overall, of the 18 buildings surveyed, eight were assessed as having high suitability, five as moderate, four as low and one as negligible for roosting bats. However none of the buildings are proposed to be lost or modified as part of the scheme and further consideration is therefore proposed only for the buildings that fall within 20m of the two village boundary site boundary.

4.1.2 20m is the distance which has been used in EPSL bat mitigation licence applications previously and approved by Natural England as the distance from an area of direct impact at which roosts may be subject to indirect impacts. Although circumstances differ, at distances greater than 20m, it is generally considered that any building roosts would be unlikely to experience any direct or indirect impacts, especially given the mitigation that is proposed to buffer any light spill, noise and vibration impacts, as outlined in the two village bypass Terrestrial Ecology and Ornithology Environmental Statement chapter [APP-425].

4.1.3 There are two buildings with moderate suitability (Buildings 3 and 4) and two buildings with high suitability (Buildings 14 and 15) within 20m of the two village bypass site boundary. All other buildings are located over 20m from the two village bypass site boundary and therefore scoped out of further survey.

4.1.4 The current designs do not show in detail the nature of works (if any) beyond vegetation clearance which will be undertaken within the area of the site boundary which falls within 20m of Buildings 3, 4, 14 and 15. As there is no excavation proposed in this area no further surveys are required.

5 APPENDIX A

Potential Roost Feature & Building Photographs

PRF 1.01:

PRF 1.02:

PRF 1.03:

Potential Roost Feature & Building Photographs

PRF 1.04:

Potential Roost Feature & Building Photographs

PRF 1.05:

PRF 1.06:

Potential Roost Feature & Building Photographs

PRF 1.07:

PRF 1.08:

Potential Roost Feature & Building Photographs

PRF 1.09:

Potential Roost Feature & Building Photographs

PRF 1.10:

PRF 2.01:

Potential Roost Feature & Building Photographs

PRF 3.01:

PRF 3.02:

Potential Roost Feature & Building Photographs

PRF 4.01

PRF 5.01:

Potential Roost Feature & Building Photographs

PRF 5.02:

e 

Potential Roost Feature & Building Photographs

PRF 5.03:

PRF 6.01:

Potential Roost Feature & Building Photographs

PRF 6.02:

PRF 7.01:

Potential Roost Feature & Building Photographs

PRF 7.02:

Building 8:

Potential Roost Feature & Building Photographs

PRF 9.01

PRF 9.02

Potential Roost Feature & Building Photographs

PRF 10.01:

PRF 10.02:

Potential Roost Feature & Building Photographs

PRF 10.03:

PRF 10.04:

Potential Roost Feature & Building Photographs

PRF 10.05:

PRF 11.01:

Potential Roost Feature & Building Photographs

PRF 11.02:

PRF 12.01:

Potential Roost Feature & Building Photographs

PRF 12.02:

PRF 12.03:

Potential Roost Feature & Building Photographs

PRF12.04:

PRF 12.05:

Potential Roost Feature & Building Photographs

PRF 12.06:

Potential Roost Feature & Building Photographs

PRF 12.07:

PRF 13.01:

Potential Roost Feature & Building Photographs

PRF 13.02:

PRF 13.03:

Potential Roost Feature & Building Photographs

PRF 14.01:

PRF 14.02:

Potential Roost Feature & Building Photographs

PRF 14.03:

Potential Roost Feature & Building Photographs

PRF 14.04:

PRF 14.05:

Potential Roost Feature & Building Photographs

PRF 15.01:

PRF 15.02:

Potential Roost Feature & Building Photographs

PRF 15.03:

Potential Roost Feature & Building Photographs

PRF 15.04:

PRF 16.01:

Potential Roost Feature & Building Photographs

PRF 16.01:

PRF 16.02:

Potential Roost Feature & Building Photographs

PRF 16.03:

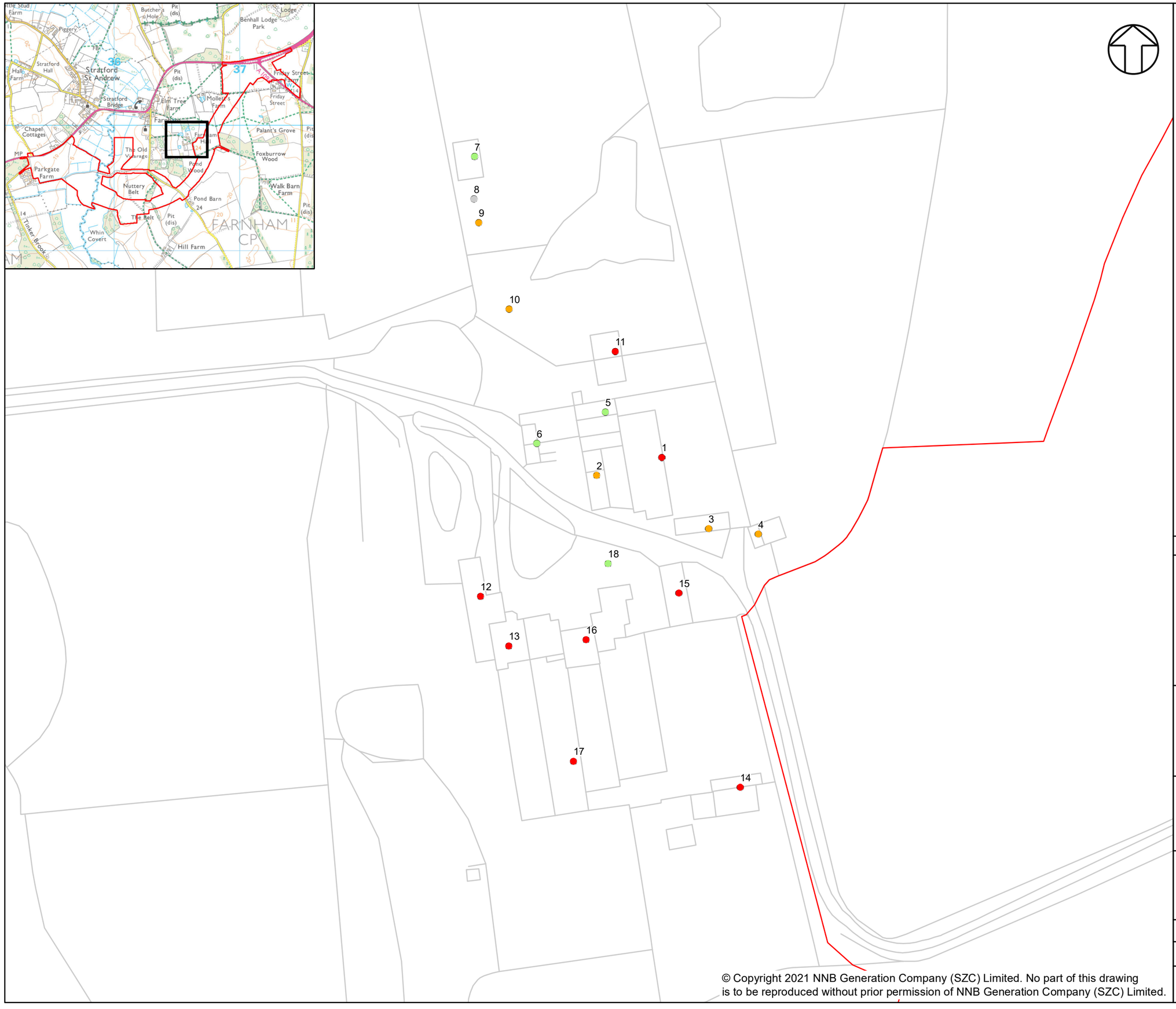
Building 17:

Potential Roost Feature & Building Photographs

PRF 18.01:

REFERENCES

1. Collins, J. (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3rd Edition. Bat Conservation Trust.



NOTES

KEY

DEVELOPMENT SITE BOUNDARY

BAT BUILDING ROOST POTENTIAL

- HIGH
- MODERATE
- LOW
- NEGLIGIBLE

NOT PROTECTIVELY MARKED

Sizewell C
Doing the power of good for Britain
EDF CGN

DOCUMENT:
2021 TWO VILLAGE BYPASS - BAT ROOST ASSESSMENT SURVEYS

DRAWING TITLE:
TVB PRELIMINARY BAT ROOST ASSESSMENT RESULTS

DRAWING NO:
FIGURE 1

DATE:	DRAWN:	SCALE :	REV:
AUG 2021	R.C.	1:1,000 @A3	01

SCALE BAR
0 10 20 30 40 50 M

APPENDIX F: 2021 BAT CROSSING POINT SURVEYS REPORT 1

CONTENTS

TABLES

FIGURES

1 SUMMARY

1.1.1 This Bat Crossing Survey Report 1 provides the results of the initial 2021 bat crossing point surveys conducted between April and June/July on the Sizewell C Project's Sizewell link road, two village bypass and main development site.

1.1.2 The Bat Crossing Survey Report 2 will be produced following the completion of the July/August to September surveys and will be submitted to examination at Deadline 9.

2 OVERVIEW

2.1 The Aims of the 2021 Survey Updates

2.1.1 The overall aims of the 2021 bat survey update were to:

- Provide a baseline for future monitoring of the Sizewell C project (especially the success of bat crossing point mitigation).
- Establish the locations of any important bat commuting routes present within the proposed Sizewell link road, two village bypass and main development site sites to enable mitigation in these locations to be optimised.

2.2 Site Description

a) Main Development Site

2.2.1 The main development site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston and within the administrative boundary of East Suffolk Council (ESC). Once constructed, the Sizewell C nuclear power station would be located directly to the north of the existing Sizewell A and B power station complex.

2.2.2 The main development site footprint is dominated by arable fields with field boundaries comprising native, species poor hedgerows or tree lines. Several woodland blocks, comprising plantation, mixed plantation and broadleaved semi-natural woodland, are scattered across the Scheme. The larger area present to the north-east includes Hilltop Covert, Dunwich Forest, Goose Hill Plantation and the northern boundary of Kenton Hills. Numerous farm buildings and structures are also scattered to the north and west of the site.

b) Sizewell Link Road

2.2.3 The Sizewell link road site measures approximately 101ha and is located to the south of the B1122 and east of the A12. The site passes to the south of Middleton Moor and Theberton. The proposed development would comprise a new, permanent, 6.8km single carriageway road, with a design speed of 60 miles per hour, which begins at the A12 south of Yoxford, bypasses Middleton Moor and Theberton before joining the B1122.

2.2.4 Once operational, the proposed development would be used by the general public as well as construction workers arriving by car, park and ride buses from both the northern and southern park and ride sites, and goods vehicles (both light and heavy) delivering freight to the Sizewell C main development site.

2.2.5 The Sizewell link road site is dominated by arable land with arable field margin habitats. Some limited areas of species-poor, semi-improved grassland and neutral semi-improved grassland are also present within the site, which were recorded to be interspersed with patches of tall ruderal and scattered scrub. Twelve blocks of broadleaved semi-natural woodland and two plantation woodlands are present, wholly or partly, within the site whilst hedgerows, the majority of which were notes to be species rich and supported a number of trees, are also present along the boundaries of the arable land that dominates the site. With respect to aquatic habitat, the site supports four watercourses and six ponds.

c) Two Village Bypass

2.2.6 The two village bypass site measures approximately 54.8 hectares (ha) and is located to the south and south-east of Stratford St. Andrew, and to the south-west to south-east of Farnham. The proposed development comprises a new permanent two-lane single carriageway road that would depart the A12, creating a new route around the south of Farnham and Stratford St. Andrew, before re-joining the A12 east of Farnham.

2.2.7 Once operational, the two village bypass would be open to construction traffic associated with the construction of the Sizewell C project as well as to the general public. The proposed development would reduce the volume of construction traffic traveling through Farnham and Stratford St. Andrew. As the proposed development is permanent, once construction of Sizewell C is completed, it will remain open for general use by the public and would provide legacy benefit to the residents of Farnham and Stratford St. Andrew.

2.2.8 The two village bypass site is dominated by arable land with field boundaries comprising native, species poor hedgerows and tree lines. The site also

supports significant areas of semi-natural woodland. Scattered trees and a number of watercourses are present within the site, whilst the site also contains a number of buildings and associated areas of hardstanding. Whilst no ponds are present within the site itself, a number of waterbodies are present within the immediate 500m surrounding the site.

3 METHODS

3.1 Survey Methodology

3.1.1 The crossing point surveys were based upon the guidance outlined within Berthinussen A & Altringham J (2015) (Ref 1). The surveys were conducted between April and July 2021. This period was selected as it is a period of roost transition and high bat activity and so can be utilised to identify important commuting routes.

3.1.2 From a review of the sites, twenty-six crossing point survey locations were identified (across Sizewell link road, two village bypass and main developement site). These are shown in **Figures 1a**, **1b** and **1c**. These survey locations consist of the landscape features considered most likely to support commuting and foraging bats (mature hedgerows, woodland blocks, and riparian habitats) and which are due to be severed or impacted by the development proposals.

3.1.3 As required by the prescribed methodology, two surveyors were positioned at each crossing point (each survey visit comprised of either one dusk or one dawn survey) using Elekon Batlogger M detectors and an Infra-red camera set-up. As required by the above-referenced guidance, two surveys of each crossing point were conducted in order to determine which locations should be carried forward for further survey.

a) Requirement for further survey

3.1.4 Any locations were carried forward for further survey where a single survey visit recorded one or more of the following:

- 10 observed bat passes;
- 100 bat calls recorded; or
- Any calls of rare species (such as barbastelle).

3.1.5 Locations meeting one or more of these thresholds were then subject to one survey every month (July – September) until a total of six survey visits were completed.

b) Survey dates

3.1.6 **Table 1** below provides the dates that crossing point surveys were conducted.

Table 1: Dates of Crossing Point Surveys

Scheme	Crossing Point	Survey Date	Sunset	Sunrise	Dusk Temp. °C	Dawn Temp. °C
Two Village Bypass	CP1	12/05/2021	20:37	--	12	--
		08/06/2021	21:12	--	16	--
	CP2	17/05/2021	20:45	--	9	--
		09/06/2021	21:13	--	20	--
	CP3	02/06/2021	21:16	--	17	--
		08/06/2021	21:13	--	22	--
	CP4	18/05/2021	20:46	--	14	--
		09/06/2021	21:13	--	17.8	--
	CP5	08/06/2021	--	04:35	--	12
		18/05/2021	20:46	--	10	--
	CP6	21/06/2021	21:18	--	14	--
		07/07/2021	--	04:42	--	14
	CP7	21/06/2021	21:18	--	17	--

Scheme	Crossing Point	Survey Date	Sunset	Sunrise	Dusk Temp. °C	Dawn Temp. °C
		07/07/2021	21:19	--	17	--
	CP8	21/06/2021	21:19	--	14	--
		07/07/2021	21:14	--	22	--
	CP9	22/06/2021	21:21	--	13	--
		08/07/2021	21:15	--	17	--
Sizewell Link Road	CP10	18/05/2021	20:46	--	10	--
		22/06/2021	--	04:32	--	12
	CP11	19/05/2021	--	04:52	--	9
		22/06/2021	21:18	--	13	--
	CP12	19/05/2021	--	04:52	--	7
		22/06/2021	21:19	--	13	--
	CP13	03/06/2021	21:07	--	20	--
		10/06/2021	21:13	--	18	--
	CP14	19/05/2021	23:16	--	13	--

Scheme	Crossing Point	Survey Date	Sunset	Sunrise	Dusk Temp. °C	Dawn Temp. °C
		10/06/2021	21:14	--	17	--
	CP15	19/05/2021	20:47	--	13	--
		10/06/2021	20:34	--	17.4	--
	CP16	19/05/2021	20:49	--	13	--
		10/06/2021	--	04:34	--	15
	CP17	28/06/2021	21:19	--	17	--
		20/07/2021	21:01	--	20	--
	CP18	07/06/2021	21:12	--	16	--
		23/06/2021	21:19	--	13	--
	CP19	07/06/2021	21:13	--	17	--
		23/06/2021	21:17	--	13	--
	CP20	24/06/2021	21:19	--	15	--
		22/07/2021	20:59	--	16	--

Scheme	Crossing Point	Survey Date	Sunset	Sunrise	Dusk Temp. °C	Dawn Temp. °C
	CP21	28/04/2021	20:14	--	8	--
		24/06/2021	21:19	--	20	--
	CP22	07/06/2021	21:11	--	13.4	--
		01/07/2021	21:18	--	17	--
	CP23	29/06/2021	21:19	--	16	--
		21/07/2021	20:55	--	21	--
Main Development Site	CP24	08/06/2021	21:12	--	17	--
		26/07/2021	20.53	--	17	--
	CP25	29/06/2021	--	04.36	--	12
		27/07/2021	20.53	--	20	--
	CP26	23/06/2021	21:19	--	15	--
		30/06/2021	21:18	--	15	--

3.2 Data Analysis Methodology

3.2.1 Following the surveys, the recordings from the Elekon Bat loggers were analysed within the Elekon propriety software Bat Explorer. All outputs from Bat Explorer were manually reviewed and verified.

3.2.2 These analysed data were assessed alongside the manual surveyor notes from the surveyors, which contained visual observations to provide a more qualitative assessment of the data. This was used to infer information such as the locations of foraging areas, and location/direction of foraging activity.

3.3 Survey Limitations

3.3.1 On a small number of the surveys only one of the surveyors were equipped with a Batlogger M largely due to equipment malfunctions. However, given the detection radius of a Batlogger M (>50m) and the additional value of visual observations permitted by the infra-red camera, this is considered to have had no effect on the results as any bats observed by either surveyor would have been recorded by the detector.

3.3.2 Some of the surveys were conducted in weather conditions considered to be sub-optimal for bat activity (i.e. temperatures below 10 degrees C). This was not a limitation where bat activity met the threshold, however any locations in sub-optimal conditions where the threshold was not met were recommended to be carried forward for at least one further survey regardless of the results, as a precautionary measure, and only the first two survey visits in suitable weather conditions considered. As such this is not considered to have impacted the value of the results.

3.4 Analysis Limitations

3.4.1 For some of the bat passes, it was possible to determine the broad group (i.e. *Nyctalus* sp. or *Myotis* sp.), but not possible to definitively determine the species. Where this is the case, the genus or broad group (i.e. “big bat”) was used within the analysis and mapping. For *Myotis* sp. calls were not identified to species as this is often not possible and/or inaccurate. This is not a significant constraint as the differentiation of these calls is unlikely to impact upon the identification of important commuting routes.

4 RESULTS

4.1.1 The results of the crossing point surveys conducted at Sizewell link road, two village bypass and main development site during May and July 2021 are summarised in **Table 2** below which shows the crossing points which have more than 10 bat passes in one survey and / or at which rare species were recorded.

Table 2: Number of Bat Passes and Presence of Rare Species per Month

Crossing Point	Survey 1		Survey 2	
	No of bat passes > 10	Rare species	No of bat passes > 10	Rare species
Two Village Bypass				
CP1	✘	✘	✓	✓
CP2	✘	✓	✘	✘
CP3	✘	✓	✘	✓
CP4	✘	✓	✘	✓
CP5	✘	✘	✓	✓
CP6	✘	✘	✘	✘
CP7	✘	✘	✘	✘
CP8	✘	✘	✘	✓
CP9	✘	✘	✘	✘
Sizewell Link Road				
CP10	✘	✘	✘	✘
CP11	✓	✘	✘	✘
CP12	✘	✘	✘	✓
CP13	✘	✓	✓	✘
CP14	✘	✘	✘	✘
CP15	✘	✘	✘	✘
CP16	✘	✘	✘	✘
CP17	✘	✘	✘	✘
CP18	✘	✘	✘	✘
CP19	✘	✘	✘	✘
CP20	✘	✘	✘	✓
CP21	✘	✘	✘	✘
CP22	✘	✘	✓	✘

Crossing Point	Survey 1		Survey 2	
	No of bat passes > 10	Rare species	No of bat passes > 10	Rare species
CP23	✘	✘	✘	✘
Main Development Site				
CP24	✘	✘	✓	✘
CP25	✘	✓	✓	✓
CP26	✘	✘	✘	✘

5 DISCUSSION

a) Crossing points with high levels of bat activity

5.1.1 The threshold used to assess a crossing point as important based on activity level is, in excess of ten observed bat passes or 100 bat calls recorded on one survey. The crossing points assessed as important based of activity level are the following (shown on **Figure 2**):

- two village bypass:
  - CP1; and
  - CP5.
- Sizewell link road:
  - CP11;
  - CP13; and
  - CP22.
- main development site:
  - CP24; and
  - CP25.

b) Crossing points with "rarer" bat activity

5.1.2 In addition to the crossing points where high levels of activity were recorded, it is important to determine crossing points which are of importance due to the assemblage of bats they support (i.e. support a significant number of the rarer species of bats). **Table 3** lists the three bandings of rarity utilised within the assessment.

Table 3: Categorisation of Bats according to Wray 2010 (Ref. 2)

Rarity within range	Species
Rarest (population under 10,000)	Greater horseshoe, Bechstein's, alcathoe, greater mouse-eared, barbastelle, grey long-eared.
Rarer (population 10,000 – 100,000)	Lesser horseshoe, whiskered, Brandt's, Daubenton's, Natterer's, Leisler's, noctule, Nathusius' pipistrelle, serotine.

Rarity within range	Species
Common (population over 100,000)	Common pipistrelle, soprano pipistrelle, brown long-eared.

5.1.3 The crossing points where rarer species of bat have been observed crossing the features are:

- Two village bypass:
  - CP1;
  - CP2;
  - CP3;
  - CP4;
  - CP5; and
  - CP8.
- Sizewell link road:
  - CP12;
  - CP13; and
  - CP20.
- Main development site:
  - CP25.

c) Summary

5.1.4 Based on the bat crossing point survey results presented in this report, the crossing points which were taken forward for a full assessment were:

- two village bypass
  - CP1 – four further surveys;
  - *CP2 – four further surveys*;
  - CP3 – four further surveys;
  - CP4 – four further surveys;

  - CP5 – four further surveys; and
  - CP8 – four further surveys.
- Sizewell link road
  - CP11 – one further survey;
  - CP12 – four further surveys;
  - CP13 – four further surveys;
  - CP20 – four further surveys;
  - *CP21 – one further survey*; and
  - CP22 – one further survey.
- main development site:
  - CP24 – four further surveys; and
  - CP25 – four further surveys.

5.1.5 As required by the guidance in Reference 1, the crossing points which met the either the bat activity threshold, or the rare bat species threshold are being repeated a further four times over the 2021 bat active period. As noted above, where survey conditions were sub-optimal an additional survey has also been taken forward where criteria was not met, these locations are noted in *italics* in the list above. The findings of these further surveys will be reported in The Bat Crossing Survey Report 2 and will be submitted to examination at Deadline 9.

5.1.6 The bat crossing point surveys covered by this report do not change the assessment conclusions reached in relation to the main development site, the Sizewell link road or the two village bypass. The results of the surveys which will be reported in The Bat Crossing Survey Report 2 will be used to inform the finalisation of bat mitigation and the planting proposals at these three sites.

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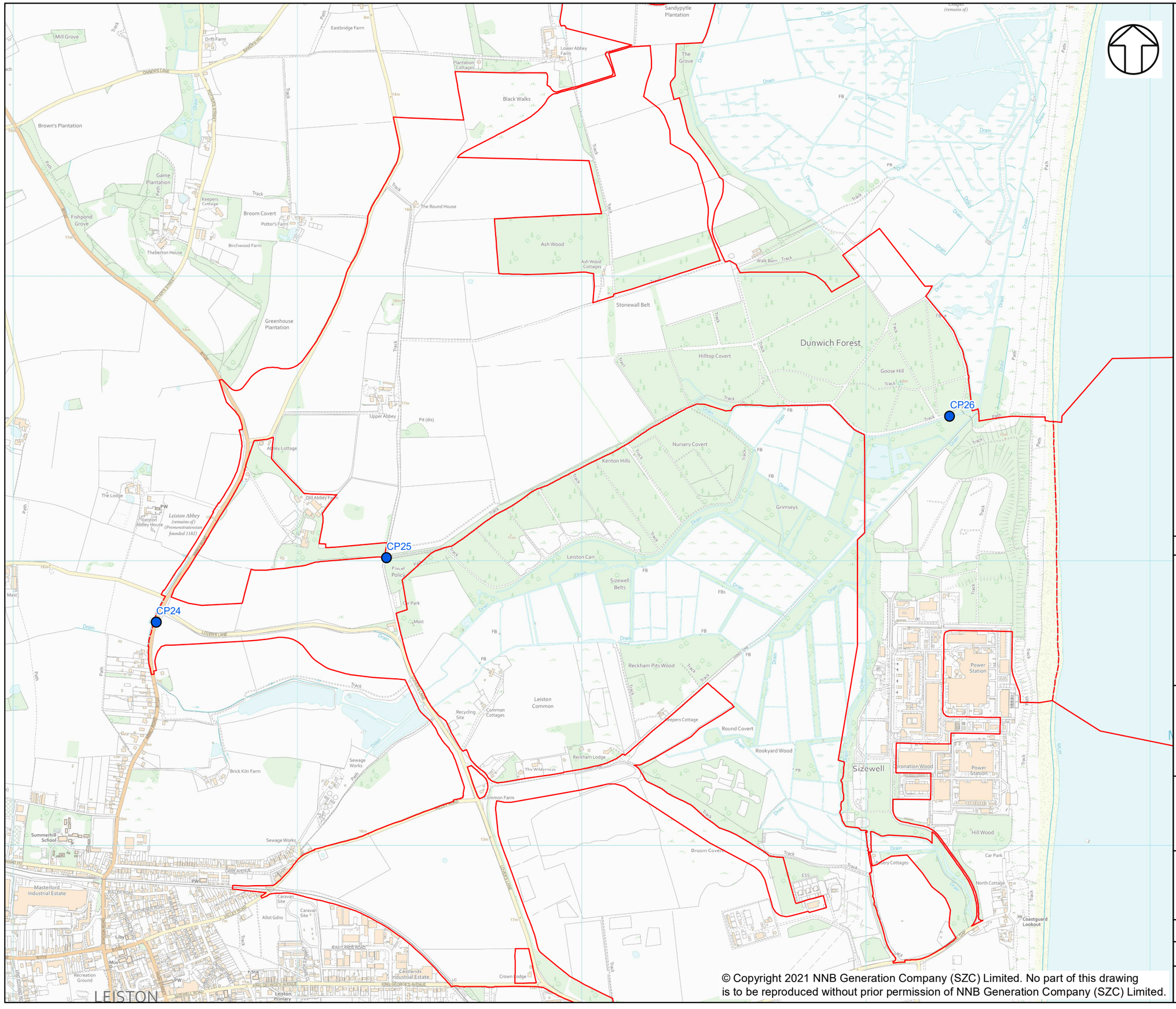

NOTES

KEY

- MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- BAT CROSSING POINT LOCATIONS

NOT PROTECTIVELY MARKED

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DOCUMENT:
BAT CROSSING POINT SURVEY REPORT 2021

DRAWING TITLE:
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DRAWING NO:
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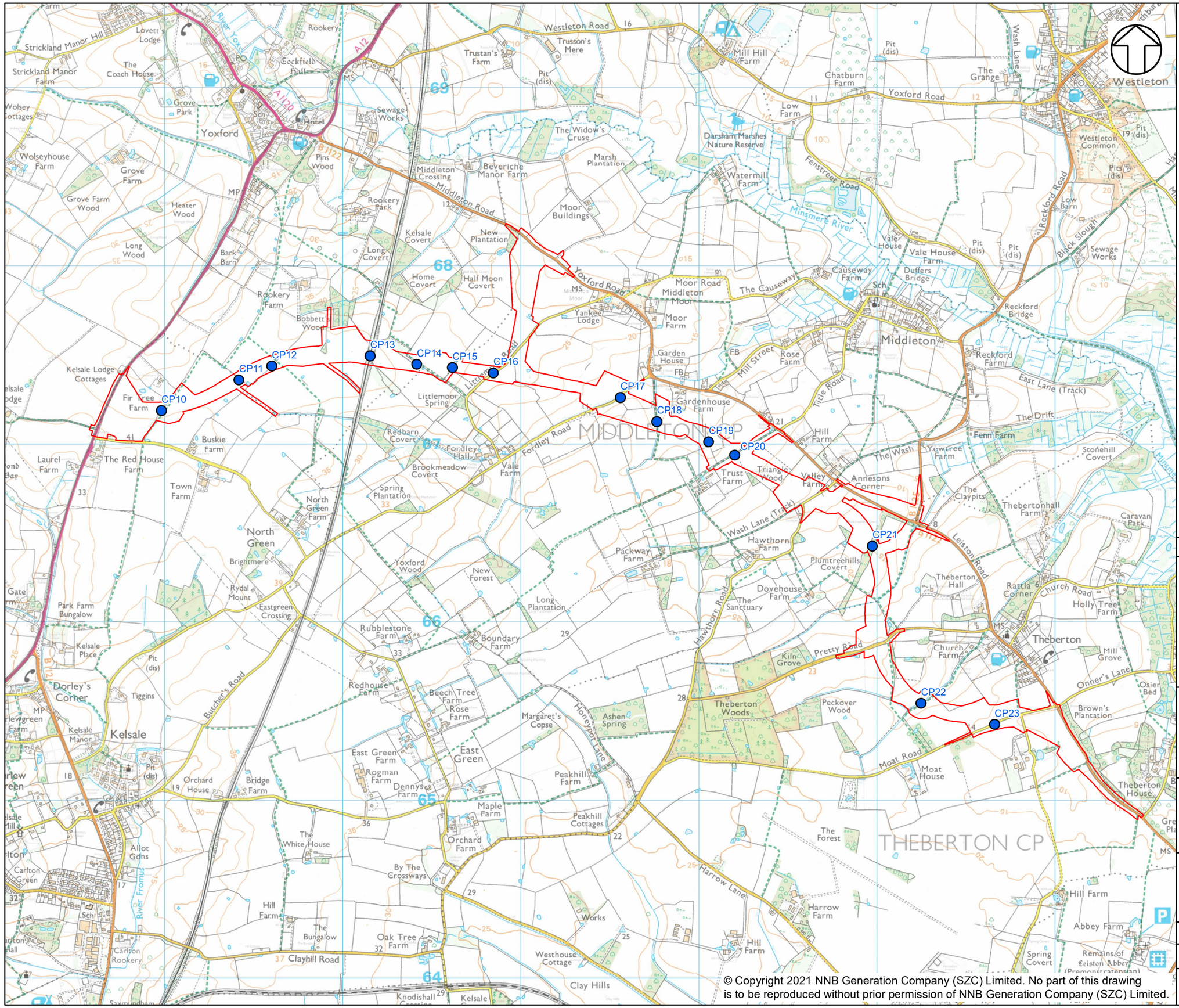

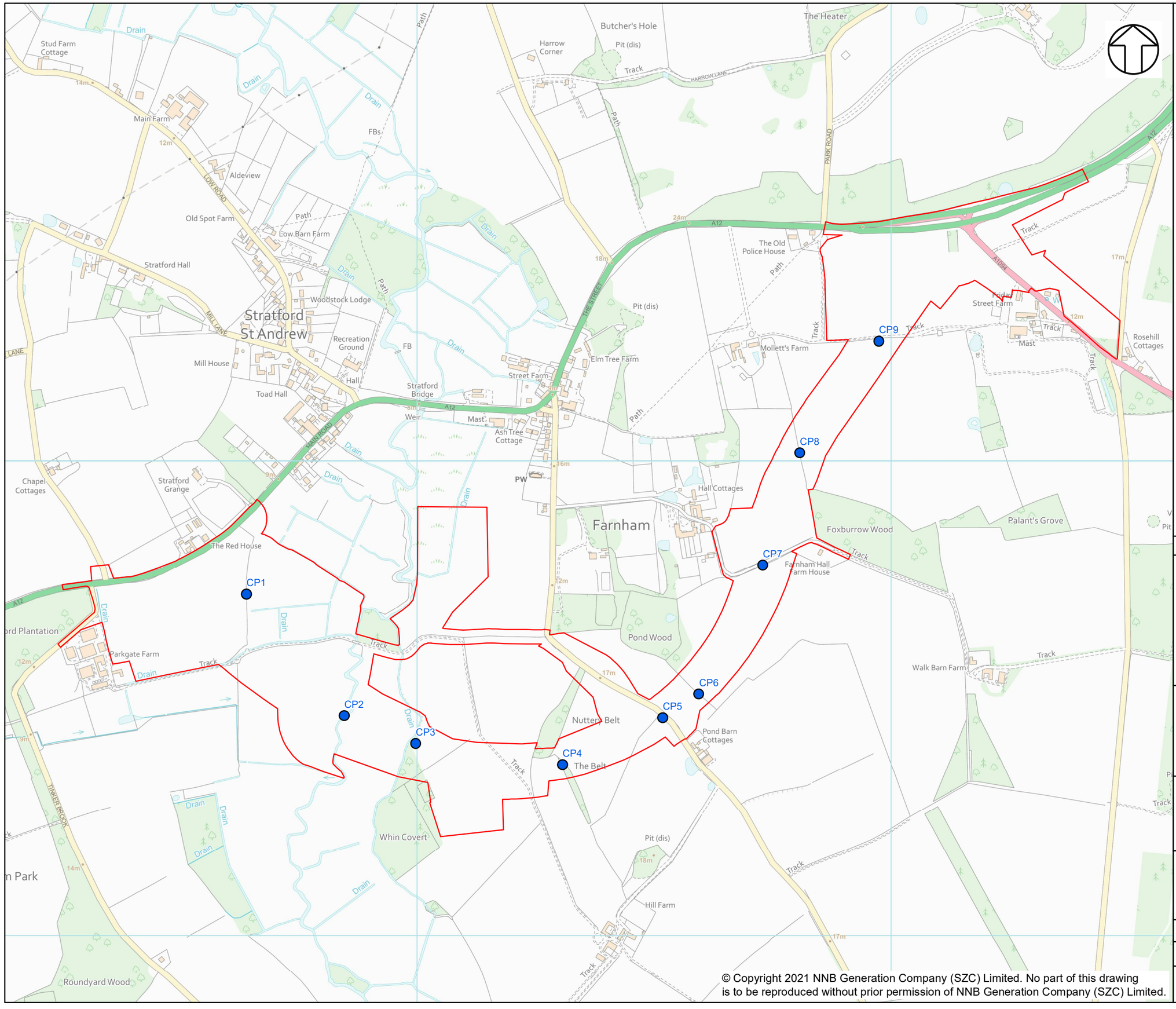

NOTES

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BAT CROSSING POINT LOCATIONS

NOT PROTECTIVELY MARKED

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DOCUMENT:
BAT CROSSING POINT SURVEY REPORT 2021

DRAWING TITLE:
TVB CROSSING POINT LOCATIONS

DRAWING NO:
FIGURE 1C

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APPENDIX G: 2021 TWO VILLAGE BYPASS BAT BACKTRACKING SURVEY REPORT 1

CONTENTS

TABLES

PLATES

None Provided.

FIGURES

1 SUMMARY

1.1.1 This Two Village Bypass Bat Backtracking Survey Report 1 outlines the results of the 2021 woodland backtracking surveys conducted on the Sizewell C two village bypass site. To provide context, a summary of previous surveys conducted to inform the Development Consent Order (DCO) submission is provided, along with a summary of the bat species valuation and mitigation provided in the two village bypass Terrestrial Ecology and Ornithology Environmental Statement (ES) Chapter [APP-425].

1.1.2 The final set of bat backtracking survey visits are due to be undertaken in September 2021 and therefore the Two Village Bypass Bat Backtracking Survey Report 2 will be prepared following those survey visits. This will be submitted to examination at Deadline 8.

1.1.3 These surveys were undertaken in response to a request for further information by the Examining Authority (ExA) dated 18 June 2021 2021 [PD-027] and as detailed in [REP4-006].

a) Species Status - Submitted Baseline Summary Overview (for DCO)

1.1.4 Bat surveys have already been undertaken of land associated with the proposed two village bypass by Arcadis between 2013 and 2020 [APP-426]. These surveys were utilised to inform the two village bypass Terrestrial Ecology and Ornithology ES Chapter [APP-425] submitted as part of the DCO application and are summarised in this section of the report, to provide the context of the backtracking surveys conducted in 2021.

1.1.5 Summaries of the data utilised to inform the DCO application is provided in **Table 1** below.

Table 1: Summary of survey results gathered between 2013 and 2020 to inform the DCO.

Survey	Summary of Results.
Desk-study.	Confirmed extensive use of the site and the surrounding area and landscape by bats, largely from data gathered by Suffolk Wildlife Trust (SWT). Six confirmed species of bat have been recorded historically within the study area, these being: noctule *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, serotine *Eptesicus serotinus*, barbastelle *Barbastella barbastellus* and brown long-eared *Plecotus auritus*. Records were also identified for unspecified species within the *Plecotus* spp., *Myotis* spp. and *Pipistrellus* spp. groups.
Habitat (landscape) appraisal.	Confirmed a high-quality mosaic of habitats suitable for foraging, commuting and roosting bat species. The habitats were considered to be well established and mature, diverse in species composition and habitat type, and to offer many local roosting opportunities in farm buildings and mature woodlands/scattered trees. Also confirmed that there is generally excellent connectivity between the proposal site and the wider landscape, especially through the hedgerow network, and that the area is largely undeveloped.

Survey	Summary of Results.
Tree surveys.	Habitats within the site boundary predominantly consist of open arable land, which is of limited value for bats. However, the site also includes habitat features such as hedgerows and blocks of woodland which provide suitable foraging, commuting and roosting habitat. An assessment of trees within Nuttery Belt identified 13 trees with bat roost potential (five high potential, four medium potential, one low potential, and three negligible potential). However, subsequent climbing surveys in 2021 [REP2-121] did not record any evidence of bats.
Transect surveys and automated detector surveys.	Activity and static detector surveys in 2019 recorded at least 13 bat species/species groups within the site (Natterer's *Myotis nattereri*, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusii*), serotine, barbastelle, noctule, brown long-eared, pipistrelle species, *Myotis* species, *Nyctalus* species, "big bat" and long-eared species (*Plecotus* spp). The activity surveys demonstrated that activity within the site and within adjacent habitats was dominated by common and soprano pipistrelle with low levels of other species recorded. The results of these surveys are set out in the primary and secondary data sections of the **Volume 5**, **Chapter 7** of the **ES** [APP-425].

b) Species Status 2021 Summary Overview – Bat Backtracking Surveys

i. Overview

1.1.6 Bat backtracking surveys were undertaken of land associated with the proposed two village bypass by Arcadis in 2021, at Pond Wood, Nuttery Belt and Foxburrow Wood which are shown in **Figures 1** to **4**.

1.1.7 N.B. The final bat backtracking survey is yet to be undertaken and therefore this report only covers the first survey visit. The final report will be produced shortly following the second survey visit in September.

Pond Wood

1.1.8 The surveys identified a number of bats foraging within and around the edges of Pond Wood. Bat activity was more frequent within areas of woodland to be retained. Commuting activity was also observed coming from the north to the woodland and along the perimeter. Activity was noticeably higher along the northern edge of the wood. No confirmed roosts within the woodland were identified.

Nuttery Belt

1.1.9 The surveys identified a number of bats commuting and foraging along the woodland edges. During the backtracking surveys no confirmed roosts were identified, although two common pipistrelle bats were observed leaving the southern edge of the woodland some 50 minutes after sunset.

Foxburrow Wood

1.1.10 Bats were observed commuting and foraging along the woodland edges, in particular along the tree-lined track along the southern edge of the wood. No confirmed roosts within this woodland were identified.

2021 Conclusion

1.1.11 The results of the first set of 2021 bat backtracking surveys do not change the assessment provided in the **Volume 5**, **Chapter 7** of the **ES** [APP-425] which was based on the previous baseline survey. Similarly, the mitigation proposed for the Two Village Bypass in the bat non-licenced method statement remain the same as in the ES, and the conservation status of bats will not be impacted by the proposed development on the site. The findings of these surveys will be used to further inform the mitigation required, inform licenses and provide an updated baseline for future monitoring.

1.1.12 Once the construction of the two village bypass is completed, and associated habitat creation and reinstatement have fully matured, it is considered that there will be an increase in habitat quality for bats.

2 OVERVIEW

a) The Aims of the 2021 Backtracking Surveys

2.1.2 These surveys were undertaken in response to a request for further information by the Examining Authority (ExA) dated 18 June 2021 2021 [PD-027] and as detailed in [REP4-006].

2.1.3 The aims of the 2021 bat backtracking survey in the woodland areas surveyed were therefore to:

- provide further details on the potential roost resource present within and adjacent to these parts of the two village bypass site; and
- provide further data on bat activity and use of the woodland blocks to inform licensing and details of mitigation.

b) Site Description

2.1.4 The two village bypass site measures approximately 54.8 hectares (ha) and is located to the south and south-east of Stratford St. Andrew, and to the south-west to south-east of Farnham. The proposed development comprises a new permanent two-lane single carriageway road that would depart the A12, creating a new route around the south of Farnham and Stratford St. Andrew, before re-joining the A12 east of Farnham.

2.1.5 The site comprises predominantly agricultural land and encompasses a number of wooded areas, including Pond Wood (ancient woodland), Nuttery Belt and Foxburrow Wood (ancient woodland), which are broadleaved woodlands. In addition, there are a number of hedgerows and tree lines connecting these features. The woodland areas listed were the focus of the surveys undertaken in 2021, in accordance with the request for further information by the ExA (see above).

b) Submitted Baseline (to 2020)

2.1.6 This section of the report provides a summary of the baseline status of bat activity within the two village bypass site as presented within the ES submitted with the application for development consent in May 2020. The full results of the surveys to date can be found in the **Volume 5**, **Chapter 7,**

Appendix 7A of the **ES** [APP-426], the Bat Non-licensable Method Statement [APP-426], and Tree Roost Inspection Report 2021 [REP2-121].

2.1.7 Six confirmed species of bat have been recorded historically within the study area, these being: noctule, common pipistrelle, soprano pipistrelle, serotine, barbastelle and brown long-eared bat. Records were also identified for unspecified species within the *Plecotus* spp., *Myotis* spp. and *Pipistrellus* spp. groups.

2.1.8 Habitats within the site boundary predominantly consisted of open arable land, which is of limited value for bats. However, the site also included habitat features such as hedgerows and blocks of woodland which provided suitable foraging, commuting and roosting habitat. An assessment of trees within the woodland blocks identified 114 trees with bat roost potential (37 high potential, 43 medium potential, 27 low potential, and seven negligible potential). These results are presented in the **Bat Roost Surveys in Trees - Associated Development Sites** report submitted at Deadline 2 [REP2-121 and REP2-122].

2.1.9 Activity and static detector surveys [APP-426] recorded at least 13 bat species/species groups within the site (Natterer's, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusii*), serotine, barbastelle, noctule, brown long-eared, pipistrelle species, *Myotis* species, *Nyctalus* species, "big bat" and long-eared species (*Plecotus* spp). The activity surveys demonstrated that activity within the site and within adjacent habitat was dominated by common and soprano pipistrelle with low levels of other species recorded.

2.1.10 Pond Wood, Foxburrow Wood and Nuttery Belt all offer roosting resource for bats. These are to be retained with the exception of a number of trees associated with Nuttery Belt, which have been subject to detailed tree surveys [REP2-121].

2.1.11 All bat species in the UK are protected under Schedule 5 of the W&CA (Ref 4) and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 5). Five species (barbastelle, brown long-eared, lesser horseshoe, noctule and soprano pipistrelle bat) are listed as priority species on the Suffolk BAP (Ref 6); these and two species not normally present in Suffolk (greater horseshoe and Bechstein's bat) are priority species in England under Section 41 of the NERC Act (Ref 7).

i. Ecological Receptor Status

2.1.12 **Table 2** provides a summary of the value of the receptors present within the proposed development site boundary as defined in the two village bypass Terrestrial Ecology and Ornithology ES Chapter [APP-425].

Table 2: Summary of the importance of ecological receptors as assessed in the Two Village Bypass Environmental Statement [AS-426]

Species	Importance under CIEEM guidelines (Ref. 8)	Importance under EIA-specific methodology (and in accordance with Volume 5, Chapter 6 of the ES [APP-425])
Barbastelle	County	Medium
Natterer's	Local	Low
Leisler's bat and Nathusius' pipistrelle	Local	Low
Noctule and serotine	Local	Low
brown long-eared bat, common pipistrelle, and soprano pipistrelle	Local	Low

3 METHODS

a) Survey Methodology

3.1.2 The following section from the Bat Survey Guidelines (Ref. 10) outlines the purpose and methodology of backtracking surveys undertaken of the Pond Wood, Nuttery Belt and Foxburrow Wood woodlands in 2021.

3.1.3 "*Back-tracking surveys involve ecologists making visual observations of bats commuting away from their roosts at sunset or commuting back to their roosts at sunrise then attempting to track back to the roost based on these observations. Bat detectors are also used to record echolocation for identification of species, where possible. This technique was first developed in the Netherlands and is based on 4 principles:*

- *The earlier a bat is seen after sunset or the later it is seen before sunrise, the closer it is likely to be to its roost (the exact time depends upon the species).*
- *Bats fly away from the roost at sunset, so ecologists should move in the opposite direction as the bats at this time to locate the roost.*

- *Bats fly towards their roost at sunrise, so ecologists should move in the same direction as the bats at this time to locate the roost.*
- *At sunrise, some bats species swarm at roost access points for between 10 and 90 minutes before entering.*

3.1.4 *The aim is to find roosts by making observations of commuting bats. These surveys are often used after a bat activity survey if numbers of bats were seen all commuting in one direction and follow-up is required or in situations with lots of potential roosts sites that are difficult to survey using alternative methods (e.g. in woodlands or highly urbanised areas).”*

3.1.5 Backtracking surveys of Pond Wood, Nuttery Belt and Foxburrow Wood were conducted on two occasions, at dusk in August 2021. The dusk surveys started approximately 30 mins before sunset and ended approximately 2 hours after.

3.1.6 The purpose of these surveys was, building on previous surveys, to identify the likelihood of bats roosting within these woodlands, and if possible, identify the location of the roosts. **Table 3**, below, outlines the dates that woodland backtracking was conducted.

3.1.7 The surveyors were positioned within open areas of the woodland and around the woodland edge to enable them to clearly view bat activity. Attempts were made to track bats along their flight path to locate indicative roosting locations. The data recorded on each survey was used to inform the surveyor positions for the subsequent surveys.

Table 3: Dates of Woodland Backtracking

Survey Date	Woodland	Sunset	Dusk Temp. °C
First Survey			
Dusk 16/08/2021	Pond Wood	20:18	17
Dusk 17/08/2021	Nuttery Belt	20:16	19
Dusk 18/08/2021	Foxburrow Wood	20:13	21
Second Survey			
Dusk 31/08/2021	Pond Wood	19:43	
Dusk 01/09/2021	Nuttery Belt	19:40	

Survey Date	Woodland	Sunset	Dusk Temp. ºC
Dusk 02/09/2021	Foxburrow Wood	19:38	

b) Data Analysis Methodology

3.1.8 Following the surveys, the recordings from the Elekon Bat loggers were analysed within the Elekon propriety software (Bat Explorer). All outputs from Bat Explorer were manually reviewed and verified. The data from this analysis is utilised within the results tables assessing the bat assemblage data.

3.1.9 These analysed data were assessed alongside the manual 'in-the-field' notes from the surveyors, which contained visual observations to provide a more qualitative assessment of the data. This was used to infer information such as where bats may be roosting, where important foraging areas are, and where there are potential commuting routes.

3.1.10 Prior to mapping, the analysed Batlogger data was reviewed, and where multiple calls were recorded within in the same minute a number of passes were likely attributable to a single foraging bat (from reviewing the field data), this was reduced to a single point for the mapping, to allow analysis of the findings of the data.

c) Survey Limitations

3.1.11 Within woodlands with dense canopy cover, it is often difficult to observe a bat leaving a roost and this is a constraint to finding roosts in trees. While any bats observed returning to roost would have been be recorded, the objective of these surveys was to assess levels of bat activity and movement through the woodland.

d) Analysis Limitations

3.1.12 For some of the bat passes, it was possible to determine the broad group (i.e. "big bat" (Leisler's, serotine and noctule) or myotis), but not possible to definitively determine the species. Where this is the case, the broad group was utilised within the analysis and mapping. This is not a significant constraint as the differentiation of these calls is unlikely to impact upon the identification of roosts or the species / woodland valuation.

4 RESULTS

4.1.1 This section of the report outlines the results of the woodland backtracking surveys conducted at Pond Wood, Nuttery Belt and Foxburrow Wood woodlands undertaken in August 2021.

a) Woodland Descriptions

4.1.2 Pond Wood comprised a block of semi-mature broadleaved plantation woodland (likely to have been a formal landscape feature for adjacent manor house), and the eastern part is recorded on the Ancient Woodland Inventry as replanted anncient woodland, supporting a canopy of predominantly Sycamore (*Acer pseudoplatanus*) and Ash (*Fraxinus excelsior*) with scattered mature Pedunculate Oak (*Quercus robor*) trees on woodland edge and a number of introduced conifer species throughout, along with Cherry Laurel (*Prunus laurocerasus*). A very sparse understorey comprising some scattered Elder (*Sambucus nigra*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and Sycamore. Due to the season the ground flora cover appeared quite sparse with some Dog's Mercury (*Mercurialis perennis*) and Bluebell (*Hyacinthoides non-scripta*) recorded. This woodland is effectively adjoined to gardens from adjacent properties and some low level management was apparent. A number of wet and seasonally dry ponds were recorded within the woodland. The bat species recorded in August 2021 within and around this woodland (in order of abundance) were common pipistrelle, soprano pipistrelle, *Nyctalus* sp., serotine, brown long-eared, *Myotis* sp. and barbastelle. It was not possible to confirm any roost sites within this woodland block.

4.1.3 Nuttery Belt comprises a small block of semi-mature broadleaved woodland with an open canopy of Ash, Field Maple (*Acer campestre*) and Wild Cherry (Prunus avium), with scattered mature Pedunculate Oak trees. A generally sparse understorey (with exception of woodland edges) supported a number of species including English Elm (*Ulmus minor*) Hawthorn, Holly (*Ilex aquifolium*), Elder, Blackthorn (*Prunus spinosa*) and Hazel. Due to the season and extensive growth of Bramble (*Rubus fruticosus* agg.), Common Nettle (*Urtica dioica*) and Cow Parsley (*Anthriscus sylvestris*) the ground flora was difficult to assess, however, Bluebell and Primrose (*Primula vulgaris*) were recorded, the woodland also shows some disturbance from game management. The bat species recorded within and around this woodland in August 2021 were (in order of abundance) common pipistrelle, soprano pipistrelle, barbastelle, *Nyctalus* sp., brown long-eared, *Myotis* sp and serotine. It was not possible to confirm any roost sites within this woodland block.

4.1.4 Foxburrow Wood is a large block of semi-natural broadleaved woodland and is recorded on the Ancient Woodland Inventry as replanted ancient woodland and comprises two distinct woodland compartments. To the east the canopy is predominantly tall semi-mature Sycamore with scattered mature and semi-mature Pedunculate Oak, Ash and Beech (*Fagus sylvatica*) trees, generally restricted to the woodland edge. The relatively sparse understorey showed some evidence of recent underplanting, and supported a number of species including Hawthorn, English Elm, Sycamore, Hazel and Blackthorn. To the west the woodland supports a more mature canopy with Hornbeam (*Carpinus betula*), Beech, Ash and Pedunculate Oak, but still supporting tall semi-mature Sycamore. The understorey remains constant across the whole woodland with Cherry Laurel and Rhododendron (*Rhododendron ponticum*) recorded in the west. Due to the season the ground flora was generally sparse across the woodland as a whole but evidence of abundant Bluebell growth was still apparent. The bat species recorded within and around this woodland in August 2021 were (in order of abundance) common pipistrelle, barbastelle, soprano pipistrelle, *Nyctalus* sp., *Myotis* sp., barbastelle, brown long-eared and serotine. It was not possible to confirm any roost sites within this woodland block.

4.1.5 **Tables 4**, **5** and **6** below, present the results of the first of the woodland backtracking surveys that was conducted. A map of the locations of surveyors and the approximate routes taken is presented in **Figure 2** (Pond Wood) and **Figure 3** (Nuttery Belt) and **Figure 4** (Foxburrow Wood).

Table 4: Results of the Pond Wood backtracking surveys

Survey Date (Dusk). Grid Reference	Bat Roost Confirmed?	Potential Bat Roost Identified?	Bat Foraging Areas Identified?	Bat Commuting Routes Identified
16/08/2021 TM 36415 59614	No	No	Generally, bats foraging up and down woodland edge and at canopy height.	Surveyor deployed on southern edge of woodland, some evidence of commuting bats but no confirmation of direction of travel.
16/08/2021 EM TM 36301 59718	No	No, but pipistrelles heard within 10 minutes of sunset	No	Surveyor deployed on north-western edge of woodland, some evidence of commuting bats but no confirmation of direction of travel
16/08/2021 MH TM 36604 59613	No	No	Generally, bats foraging up and down woodland edge and at canopy height. Soprano pipistrelle foraging over ponds within woodland.	Surveyor deployed on eastern edge of woodland, no evidence of commuting bats.
16/08/2021 RR TM 36513 59718	No	No, but single bat heard at approximately 1 minute after sunset	Generally, bats foraging up and down woodland edge and within field to north.	Surveyor deployed on northeast edge of woodland south of Farnham Hall, some evidence that bats are commuting from this direction towards the woodland.

Table 5: Results of the Nuttery Belt backtracking surveys

Survey Date (Dusk). Grid Reference	Bat Roost Confirmed?	Potential Bat Roost Identified?	Bat Foraging Areas Identified?	Bat Commuting Routes Identified
17/08/2021 AB TM 36257 59484	No	No	No	No. Surveyor deployed on western edge of woodland.
17/08/2021 EM TM 36283 59373	No	No, but three common pipistrelle seen emerging from woodland some 50 minutes after sunset.	No	No. Surveyor deployed on southern edge of woodland.
17/08/2021 MH TM 36336 59468	No	No	Several bats observed foraging along woodland edge.	Many bat passes likely to just be foraging. Surveyor deployed on eastern edge of woodland.
17/08/2021 RR TM 36288 59452	No	No	Foraging bats recorded (and seen) within the woodland.	No. Surveyor deployed within southern half of woodland.

Table 6: Results of the Foxburrow Wood backtracking surveys

Survey Date (Dusk). Grid Reference	Bat Roost Confirmed?	Potential Bat Roost Identified?	Bat Foraging Areas Identified?	Bat Commuting Routes Identified
18/08/2021 AB TM 37127 59792	No	No	Substantial barbastelle foraging around approx. location TM 46455 64502 (crossroads between Hilltop Covert and Goose Hill).	Surveyor deployed on eastern edge of woodland, some evidence that bats are commuting from the north to south along the woodland edge.
18/08/2021 EM TM 36960 59782	No	No, but bats heard within 10 minutes of sunset	Several bats foraging along the track to the south of the woodland.	Surveyor deployed on southern edge of woodland on track. Many bat passes along track to south of woodland, unable to differentiate foraging and commuting bats.
18/08/2021 MH TM 36973 59926	No	No	Several bats foraging along northern edge of woodland	Surveyor deployed on northern edge of woodland. A small number of bats identified commuting in a west to east direction along woodland edge at start of survey.
18/08/2021 RR TM 36810 59893	No	No	Several bats recorded foraging over field and woodland edge and around hedgerow along track.	No. Surveyor deployed on western edge of woodland.

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KEY

DEVELOPMENT SITE BOUNDARY

TVB WOODLANDS

NOT PROTECTIVELY MARKED

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TVB BACK-TRACKING REPORT 2021

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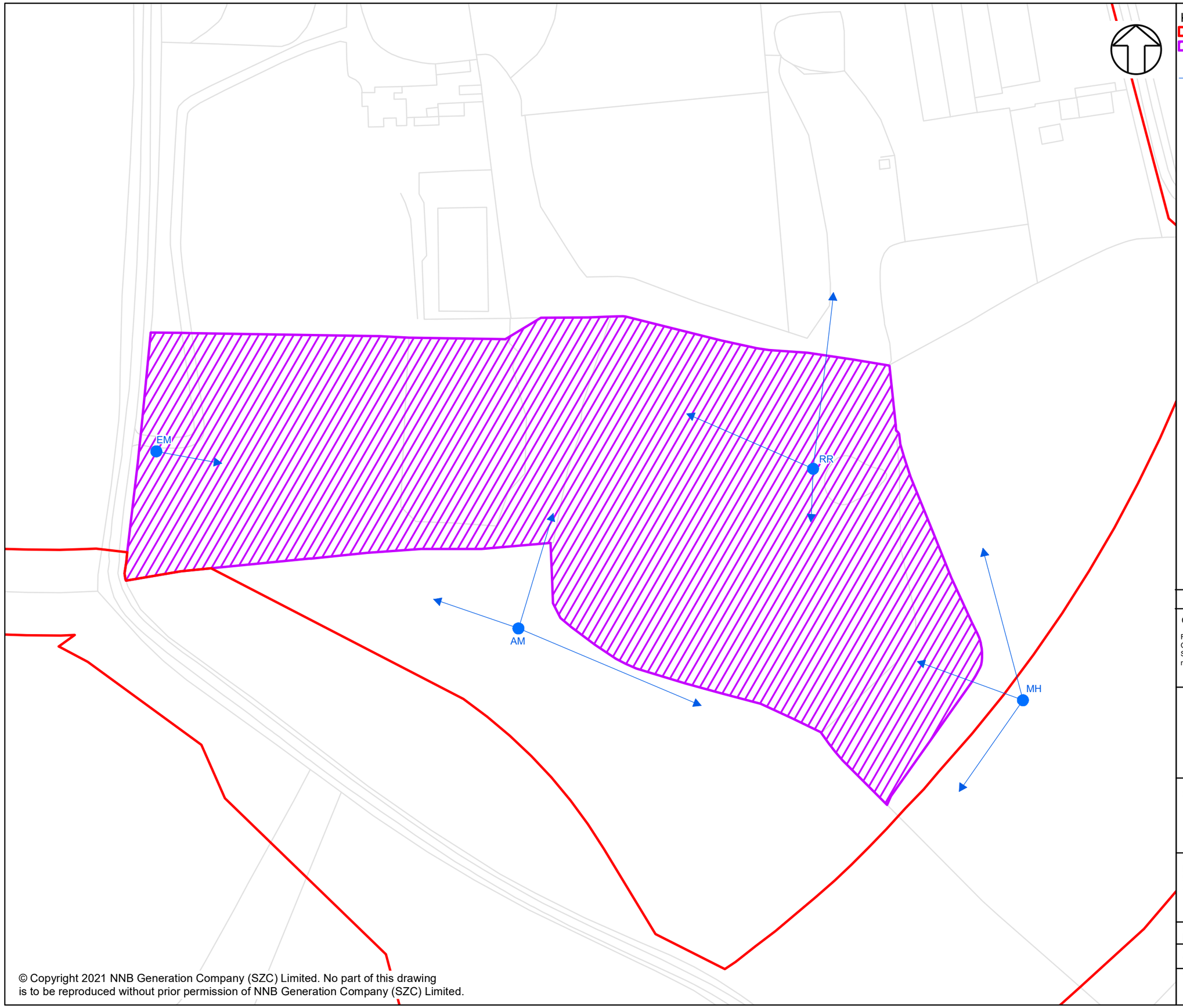

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SURVEYOR LOCATIONS AND INDICATION OF AREAS COVERED

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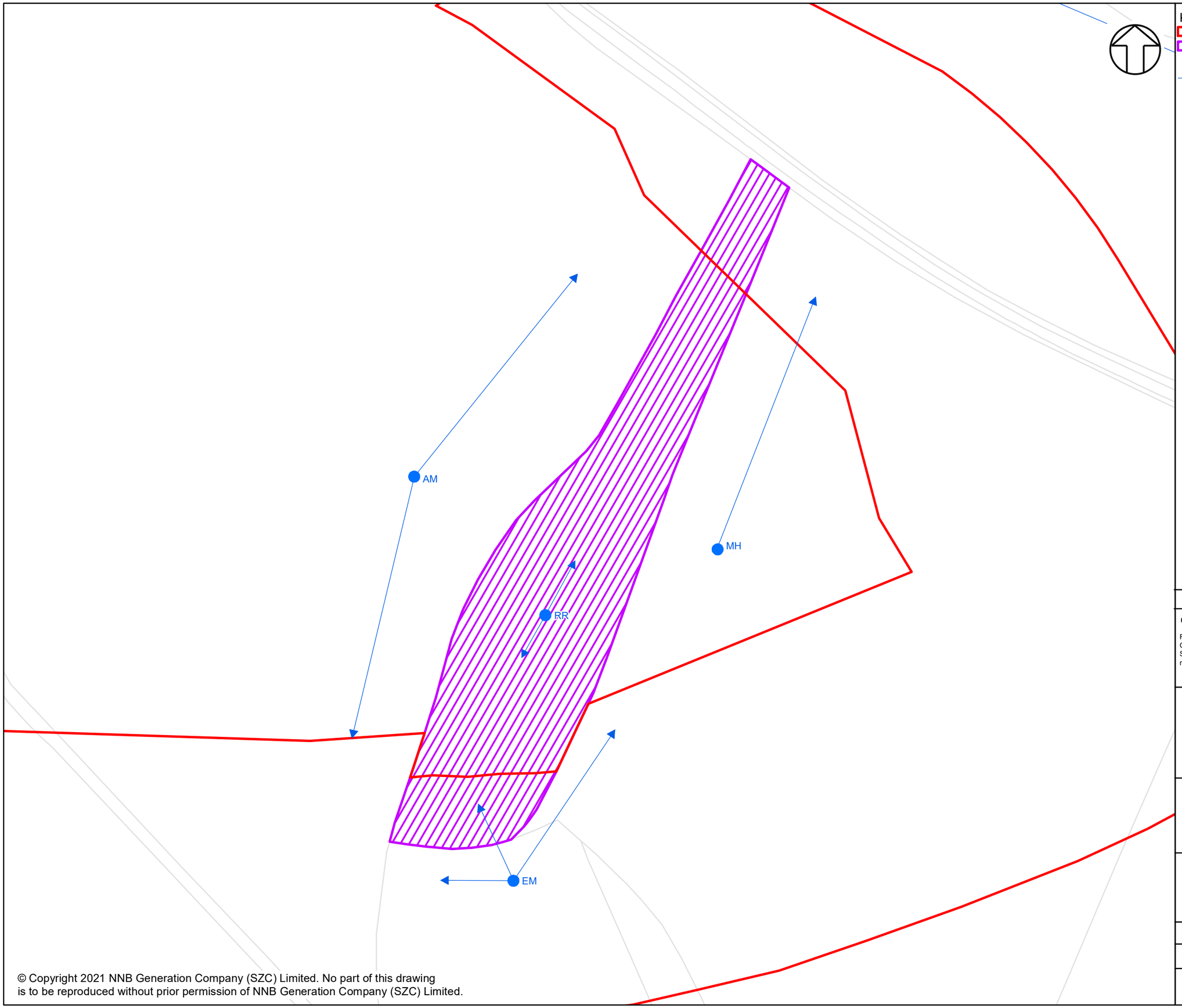

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DOCUMENT:
SIZEWELL C
TVB BACK-TRACKING REPORT 2021

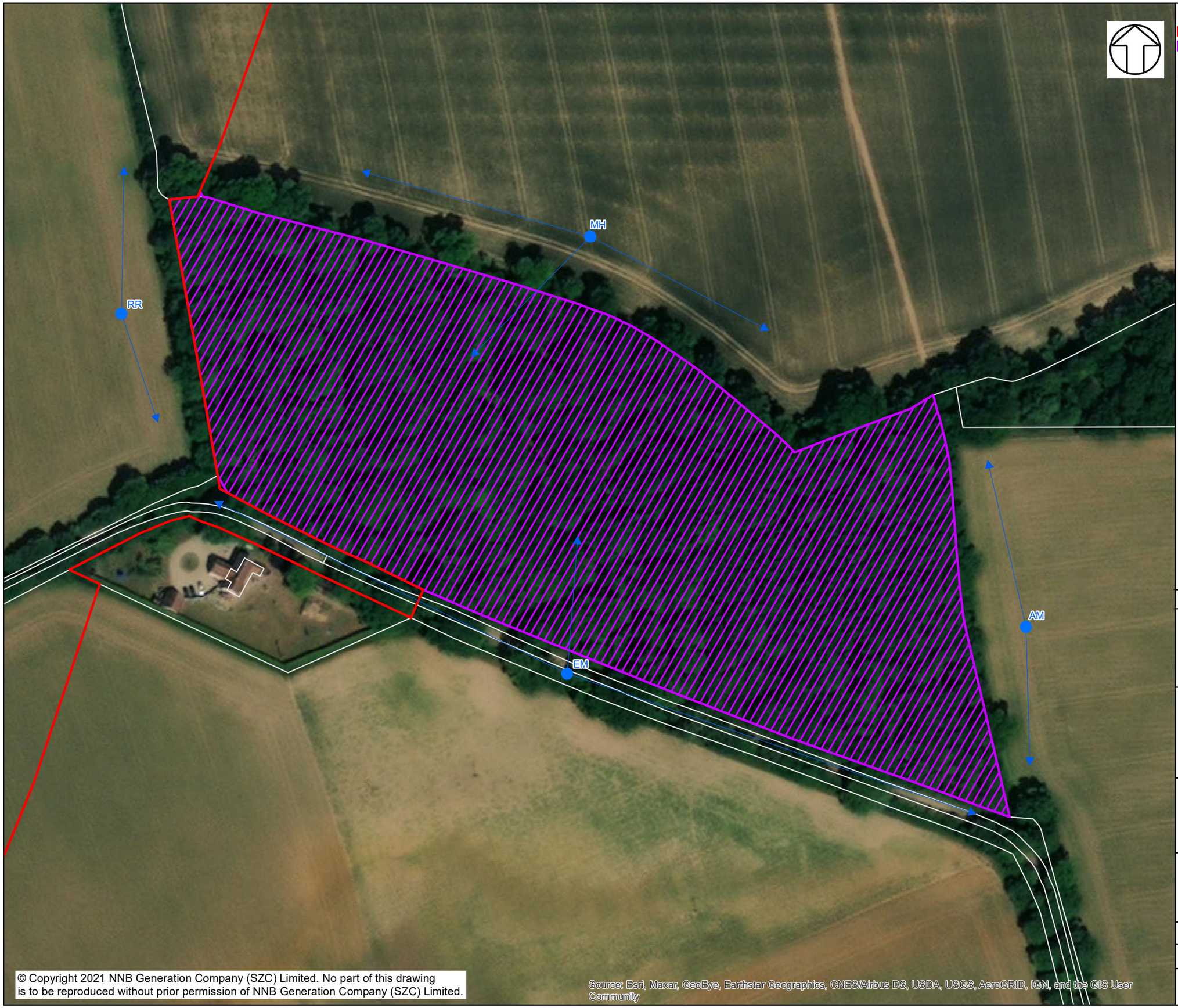
DRAWING TITLE:
NUTTERY BELT: 17TH AUGUST 2021.
SURVEYOR LOCATIONS AND INDICATION OF AREAS COVERED

DRAWING NO:
FIGURE 3

DATE:	DRAWN:	SCALE :	REV:
SEPT 2021	R.C.	1:1,000 @A3	01

SCALE BAR

0 8 16 24 32 40 M



KEY

- DEVELOPMENT SITE BOUNDARY
- FOXBURROW WOOD
- SURVEYOR LOCATION
- INDICATOR OF AREA COVERED

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FIGURE 4

DATE:	DRAWN:	SCALE :	REV:
SEPT 2021	R.C.	1:1,250 @A3	01

SCALE BAR
0 10 20 30 40 50 M

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community