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Site	DITCH 1	POND 10	POND 11
Date	12 July 2012	12 July 2012	12 July 2012
NGR	SD 55552 24701	SD 55603 24577	SD 55686 24704
EPHEMEROPTERA			
Baetidae			
Cloeon dipterum		80	
Limnephilidae			
Limnephilus lunatus		4	7
Coenagrionidae			
Enallagma cyathigerum		1	
NEUROPTERA			
Sialidae			
Sialis lutaria		62	
HEMIPTERA			
Corixidae			
nymphs indet		300	
Corixa sp nymph			1
Corixa punctata		7	
Sigara falleni		62	
Sigara dorsalis	3	70	
Sigara lateralis		26	
Hesperocorixa sahlbergi	5	3	
Sigara nigrolineata	2	10	
Notonectidae			
nymph indet		20	
Notonecta glauca		4	
Hydrometridae			
Hydrometra stagnorum			2
Gerridae			
nymphs indet		4	
Gerris lacustris	2	2	
Veliidae			
nymphs indet		8	
Velia caprai		17	
COLEOPTERA			
Chrysomelidae			
larvae indet			6
Dytiscidae			
Agabus sp larvae	25	39	
Agabus bipustulatus	13	18	7
Agabus nebulosus	3		
Agabus paludosus			1
Agabus sturmii		1	
Hygrotus inaequalis		15	

Hygrotus(Coelambus)impressopunctatus	1	7	
Rhantus sp larvae	4	12	
Rhantus suturalis		2	
Ilybius ater		6	
Ilybius fuliginosus	3	4	
Colymbetes fuscus		1	
Hydroporus sp larvae	12	19	
Hydroporus angustatus		1	
Hydroprous memnonius			2
Hydroporus pubescens		2	
Hydroporus planus	2		
Hydroporus palustris	8	56	
Hyphydrus ovatus		1	
Dytiscus sp larvae		4	
Dytiscus marginalis		1	
Noteridae			
Noterus sp larva			
Noterus clavicornis		1	
Hydrophilidae			
Anacaena globulus	8		
Cercyon convexiusculus			1
Laccobius minutus		1	
Laccobius bipunctatus			
Hydrobius fuscipes		1	
Helophorus aequalis	2		
Helophorus brevipalpis		40	
Helophorus grandis		80	
Helophorus minutus		76	
Helophorus obscurus		51	
MALACOSTRACA			
Crangonyctidae			
Crangonyx pseudogracilis		640	>1000
Asellidae			
Asellus aquaticus		800	800
DIPTERA			
Ceratopogonidae			
Chironomidae	90	>1000	>1000
Chaoboridae			
Chaoborus crystalinus		30	
Dixidae			
Dixella sp			9
Tipulidae			
Tipula sp		1	
Tabanidae	9		36
Syrphidae	2		
Eristalis sp			

Ptychopteridae			
Ptychoptera lacustris		**8**	
TRICLADIDA			
Dugesiidae			
Dugesia polychroa grp		**61**	
HIRUDINIDAE			
Glossiphonidae			
Helobdella stagnalis		**70**	**27**
MOLLUSCA			
Lymnaeidae			
Galba truncatula	**1**	**9**	**14**
Lymnaea stagnalis			
Rhadix baltica			**1**
OLIGOCHAETA	**2**	**>1000**	**>1000**
CLADOCERA		**>1000**	
HYDRACARINA	**5**		
OSTRACODA	**7**	**>1000**	
NEMATODA			
VERTEBRATES			
Lissotriton vulgaris	**PRESENT**		

Site	**POND 12**	**POND 13**	**POND 16**
Date	**12 July 2012**	**12 July 2012**	**12 July 2012**
NGR	**SD 55569 24702**	**SD 55479 24696**	**SD 55267 24344**
EPHEMEROPTERA			
Baetidae			
Cloeon dipterum	**36**		**46**
Caenidae			
Caenis horaria	**2**		
TRICHOPTERA			
Leptoceridae			
Athripsodes aterrimus	**1**		
Mystacides longicornis	**5**		
Limnephilidae			
larvae/pupae indet	**11**	**2**	
Limnephilus lunatus	**2**	**8**	
ODONATA			
Aeshnidae			
Aeshna sp	**3**		
Aeshna grandis	**Adults on wing**		
Libellulidae			
Libellula depressa	**Adults on wing**		
Coenagrionidae			
nymphs indet	**3**		
Enallagma cyathigerum	**Adults on wing**	**1**	**Adults on wing**
Ischnura elegans	**Adults on wing**		
Pyrrhosoma nymphula			**2**
NEUROPTERA			
Sialidae			
Sialis lutaria	**16**		**3**
HEMIPTERA			
Corixidae			
nymphs indet	**21**	**104**	**24**
Corixa sp nymph		**72**	
Corixa punctata		**34**	**4**
Sigara falleni	**12**		
Sigara dorsalis	**16**	**4**	
Sigara limitata		**19**	
Sigara lateralis			**2**
Hesperocorixa sahlbergi		**28**	**9**
Notonectidae			
nymph indet	**11**	**102**	**38**
Notonecta glauca	**5**	**8**	**4**
Gerridae			
nymphs indet	**2**	**2**	
Veliidae			

Velia caprai			7
COLEOPTERA			
Chrysomelidae			
larvae indet		3	9
Dytiscidae			
Agabus sp larvae	5	70	13
Agabus bipustulatus	21	22	19
Agabus nebulosus			2
Agabus paludosus		1	
Hygrotus inaequalis	3	3	
Hygrotus(Coelambus)impressopunctatus	1		
Hygrotus (Coelambus) confluens		1	
Hyphydrus ovatus	6		
Rhantus suturalis		1	
Ilybius fuliginosus	4	8	5
Colymbetes fuscus		4	
Hydroporus sp larvae	9	13	
Hydroporus angustatus		2	
Hydroprous memnonius			2
Hydroporus palustris	7	19	
Hyphydrus ovatus	2		
Dytiscus sp larvae		1	
Haliplidae			
larvae indet		7	
Haliplus ruficollis		5	
Haliplus ruficollis grp females		19	
Hydrophilidae			
larvae indet		6	
Anacaena globulus	2	17	9
Laccobius minutus		3	
Laccobius colon		1	
Hydrobius fuscipes	1	3	
Helophorus aequalis			1
Helophorus brevipalpis	9		
Helophorus minutus		1	
Paelobiidae			
Hygrobia hermanni		1	
MALACOSTRACA			
Crangonyctidae			
Crangonyx pseudogracilis	73		890
Asellidae			
Asellus aquaticus	159	47	>1000
DIPTERA			
Ceratopogonidae	12		
Chironomidae	230	98	>1000
Culicidae			

Culex sp	**2**		**145**
Tipulidae			
Tipula sp		**1**	**6**
Syrphidae		**15**	**11**
Eristalis sp			
Ptychopteridae			
Ptychoptera lacustris		**3**	
TRICLADIDA			
Dugesiidae			
Dugesia polychroa grp		**30**	
HIRUDINIDAE			
Erpobdellidae			
Erpobdella octoculata		**2**	
Glossiphonidae			
Glossiphonia complanata	**2**		
Helobdella stagnalis	**56**	**67**	**78**
MOLLUSCA			
Sphaeriidae	**78**	**9**	**59**
Lymnaeidae			
Galba truncatula		**15**	
Lymnaea stagnalis	**2**		
Rhadix baltica	**9**		
Planorbiidae			
Hippeutis complanatus	**1**		
OLIGOCHAETA	**7**	**23**	**>1000**
CLADOCERA		**97**	**>1000**
OSTRACODA		**50**	**69**
VERTEBRATES			
Gasterosteus aculeatus	**Present**		
Rana temporaria			
Lissotriton vulgaris		**Present**	
Cyprinus carpio	**Present**		
n-Species			

	EPHEMERAL	
Site	**POND 1**	**POND 19**
Date	**19 July 2012**	**03 August 2012**
NGR	**SD 55643 24567**	SD 55075 24619
Caenidae		
Caenis horaria		**3**
TRICHOPTERA	**>1000**	
Limnephilidae		
larvae/pupae indet		**5**
Limnephilus lunatus		**2**
ODONATA		
Aeshnidae		
Aeshna sp		**1**
NEUROPTERA		
Sialidae		
Sialis lutaria		**7**
HEMIPTERA		
Corixidae		
nymphs indet	**14**	**2**
Corixa sp nymph	**2**	**14**
Corixa punctata		**5**
Sigara dorsalis		**1**
Hesperocorixa sahlbergi		
Notonectidae		
nymph indet		**17**
Notonecta glauca		**3**
Hydrometridae		
Hydrometra stagnorum	**3**	**2**
Veliidae		
Velia caprai		**6**
COLEOPTERA		
Chrysomelidae	**10**	
larvae indet	**5**	**1**
Dytiscidae		
Agabus sp larvae	**3**	**9**
Agabus bipustulatus	**2**	**5**
Agabus sturmii	**9**	**1**
Hygrotus (Coelambus) confluens		**1**
Rhantus suturalis		
Ilybius fuliginosus		**3**
Ilybius montanus	**9**	
Colymbetes fuscus	**3**	**2**
Hydroporus sp larvae		
Hydroporus angustatus		**1**
Hydroporus ingognitus		

Hydroprous memnonius		
Hydroporus palustris	**9**	**12**
Dytiscus sp larvae	**2**	**6**
Haliplidae		
larvae indet	**12**	**3**
Haliplus ruficollis		**9**
Haliplus ruficollis grp females		**1**
Hydrophilidae		
Anacaena globulus		**5**
Laccobius colon		**1**
Laccobius bipunctatus		**3**
Hydrobius fuscipes		**1**
Helophorus aequalis		
Helophorus brevipalpis		**26**
Hydraenidae	**>1000**	
Hydraena britteni		**12**
Hydraena riparia		**5**
Scirtidae		
Helodes sp larvae	**82**	
MALACOSTRACA	**21**	
Crangonyctidae		
Crangonyx pseudogracilis		**370**
Asellidae		
Asellus aquaticus		**>1000**
DIPTERA		
Ceratopogonidae		**5**
Chironomidae		**650**
Culicidae		
larvae/pupae indet		**9**
Dixidae		
Dixella sp		**3**
Tipulidae		
Tipula sp		**4**
Ptychopteridae		
Ptychoptera lacustris		
HIRUDINIDAE	**3**	
Glossiphonidae	**>1000**	
Glossiphonia complanata		**2**
Helobdella stagnalis		**1**
MOLLUSCA		
Sphaeriidae		
Lymnaeidae		
Galba truncatula		**4**
Lymnaea fusca		
Lymnaea stagnalis		**1**
Rhadix baltica		**6**

Physidae	
Aplexa hypnorum	
OLIGOCHAETA	**47**
VERTEBRATES	
Rana temporaria	**present**

Appendix 1. Amphibian Survey Raw Data.

Pond 1

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch					5	7		Y						1
	Bottle					4	5								
25/4/12	Torch								Y						
	Bottle					5	6								
10/5/12	Torch						9		Y						
	Bottle					3	12								
24/5/12	Torch					2	6		Y						
	Bottle					8	4								
Total		0	0	0	0	27	49	0	Y	0	0	0	0	0	Small popn

Pond 2

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch						1							1	
	Bottle					8	8								
25/4/12	Torch								Y						
	Bottle					2	17								
10/5/12	Torch						8		Y					1	
	Bottle					16	28								
24/5/12	Torch						11		Y					2	3
	Bottle					28	6							1	
Total		0	0	0	0	54	79	0	Y	0	0	0	0	Small popn	Small popn

Pond 3

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch					5	1		Y					10+ tad	
	Bottle					4	9							1 tad	
25/4/12	Torch								Y					<10 tads	<100 tads
	Bottle					2	8							4 tads	<100 tads
10/5/12	Torch					4			Y					1 + <10 tads	3 + <100 tads
	Bottle					5	4							<10 tads	<10 tads
24/5/12	Torch					2	4		Y					<10 tads	<100 tads
	Bottle						1							<100 tads	4 + <100 tads
Total		0	0	0	0	22	27	0	Y	0	0	0	0	Med popn	Med popn

Pond 4

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch													2 tads	
	Bottle													<10 tads	
24/5/12	Torch													1	
	Bottle													<10 tads	
Total		0	0	0	0	0	0	0	0	0	0	0	0	Small popn	0

Pond 5

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch						1		Y					1	
	Bottle														
25/4/12	Torch						1		Y					1	
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch													1	
	Bottle													<10 tads	
Total		0	0	0	0	0	2	0	Y	0	0	0	0	Small popn	0

Pond 6

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch													1	
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch													1	
	Bottle														
Total		0	0	0	0	0	0	0	0	0	0	0	0	2	0

Pond 7

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch														
	Bottle														
Total		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Pond 8*

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch														
	Bottle														
Total		0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Edges of the pond were very shallow. Netting was used in combination with torch survey and egg search to ensure 3 acceptable survey techniques.

Pond 9

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch														
	Bottle														
Total		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Pond 10

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch													1	
	Bottle														
* 10/5/12	Torch														
	Net														
24/5/12	Torch													1	
	Net														
Total		0	0	0	0	0	0	0	0	0	0	0	0	Small popn	0

*Bottle trapping was suspended after 25/04/2012 due to presence of water shrew. Netting was used in combination with torch survey and egg search.

Pond 11

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														1
	Bottle														
25/4/12	Torch													1	
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch													1	
	Bottle														
Total		0	0	0	0	0	0	0	0	0	0	0	0	Small popn	Small popn

Pond 12

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch														
	Bottle														
Total		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Pond 13

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch														
	Bottle														
Total		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Pond 14

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch													1	
	Bottle														
25/4/12	Torch														
	Bottle					1		1							
10/5/12	Torch														
	Bottle					3	4								
24/5/12	Torch														
	Bottle					1	4							1	
Total		0	0	0	0	5	8	1	0	0	0	0	0	Small popn	0

Pond 15*

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														>100 tad
10/5/12	Torch														
	Bottle					1 bottle									>100 tad
24/5/12	Torch													<10 tad	
	Bottle					9 bottle	1 bottle							<10 tad	<100 tad
Total		0	0	0	0	10	1	0	0	0	0	0	0	Small popn	Med popn

*Terrestrial searches were undertaken around this Pond as only 50% of the perimeter could be bottle-trapped. This ensured full survey.

Pond 16

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle													<10 tad	
25/4/12	Torch														<10 tad
	Bottle													<100 tad	
10/5/12	Torch														1 + <10 tad
	Bottle						1 bottle							<100 tad	
24/5/12	Torch														
	Bottle													<10 tad	
Total		0	0	0	0	0	1	0	0	0	0	0	0	Small popn	Small popn

Pond 17

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch														
	Bottle														
Total		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Pond 18

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle					1 bottle	2 bottle								
25/4/12	Torch														
	Bottle														
10/5/12	Torch					7	1							<10 tad	
	Bottle														
24/5/12	Torch														
	Bottle					3 bottle	2 bottle								
Total		0	0	0	0	11	5	0	0	0	0	0	0	Small popn	0

Pond 19

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch														
	Bottle					1 bottle									
24/5/12	Torch														
	Bottle														
Total		0	0	0	0	1	0	0	0	0	0	0	0	0	0

Pond 20

Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch													<100 tad	
	Bottle													<100 tad	
25/4/12	Torch													<100 tad	
	Bottle														
10/5/12	Torch														
	Bottle														<10 tad
24/5/12	Torch														
	Bottle						1 bottle							>100 tad	
Total		0	0	0	0	0	1	0	0	0	0	0	0	Med popn	Small popn

Pond 21

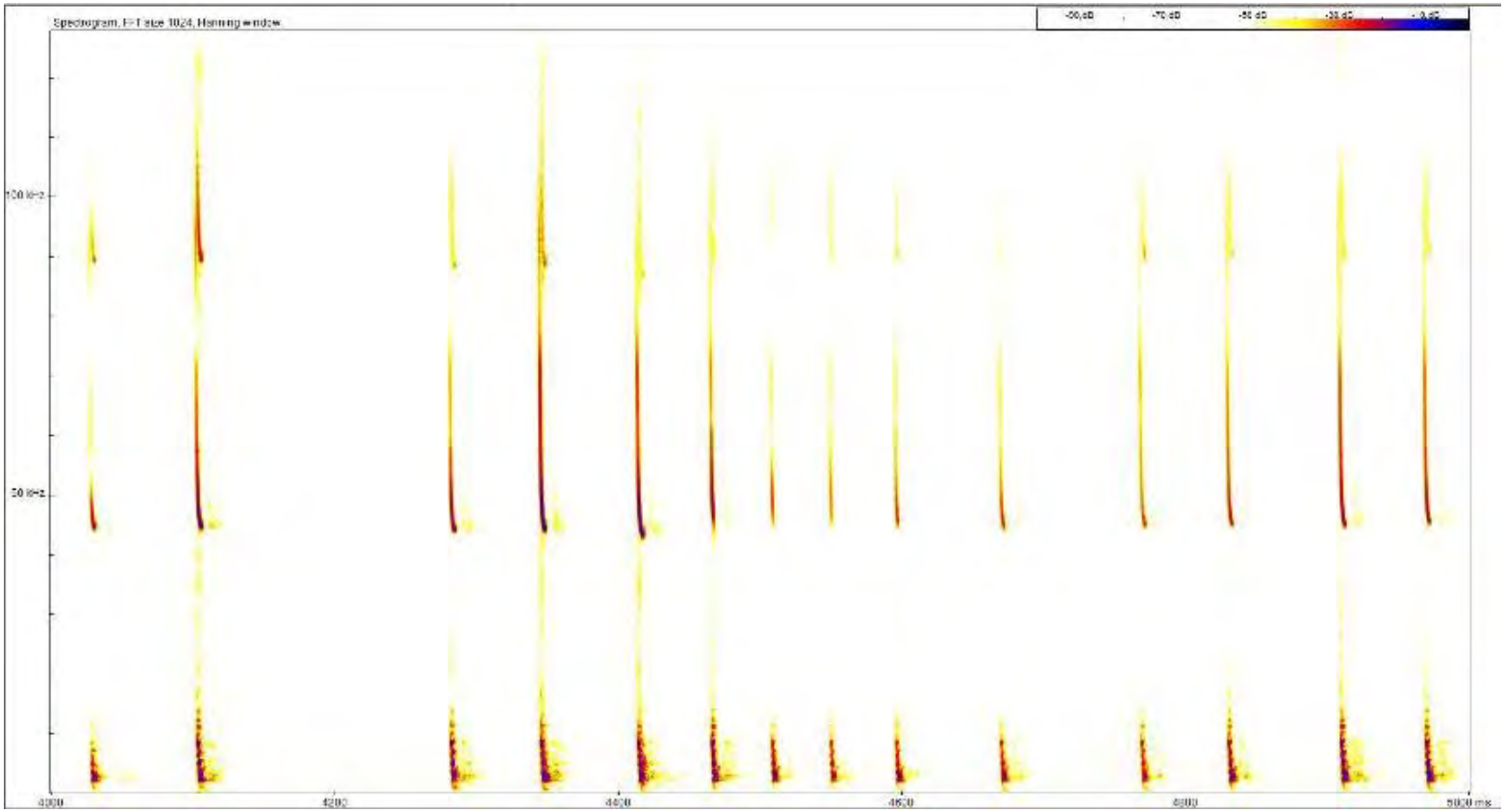
Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch						1							>100 tad	
	Bottle													<100 tad	
25/4/12	Torch													1 + <100 tad	
	Bottle													<100 tad	
10/5/12	Torch													<100 tad	
	Bottle					3	1							<100 tad	
24/5/12	Torch														
	Bottle					1								<100 tad	
Total		0	0	0	0	4	2	0	0	0	0	0	0	Med popn	0

Pond 22

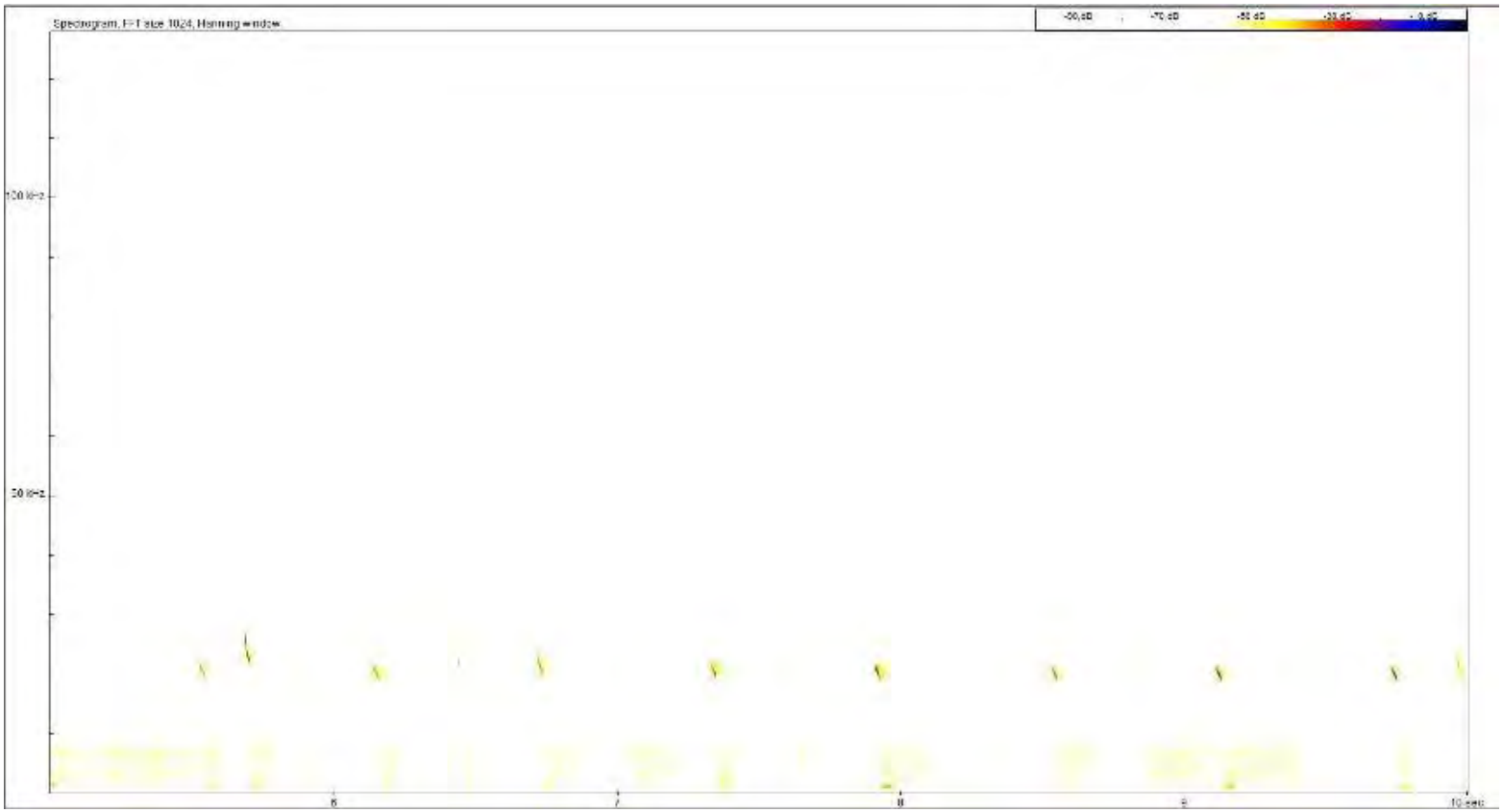
Survey Date		GCN				Smooth				Palmate				Frog	Toad
		M	F	Juv	Egg	M	F	Juv	Egg	M	F	Juv	Egg		
19/4/12	Torch														
	Bottle														
25/4/12	Torch														
	Bottle														
10/5/12	Torch														
	Bottle														
24/5/12	Torch														
	Bottle														
Total		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 2: Sonograms of bat ultrasound at Cuerden Statetegic Site.

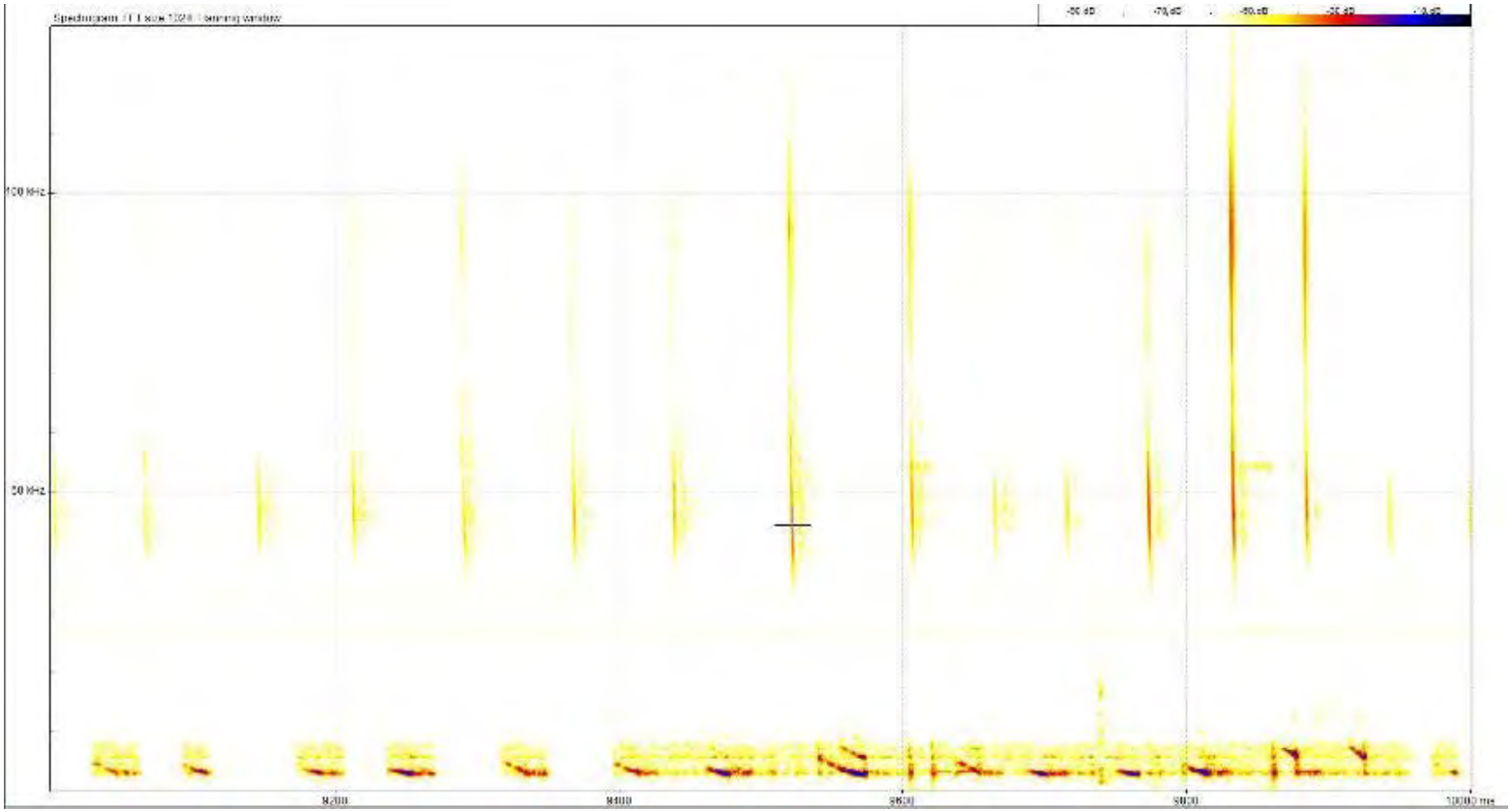
Common Pipistrelle



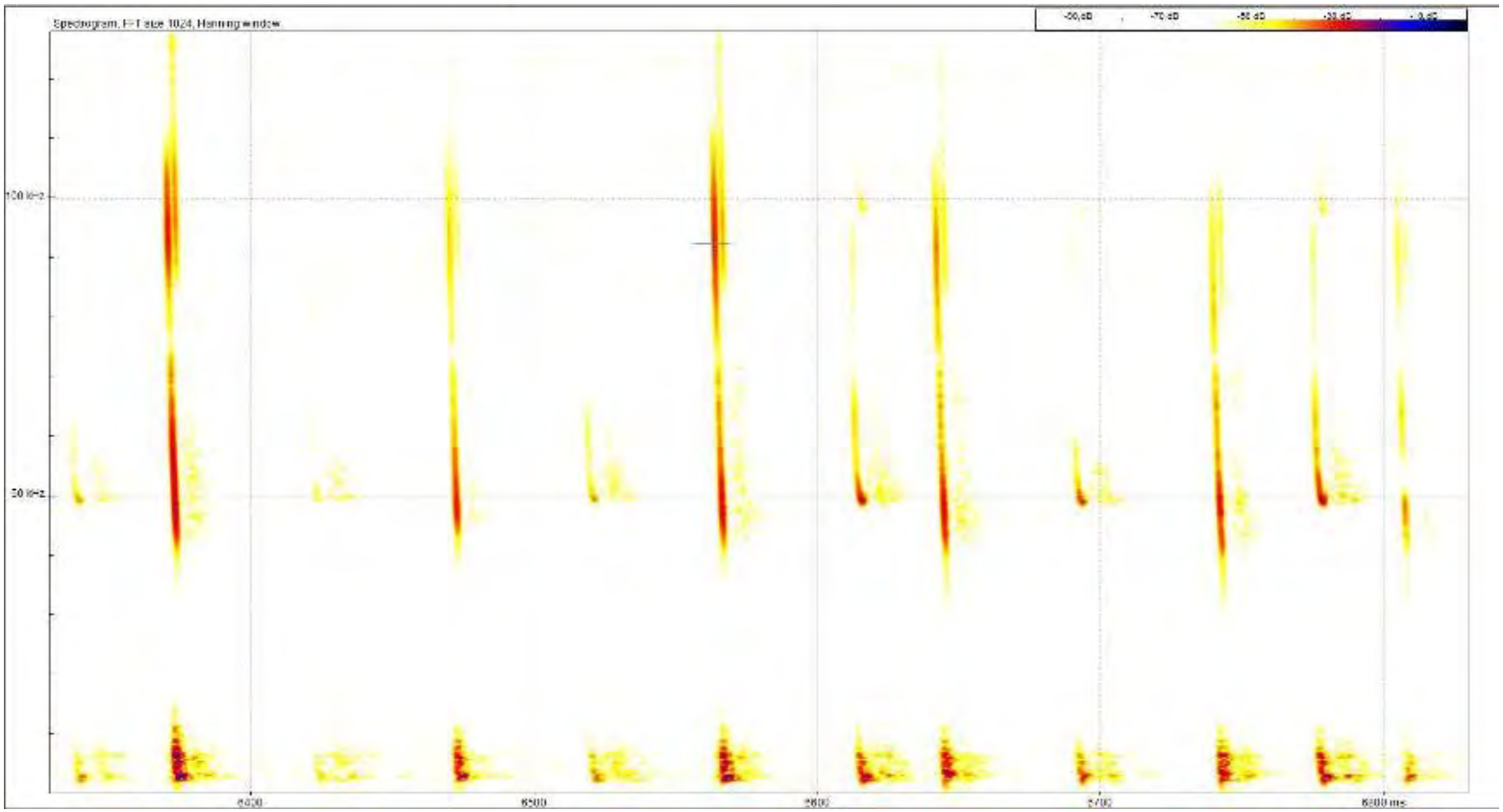
Noctule bat



Brown long-eared bat



Unidentified Myotis- possibly BLE? (Common pipistrelle calls also)

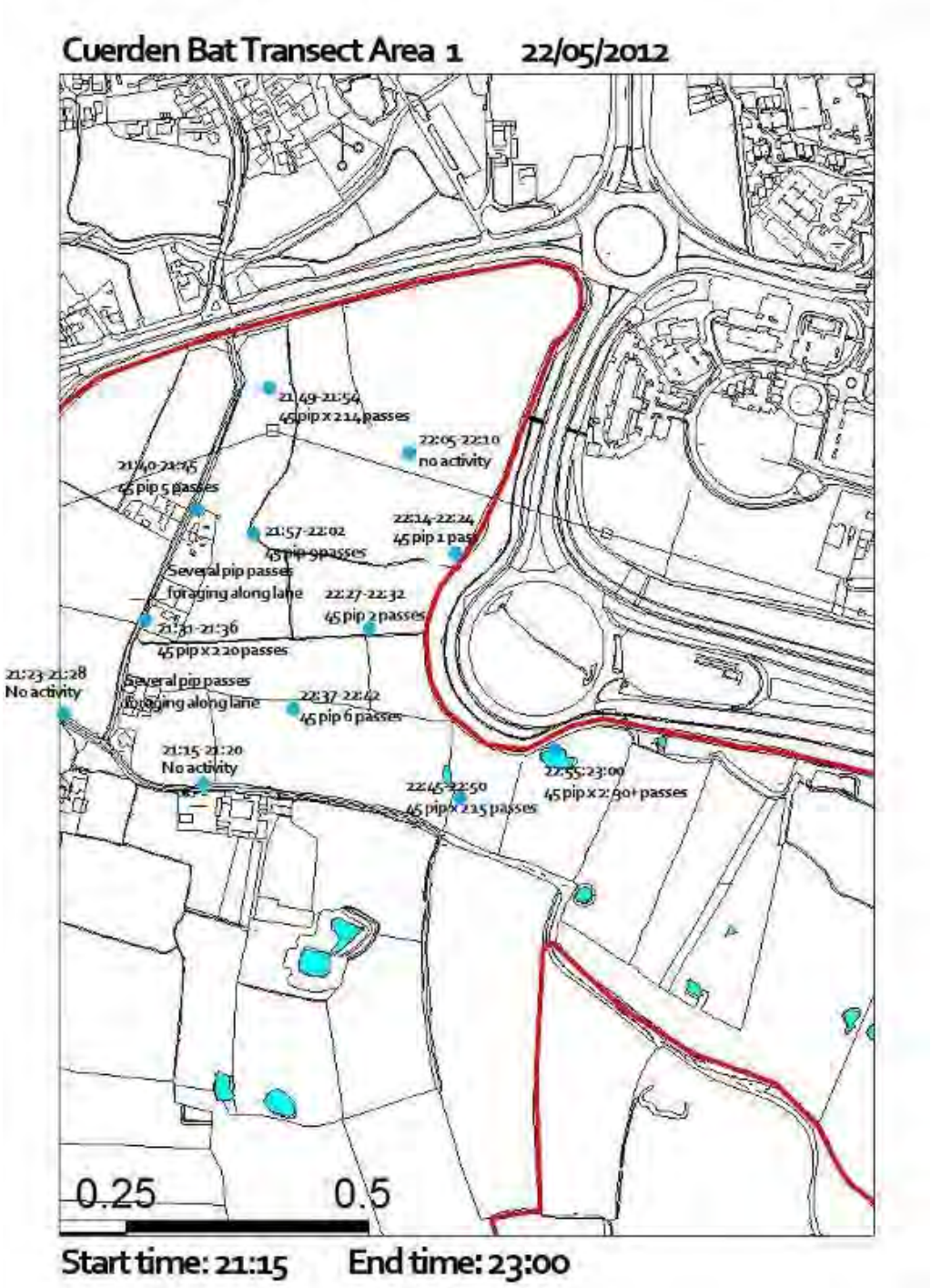


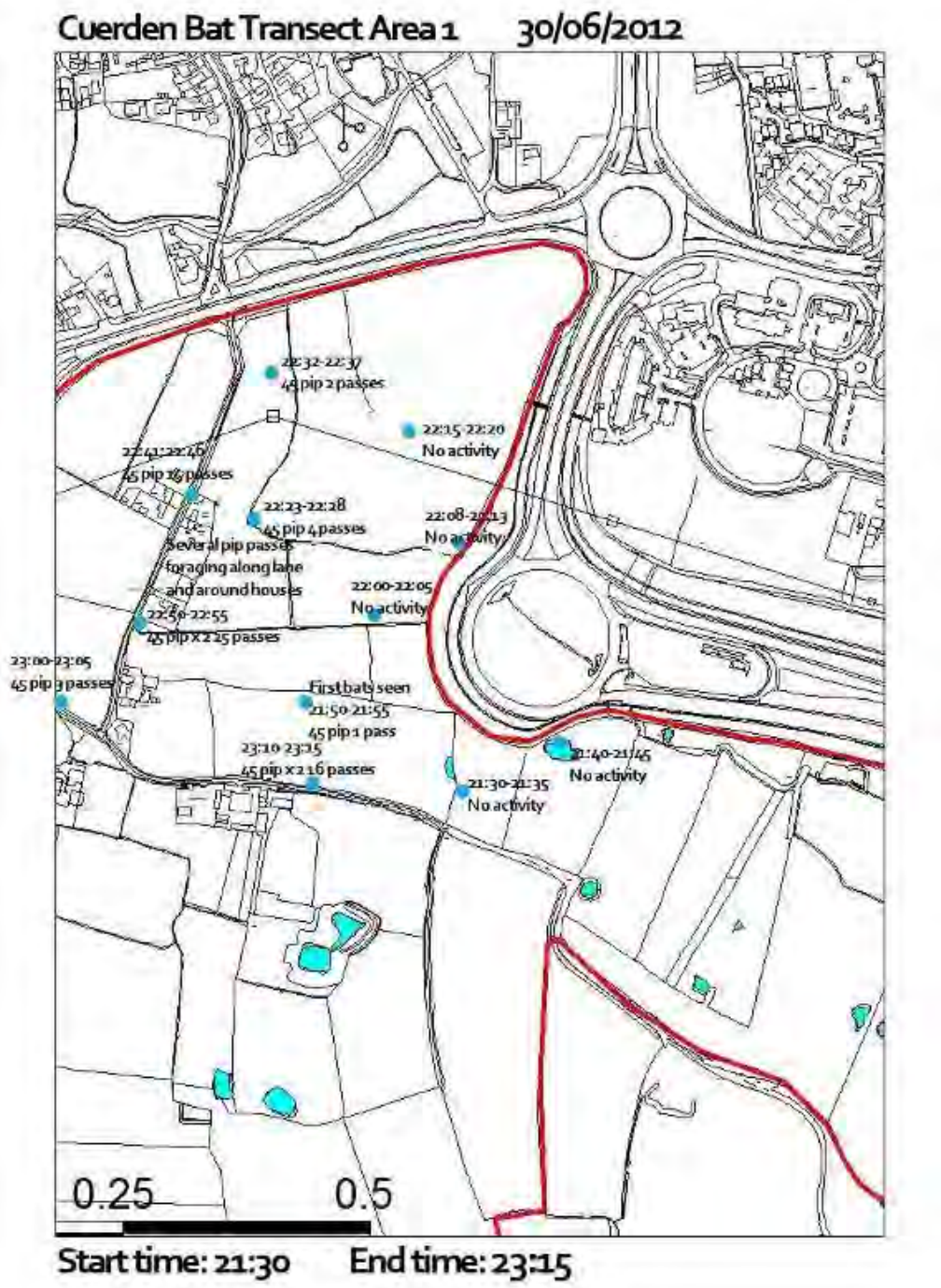
Appendix 3: Anabat Data Analyis

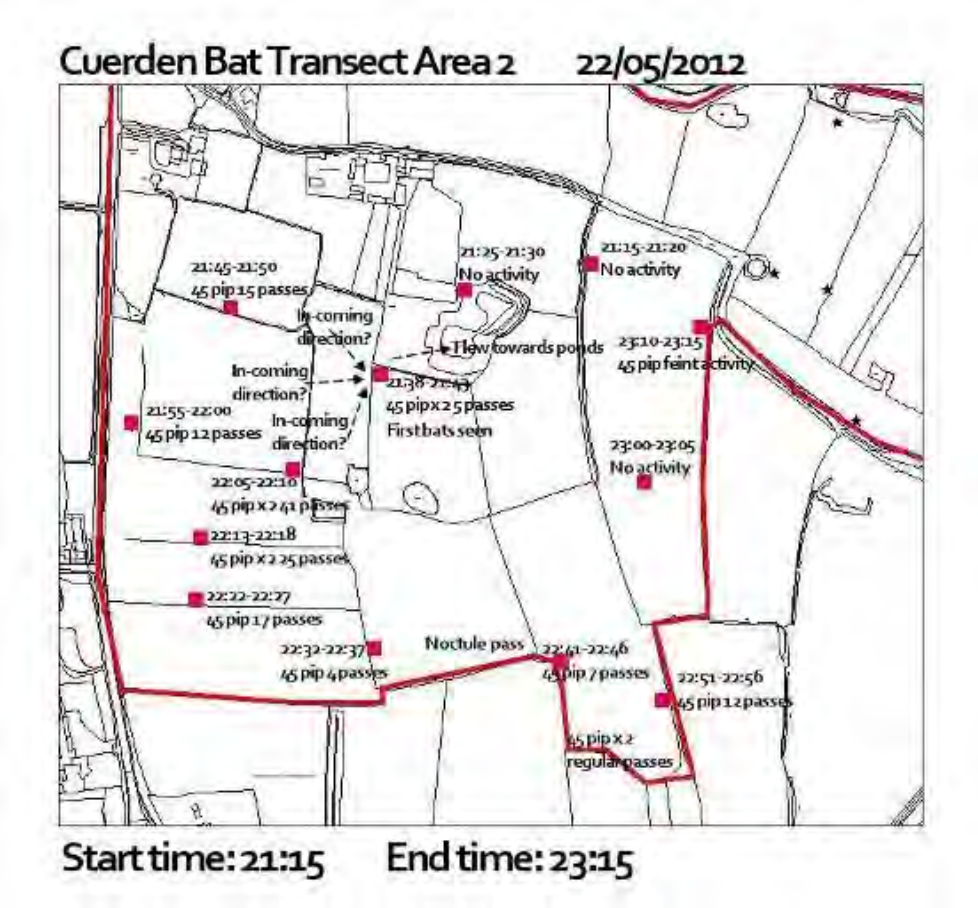
Date	Time	SPECIES
2012/08/22	2130:23	45
2012/08/22	2131:13	45
2012/08/22	2136:36	BLE
2012/08/22	2137:44	45
2012/08/22	2138:00	45
2012/08/22	2141:02	U
2012/08/23	2241:41	45
2012/08/23	2243:24	Unknown
2012/08/24	0024:42	BLE
2012/08/24	0027:35	BLE
2012/08/24	0040:15	45
2012/08/24	0048:19	BLE
2012/08/24	2117:31	BLE
2012/08/24	2118:15	BLE
2012/08/25	0417:31	45
2012/08/25	2114:54	BLE
2012/08/26	2109:32	45
2012/08/26	2216:40	45
2012/08/27	0012:34	BLE
2012/08/27	0133:56	BLE
2012/08/27	0312:20	45
2012/08/27	0321:43	45
2012/08/27	0329:35	BLE
2012/08/27	0334:25	BLE
2012/08/27	0338:44	BLE
2012/08/27	0346:45	BLE
2012/08/27	0347:35	BLE
2012/08/27	0350:38	BLE
2012/08/27	0426:33	BLE
2012/08/27	0432:04	BLE
2012/08/27	0432:16	BLE
2012/08/27	0503:43	BLE
2012/08/27	0504:45	BLE
2012/08/27	2129:15	BLE
2012/08/27	2129:56	Unknown
2012/08/27	2134:41	Unknown
2012/08/27	2152:01	Unknown
2012/08/27	2153:04	Myotis
2012/08/27	2201:42	Unknown
2012/08/27	2228:34	Unknown
2012/08/27	2255:14	45
2012/08/28	0502:01	45
2012/08/29	2159:27	Unknown
2012/08/29	2200:28	Myotis

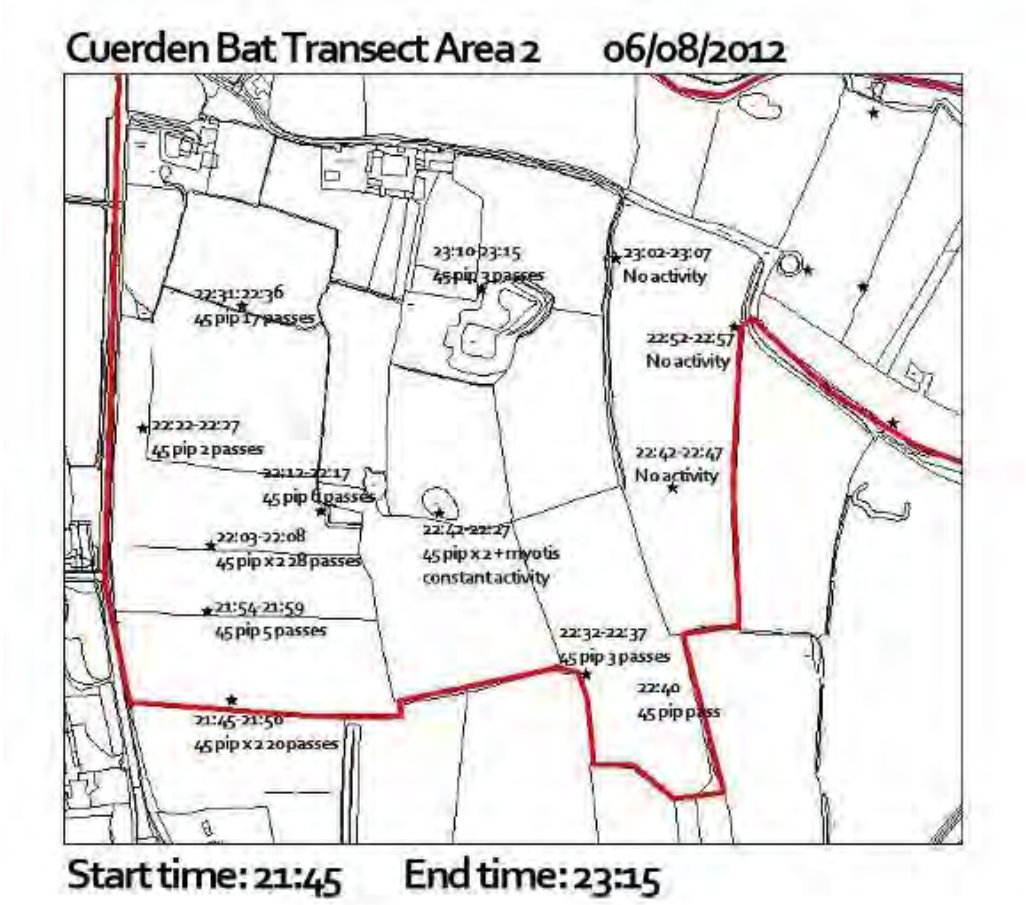
2012/08/30	0204:49	Unknown
2012/08/30	0409:11	Unknown

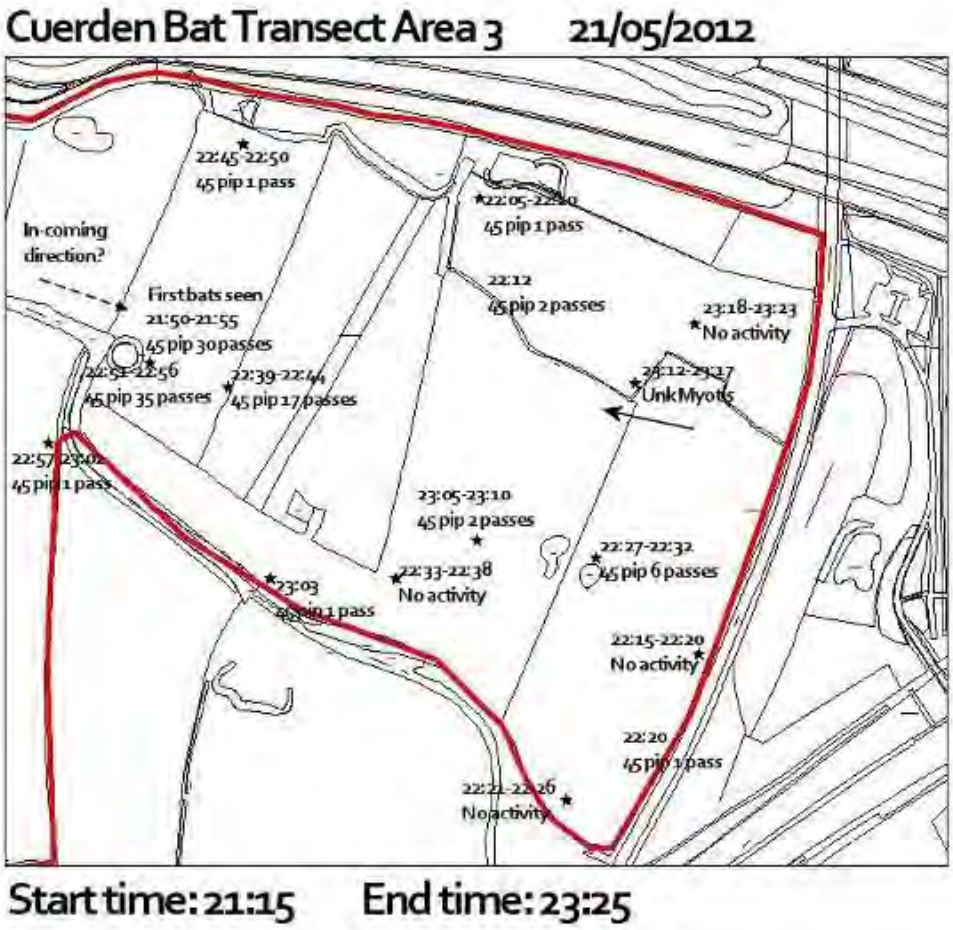
Appendix 4: Data Transects: Raw Field Data

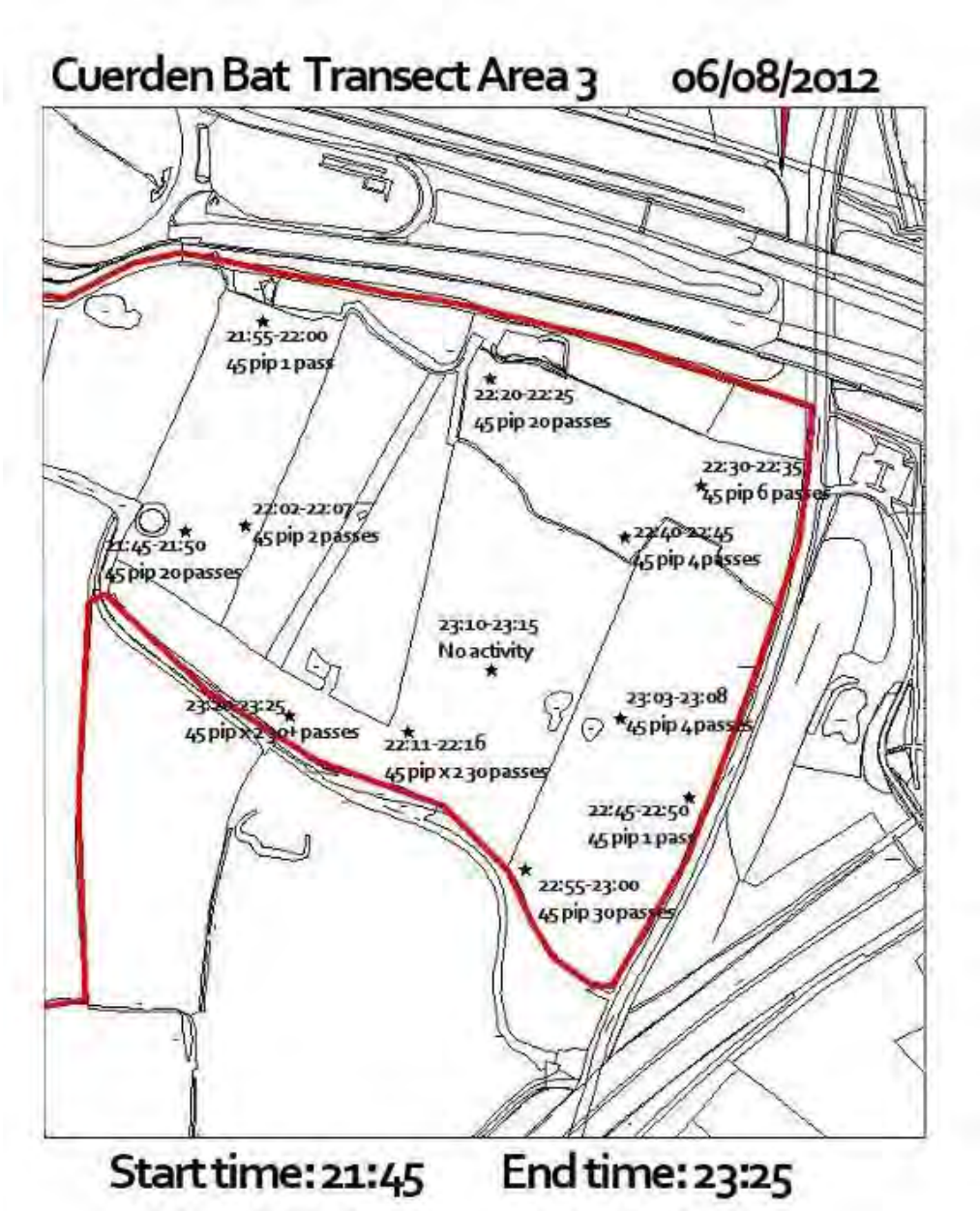



Cuerden Bat Transect Area 1 30/06/2012
22:32-22:37
4 pip 2 passes
22:15-22:20
No activity
22:41-22:46
45 pip 26 passes
22:23-22:28
45 pip 4 passes
22:08-22:13
No activity
Several pip passes foraging along lane and around houses
22:00-22:05
No activity
22:50-22:55
45 pip x 2 25 passes
23:00-23:05
45 pip 9 passes
First bats seen
21:50-21:55
45 pip 1 pass
23:10-23:35
45 pip x 2 16 passes
21:40-21:45
No activity
21:30-21:35
No activity
0.25
0.5
Start time: 21:30
End time: 23:15


Cuerden Bat Transect Area 2 22/05/2012
21:45-21:50
45 pip 15 passes
In-coming direction?
21:25-21:30
No activity
21:15-21:20
No activity
Flew towards ponds
23:10-23:15
45 pip feint activity
In-coming direction?
21:38-21:43
45 pip x 25 passes
First bats seen
21:55-22:00
45 pip 12 passes
In-coming direction?
23:00-23:05
No activity
22:05-22:10
45 pip x 2 41 passes
22:13-22:18
45 pip x 2 25 passes
22:22-22:27
45 pip 17 passes
22:32-22:37
45 pip 4 passes
Noctule pass
22:41-22:46
45 pip 7 passes
22:51-22:56
45 pip 12 passes
45 pip x 2 regular passes
Start time: 21:15
End time: 23:15


Cuerden Bat Transect Area 2 06/08/2012
23:10-23:15
45 pip 3 passes
23:02-23:07
No activity
22:31-22:36
45 pip 17 passes
22:52-22:57
No activity
22:22-22:27
45 pip 2 passes
22:42-22:47
No activity
22:12-22:17
45 pip 6 passes
22:03-22:08
45 pip x 2 28 passes
22:42-22:27
45 pip x 2 + myotis
constant activity
21:54-21:59
45 pip 5 passes
22:32-22:37
45 pip 3 passes
22:40
45 pip pass
21:45-21:50
45 pip x 2 20 passes
Start time: 21:45
End time: 23:15


Cuerden Bat Transect Area 3 21/05/2012
22:45-22:50
45 pip 1 pass
In-coming direction?
First bats seen 21:50-21:55
45 pip 30 passes
22:51-22:56
45 pip 35 passes
22:39-22:44
45 pip 17 passes
22:57-23:02
45 pip 1 pass
23:03
45 pip 1 pass
23:05-23:10
45 pip 2 passes
22:33-22:38
No activity
22:05-22:10
45 pip 1 pass
22:12
45 pip 2 passes
23:18-23:23
No activity
23:12-23:17
Unk Myotis
22:27-22:32
45 pip 6 passes
22:15-22:20
No activity
22:20
45 pip 1 pass
22:21-22:26
No activity
Start time: 21:15
End time: 23:25


Cuerden Bat Transect Area 3 06/08/2012
21:55-22:00
45 pip 1 pass
22:20-22:25
45 pip 20 passes
22:30-22:35
45 pip 6 passes
22:02-22:07
45 pip 2 passes
21:45-21:50
45 pip 20 passes
22:40-22:45
45 pip 4 passes
23:10-23:15
No activity
23:03-23:08
45 pip 4 passes
23:20-23:25
45 pip x 230+ passes
22:11-22:16
45 pip x 230 passes
22:45-22:50
45 pip 1 pass
22:55-23:00
45 pip 30 passes
Start time: 21:45
End time: 23:25

Appendix 5: Lancashire Pond Biodiversity Survey Methodology

The following ecological survey methodology is developed from that which has been used by the Pond *Life* Critical Biodiversity Survey. This survey has investigated some 1000 ponds in NW England between 1995 and 1998.

The survey should be conducted at an appropriate time of year, ideally between April and June, and the following information recorded separately for each pond. A *pro forma* record form has been prepared to facilitate the presentation of this information, a copy is attached. For the purposes of this methodology a pond is a small body of standing water between $1m^2$ and 2 hectares in size which holds water for at least 4 months of the year.

Location and physical characteristics

- Eight figure grid reference.
  Given for the centre of the pond e.g. SD45682365. This is critical in areas of high pond density.

- Altitude.
  An estimate of the height in metres above Ordnance Survey Datum.

- Recorded value.
  Investigations of existing sources of information should be made. These will include SSSIs, the Biological Heritage Sites register, the Sites and Monuments register, the phase 1 habitat survey and other ecological databases held be local authorities and conservation bodies.

- Estimated depth of water.
  Estimate whether the depth of water at the centre of the pond is greater or less than 0.5m or provide a more precise figure where possible. The surveyor should also give their view of the permanence/seasonality of the pond under "Other Comments."

- Water pH.
  Sample the pH of the pond water.

- Estimated depth of sediment.
  Estimate whether the depth of sediment at the centre of the pond is greater or less than 0.5m or a more precise figure where possible.

- Surrounding land use and habitats.
  List separately the Phase 1 habitat types and land uses present within 10 metres of the pond and those between 10 and 100 metres from the pond. The principal habitat types/land uses should be indicated with an asterisk.

- Nature of pond base.

This refers to the layer of material immediately below the water and not the underlying clay, bedrock or other membrane which may be deeply covered by sediment and have lost any influence on water quality or ecology. Clay or other bedrock may be exposed in recently dredged ponds or where the banks have slipped.

- Nature of sediment.
  The nature of any accumulated sediment e.g. organic ooze, stream borne sand, leaves and twigs.

- History and use.
  Where the origin and history of pond use and previous management is known this information may be of value. Sources of information include the SMR, old maps and local cultural sources.

Wetland Plants

- Identify and record all vascular plants including aquatic species.
  Include all open water and vegetation up to the presumed maximum normal water level or the upper limit of wetland influence, including any weed communities on exposed/trampled mud. In certain circumstances the area to be surveyed may require discussion with the local planning authority.

- Apply DAFOR ratings to all species listed.
  Give a relative estimate of abundance to each of the species listed using: (locally) dominant, (locally) abundant, (locally) frequent, occasional, rare.

Invertebrates

- Net the pond as long as additional species continue to be found, searching in all accessible habitats.

- Remove invertebrates for laboratory identification.
  A degree of competence and familiarity with the fauna is desirable to avoid large-scale removal of rare species.

- Check for the presence of nationally scarce or protected species

- Record the following species groups to species level:

Tricladida	flatworms (Polycelis nigra/tenuis and Dugesia lugubris/polychroa may be treated as aggregates)
Hirudinea	leeches
Mollusca	snails and mussels (Identification of Pisidium species need not be attempted)
Malacostraca	shrimps and hoglice
Ephemeroptera	mayflies
Plecoptera	stoneflies
Odonata	dragonflies and damselflies
Hemiptera	aquatic bugs
Coleoptera	water beetles
Megaloptera	alderflies

Trichoptera caddis flies

- An indication of the numbers of individuals of each species netted is to be given using either of the following systems:

a = 1	Rare
b = 2-5	Occasional
c = 6-20	(Locally) Frequent
d = 21-99	(Locally) Abundant
e = 100-500	
f = 500+	
g = 1000+	

- Where species are only recorded from the pond environs, e.g. odonata in flight, then an indication should be given of the sex, life stage (e.g. adult, tenneral, exuvia), and the behaviour (e.g. ovipositing, copulating) as well as the abundance.

Amphibians

- Survey using appropriate techniques to determine presence/absence in accordance with Great Crested Newt Mitigation Guidelines (English Nature, 2001). Four visits in suitable weather conditions using three methods (preferably torch survey, bottle-trapping and egg search) per visit. Visits should take place between mid March and mid June, with at least two visits between mid April to mid May. Where it is necessary to obtain an estimate of population size (e.g. to inform a mitigation method statement), six visits will be required with at least three between mid April and mid May.

- Record amphibians found on land beside the pond separately.

Mammals

- Survey for the presence of water vole using appropriate techniques as described in Strachan, R. ***Water Vole Conservation Handbook*** (2006), English Nature, the Environment Agency and the Wildlife Conservation Research Unit. Indicate the location of signs on the Sketch Map.

Additional Information

- Make incidental records of other species using the pond e.g. fish, breeding birds.

- Draw attention to any features of particular interest or nature conservation value at each pond.

- Itemise particular botanical features, rare or uncommon invertebrate species or assemblages, important amphibian populations etc.

Sketch Map

- Show the normal high water mark and existing water level if different.

- Mark and annotate all stands of emergent and aquatic vegetation.

Include all trees, scrub and other bank vegetation which influences the pond.

- Indicate adjacent terrestrial habitat types.
- Supplement the sketch with a photographic record.

Location Plan

- The pond(s) surveyed should be indicated on a large scale (at least 1:10,000) O.S. plan.

Historic Maps

- Include copies of appropriate historic maps where appropriate.

Appendix 6: Full Species List Encountered At The Site

Common Name	Latin Name	Taxon Group
Alder	*Alnus glutinosa*	Flowering Plants
Hawthorn	*Crataegus monogyna*	
Blackthorn	*Prunus spinosa*	
Elder	*Sambucuc nigra*	
Goat willow	*Salix caprea*	
Hazel	*Corylus avellana*	
Holly	*Ilex aquafolium*	
European Larch	*Larix decidua*	
Turkey oak	*Quercus cerris*	
Pedunculate oak	*Quercus robur*	
Sycamore	*Acer pseudoplatinus*	
Ash	*Fraxinus excelsior*	
White poplar	*Populus alba*	
Privet	*Ligustrum vulgare*	
Field maple	*Acer campestre*	
Wych elm	*Ulmus glabra*	
Beech	*Fagus syvatica*	

Common Name	Latin Name	Taxon Group
Silver birch	*Betula pendula*	
Sweet chestnut	*Castanea sativa*	
Dogwood	*Cornus sanguinea*	
Bulrush	*Schoenoplectus lacutris*	
Common Reed	*Phragmites australis*	
Marsh Foxtail	*Alopecurus geniculatus*	
Perennial Rye-grass	*Lolium perenne*	
Red Fescue	*Festuca rubra*	
Sweet Vernal-grass	*Anthoxanthum odoratum*	
Common Bent	*Agrostis capillaris*	
Crested Dog's-tail	*Cynosurus cristatus*	
Annual Meadow-grass	*Poa annua*	
Cock's Foot	*Dactylis glomerata*	
False Oat-grass	*Arrhenatherum elatius*	
Floating Sweet-grass	*Glyceria fluitans*	
Yorkshire Fog	*Holcus latanus*	
Meadow Foxtail	*Alopecurus pratensis*	
Reed Canary-grass	*Phalaris arundinacea*	
Remote Sedge	*Carex remota*	
Small Sweet-grass	*Glyceria declinata*	
Soft Rush	*Juncus effusus*	
Timothy	*Phleum pratense*	
Tufted Hair-grass	*Deschampsia cespitosa*	
Common Couch	*Elymus repens*	
Bird's-foot Trefoil	*Lotus corniculatus*	

Common Name	Latin Name	Taxon Group
Black Horehound	*Ballota nigra*	
Bugle	*Ajuga reptans*	
Cleavers	*Galium aparine*	
Common Knapweed	*Centaurea nigra*	
Common Nettle	*Urtica dioica*	
Cuckooflower	*Cardamine pratensis*	
Bluebell	*Hyacinthoides non-scripta*	
Red Campion	*Silene dioica*	
Red Clover	*Trifolium pratense*	
Rosebay Willowherb	*Chamerion angustifolium*	
Hogweed	*Heracleum sphondylium*	
Great Willowherb	*Epilobium hirsutum*	
Foxglove	*Digitalis purpurea*	
Silverweed	*Potentilla anserina*	
Herb Robert	*Geranium robertianum*	
Tufted Vetch	*Vicia cracca*	
Broad-leaved Dock	*Rumex obtusifolius*	
Garlic Mustard	*Alliaria petiolata*	
Common dog-violet	*Viola riviniana*	
Meadow Buttercup	*Ranunculus acris*	
Lesser Burdock	*Arctium minus*	
Bramble	*Rubus fruticosus*	
Creeping Buttercup	*Ranunculus repens*	
Cow Parsley	*Anthriscus sylvestris*	
Common Comfrey	*Symphytum officinale*	

Common Name	Latin Name	Taxon Group
Creeping Thistle	*Cirsium arvense*	
Dandelion	*Taraxacum agg*	
Hedge Bindweed	*Calystegia sepium*	
Ivy	*Hedera helix*	
Honeysuckle	*Lonicera periclymenum*	
Redshank	*Persicaria maculosa*	
White Clover	*Trifolium repens*	
Common Sorrel	*Rumex pulcher*	
Common Ragwort	*Senecio jacobaea*	
Common Mouse-ear	*Cerastium fontanum*	
Chickweed	*Stellaria media*	
Spear Thistle	*Cirsium vulgare*	
Wild Angelica	*Angelica sylvestris*	
Meadowsweet	*Filipendula ulmaria*	
Water Pepper	*Persicaria hydropiper*	
Fools Watercress	*Apium nodiflorum*	
Brooklime	*Veronica beccabunga*	
Marsh Willowherb	*Epilobium palustre*	
Bittersweet	*Solanum dulcamara*	
Marsh Thistle	*Cirsium palustre*	
Marsh Bedstraw	*Galium palustre*	
Common Duckweed	*Lemna minor*	
Common Water Starwort	*Callitriche stagnalis*	
Common Water Plantain	*Alisma plantago-aquatica*	
Yellow Iris	*Iris pseudacorus*	

Common Name	Latin Name	Taxon Group
Gypsywort	*Lycopus europaeus*	
Prickly Sow Thistle	*Sonchus asper*	
Japanese Rose	*Rosa rubiginosa*	
Cotoneaster	*Contaneaster sp*	
Marsh Cinquefoil	*Potentilla palustris*	
Branched Bur-reed	*Sparganium erectum*	
Lesser Spearwort	*Ranunculus flammula*	
Himalayan Balsam	*Impatiens glandulifera*	Flowering Plants
Rhododendron	*Rhododendron ponticum*	
Common Male Fern	*Dryopteris filix-mas*	Pteridophyta
Broad Buckler Fern	*Dryopteris dilatata*	
Bracken	*Pteridium aquilinum*	
Pleurocarpous mosses		Mosses & Liverworts
Water Horsetail	*Equisetum fluviatile*	Equisitum
Field Horsetail	*Equisetum arvense*	
Smooth Newt	*Lissotriton vulgaris*	Amphibians
Common Toad	*Bufo bufo*	
Common Frog	*Rana temporaria*	
barn owl	*Tyto alba*	Birds
blackbird	*Turdus merula*	
black cap	*Sylvia atricapilla*	
black-headed gull	*Chroicocephalus ridibundus*	
blue tit	*Cyanistes caeruleus*	
bullfinch	*Pyrrhula pyrrhula*	
buzzard	*Buteo buteo*	
carrion crow	*Corvus corone*	

Common Name	Latin Name	Taxon Group
chaffinch	*Fringilla coelebs*	
chiffchaff	*Phylloscopus collybita*	
coal tit	*Periparus ater*	
collared dove	*Streptopelia decaocto*	
dunnock	*Prunella modularis*	
goldcrest	*Regulus regulus*	
goldfinch	*Carduelis carduelis*	
great spotted woodpecker	*Dendrocopos major*	
great tit	*Parus major*	
greenfinch	*Carduelis chloris*	
herring gull	*Larus argentatus*	
house sparrow	*Passer domesticus*	
jay	*Garrulus glandarius*	
kestrel	*Falco tinnunculus*	
lesser black-backed gull	*Larus fuscus*	
little owl	*Athene noctua*	
long-tailed tit	*Aegithalos caudatus*	
mallard	*Anas platyrhynchos*	
magpie	*Pica pica*	
mistle thrush	*Turdus viscivorus*	
moorhen	*Gallinula chloropus*	
oyster catcher	*Haematopus ostralegus*	
peregrine	*Falco peregrinus*	
pheasant	*Phasianus colchicus*	
reed bunting	*Emberiza schoeniclus*	

Common Name	Latin Name	Taxon Group
robin	*Erithacus rubecula*	
sand martin	*Riparia riparia*	
snipe	*Gallinago gallinago*	
song thrush	*Turdus philomelos*	
sparrowhawk	*Accipiter nisus*	
starling	*Sturnus vulgaris*	
swallow	*Hirundo rustica*	
swift	*Apus apus*	
treecreeper	*Certhia familiaris*	
whitethroat	*Sylvia communis*	
willow warbler	*Phylloscopus trochilus*	
wood pigeon	*Columba palumbus*	
woodcock	*Scolopax rusticola*	
wren	*Troglodytes troglodytes*	
Three-spined Stickleback	*Gasterosteus aculeatus*	Bony Fish
Common Carp	*Cyprinus carpio*	
Common Frog	*Rana temporaria*	
brown long-eared bat	*Plecotus auritus*	Terrestrial Mammals
common pipistrelle	*Pipistrellus pipistrellus*	
noctule bat	*Nyctalus noctula*	
myotis spp	*Myotis sp*	
field vole	*Microtus agrestis*	
fox	*Vulpes vulpes*	
rabbit	*Oryctolagus cuniculus*	
water shrew	*Neomys fodiens*	

Common Name	Latin Name	Taxon Group
grey squirrel	*Sciurus carolinensis*	
blue-tailed damselfly	*Ischnura elegans*	Odonata
common blue damselfly	*Enallagma cyathigerum*	
large red damselfly	*Pyrrhosoma nymphula*	
brown hawker	*Aeshna grandis*	
broad-bodied chaser	*Libellula depressa*	
Mayfly	*Cloeon dipterum*	Ephemeroptera
Mayfly	*Caenis horaria*	
Mayfly	*Limnephilus lunatus*	
Mayfly	*Enallagma cyathigerum*	
Caddisfly	*Athripsodes aterrimus*	Tricoptera
Caddisfly	*Mystacides longicornis*	
Caddisfly	*Limnephilus lunatus*	
Alder Fly	*Sialis lutaria*	Neuroptera
Water Boatman	*Corixa punctata*	Hemiptera
Water Boatman	*Sigara falleni*	
Water Boatman	*Sigara dorsalis*	
Water Boatman	*Sigara limitata*	
Water Boatman	*Sigara lateralis*	
Water Boatman	*Hesperocorixa sahlbergi*	
Back Swimmer	*Notonecta glauca*	
Water measurers	*Hydrometra stagnorum*	
Pond Skater	*Gerris lacustris*	
Water Cricket	*Velia caprai*	
Water Boatman	*Sigara nigrolineata*	
Pond Skater	*Gerris odontogaster*	

Common Name	Latin Name	Taxon Group
Beetle	*Agabus bipustulatus*	Coleoptera
Beetle	*Agabus nebulosus*	
Beetle	*Agabus paludosus*	
Beetle	*Agabus paludosus*	
Beetle	*Agabus sturmii*	
Beetle	*Hygrotus inaequalis*	
Beetle	*Hygrotus(Coelambus)impressopunctatus*	
Beetle	*Hygrotus (Coelambus) confluens*	
Beetle	*Hyphydrus ovatus*	
Beetle	*Rhantus suturalis*	
Beetle	*Ilybius ater*	
Beetle	*Ilybius montanus*	
Beetle	*Ilybius fuliginosus*	
Beetle	*Colymbetes fuscus*	
Beetle	*Hydroporus angustatus*	
Beetle	*Hydroporus ingognitus*	
Beetle	*Hydroprous memnonius*	
Beetle	*Hydroporus pubescens*	
Beetle	*Hydroporus palustris*	
Beetle	*Hydroporus planus*	
Beetle	*Hyphydrus ovatus*	
Beetle	*Dytiscus marginalis*	
Beetle	*Haliplus ruficollis*	
Beetle	*Anacaena globulus*	
Beetle	*Cercyon convexiusculus*	

Common Name	Latin Name	Taxon Group
Beetle	*Laccobius minutus*	
Beetle	*Laccobius bipunctatus*	
Beetle	*Laccobius colon*	
Beetle	*Hydrobius fuscipes*	
Beetle	*Helophorus aequalis*	
Beetle	*Helophorus brevipalpis*	
Beetle	*Helophorus grandis*	
Beetle	*Helophorus minutus*	
Beetle	*Helophorus obscurus*	
Beetle	*Hygrobia hermanni*	
Beetle	*Noterus clavicornis*	
Beetle	*Hydraena britteni*	
Beetle	*Hydraena riparia*	
Amphipod	*Crangonyx pseudogracilis*	Malacostraca
Waterlouse	*Asellus aquaticus*	
True Fly	*Ceratopogonid sp*	Diptera
True Fly	*Chironomid sp*	
True Fly	*Culex sp*	
True Fly	*Tipula sp*	
True Fly	*Eristalis sp*	
True Fly	*Ptychoptera lacustris*	
True Fly	*Chaoborus crystalinus*	
True Fly	*Dixella sp*	
True Fly	*Drosophilid sp*	
True Fly	*Ephydrid sp*	

Common Name	Latin Name	Taxon Group
True Fly	*Tabanid sp*	
Flatworm	*Dugesia polychroa grp*	Tricladida
Leech	*Erpobdella octoculata*	Hirudinidae
Leech	*Glossiphonia complanata*	
Leech	*Helobdella stagnalis*	
Pea clams	*Sphaeriidae*	Mollusca
Snail	*Galba truncatula*	
Snail	*Lymnaea stagnalis*	
Snail	*Rhadix baltica*	
Snail	*Hippeutis complanatus*	
Snail	*Lymnaea fusca*	
Snail	*Aplexa hypnorum*	
Worms	*Oligochaeta*	Oligochaeta
Daphnia	*Cladocera*	Cladocera
Water Mites	*Hydracarina*	Hydracarina
Seed Shrimps	*Ostracoda*	Ostracoda
Roundworms	*Nematoda*	Nematoda

Appendix 7: Semi-natural Habitats At The Site.

Target Note and community	Common Name	Latin name	DAFOR[3]
TN 66 marshy grassland	soft rush	*Juncus effusus*	A
	Yorkshire fog	*Holcus lanatus*	A
	jointed rush	*Juncus articulatus*	F
	common bent	*Agrostis capillaris*	F
	meadow fox-tail	*Alopecurus geniculatus*	F
	crested dog's tail	*Cynosurus cristatus*	F
	bird's-foot trefoil.	*Lotus corniculatus*	F
	marsh willowherb	*Epilobium palustre*	F
	marsh thistle	*Cirsium palustre*	F
	marsh bedstraw	*Galium aparine*	F
	Sedge (no flowering parts present)	*Carex spp*	O
	cuckooflower	*Cardamine pratensis*	O
	nettle	*Urtica dioica*	R
	selfheal	*Prunella vulgaris*	R
	watermint	*Mentha aquatica*	R
	marsh ragwort	*Senecio aquaticus*	R
	water pepper	*Persicaria hydropiper*	R
TN 67 marshy grassland	soft rush	*Juncus effusus*	A
	reed canary grass	*Phalaris arundinacea*	LA
	marsh willowherb	*Epilobium palustre*	F
	brooklime	*Veronica beccabunga*	F
	marsh bedstraw	*Galium aparine*	F
	cuckooflower	*Cardamine pratensis*	F
	cleavers	*Galium aparine*	F
	common duckweed	*Lemna minor*	LF
	bird's-foot trefoil	*Lotus corniculatus*	LF
	marsh thistle	*Cirsium palustre*	O
	gypsywort	*Lycopus europaeus*	R
	water pepper	*Persicaria hydropiper*	R
	lesser spearwort	*Ranunculus flammula*	R
	water horsetail	*Equisetum fluviatile*	R

[3] **D** = Dominant; **A** = Abundant, **F** = Frequent, **O** = Occasional, **R** = Rare.

TN 24 marshy grassland (borderline semi-improved grassland)	soft rush	*Juncus effusus*	A
	compact rush	*Juncus conglomeratus*	A
	Yorkshire fog	*Holcus lanatus*	A
	common bent	*Agrostis capillaris*	F
	creeping buttercup	*Ranunculus repens*	F
	common sorrel	*Rumex acetosa*	F
	cock's-foot	*Dactylis glomerata*	LF
	tufted hair grass	*Deschampsia flexuosa*	LF
	Timothy	*Phleum pratense*	O
	meadow buttercup	*Ranunculus acris*	O
	broad-leaved dock	*Rumex obtusifolius*	O
	cuckooflower	*Cardamine pratensis*	O
	ragwort	*Senecio jacobacea*	O
	marsh willowherb	*Epilobium palustre*	R

Cuerden Strategic Site,

Bamber Bridge, Lancashire

Great Crested Newt Survey

Simply Ecology Limited

May 2017

For

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This report has been prepared by Simply Ecology Limited with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The actions of the surveyor on site and during the production of the report were undertaken in accordance with the Code of Professional Conduct for the Chartered Institute of Ecology and Environmental Management. (www.cieem.org.uk).

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EXECUTIVE SUMMARY

An aquatic amphibian survey of 3 ponds on land south of Bamber Bridge around the hamlet of Cuerden Green was undertaken during the spring of 2017. This was undertaken on the advice of Natural England in order to clarify a series of uncertain results in relation to great crested newts (*Triturus cristatus*) which had been obtained during surveys in 2016. The 2016 survey had comprised of traditional amphibian survey methods (torch, bottle tap and egg survey) and also great crested newt (GCN) eDNA survey. Despite negative results for GCN from all ponds using traditional techniques (as they also had in an earlier 2012 survey), the eDNA surveys had indicated GCN presence in 3 of the ponds.

Discussions with Natural England via their discretionary advice service on 3 October 2016 advised that re-survey of the 3 ponds should be undertaken in 2017 to clarify presence/absence. This would then provide a definitive answer in relation to GCN presence/absence and this would inform the proposed Cuerden Strategic Site design.

The amphibian surveys of the 3 ponds were completed between 23rd March and 2nd May 2017 using four techniques: bottle trapping, torchlight surveys, egg searches and netting.

This year the full surveys found no GCN , a population of toads and a small population of smooth newts. The common toad is a species of conservation concern and regard for the presence of this species will need to be addressed during any development at the site.

Therefore it is concluded that GCN are absent from the ponds at Cuerden, and no specific provision for this species needs to be incorporated into the overall Strategic Site layout. This is a change from the Cuerden Strategic Site Environmental Statement, which had made Recommendations in relation to GCN being present. Finally we note that Recommendations made within the Cuerden Strategic Site Environmental Statement for pond retention and re-creation within the site layout in relation to toad conservation remain pertinent as these are priority habitats for this species.

1.0 INTRODUCTION

1.1 Background Information

1.1.1 Simply Ecology Consultants were commissioned by Lancashire County Council in the spring of 2017 to undertake a great crested newt survey of three ponds located at land south of Bamber Bridge around the hamlet of Cuerden Green, Lancashire (O/S Grid Reference SD555245). See Plan 1 showing the Site Location.

1.2 Aims

1.2.1 The aims of this report are to present the results of an amphibian survey in order to confirm the presence or absence of great crested newts (*Triturus cristatus*) (GCN), both within and adjacent to the proposed development site. The results of this report will be used to facilitate two planning applications.

1.3 Context

1.3.1 The 69.67 ha site contains 17 ponds with a further 4 ponds to the east and west of the site boundary (See Plan 2). Some of which are large fishing ponds, and others smaller and unmanaged. Traditional GCN surveys that comprised egg search, bottle trapping and torching were undertaken on all ponds in 2016 to determine presence/absence. These surveys revealed GCN to be absent from all ponds. However due to a late start to the surveys, it was felt prudent to also carry out simultaneous GCN eDNA surveys on ponds around the site. However, the tradition survey and the eDNA surveys produced conflicting results, with traditional surveys not finding any GCN, but three of the ponds showing presence for GCN eDNA.

1.3.2 This unusual situation required interpretation, so Natural England's Discretionary Advice Service was sought. On 3rd October 2016 Natural England advised that GCN presence should be tentatively accepted, but that survey in 2017 should also be undertaken. This would provide a final and definitive conclusion as to whether GCN were present at the site.

1.3.3 Therefore, 3 ponds were re-surveyed during Spring 2017 (See Plan 3).

1.4 The survey area

1.4.1 Cuerden Strategic Site – henceforth referred to as 'the site' – is located in Lancashire, 2.5km south of Bamber Bridge. It comprises the hamlet of Cuerden Green and land surrounding it, covering an area of 69.67 hectares. It is bounded to the west, north and east by roads and to the south by field margins: To the west is the A5083 Stanifield Lane, to the north the A582 Lostock Lane, A6 and M65 and to the east the A49 Wigan Road. The terrain is generally flat and the land slopes gently towards the north west, being 55m above sea level at its highest and 35m at its lowest.

1.4.2 Land use across the site is dominated by agriculture, particularly permanent pasture for horses and cattle. Of the 29 fields on the site just one is given over to arable crops. The field margins are a mixture of hedgerows, post-and-wire fencing, a drain network and lines of trees of varying

age. The majority of these trees are to be found in the southern half of the site. Additionally, there is one woodland plantation known as New Plantation situated towards the west of the site; this covers approximately 2.5ha.

2.0 STATUTORY AND PLANNING CONTEXT

2.1 Great Crested Newts

2.1.1 The client is advised that great crested newts (GCNs) are European Protected Species (EPS). This EPS receives the full protection of the Wildlife and Countryside Act 1981 (as amended) (Section 9, Schedule 5). In addition, they are also protected under European legislation that is implemented in England via The Conservation of Habitats And Species Regulations 2010 (Regulation 41). A full list of EPS is provided in Schedule 2 of the Regulations.

2.1.2 If both national and international legislation are taken together, the legislative protection afforded to the species makes it an offence to:

- Intentionally/deliberately kill, disturb, injure or capture them.
- Intentionally or recklessly damage, destroy or obstruct access to any breeding site or resting place.
- Possess or control any live or dead specimen or anything derived from a European Protected Species.

2.1.3 The presence of a protected species is a 'material consideration' in planning terms and development of areas of land containing this species may often only proceed under a European Protected Species licence issued by Natural England. Licences for development purposes are issued under The Conservation of Habitats and Species Regulations (2010) and only allow what is permitted within the terms and conditions of the licence. If any EPS are found during the course of the survey, this will be highlighted in this report.

2.2 Other Amphibians

2.2.1 Apart from the great crested newt, the other British amphibians, (common frog *Rana temporaria*, common toad *Bufo bufo*, smooth newt *Triturus vulgaris* and palmate newt *Triturus helveticus*) are protected under Section 9(5) of the *Wildlife and Countryside Act 1981*. This prohibits their sale, barter, exchange, transportation for sale and advertising for commercial purchase.

2.2.2 These other amphibian species are generally common and widespread in England. However, local authorities may take into account situations where noteworthy populations of these species occur. For example, if a pond supports all five species of British amphibians in high numbers it may be afforded local protection via the planning process via its designation as a County Wildlife Site.

3.0 SURVEY METHODOLOGY

3.1 Field Survey

3.1.1 Surveys were undertaken in accordance with the standard methods described in the *'Great Crested Newt Mitigation Guidelines'* (English Nature 2001). Natural England great crested newt survey license holders, Jason Reynolds and Richard Lowe led the surveys, each working with a field assistant. In accordance with best practice, the survey comprised the following elements:

- A daylight walkover was undertaken to establish the location of all waterbodies within the survey area.
- Four subsequent evening survey visits were carried out to identify the presence/absence of great crested newts on site. The following survey techniques were implemented in each waterbody where possible 1) Torchlight surveys 2) Bottle trapping 3) Egg-searches.

Torchlight Survey

3.1.2 Waterbodies were surveyed by walking the perimeter of the waterbodies after dusk and searching the water with a powerful torch (Cluson Clulite CB2, 50W Xenon spot bulb). All newts observed were recorded according to species, sex and life stage where possible.

Bottle Trap Survey

3.1.3 Plastic bottle traps (standard 2L pop bottle design) were set at an average spacing of 2m along accessible pond perimeters. Traps were set using the surveyor's preferred technique of securing the bottle with an air pocket above the waterline rather than the fully submerged option.

3.1.4 In accordance with best practice, traps were set in the evening, left overnight and emptied early the following morning. Where it was not possible to trap an entire shoreline, sample sections were trapped (with bottles at 2 m spacing) in locations deemed most likely to yield newts e.g. amongst egg-laying vegetation for females and in open water for displaying males.

Egg Search

3.1.5 During the course of walking the pond perimeter to collect in the bottle traps during daylight, any accessible aquatic vegetation was searched for newt eggs.

3.2 Weather Conditions/Survey Constraints

3.2.1 The weather conditions were checked before commencing each survey. No surveys were undertaken when evening temperature was predicted to be below 5ºC or when heavy rainfall or strong wind was predicted. This is because these weather conditions would significantly reduce the activity of newts or ability of the surveyor to see newts through the water's surface during torchlight searches.

3.2.2 As the season progressed and nights became warmer, traps were set later in the evening in order to ensure the welfare of newts was not compromised as a result of high ambient temperatures causing low oxygen conditions in the bottles, which could compromise newt

welfare. Also, torchlight surveys commenced later as the survey period progressed as this maximises chances of observing newts during the night-time activity period.

3.2.3 Pond 15 had very steep sides and deep water, so this reduced the number of bottle traps that could safely be located around its margin. Instead bottles were set at a higher density in those areas where access could safely be obtained.

3.2.4 The only other variation to the survey technique was the use of netting instead of bottle trapping at Pond 10. At this pond bottle trapping was not undertaken because water shrew had previously been captured at the pond during 2016 survey. To offset the lack of bottle trapping, standardized netting survey was carried out as the third acceptable survey technique and this was not considered to be a significant constraint to survey.

3.3 Timing

3.3.1 All surveys were carried out between 23rd March and 02nd May 2017. Natural England's guidelines for presence/absence surveys recommend that at least two surveys are carried out between mid-April and mid-May in each of the ponds surveyed (English Nature, 2001).

4.0 SURVEY RESULTS

4.1 Weather

4.1.1 Weather conditions during the survey period were good for surveying newts. There was no significant rain to affect surveying. Temperatures ranged between 8°C to 12°C during the surveys (see Table 1).

Table 1: *Weather Conditions for GCN Survey*

Survey Date	Temp	Rain	Wind
23/03/2017	8°C	Dry	Light
18/04/2017	11°C	Dry	Light
26/04/2017	12°C	Dry	Light
02/05/2017	11°C	Dry	Calm

4.2 Newt Survey

4.2.1 The results revealed no presence of GCN or any other amphibian within the three ponds surveyed (See Table 2). The terrestrial habitat surrounding the ponds was all heavily grazed pasture (See Plate 1), which is suitable, but not ideal for amphibians.

Table 2: *Summary of amphibian survey results by pond.*

Pond No	Survey Type	GCN	Smooth	Palmate	Frogs	Toads
12	Bottle	N	N	N	N	N

10	Net	N	N	N	N	N
15	Bottle	N	N	N	N	N
12	Torch	N	N	N	N	N
10	Torch	N	1x	N	N	N
15	Torch	N	N	N	N	Y
12	Egg search	N	N	N	N	N
10	Egg search	N	N	N	N	N
15	Egg search	N	N	N	N	N

4.2.2 Pond 12 was a large sized pond at around 671m² (See Plate 1). This pond has a large population of common carp, consequently it is very turbid. A number of horses are resident in the field surrounding the pond and the margins show a high degree of poaching and faeces present. Horses have cropped what little marginal/emergent vegetation was present down to the surface of the water. The water in this pond was too turbid to make observations on any aquatic vegetation that may be present. Common blue and blue tailed damselflies were observed in amplexus and ovipositing. In addition, adult brown hawkers (*Aeshna gran*dis) and broad-bodied chasers (*Libellula depress*a) were observed hunting around the perimeter and margins.

Plate 1: *Pond 12. Large open waterbody, shallow (max 1m), very turbid, fish present, no macrophyte vegetation.*

4.2.3 Pond 10 was a medium sized pond at around 355m². Pond 10 was a deep and circular pond located in the corner of permanent pasture. The pond was accessible to livestock and there was only short grass around approximately 40% of the margin. This area was subject to cattle

poaching. Mature unmanaged hawthorn was present around 30% of the margin and mature trees around a further 30% of the margin comprised the surrounding vegetation. The pond had limited aquatic vegetation, with floating sweet-grass, common water-starwort and common duckweed only present in one small area along with soft rush and several tufts of remote sedge.

Plate 2: *Pond 10. Medium sized waterbody, limited macrophyte cover and marginal vegetation abundant.*

4.2.4 Pond 15 was a medium to large sized pond at around 674m² (See Plate 3). Ponds 15 was a stocked fish pond surrounded by heavily cattle poached ground and semi-mature deciduous woodland. The aquatic and marginal plants comprised an extensive stand of common reed with occasional bulrush, flag iris, gypsywort, marsh willowherb, soft rush and bittersweet. The trees planted around the ponds comprised abundant silver birch and alder with a few Pedunculate oak, ash, hazel and goat willow. Grasses in the disturbed ground around the pond were: timothy, crested dog's-tail, creeping thistle, creeping buttercup, false oat-grass, Yorkshire fog, cleavers, bugle, nettle, hogweed, colt's-foot and prickly sow thistle along with rare spear thistle and ragwort. A couple of examples of Japanese rose and cotoneaster and a stand of dogwood were also present.

Plate 3: *Pond 15, medium to large open waterbody, extensive marginal reeds, limited macrophyte cover, medium turbidity, fish present.*

5.0 INTERPRETATION AND EVALUATION

5.0.1 Full traditional surveys for great crested newts showed that no GCN were located in any of the three ponds surveyed (See Plan 3).

5.0.2 This finding updates the results from 2016, which had concluded that GCN were present in all three ponds. A small smooth newt population was present in Pond 12, in 2016. No smooth newts were found in Pond 15 in 2017, but they were present in previous surveys. Toads remained present in Pond 15 in 2017, as in 2016.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.0.1 Comprehensive amphibian survey was undertaken on three ponds at Cuerden Strategic Site in 2017 in order to update the results of the 2016 survey at the site. Three ponds which had returned positive eDNA results in 2016 were re-surveyed. Despite a thorough survey at the optimum time of year, the 2017 surveys revealed no GCN presence within any of the three waterbodies surveyed.

6.0.2 It is therefore advised that GCN are not considered to be present at the Cuerden Strategic Site. Given their absence, no specific provision for GCN, such as Natural England Licensing, needs to be made at the site. This advice updates and supersedes that given in The Cuerden Strategic Site Environmental Statement. However, the advice in relation to pond retention/re-creation and provision of suitable habitat for toads still remain valid as these are priority habitat and species. **Reason**: This advice is compliant with The Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitat and Species Regulations 2010 (as amended).

7.0 REFERENCES

ENGLISH NATURE (2001) *Great Crested Newt Mitigation Guidelines* (August 2001 version). English Nature, Peterborough.

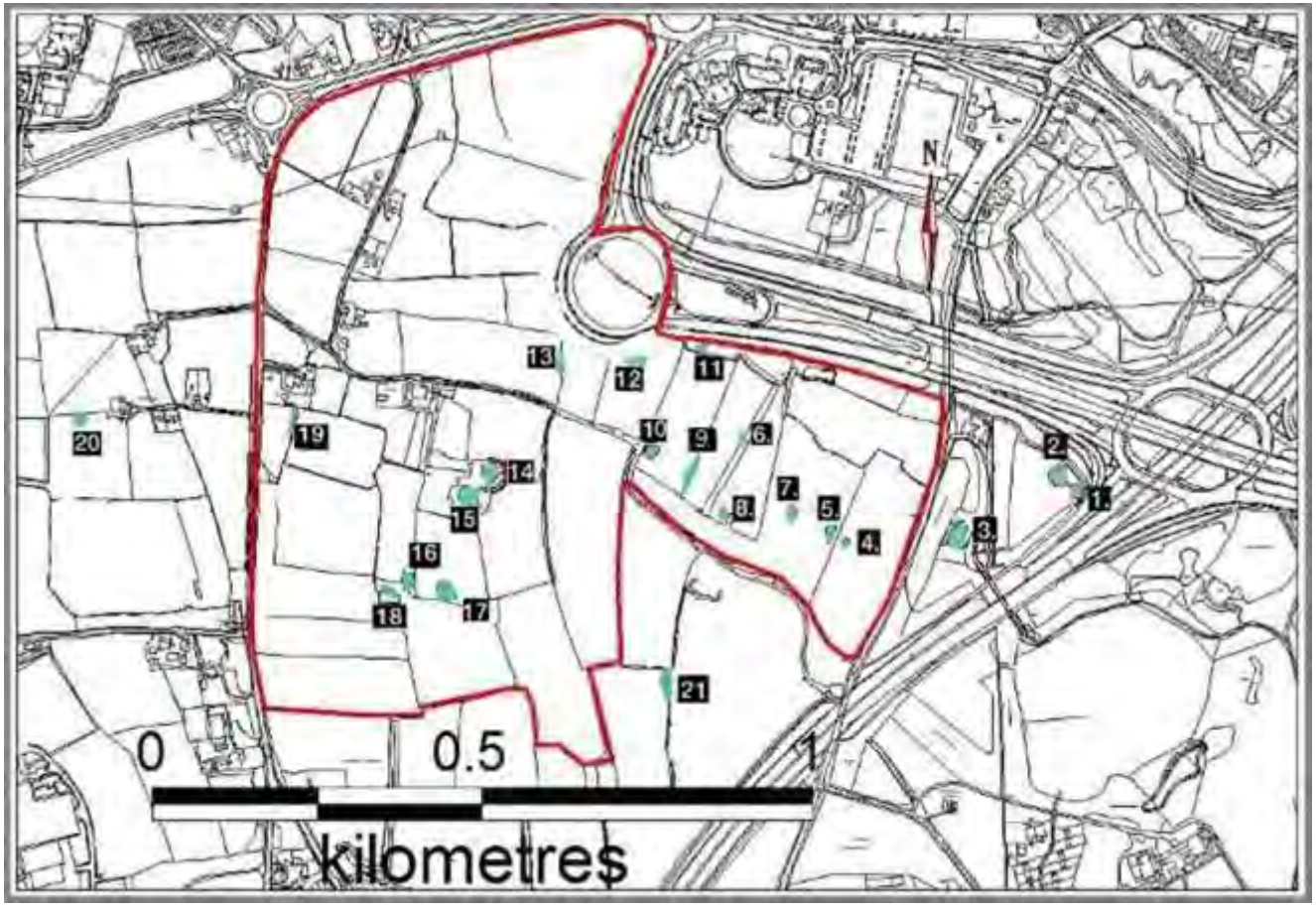
FROGLIFE (2001) *Great Crested Newt Conservation Handbook*. Published by Froglife, Mansion House, Halesworth, Suffolk.

JOINT NATURE CONSERVATION COMMITTEE (1998) *'Herpetofauna Workers Manual'* Gent, A. & Gibson, S. (eds). JNCC, Peterborough.

PLANS

Plan 1: Site Location

Plan 2: The site and ponds surveyed within a 500m radius in 2016.



Plan 3: 3x Ponds surveyed in spring 2017

Appendix 1: Raw Survey Data

C4.2 Aquatic amphibian survey *NB: This page prints in landscape format*

Was an aquatic amphibian survey done? Yes If no, proceed to next section.

Number of ponds surveyed: 3 Number of survey visits per pond: 4 [if >10 ponds or >6 visits, provide details in annex in same format.]

Surveyor name(s): Jason Reynolds

Important. Read before completing this section: Fill in relevant boxes in the table below (for visit 1) and those on subsequent sheets (for up to 5 later visits). Enter "0" where you did a survey and found no newts; leave box blank if no survey was done. In cases where different ponds were surveyed on different dates but effectively as part of the same "visit", enter the earliest date in "Date" box, click "No" in "Same date for all surveys" box, and give all dates in "Comments". To count as effectively the same "visit", surveys must be within 14 days of each other. This format is designed for a typical single season survey with typical methods and effort. Explain atypical methods/effort later (see later). For multiple year surveys, give details in annex (convert data to this format if possible). Use these tables to provide details only for the most recent season's survey. Append older survey results in full. Use consistent pond references. Automatic yellow highlight indicates possible detectability problem (see Evaluation & interpretation section, later).

Great crested newts - survey visit 1				Method:	Torch			Bottle-trap			Net			Egg search	Larvae
Date:	23/03/2017				Torch power			No. of traps per pond							(any
Same date for all surveys?	Yes				>= 1,000,000 cp									eggs found?	method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 12	8	0	5	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 10	8	2	3	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 15	8	3	3	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
			0	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				

Max count - any one pond (by torch or trap): 0 Peak site count (sum of max counts for each pond): 0

Comments and constraints: Pond 15 contained a small number of Common Toad.

C4.2 Aquatic amphibian survey *NB: This page prints in landscape format*

Was an aquatic amphibian survey done? Yes If no, proceed to next section.

Number of ponds surveyed: 3 Number of survey visits per pond: 4 [if >10 ponds or >6 visits, provide details in annex in same format.]

Surveyor name(s): Jason Reynolds

Important. Read before completing this section: Fill in relevant boxes in the table below (for visit 1) and those on subsequent sheets (for up to 5 later visits). Enter "0" where you did a survey and found no newts; leave box blank if no survey was done. In cases where different ponds were surveyed on different dates but effectively as part of the same "visit", enter the earliest date in "Date" box, click "No" in "Same date for all surveys" box, and give all dates in "Comments". To count as effectively the same "visit", surveys must be within 14 days of each other. This format is designed for a typical single season survey with typical methods and effort. Explain atypical methods/effort later (see later). For multiple year surveys, give details in annex (convert data to this format if possible). Use these tables to provide details only for the most recent season's survey. Append older survey results in full. Use consistent pond references. Automatic yellow highlight indicates possible detectability problem (see Evaluation & interpretation section, later).

Great crested newts - survey visit 1				Method:	**Torch**			**Bottle-trap**			**Net**			**Egg search**	**Larvae**
Date:	18/04/2017				Torch power			No. of traps per pond							(any
Same date for all surveys?	Yes				>= 1,000,000 cp									eggs found?	method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 12	11	0	5	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 10	11	2	3	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 15	11	3	3	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
			0	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				

Max count - any one pond (by torch or trap): 0 Peak site count (sum of max counts for each pond): 0

Comments and constraints: 1 x female smooth newt Pond 10 torch

C4.2 Aquatic amphibian survey *NB: This page prints in landscape format*

Was an aquatic amphibian survey done? Yes If no, proceed to next section.

Number of ponds surveyed: 3 Number of survey visits per pond: 4 [if >10 ponds or >6 visits, provide details in annex in same format.]

Surveyor name(s): Jason Reynolds

Important. Read before completing this section: Fill in relevant boxes in the table below (for visit 1) and those on subsequent sheets (for up to 5 later visits). Enter "0" where you did a survey and found no newts; leave box blank if no survey was done. In cases where different ponds were surveyed on different dates but effectively as part of the same "visit", enter the earliest date in "Date" box, click "No" in "Same date for all surveys" box, and give all dates in "Comments". To count as effectively the same "visit", surveys must be within 14 days of each other. This format is designed for a typical single season survey with typical methods and effort. Explain atypical methods/effort later (see later). For multiple year surveys, give details in annex (convert data to this format if possible). Use these tables to provide details only for the most recent season's survey. Append older survey results in full. Use consistent pond references. Automatic yellow highlight indicates possible detectability problem (see Evaluation & interpretation section, later).

Great crested newts - survey visit 1				Method:	**Torch**			**Bottle-trap**			**Net**			**Egg search**	**Larvae**
Date:		26/04/2017			Torch power			No. of traps per pond							(any
Same date for all surveys?		Yes			>= 1,000,000 cp									eggs found?	method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 12	12	0	5	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 10	12	2	3	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 15	12	3	3	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
			0	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				

Max count - any one pond (by torch or trap): 0 Peak site count (sum of max counts for each pond): 0

Comments and constraints:

C4.2 Aquatic amphibian survey *NB: This page prints in landscape format*

Was an aquatic amphibian survey done? Yes If no, proceed to next section.

Number of ponds surveyed: 3 Number of survey visits per pond: 4 [if >10 ponds or >6 visits, provide details in annex in same format.]

Surveyor name(s): Jason Reynolds

Important. Read before completing this section: Fill in relevant boxes in the table below (for visit 1) and those on subsequent sheets (for up to 5 later visits). Enter "0" where you did a survey and found no newts; leave box blank if no survey was done. In cases where different ponds were surveyed on different dates but effectively as part of the same "visit", enter the earliest date in "Date" box, click "No" in "Same date for all surveys" box, and give all dates in "Comments". To count as effectively the same "visit", surveys must be within 14 days of each other. This format is designed for a typical single season survey with typical methods and effort. Explain atypical methods/effort later (see later). For multiple year surveys, give details in annex (convert data to this format if possible). Use these tables to provide details only for the most recent season's survey. Append older survey results in full. Use consistent pond references. Automatic yellow highlight indicates possible detectability problem (see Evaluation & interpretation section, later).

Great crested newts - survey visit 1				Method:	**Torch**			**Bottle-trap**			**Net**			**Egg search**	**Larvae**
Date:		02/05/2017			Torch power			No. of traps per pond							(any
Same date for all surveys?		Yes			>= 1,000,000 cp									eggs found?	method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 12	11	0	5	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 10	11	2	3	Adult totals:	0			0			0				
Pond ref		Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
Pond 15	11	3	3	Adult totals:	0			0			0				
Pond ref	Air te		r Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air te		r Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
			0	Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
Pond ref	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				

Enter night air temp, in degrees C

Max count - any one pond (by torch or trap): 0 Peak site count (sum of max counts for each pond): 0

Comments and constraints:

Cuerden Strategic Site, Farington, South Ribble, Lancashire

Updated Ecological Appraisal

Simply Ecology Limited

Ref: LCCQ119/LCCQ0120/02

November 2019

For

Lancashire County Council,

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Preston,

PR1 8RE

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PLANS PAGE

Control Sheet

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Version History

Version	Date	Modified by	Approved by	Comment/Reason(s)
1	16/10/19	N/A	JR	First Issue
2	20/12/19	JR	JR	Minor revisions to Section 4.0

Disclaimer

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1.0 INTRODUCTION

1.1 Background Information

1.1.1 In May 2019, Simply Ecology Limited was commissioned by Lancashire County Council to undertake updated Protected Species surveys of land at Cuerden Strategic Site, Farington, South Ribble, Lancashire (OS grid reference SD 5545 2462). These updated surveys followed an comprehensive Ecological Appraisal that was completed at the site in December 2016 and which was granted Planning Permission (Ref: 07/2017/0211/ORM). See Plan 1 Site Location and Plan 2 Strategic Site Boundary.

1.2 Aims

1.2.1 The aims of this ecological assessment were to:

- To provide clear advice to the client, the Local Planning Authority and third parties, on the nature conservation value of the site and surrounding area.
- To confirm the presence or absence of protected species, such as badgers, bats, great crested newts, otter, etc) within the proposed development site.
- To enable the client to comply with legislation afforded to protected sites and species.
- To highlight the presence of any habitats or species of ecological importance, including Habitats and Species of Principal Importance (NERC Act, 2006).
- To identify any ecological constraints on future development.
- To establish the need for any further surveys and assessments.
- To make nature conservation recommendations.

1.2.2 To achieve this, updated protected species surveys were carried out across the site between May and September 2019. This submission presents the results of these ecological surveys at the site.

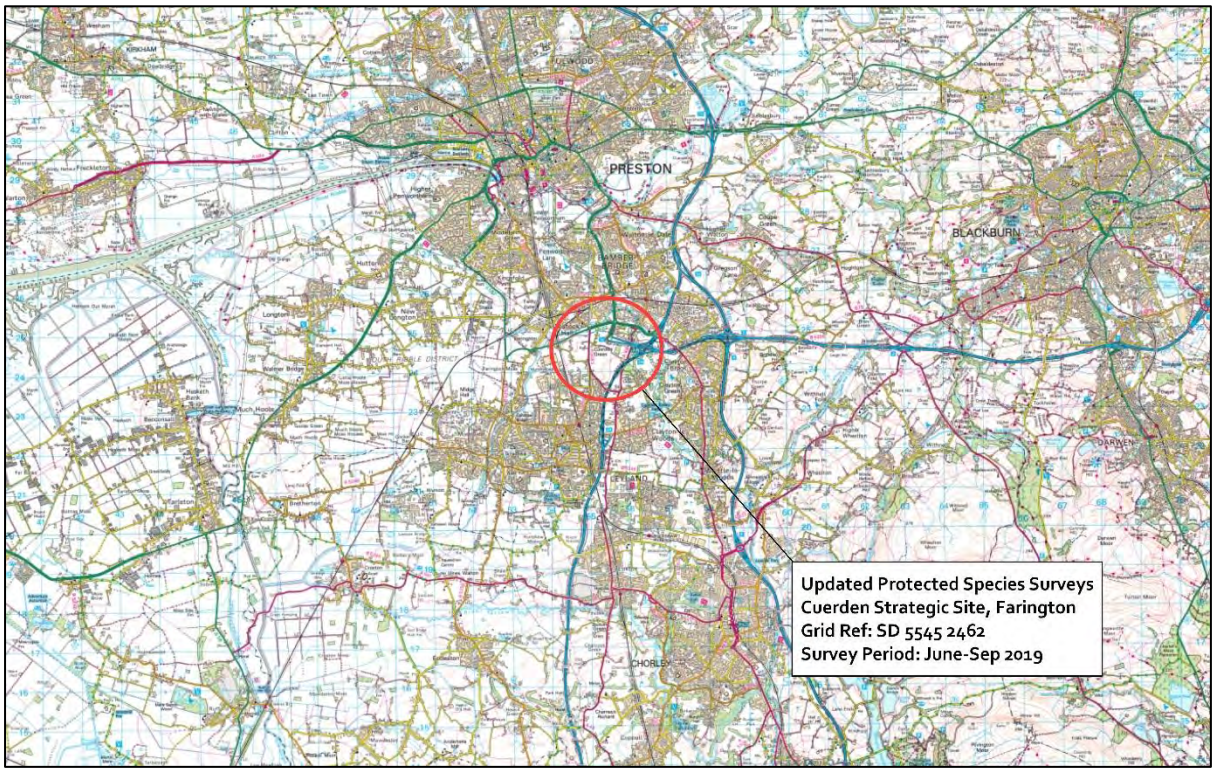
1.3 Site Description and Proposed Works

1.3.1 Cuerden Strategic Site – henceforth referred to as 'the site' – is located in Lancashire, 2.5km south of Bamber Bridge. It comprises the hamlet of Cuerden Green and land surrounding it, covering an area of 69.67 hectares. It is bounded to the west, north and east by roads and to the south by field margins: To the west is the A5083 Stanifield Lane, to the north the A582 Lostock Lane, A6 and M65 and to the east the A49 Wigan Road. An irregular line following field boundaries, to the south of which is Lydiate Lane Sand Quarry and the A49 forms the southern site boundary. The terrain is generally flat and the land slopes gently towards the north west, being 55m above sea level at its highest and 35m at its lowest.

1.3.2 Two roads are present within the site. The first being Stoney Lane which is a metalled, single-track road entering the site from the A5083. This road is approximately 300m long and ends at Stoney Lane Farm from where it becomes a narrow trackway following the line of an historical driveway to a long-since demolished country house. The second road is Old

School Lane which enters the site from the north and heads south for 450m before meeting Stoney Lane at Cuerden Green. The hamlet consists of a small number of farms and houses along these two lanes.

1.3.3 Historically land use across the site had been utilised for agriculture, particularly permanent pasture for horses and cattle. Of the 29 fields on the site just one had previously been given over to arable crops. However, recent cessation of grazing/cutting regime on the site had resulted in the development of long/rank swards which now dominated the wider site. The field margins are a mixture of hedgerows, post-and-wire fencing, a drain network and lines of trees of varying age. The majority of these trees are to be found in the southern half of the site. A pre-existing 2.5ha plantation located towards the east of the site had been felled in recent years and now comprised cleared ground with ruderal regeneration. Other notable features of the site include a selection of ponds across the site.



Plan 1: Site Location.

Plan 2: Aerial View of the Strategic Site.

2.0 SURVEY METHODOLOGY

2.1 Bats: Tree Roost Characterisation and Aerial Inspections

2.1.1 As part of the bat survey a visual survey of all trees was carried out. The following signs which can be indicators of bat presence were used for the categorisation:

- Woodpecker holes with small cracks/crevices
- Cracks/crevices, ivy cover and flaking bark
- Loose or flaking bark deadwood in canopy or stem low/no ivy cover
- Medium to dense ivy cover
- Deadwood in canopy or stem
- Snagged branches
- Hollow stems or limbs
- Hole in buttresses/hollow core

2.1.2 The following signs were searched for in all of the above places as these would indicate bat presence:

- Staining around a hole, caused by natural oils in the bats' fur.
- Stains beneath a hole, caused by bat urine.
- Scratch marks around a hole, caused by bat claws.
- Bat droppings in and beneath a hole.
- Insects (especially bat fly pupae) around a hole.

2.1.3 Once surveyed, each tree was categorised, using Bat Conservation Trust guidelines, according to its potential to support roosting bats into one of four categories: 1. Confirmed bat roost, 2a. High potential to support bats, 2b. Low/moderate potential to support bats, and 3. Negligible potential to support bats.

2.1.4 Potential Roost Feature (PRF) inspections were subsequently undertaken at height on trees that were categorised as having bat roosting potential as per 'Bat Surveys – Good Practice Guidelines' (Bat Conservation Trust 2016). These were undertaken by Rich Flight, a suitably qualified and experienced tree climber and licenced bat handlers. These checks assessed features that were obscured or difficult to observe from a ground level inspection alone. The climber/surveyor collected additional information regarding the feature(s) in order to make a more informed judgement as to its bat roosting potential. As per the good practice guidelines where a PRF has been verified as moderate or high suitability for bats or evidence of bats are found, further surveys are likely to be necessary if impacts on PRF are to occur.

2.2 Bat and Barn Owl Transect Activity Surveys

2.2.1 Linear transects around the site were undertaken in order to ascertain the value of the site for bats, as well as barn owls. Three separate routes were planned around the site that incorporated all of the range of habitats present. Surveys of the transects were carried out in accordance with the standard methods described in the 'Bat Worker's Manual' (JNCC 2004) and 'Bat Surveys – Good Practice Guidelines' (Bat Conservation Trust 2016), and in the context of our understanding of barn owl's needs. All surveys were led by Jason Reynolds MSc MCIEEM, a bat surveyor with over 20 years' of experience and an MSc from Aberdeen University in the foraging behaviour of Pipistrelle bats. In all, 3 separate surveys were carried out, providing a good depiction of general activity patterns across the area.

2.2.2 Subsequent bat data analysis was carried out using data from two keys sources. Firstly, surveyors recorded all activity seen and heard and gave interpretation live in the field. This was carried out with the aid of heterodyne and time expansion detectors with live sonogram feed. This provided qualitative data that supplemented the second, quantitative data source which consisted of desk-based sound analysis using bat sound. Verified sound files were subsequently presented using QGIS, showing total duration of calls for each species. Final interpretations and conclusions were drawn using information from both data sources.

2.2.3 In addition to the bat analysis, all records of barn owl activity observed by surveyors was added context utilised in the final barn owl conclusions.

2.3 Badger

Habitat Suitability

2.3.1 The site and the 50m surrounding the site perimeter was searched in its entirety to identify any potential habitat suitable for foraging and commuting badgers.

2.3.2 Badgers require suitable ground conditions for sett creation (e.g. soil that is free draining and can easily be excavated). Continuous well-connected linear vegetation, such as tree lines and hedgerows, provide good foraging, sheltering and commuting habitats for badgers and native berry producing trees and shrub species offer a seasonal food resource for badgers.

Sett Survey

2.3.3 A badger sett is any structure or place which displays signs indicating current use by badger/located within an active badger territory. Setts comprise a series of underground tunnels and chambers which form the home of a badger social group (clan). Although normally recorded in sloped, sandy soil in woodland habitats, it should be noted that badgers will excavate setts in a wide range of environs including urban settings.

2.3.4 Setts can be located anywhere within the territory of the clan and more than one sett can often be in use. Within one territory badgers may maintain a main sett with several annexe or outlier setts within the territory. Setts are identified by a number of characteristic features. These features include:

- A network of broad, concave entrances;
- Well-worn paths between entrances and foraging areas;
- Piles of excavated soil beside entrances (spoil heaps); and
- Piles of bedding materials beside entrances.
- Footprints and hair found around a sett can often confirm the presence of badgers and provide evidence of recent use.
- Fresh soil on spoil heaps can indicate recent use.

Field Signs

2.3.5 Badger field signs not only provide evidence of the species, but also give an indication of badger movements and how they utilise their territory. The following field signs were searched for:

- Badger guard hair;
- Footprints;
- Snuffling (badgers use their snout to turn over vegetation or soft soil to forage for bulbs and invertebrates);
- Scratching posts (marks on tree trunks/ fallen trees where badgers have left claw marks);
- Breach points (gaps in fences or crossing points over roads);
- Dung pit (single faeces deposit placed in a small excavation); and
- Latrines (collection of faecal deposits often used by badger clans to mark home range boundaries).

2.4 Breeding Birds: Field Survey

2.4.1 An inspection of the site was undertaken to search for breeding birds. The survey methodology followed that from the British Trust for Ornithology (BTO) Common Bird Census (CBC) methodology. This technique records the location and movements of individual birds present within a defined survey area(s). A pre-determined transect route was walked throughout the entire site. Using standard BTO species codes and symbols records were made of: birds singing or calling, repeated territorial calls, territorial aggression, displaying, adults carrying food or nesting material, juvenile birds and family groups. Surveys were undertaken by Bill Aspin; an experienced ornithologist and accredited bird ringer.

2.4.2 The criteria used in the assessment of birds' breeding status have been adapted from the standard criteria proposed by the European Ornithological Atlas Committee (EOAC 1979). As such all birds are grouped into one of the following categories:

- **Possible breeder** - Evidence accumulated during the survey indicates that the bird species could be breeding on the landholding, but the evidence is less conclusive than that obtained for probable breeders.

- **Probable breeder** - Evidence accumulated during the survey indicates that the bird species is breeding on the landholding.
- **Confirmed breeder** - An active nest was observed or equivalent.
- **Non-Breeder** – Seen but either flying over and/or no suitable habitats for breeding.

2.4.3 The conservation value of bird populations has been measured using two separate approaches: nature conservation status and nature conservation value. The status of birds was depicted using the most up to date Birds of Conservation Concern Red List (Eaton, *et al.* 2015). As such, each species was designated red, amber or green listed. These designations are distinguished largely based on population trends on various geographical scales and overall rarity.

2.4.4 As per CIEEM EIA guidance, survey recordings were valued based on their geographical significance. This was carried out using literature on local bird distributions (White *et al.* 2013). To attain each level of value, an ornithological resource or one of the features (species population or assemblage of species) should meet the criteria set out in **Table 1** below. In some cases, professional judgement may also be required to increase or decrease the allocation of specific value, based upon local knowledge.

Table 1: *Definition of terms relating to nature conservation value.*

Nature Conservation	Examples of Selection Criteria
International	A species which is part of the cited interest of an SPA and which regularly occurs in internationally or nationally important numbers. A species present in internationally important numbers (>1% of international population).
National	A species which is part of the cited interest of a SSSI and which regularly occurs in nationally or regionally important numbers. A nationally important assemblage of breeding or over-wintering species. A species present in nationally important numbers (>1% UK population). Rare breeding species (<300 breeding pairs in the UK).
Regional	Species listed as Priority Species, which are not covered above, and which regularly occurs in regionally important numbers. Species present in regionally important numbers (>1% of regional population). Sustainable populations of species that are rare or scarce within a region. Species on the BoCC Red List and which regularly occurs in regionally important numbers.
County	Species listed as Priority Species, which are not covered above, and which regularly occurs in county important numbers. Species present in county important numbers (>1% of county population). Sustainable populations of species that are rare or scarce within a county, or listed in a county Biodiversity Action Plan. A site designated for its county important assemblage of birds (e.g. a SINC Site). Species on the BoCC Red List and which regularly occur in county important numbers.

District	Species listed as Priority Species, which are not covered above, and are rare in the locality or in the relevant Natural Area profile. Species present in numbers just short of county importance. Sustainable populations of species which are rare or scarce within the locality. A site whose designation falls just short for inclusion for its county important assemblage of birds (e.g. a SINC Site). Other species on the BoCC Red List and which are considered to regularly occur in district important numbers.
Local	Other species of conservation interest (e.g. all other species on the BoCC Red and Amber List and Priority Species which are not covered above) regularly occurring in locally sustainable populations.
Site	All other BoCC Green-listed common and widespread species.

2.4.5 RSPB BoCC interpretation - The criteria used in assessments are intended to ensure that Birds of Conservation Concern (BoCC) listings reflect each species' global and European status as well as that within the UK, and additionally measure the importance of the UK population in international terms (Eaton *et al* 2015).

Species that meet any of the following criteria are **red** listed:

- Globally threatened
- Historical population decline in UK during 1800–1995
- Severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period (the entire period used for assessments since the first BoCC review, starting in 1969).
- Severe (at least 50%) contraction of UK breeding range over last 25 years, or the longer-term period

Species that meet any of the following criteria are **amber** listed:

- Species with unfavourable conservation status in Europe (SPEC = Species of European Conservation Concern)
- Historical population decline during 1800–1995, but recovering; population size has more than doubled over last 25 years
- Moderate (25-49%) decline in UK breeding population over last 25 years, or the longer-term period
- Moderate (25-49%) contraction of UK breeding range over last 25 years, or the longer-term period

- Moderate (25-49%) decline in UK non-breeding population over last 25 years, or the longer-term period
- Rare breeder; 1–300 breeding pairs in UK
- Rare non-breeders; less than 900 individuals
- Localised; at least 50% of UK breeding or non-breeding population in 10 or fewer sites, but not applied to rare breeders or non-breeders
- Internationally important; at least 20% of European breeding or non-breeding population in UK (NW European and East Atlantic Flyway populations used for non-breeding wildfowl and waders respectively)

2.5 Personnel

2.5.1 Surveys were undertaken by Jason Reynolds MSc MCIEEM, Kevin Heywood BSc (Hons) ACIEEM, Samantha Gray BA (Hons) Grad CIEEM, Philip Wright MSc, Rich Flight BSc MCIEEM and Bill Aspin. Jason Reynolds MSc MCIEEM. Jason started Simply Ecology Limited in 2007. Jason is an experienced ecologist who has been continuously employed in the field of nature conservation since 1995 and has a wealth of experience in both the statutory nature conservation agencies and private consultancy. During his career has worked in Conservation Officer roles for the Joint Nature Conservation Committee, English Nature, Environment Agency, Cumbria Wildlife Trust and Durham Wildlife Trust prior to setting up Simply Ecology ecological consultancy in 2007, where he is the Lead Ecologist. He has an MSc from The University of Aberdeen and his thesis investigated the relationship between habitat type and complexity and the foraging behaviour of Pipistrelle bats. Jason holds protected species survey licences for all British bats, white-clawed crayfish and great crested newts.

2.5.2 Kevin Heywood BSc (Hons) ACIEEM is an Ecologist with Simply Ecology Ltd. Kevin graduated with a first-class honours degree in Ecology from Lancaster University in 2015. In addition to this, he has acquired experience since 2012 working as an ecologist in a freelance capacity and since 2015 as a full-time employee for Simply Ecology Ltd. During this time, he has developed numerous field skills and carried out a wide range of botanical and protected species surveys. His expertise predominantly lies with habitat mapping and undertaking protected species surveys including: bats, great crested newts, badgers, otters and reptiles. Kevin holds a protected species licence for all British bats.

2.5.3 Samantha Gray BA (Hons) Grad CIEEM is a Business Ecologist working for Simply Ecology Limited. Since graduating with a Geography degree from Lancaster University in 2015, Samantha has gained over 4 years' of experience in ecology. During this period she has completed an internship with Simply Ecology, where she developed her skills in botany, bat surveys and data analysis and also subsequently worked at RSPB Leighton Moss, carrying out habitat management and species monitoring work. In 2016 Samantha became a full-time employee with Simply Ecology as an Ecologist and Office Manager.

2.5.4 Philip Wright MSc CIEEM. Philip obtained his first degree in Biology from the University of Bath and an MSc in Ecology and Conservation from Lancaster University. He is a member of

the North Lancashire Bat Group and is in his second season of bat surveying. His wider experience includes conducting botanical surveying and habitat management work with the RSPB and with the Wildlife Trust for Lancashire, Manchester and North Merseyside.

2.5.5 Rich Flight BSc MCIEEM. Rich graduated with a BSc (hons) in Zoology from Swansea University in 2000. Rich is a full Member of CIEEM and has held a Class 2 Natural England protected species licence for bats for over three years. Rich is also Class 2 Natural England protected species licence holder for bats as a Voluntary Roost Visitor. Rich has primarily been focussed this year upon working for Arcadis on National Grid's Northwest Coast Connection Scheme. Climbing trees to survey for bat roost potential is one of Rich's key skills.

2.6 Timing and Constraints

Bats and Barn Owl

2.6.1 The activity survey visits were carried out across the site on three occasions between 02nd July and 09th September 2019. The daytime roost tree inspection surveys were carried out on 08th July 2019. This was during the summer when bats are active and are expected to be found foraging every evening given favourable weather conditions. This was an ideal time to survey for all bats and the weather was good on each of the surveys. Conditions encountered are shown in Table 2.

2.6.2 The activity surveys were conducted from approximately 15 minutes prior to sunset through to around one hour and 15 minutes after sunset. This covers the peak activity period for bats increasing the likelihood of detecting bats on site. During the transect surveys fencing obstructed direct access to some areas. However, it was possible to find alternative routes whilst not restricting the areas surveyed.

Table 2: Survey type, date, weather during the bat surveys.

Survey type	Survey Date	Temperature	Sunset/Sunrise	Weather
Dusk Transect	02/07/2019	15°C	21:44	0% cloud, gentle breeze, dry
Dusk Transect	09/07/2019	16°C	21:39	90% thin high cloud, still, dry
Dusk Transect	31/07/2019	19°C	21:10	100% cloud, moderate breeze, dry
Dusk Transect	09/09/2019	13°C	19:42	60% cloud, still, damp
Tree Climbing	08/07/2019	-	-	Fine, Dry, Light breeze

Badger

2.6.3 The badger survey was carried out on 02/07/2019 and 09/07/2019. Weather was fine to carry out these surveys (See Table 3). Although surveys were undertaken in the summer, the vegetation was not too dense to preclude the completion of a thorough survey. The key areas are heavily shaded by nature shrubs, so the ground cover is sparse in the areas most suitable for sett creation.

Table 3: Survey type, date, weather during the bat surveys.

Visit	Survey Date	Weather
1	02/07/2019	0% cloud, gentle breeze, dry
2	09/07/2019	90% thin high cloud, still, dry

Breeding Birds

2.6.4 Three visits were made between May and July, commencing in the early morning; birds are most active at this time of day. Weather conditions were fine for surveying and it was possible to hear and see birds readily (see Table 4). The survey route was walked at a slow walking pace with frequent pauses, so that all birds detected could be identified. The route was designed such that any point within 50m of the survey route was visible and there were no constraints to being able to complete a full and comprehensive survey.

Table 4: Details of bird survey visits.

Visit	Date	Weather Conditions
1	28/05/2019	9-14°C, 60% cloud, gentle breeze, dry
2	10/06/2019	8°C, 30% cloud, gentle breeze, dry
3	04/07/2019	13-18°C, 50% cloud, gentle breeze, dry

3.0 PROTECTED SPECIES SURVEYS

3.1 Bats: Tree Roost Characterisation and Aerial Inspections

3.1.1 Since the 2016 round of tree surveys and the subsequent granting of planning permission, numerous trees across the site have been felled. The updated ground level tree inspection revealed that the entire mixed plantation had been clear-felled. Remaining trees across the site were associated with hedgerows along field boundaries. The majority of trees were not suitable for bat use due to their young age and small size, and lacked the features and structures that can be used by roosting bats.

3.1.2 Following on from the ground-level inspection, all of the trees found to have potential roost features were subsequently climbed in order to better assess the potential for bats to use the features for roosting. This involved a qualified tree climber with a bat licence to climb and assess each tree in more detail over repeated climbs (see APPENDIX 1).

3.1.3 All trees climbed are described below (see Table 5) and illustrated on Plan 3 below. In summary, of these ten trees, there were two with low potential, seven with moderate potential and one with high potential. See (Plate 1 and Plate 2) for indicative images of features described. However, no evidence of bat activity was found in any of the trees, as was found in 2016. Therefore the key finding was that no roosts were confirmed from these inspections.

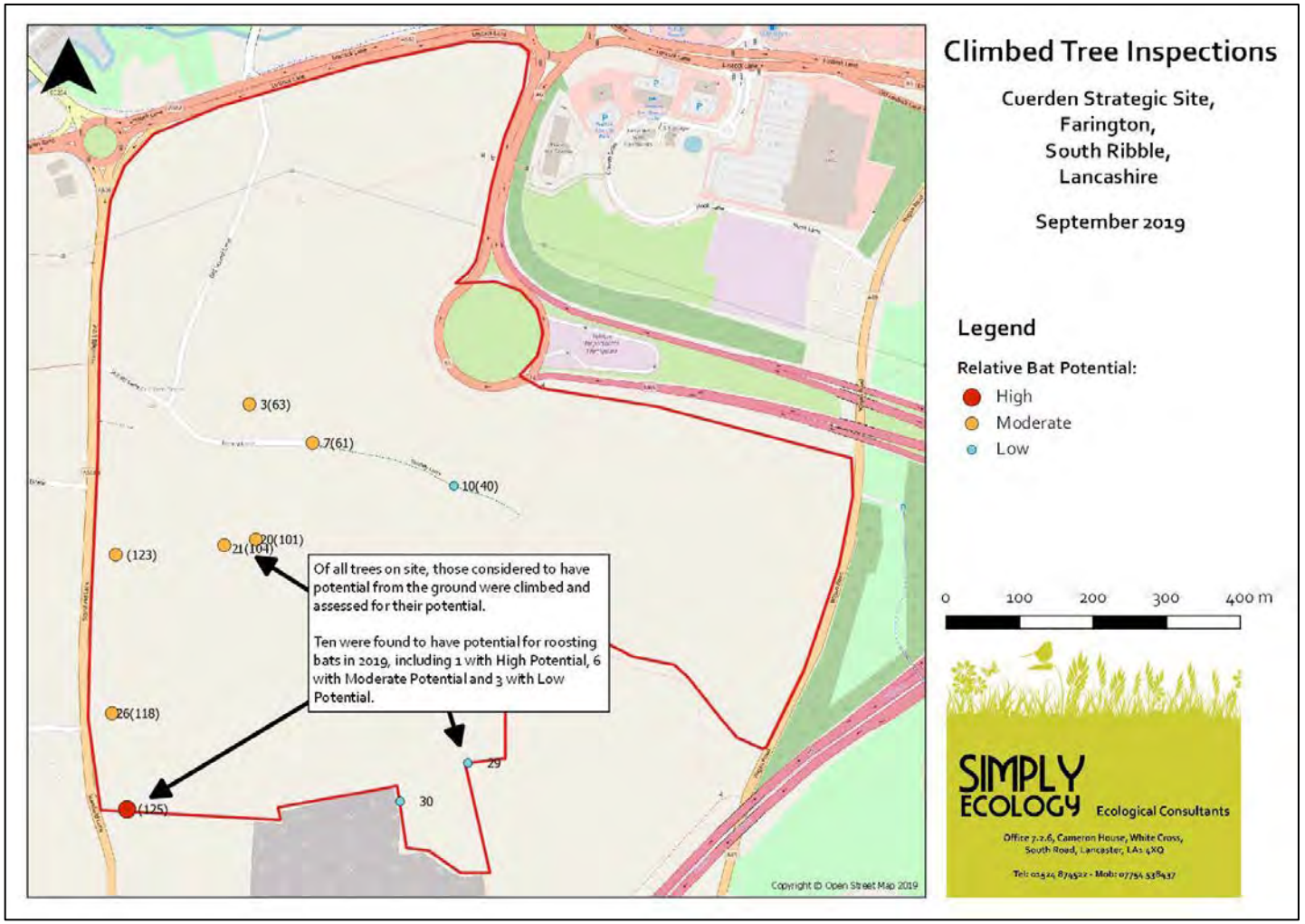
Table 5: Comparison of all trees climbed and their Roost potential (as per BCT 2016 Guidelines).

Tree Number	Species	Properties	2016 Assessment	2019 Assessment
(125)	*Fraxinus excelsior*	V Mature large tree on field boundary; PRF on north side extending 20cm upwards; no bat evidence seen.	High	High
26(118)	*Quercus robur*	Dead tree in field off treeline; PRFs on various aspects including a large internal dry cavity with moderate potential; no evidence.	Moderate	Moderate
20(101)	*Quercus robur*	Mature tree on field boundary; PRFs on eastern and southern aspects including a large internal cavity with moderate potential; no evidence.	Moderate	Moderate

21(104)	*Quercus robur*	Semi-mature tree on field boundary; PRF on eastern aspect comprising a dry woodpecker hole leading up to 1m high cavity with moderate potential; no evidence.	**High**	**Moderate**
(123)	*Quercus robur*	Large tree on field boundary; PRFs including trunk cavity and suitable sized crevice present both with moderate potential; no evidence.	**Moderate**	**Moderate**
3(63)	*Quercus robur*	Semi-mature field boundary tree with tube-like cavity on western aspect extending 10-15cm inwards; no signs.	**Moderate**	**Moderate**
10(40)	*Quercus robur*	Dead field boundary tree with tear out and inclusive 18inch cavity; no signs seen.	Not climbed	**Moderate**
7(61)	*Quercus robur*	Dead field boundary tree with branch tear on northern side; no signs seen.	**Moderate**	**Moderate**
29	*Quercus robur*	Small field boundary corner mature tree; trunk and major limb cavity crevices found to be too open in 2019; no signs seen.	**Low**	**Low**
30	*Quercus robur*	Small field boundary mature tree; dead limbs and adjacent cavities had decayed so much that crevices had become very open/exposed; no signs seen.	**Low**	**Low**

Plate 1: Tree 7(61) had a branch tear that was dry internally and had moderate potential.

Plate 2: Tree 26(118) had moderate potential with two keys features, including a tall dry cavity.



Plan 3: Trees identified as having Potential Roost Features and their relative potential after climbing.

3.2 Bat Transect Activity Surveys

3.2.1 Following on from the tree-climbing survey, three bat activity transect surveys were undertaken between July and September 2019 within the Cuerden site. These followed the same routes every time to ensure consistency of approach and to enable comparisons to be made between nights. Good coverage of the landholding and site was achieved, by making use of the extensive network of paths and tracks which pass through all of the habitat types on the site. The key finding at Cuerden was that, overall, levels of bat activity were low, much lower than the surveyors anticipated based upon their experience from other sites in Lancashire. All field results are provided on the transects in Plans 6-8 in APPENDIX 2.

3.2.2 The levels of activity observed in 2019 were comparable to those seen in 2012 and 2016. By and large this comprised low numbers of common pipistrelle bats utilising the hedgerows and lanes throughout site. Activity was particularly focussed upon Stoney Lane and the tree line along the east (see Plan 4). In addition, very few recordings of other species were encountered. Other infrequently heard species were: soprano pipistrelle, noctule and Daubenton's. All of these were so few as to indicate that none of these species regularly forages or makes use of the site in a way that is regular, although it could still provide a useful landscape link between different areas of green space.

3.2.3 Given that the majority of bat activity was recorded along linear features such as hedgerows and tree lines, this demonstrates the importance of retaining such features within an otherwise heavily fragmented landscape to facilitate commuting behaviour between more favourable habitats.

3.2.4 **Also, no roosting activity was observed on the site associated with any of the trees that had been classed as having bat roost potential. It was determined that no bats were seen emerging from any of the tree on the site. There remains some roosting potential, but as with the previous year's surveys, no bat roost was confirmed in 2019 within the survey area.**

3.2.5 **Overall it was determined that between the 2012, 2016 and 2019 transect surveys, bat activity on site remains low, consisting of common species, with activity concentrated around Stoney Lane.**

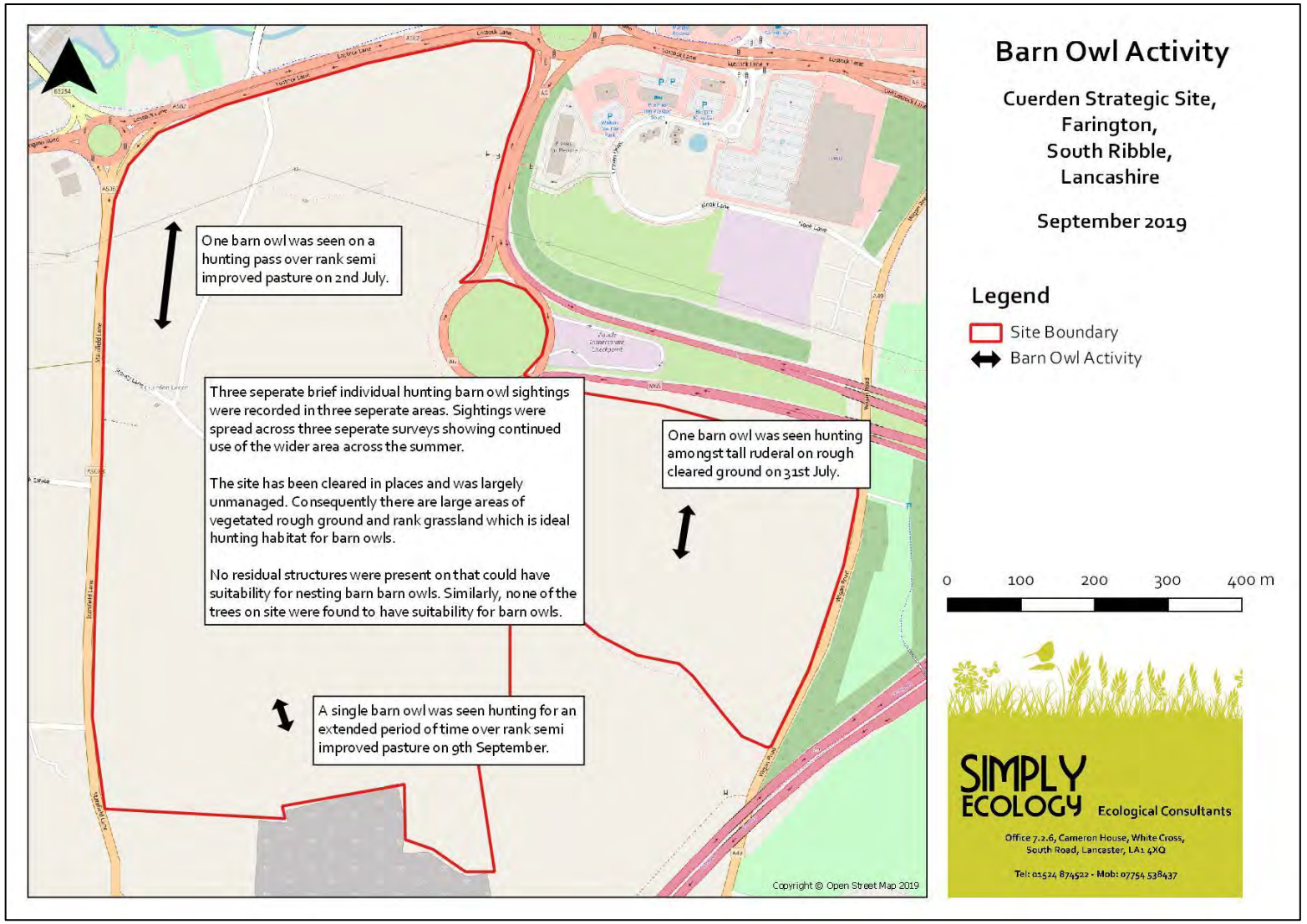
Plan 4: Indicative representation of bat activity across the site.

3.3 Barn Owl Transect Activity Surveys

3.3.1 During the night time bat transect surveys, all barn owl sightings were recorded. Three separate sightings were recorded and each one took place on a separate survey (see Plan 5). On each occasion it was clear that the barn owls were hunting on site. Since the previous ecology surveys in 2012/16, the site had become overgrown and rank as a result of the removal of grazing horses. Consequently the value of the site for barn owl is likely to have increased as the long grass will offer improved suitability for voles, and therefore hunting barn owls.

3.3.2 During the bat tree inspections none of the trees were found to be suitable for barn owl nesting, and none of the pre-existing buildings remained on site. Therefore, it was concluded that whilst there were no likely barn owl nesting locations on site, the site clearly offered improved foraging grounds for barn owls now as a result of a lack of grazing/management.

3.3.3 **In summary, despite a lack of nesting sites, the site was found to have increased suitability for hunting barn owls. This was evidenced by individual sightings on all transect surveys including coverage across the site which was more frequent than in other years.**



Plan 5: Barn Owl Transect Findings.

3.4 Badger

3.4.1 The assemblage of pasture and woodland pockets on this site was considered to have potentially good suitability for badgers. However, similar to previous surveys, the 2019 surveys found no signs of activity on site (such as: paths, setts, snagged guard hairs, snuffle holes, dung pits or latrines). It is likely that the fairly isolated nature of the land (cut off from adjoining countryside by the M6, M65 and Bamber Bridge and Leyland), plays a part in the ongoing lack of badger presence.

3.5 Breeding Birds: Field Survey

3.5.1 A total of 50x breeding bird species were recorded within or near to the site during the three breeding bird walkover surveys which took place during May, June and July 2019 (see Plan 9 to Plan 11 in APPENDIX 3 for the full depiction of birds at the site). This included 17 species previously not recorded (see Table 6) and 33 species identified in 2016 (see Table 7).

3.5.2 In terms of nature conservation importance, the more noteworthy 2019 species were the 2x species which breed on the site and which appear on the RSPB BoCC '**Red List'** as declining conservation status. These were: **Linnet** and **Mistle Thrush.** There was however, a lack of suitable nesting habitat present at the site for the 2 other red listed species which were observed over-flying the site (Grey Wagtail and Herring Gull; Table 9). All species have been subject to rapid breeding declines nationwide hence their designations as red listed due to decline nationally. All of the red listed species were present in low numbers (see Table 8).

3.5.3 A further 4x new species recorded on site appear on the '**Amber List**'. These were: **oystercatcher**, **reed bunting**, **stock dove** and **swift**. Again, by and large there was relatively low abundance of individuals on site indicating the site's low overall value for these species. Notable peaks included seven individual oystercatchers and seven stock doves. Reed bunting were confirmed to be breeding on site through discovery of active nests. Swift was not considered likely to be breeding on site.

3.5.4 The vast majority of regularly occurring species that do not qualify under any of the red or amber criteria are green listed. The '**Green List**' also includes those species listed as recovering from Historical Decline in the last review that have continued to recover or do not qualify under any of the other criteria. The site had good coverage of numerous green bird species indicating that existing habitats offer a range of niches for an assemblage of common species. A notable difference from the original surveys includes the introduction of cleared land to site due to the felled woodland to the east (see Plate 3). Lapwing were noted to be present here emphasising a possible increased suitability for ground nesting birds.

3.5.5 Overall the results show that the site supports a good range of breeding bird species, including a selection of declining red and amber listed species. The species list here represents a good selection of bird species typical of the area/habitats present. See below for a case by case impact assessment of each red and amber listed species, in the context of local species trends. Mitigation and compensation measures will need to be proportional to the potential impacts inflicted by the proposed works.

Table 6: Additional species identified in 2019.

Common Names	Latin Name	BTO Species code	Conservation Status
Grey wagtail	*Motacilla cinerea*	**GL**	**Red**
Herring gull	*Larus argentatus*	**HG**	**Red**
Linnet	*Carduelis cannabinia*	**LI**	**Red**
Mistle thrush	*Turdus viscivorus*	**M**	**Red**
Oystercatcher	*Haematopus ostralegus*	**OC**	**Amber**
Reed bunting	*Emberiza schoeniclus*	**RB**	**Amber**
Stock dove	*Columba oenas*	**SD**	**Amber**
Swift	*Apus apus*	**SI**	**Amber**
Blue tit	*Cyanistes caeruleus*	**BT**	**Green**
Brambling	*Fringilla montifringilla*	**BL**	**Green**
Feral pigeon	*Columba livia*	**FP**	**Green**
Great tit	*Parus major*	**GT**	**Green**
Lesser whitethroat	*Sylvia curruca*	**LW**	**Green**
Little ringed plover	*Charadrius dubius*	**LP**	**Green**
Long-tailed tit	*Aegithalos caudatus*	**LT**	**Green**
Sand martin	*Riparia riparia*	**SM**	**Green**
Canada goose	*Branta canadensis*	**CG**	**No Status**

Table 7: Species previously recorded, also found in 2019.

Common Names	Latin Name	BTO Species code	Conservation Status
House Sparrow	*Passer domesticus*	**HS**	**Red**
Lapwing	*Vanellus vanellus*	**L.**	**Red**
Song Thrush	*Turdus philomelos*	**ST**	**Red**
Starling	*Sturnus vulgaris*	**SG**	**Red**
Black Headed Gull	*Chroicocephalus ridibundus*	**BH**	**Amber**
Bullfinch	*Pyrrhula pyrrhula*	**BF**	**Amber**
Common Kestrel	*Falco tinnunculus*	**K.**	**Amber**
Dunnock	*Prunella modularis*	**D.**	**Amber**
House Martin	*Delichon urbica*	**HM**	**Amber**
Lesser Black backed Gull	*Larus fuscus*	**LB**	**Amber**
Mallard	*Anas platyrhynchos*	**MA**	**Amber**
Barn owl	*Tyto alba*	**BO**	**Green**
Blackbird	*Turdus merula*	**B.**	**Green**
Blackcap	*Sylvia atricapilla*	**BC**	**Green**
Buzzard	*Buteo buteo*	**BZ**	**Green**
Carrion Crow	*Corvus corone*	**C.**	**Green**
Chaffinch	*Fringilla coelebs*	**CH**	**Green**
Chiffchaff	*Phylloscopus collybita*	**CC**	**Green**

Coal Tit	*Periparus ater*	**CT**	**Green**
Goldcrest	*Regulus regulus*	**GC**	**Green**
Goldfinch	*Carduelis carduelis*	**GO**	**Green**
Greenfinch	*Carduelis chloris*	**GR**	**Green**
Jackdaw	*Corvus monedula*	**JD**	**Green**
Jay	*Garrulus glandarius*	**J.**	**Green**
Magpie	*Pica pica*	**MG**	**Green**
Moorhen	*Gallinula chloropus*	**MH**	**Green**
Nuthatch	*Sitta europaea*	**NH**	**Green**
Robin	*Erithacus rubecula*	**R.**	**Green**
Sparrow Hawk	*Accipiter nisus*	**SH**	**Green**
Swallow	*Hirundo rustica*	**SL**	**Green**
Whitethroat	*Silvia communis*	**WH**	**Green**
Woodpigeon	*Columba palumbus*	**WP**	**Green**
Wren	*Troglodytes troglodytes*	**WR**	**Green**

Plate 3: The pre-existing woodland had been felled leaving suitable ground nesting bird habitat.

Table 8: Peak counts of red and amber species per 2019 survey.

	Species	Peak count May	Peak count June	Peak count July
1	Grey wagtail	-	1	-
2	Herring gull	-	-	8
3	Linnet	2	-	1
4	Mistle thrush	1	2	1
5	Oystercatcher	1	1	7
6	Reed bunting	-	2	1
7	Stock dove	6	7	7
8	Swift	-	1	-

3.5.6 The potential impacts on a given bird species is based on a range of factors which include:

- Numbers of bird's present throughout the season
- Species' habitat requirements
- Conservation status in a national context
- Nature conservation value in a district/local context
- Professional judgement

These factors can be established based on the surveys carried out across the site, as well as having a good understanding of current legislation, guidance and local species trends (e.g. NERC Act 2006; RSPB Birds of Conservation Concern (Eaton, *et al.* 2015); Lancashire bird trend data (White *et al.* 2013)).

3.5.7 The species that are potentially the most susceptible to impacts are those that are red or amber listed and those that are BAP/NERC listed species. As such, (see Table 9) and the subsequent text below lists these species, as well as their nature conservation value based on local species trends in recent years. In addition, further information is provided below that highlights the numbers of birds encountered on site giving indication of the importance of the site for these species.

Table 9: Assessment of on-site birds' Conservation Value.

Common Names	Conservation Status	Breeding Status on Site*	Nature Conservation Value	UK BAP/NERC Species
Grey wagtail	**Red**	**Not on Site**	**Local**	✓
Herring gull	**Red**	**Not on Site**	**Local**	✓
Linnet	**Red**	**Possible**	**Local**	✓
Mistle thrush	**Red**	**Probable**	**Local**	
Oystercatcher	**Amber**	**Possible**	**Local**	
Reed bunting	**Amber**	**Confirmed**	**Local**	
Stock dove	**Amber**	**Possible**	**Local**	
Swift	**Amber**	**Not on Site**	**Local**	

Red Listed Species

Grey Wagtail

3.5.8 This species has suffered an overall decline of around -39% between 1970-2015 (RSPB, 2017). Limited areas scattered across the county have this species present in no great concentrations (White S.J *et al* 2013). One single individual was recorded on the second

survey only. It was considered unlikely that this species would be breeding on site as these birds are strongly associated with breeding near water by streams and rivers. The species was categorised local due to being a BAP priority species but the low numbers make the site less important.

Herring Gull

3.5.9 Despite national decline, herring gull populations increased in Lancashire in recent years (White S.J *et al* 2013). However, this species is unlikely to be breeding on site due to a lack of suitability. The birds identified were seen just outside the site to the south within the quarry and were likely foraging. Eight individuals were recorded on the final survey only. The site may hold some low foraging opportunity for the species.

Linnet

3.5.10 Despite an overall population decline across the UK, in Lancashire, Linnet populations have changed little (White S.J *et al* 2013). There is also a history of this species breeding in the nearby area. A maximum count of two individuals were recorded on two of the three surveys. Only birds in flight were observed with accompanying calls. No confirmed breeders were identified but it is possible that they could do so. The presence of hedgerow and long grasses will offer some suitability for this species. The species was categorised local due to being a BAP priority species but the low numbers make the site less important.

Mistle Thrush

3.5.11 This species has shown to continually be fairly ubiquitous across Lancashire tetrads (White S.J *et al* 2013), including that which covers the site. This species was recorded on all three surveys at a maximum of two individuals. In addition, presence was scattered across the entire site. Strong territorial behaviour was observed indicating that breeding is probable here but in small numbers. The species was categorised local due to being a BAP priority species but the low numbers make the site less important.

Amber Listed Species

Oystercatcher

3.5.12 Over the last century there has been a gradual increase in Oystercatcher breeding range in Lancashire (White S.J *et al* 2013). Overwintering oystercatchers however are located in more coastal areas, with the nearby Morecambe Bay representing the most important wider site around the UK for this species. An average annual 2% decline of birds on estuaries has been found nationwide (RSPB, 2017). A single recording of this species was made on the first two surveys, and a peak count of 7 were present on the third survey. No confirmed signs of breeding behaviour were observed but there is a low possibility of this species breeding on the site. The site likely has some importance for feeding purposes. Given the low numbers of this amber status bird, this species was categorised at the local conservation value level.

Reed Bunting

3.5.13 After dramatic declines of this species across the country throughout the 20th century, there has been a marked recovery in recent years (RSPB, 2017). This has been more or less mirrored in Lancashire with breeding corn buntings being present in ~67% of the county's tetrads (White S.J *et al* 2013). This species was found at a maximum count of two on site and was a confirmed breeder with nesting observed in a hedgerow in north of site. Given the low numbers of this breeding amber status bird, this species was categorised at the local conservation value level.

Stock Dove

3.5.14 Stock dove populations have typically increased throughout the last century, including within Lancashire (White S.J *et al* 2013). Between six and seven were recorded on each survey and across the site. This species was not confirmed to be breeding and no evident behaviour was identified. However, given the number and the overall coverage across the site it was considered possible. Given the low numbers of this amber status bird, this species was categorised at the local conservation value level.

Swift

3.5.15 Between 1997 to 2011 there was an overall ranged contraction for this species of 3.5% across the county (White S.J *et al* 2013). This imitates the overall national decline over this time period (RSPB, 2017). Only one single bird was seen passing through the site on the second survey. It is thought therefore that the site likely offers limited suitability for this species. Given the low numbers of this amber status bird, this species was categorised at the local conservation value level.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Summary of Findings

4.1.1 In May 2019, Simply Ecology Limited was commissioned by Lancashire County Council to undertake updated Protected Species surveys of land at Cuerden Strategic Site, Farington, South Ribble, Lancashire. At the time of writing the intention is to implement South Ribble Borough Council planning decision 07/2017/0211/ORM. Due to the hybrid nature of the planning decision, which includes large undeveloped areas as 'Outline', up-to-date information is being maintained until 'Detailed' planning submissions are submitted for each phase.

4.1.2 Extensive ecological surveys of the site were conducted in in 2012 and 2016, and this report provides updated information on the suitability for protected species, including: bats, badgers and breeding birds. No habitat surveys were undertaken as no gross changes in any of the common and widespread habitats at the site are likely in such a short time-frame since 2016, so there was no need to update these.

4.1.3 Ground-level tree inspections identified a total of ten remaining trees as having potential for bat roosting. However, no signs of bat roosting were found during the aerial inspection. The results are the same as in 2016. The only difference in 2019 was that there were fewer trees than the 14 previously identified (2016), due to 4 of them having been felled. Follow-up night-time bat activity surveys also failed to find any signs of a bat roost on the site. This was again the same as the previous surveys.

4.1.4 The 2019 night time transect surveys revealed very similar patterns to the previous surveys, with peak activity concentrated alongside linear features, principally Stoney Lane and hedgerows and treelines on site. Low numbers of common pipistrelle comprised the vast majority of the activity recorded, with only a few individual recordings of other common species such as Noctule and Daubenton's.

4.1.5 A comprehensive survey for badgers again failed to find any direct evidence of their presence. This is in line with the previous findings and is likely due to being surrounded by barriers to dispersal.

4.1.6 Barn owl activity during 2019 showed a slight increase compared to previous years. The night time survey encountered was indicative of low numbers using the site for feeding purposes. The more regular observations of barn owl was attributed to the increased suitability of the site in recent years due to the temporary cessation of grazing during construction. The development of a long and tussocky grass sward across such a large site and likely increase in suitability for prey will be beneficial for barn owl. However, it is understood that grazing is due to re-commence across the undeveloped parts of this agricultural site, which will result in shorter swards.

4.1.7 Of the bird species identified on and around the site during the breeding bird surveys, in total there were 50, as in 2016. However, 17 of these species were newly recorded species for the site and this included 4 red listed and 4 amber listed species. By and large these birds were assessed to represent local level conservation value. This was due to the relatively low

number of birds in the context of national and county populations. Overall, whilst the site had a similar number of species and relative abundance to those seen previously, the actual assemblage of species had altered a little. This is likely due to the gradual change on site from a regularly grazed site to a rank unmanaged site, and with an increase in open areas as a result of recent woodland felling improving the site for ground nesting birds.

4.1.8 In line with these findings, pertinent recommendations for the species surveyed are provided below:

4.2 Wider Ecology

4.2.1 It is recommended that each submission for detailed planning approval should be accompanied by this updated ecology report. Planning amendments and further planning submissions will need to take into account relevant ecological matters that are based upon these up-to-date surveys. **Reason:** This will ensure compliance with the Local Authority's statutory duty to conserve and enhance biodiversity under The Natural Environment and Rural Communities Act 2006, as reflected in Section 15 of the National Planning Policy Framework and The Local Plan.

4.3 Bats

- *It is recommended* that any site master-planning exercise should retain important habitat features for bats, such as hedge lines and intersections or trees around ponds. If retention of features is designed into the development, this will help to mitigate any impacts. **Reason**: This will ensure compliance with the Local Authority's statutory duty to conserve and enhance biodiversity under The Natural Environment and Rural Communities Act 2006, as reflected in Section 15 of the National Planning Policy Framework and The Local Plan.
- *It is advised* that no Natural England licence is necessary in this instance as no impact upon any bat tree roost is predicted. This is due to the lack of any signs of current or historical use of the trees by bats. Reason: This will deliver compliance with: Section 9 (1 & 4) of The Wildlife & Countryside Act 1981 (as amended), Part 3 (43; 1 & 2) of The Conservation of Habitats and Species Regulations 2017 and Section 15 of The National Planning Policy Framework.
- *It is recommended* that a lighting scheme should be adopted at the site which delivers low wildlife impact and is in accordance with BCT/ILP (2018). Lighting should seek to avoid creation of light spill onto any boundary vegetation so that bat flight-lines are maintained. The effects of any lighting provided shall be reduced through the use of i) directional lighting, ii) lighting on poles of the minimum permissible height iii) lighting on timers and iv) use of narrow-spectrum bulbs to reduce UV emission. **Reason:** This will ensure compliance with the Local Authority's statutory duty to conserve and enhance biodiversity under The Natural Environment and Rural Communities Act 2006, as reflected in Section 15 of the National Planning Policy Framework and The Local Plan.

4.4 Birds

- *It is recommended* that the mature hedges and trees around the site are retained as they provide valuable breeding bird habitat. However, if any hedge or tree-removal in the site is required, it is recommended that all clearance should be undertaken outside of the bird nesting season (March to August inclusive). If this is not possible, a suitably qualified ecologist must be present to check to confirm the absence of nesting birds immediately prior to clearance works commencing. If a bird nest in current use is discovered, then an appropriate buffer zone around the nest should be created where clearance works can only continue after the nest is vacated. **Reason:** To ensure that no offences are committed under The Wildlife and Countryside Act 1981 (as amended). The bird nesting season is generally regarded to extend between March and August inclusive.

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Wildlife and Countryside Act 1981:

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6.0 ANNEX A: STATUTORY AND PLANNING CONTEXT

A.0.1 The client is advised that many species of British wildlife are legally protected. The following section provides a brief overview of the protection afforded to species commonly encountered during development. The Recommendations at the end of this report will advise as necessary, but it is also useful for the client to have an understanding of the legal protection as this helps to ensure that the law is complied with.

A.1 Badgers

A.1.1 Badgers are protected under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended) (WCA), and the Protection of Badgers Act 1992. It is illegal to:

- Kill, injure, take, possess or cruelly ill-treat a badger or to attempt to do so;
- Interfere with a badger sett by damaging or destroying it;
- Obstruct access to or any entrance of a badger sett;
- Disturb a badger when it is occupying a sett

A.1.2 A badger sett is "any structure or place that displays signs indicating current use by a badger". Natural Resources Wales, the Government's statutory nature conservation body, classifies a sett as active if it has been occupied within the last 12 months.

A.1.3 Operations that might cause disturbance of an active sett entrance can be carried out under licence from Natural Resources Wales. If any badgers are found during the course of the survey, this will be highlighted in this report.

A.2 Birds

A.2.1 All wild birds are protected against killing or injury under The WCA 1981 (as amended). This protection extends to bird's nests during the breeding season, which makes it an offence to damage or destroy nests or eggs. Birds that are listed on Schedule 1 of the Act receive additional protection against intentional or reckless disturbance during the breeding season. This makes it an offence to disturb these species at or near to their nesting site.

A.3 European Protected Species (includes bats, otter, hazel dormouse, great crested newts, and others)

A.3.1 The client is advised that all bats and great crested newts are European Protected Species (EPS). These EPS are protected under European legislation that is implemented in Wales via The Conservation of Habitats and Species Regulations 2017 (Regulation 43). A full list of EPS is provided in Schedule 2 of the Regulations. In addition, these EPS also receive the protection of the Wildlife and Countryside Act 1981 (as amended) in respect of Section 9 (4)(b & c) and (5).

A.3.2 If both national and international legislation are taken together, the legislative protection afforded to these species makes it an offence to:

- Intentionally/ deliberately kill, disturb, injure or capture them.
- Intentionally or recklessly damage, destroy or obstruct access to any breeding site or resting place.

- Possess or control any live or dead specimen or anything derived from a European Protected Species.

A.3.3 If an activity is likely to result in any of the above offences, derogation from the legal protection can be issued in the form of a European Protected Species licence issued by Natural Resources Wales. Licences for development purposes are issued under The Conservation of Habitats And Species Regulations (2017) and only allow what is permitted within the terms and conditions of the licence. If any EPS are found during the course of the survey, this will be highlighted in this report.

A.4 Protected Mammals and Reptiles (includes water vole, red squirrel, reptiles and others)

A.4.1 All native reptiles and a variety of British mammals also receive protection under The WCA 1981 (as amended). Schedule 5 of The WCA lists animals that are protected. The degree of protection varies. Water voles and red squirrel are examples of species with full protection. The Act makes it an offence to intentionally kill, injure, take, possess, or trade in any wild animal listed in Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places.

A.4.2 All native reptiles in the UK are protected. The commoner species such as grass snake, common lizard, slow worm and adder are protected only from unlawful killing and injuring. In practice this may require a reptile protection scheme before implementing a planning permission but no specific licence is required. Sand lizard and smooth snake listed as EPS (see A3.3 above).

A.4.4 If any protected species are found during the course of the survey, this will be highlighted in this report.

A.5 Non-native invasive species

A.5.1 A number of non-native plant species growing wild in the UK are listed on Schedule 9 of the WCA due to their invasive nature and the detrimental impact they can have on native habitats and wildlife. This legislation makes it an offence to plant or otherwise cause to grow in the wild any plant species which is included in Part II of Schedule 9.

A.5.2 This legislation should be considered during site clearance works which could lead to the spread of Schedule 9 listed plant species from the site if plant material is not properly handled and disposed of. Development proposals should also consider the removal of invasive species from areas of site that would otherwise remain unaffected by works in order to avoid the risk of these invasive plants spreading from the site in the future and enhance habitats within the site. This would in turn free up space for wildlife friendly planting, prioritising use of native species within planting schemes where appropriate.

A.6 Planning Considerations

A.6.1 When considering each planning application, the presence of protected species, such as those listed above, is a material consideration which must be fully considered by the Local Authority when granting planning permission. If a licence from Natural Resources Wales is required, then prior to issuing any planning consent, the local planning authority will need to be satisfied that there is no reason why such a licence would not be issued. Therefore, in reaching the planning decision the local planning authority will need to have regard to the requirements of the Conservation of Habitats and Species Regulations 2010. The three licensing tests given in the Regulations must be considered. In summary, these are that:

1. The development is required for the purpose of:

- Preserving public health or public safety;
- For other imperative reasons of over-riding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment;
- For preventing serious damage to property.

2. There is no satisfactory alternative.

3. The proposal will not be detrimental to the maintenance of the population of the species at a favourable conservation status.

A.6.2 All necessary information would need to be provided to the planning authority as part of the planning application in order to address the above tests.

A.6.3 The Natural Environment and Communities Act (NERC Act) 2006 extended the biodiversity duty set out in the Countryside and Rights of Way (CROW) Act to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity. The Duty is set out in Section 40 of the Act, and states that:

"Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity"

A.6.4 The Duty applies to all local authorities, community, parish and town councils, police, fire and health authorities and utility companies. Section 42 (S42) of this Act (the 'Wales Biodiversity List') also requires the Secretary of State to publish a list of habitats and species that are of principal importance for the conservation of biodiversity in Wales. This list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40(1) of the Act.

A.6.5 Also, Local Authorities must follow the National Planning Policy Framework (NPPF) which provides guidance on the interpretation of the law in relation to wildlife issues and development. For each development proposal considered by the Local Planning Authority the NPPF states that the authority must aim to conserve and enhance biodiversity. If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

7.0 ANNEX B: IMPACT ASSESSMENT CRITERIA

Table 1: Valuing Ecological Features

Level of Value	Examples
International	An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, pSAC, Ramsar site, Biogenetic Reserve). A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole. Any regularly occurring population of an internationally important species, which is threatened or rare in the UK, i.e. it is a UK Red Data Book species or listed as occurring in 15 or fewer 10km squares in the UK (Categories 1 and 2 in the UK BAP) or of uncertain conservation status or of global conservation concern in the UK BAP. A regularly occurring, nationally significant population of any internationally important species.
National	A nationally designated site (SSSI, ASSI, NNR, Marine Nature Reserve) or a discrete area, which meets the published selection criteria for national designation. A viable area of a priority habitat identified in the UK BAP, or of smaller areas of such habitat which are essential to maintain the viability of a larger whole. Any regularly occurring population of a nationally important species which is threatened or rare in the region or county (see local BAP). A regularly occurring, regionally or county significant number of a nationally important species.
Regional	Viable areas of key habitat identified in the Regional BAP or smaller areas of such habitat which are essential to maintain the viability of a larger whole. Viable areas of key habitat identified as being of Regional value in the appropriate Natural Area profile. Any regularly occurring population of a nationally important species which is not threatened or rare in the region. Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK or in a Regional BAP or relevant Natural Area on account of its regional rarity or localisation. A regularly occurring, locally significant number of a regionally important species.
County	Semi-natural ancient woodland greater than 0.25ha. County/Metropolitan sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on County/metropolitan ecological criteria. A viable area of habitat identified in the County BAP. A regularly occurring, locally significant number of a County/Metropolitan 'red data book' or BAP species, designated on account of its regional rarity or localisation. A regularly occurring, locally significant number of a County/Metropolitan important species.
District/Borough	Semi-natural ancient woodland smaller than 0.25ha. Areas of habitat identified in a sub- County (District/Borough) BAP or in the relevant Natural Area profile. Sites/features that are scarce within the District/Borough or which appreciably enrich the District/Borough habitat resource. A diverse and/or ecologically valuable hedgerow network. A population of a species that is listed in a District/Borough BAP, because of its rarity in the locality or in the relevant Natural Area profile because of its regional rarity or localisation. A regularly occurring, locally significant number of a District/Borough important species during a critical phase of its life cycle.
Site	Areas of habitat or populations/communities of species considered to appreciably enrich the habitat resource within the context of the parish or neighbourhood, e.g. species-rich hedgerows. NB: Where species or habitats occur in more than one category, the highest value is applicable.

Table 2: Impact Magnitude

Impact Magnitude	Examples
Major	Loss of over 50% of a site feature, habitat or population. Adverse change to all of a site feature, habitat or population. For benefits, an impact equivalent in nature conservation terms to gain of over 50% of a site feature, habitat or population.
Moderate	Loss affecting 20-50% of a site feature, habitat or population. Adverse change to over 50% of a site feature, habitat or population. For benefits, an impact equivalent in nature conservation terms to a gain of 20-50% of a site feature, habitat or population.
Slight	Loss affecting 5-19% of a site feature, habitat or population. Adverse change to 20-50% of a site feature, habitat or population. For benefits, an impact equivalent in nature conservation terms to a gain of 5-19% of a site feature, habitat or population.
Negligible	Loss affecting up to 5% of a site feature, habitat or population. Adverse change to less than 20% of a site feature, habitat or population. For benefits, an impact equivalent in nature conservation terms to a gain of up to 5% of a site feature, habitat or population.

8.0 APPENDIX 1: BAT TREE INPSECTION RESULTS

Site: Cuerden Investement Site, South Ribble
Surveyor: Rich Flight, Will Walton
Weather: Fine, dry, warm

Dates: 08/07/2019
Grid Ref: SD 554 244

Tree Number (Arb report no. in brackets)	Species	Height	Width (at breast height)	Condition / Maturity	Grid ref (SD)	Position in Landscape	Potential Roost Feature (PRF)	PRF aspect & height	2016 Notes	2016 Potential	2019 Notes	2019 Potential
(T125)	Ash	23m	1m	Mature	55057 24175	Field boundary	Pruning cut	North 6m	High potential. Extends approx 20cm up. Mildew at apex. Slugs. Poss too open at entrance	**High**	No obvious change. Slugs remain, mildew still present. No definitive bat evidence but suspiciously smooth and clean internally.	**High**
T26 (118)	Oak	See arb report	See arb report	See arb report	55031 24374	In field, slightly away from treelike	Callus roll	West 3m	Cavity extends but open at both ends. Moderate potential for day roost	**Moderate**	Full of squirrel nest. Completely clogges up.	Low
							Knot	North 4m			Extends all the way top a large internal cavity. Stub still present. Cobwebs over entrance and opens up inside. Clean and dry internally.	**Moderate**
							Trunk cavity	East 4m	Did not extend. Negligible	Negligible	NA	NA
T25 (g48)	Oak	See arb report	See arb report	See arb report	55045 24394	On field boundary, first tree on northern tree line	Branch tears	All, various heights	Neg, do not extend	Negligible	NA	NA
T27(g43)	Oak	14m	1m	Mature	55169 24365	Field boundary	Branch tears	Various	Neg, do not extend	Negligible	NA	NA
T28(g43)	Oak	16m	1m	Mature	55172 24364	Field boundary	Dead limbs	S, n, e	Neg, do not extend	Negligible	NA	NA
T22 (105)	Oak	9m	0.75m	Mature	55200 24500	Field. Boundary	Basal cavity	S	Neg, too open and large	Negligible	NA	NA

T20(101)	Oak	See arb report	See arb report	See arb report	55236 24517	Field boundary	Hazard beam	E, 3m	Low, shallow and not rotted back	Low	Has now rotted back away from stem (approx 20cm). No bat evidence, woodlice and slugs present	**Moderate**
							Knot hole	E, 4m	Large hole with stub protruding from main stem. Mod. Rots back well but large and contains bird nest	**Moderate**	No significant change. Soggy. Woodlice present	**Moderate**
							Branch tear	7m, south	On upward aspect of higher limb. Rotted back 15cm but pool of water in entrance and full of slugs and wood lice. Low	Low	Multiple dessicated crevices of dead wood. Chambers relatively shallow	Low
T21 (104)	Oak	See arb report	See arb report	See arb report	55201 24511	Field boundary	Woodpecker hole	4m, east	Extends up approx 1m, 30cm down. Tapers to spire, but gets very narrow. Dry, rough. Moderate	**Moderate**	Does not extend down any more (filled in?). Dead bee comb and dead bees present. Smooth walls, dry, woodlice present.	**Moderate (when bee comb collapses)**
T23 (107)	Oak	See arb report	See arb report	See arb report	55261 24515	Field boundary	Dessication cracks	4m west	Superficial, negligible	Negligible	NA	NA
T24 (g38)	Oak	See arb report	See arb report	See arb report	55252 24448	Field boundary	Trunk wound, large tear	1-4 m west	Large open wound, too open for bats. Small crevices to edge, but none that show bat use or have good potential. Low	Low	NA	NA
(T123)	Oak	See arb report	See arb report	See arb report	55044 24517	Field boundary	Trunk cavity	1-4m	Small crevice extends from large open wound on trunk. Rotted back by approx 20cm, but damp and contains wood live and slugs.	**Moderate**	Extends approx 50cm. Slugs present. Rough internal surface	**Moderate**
							Crevice between callus & heartwood	5m, Limb SSE, PRF NNE			Gap between dead hearwood and callused bark along large tear. Suitable sized crevice present	**Moderate**

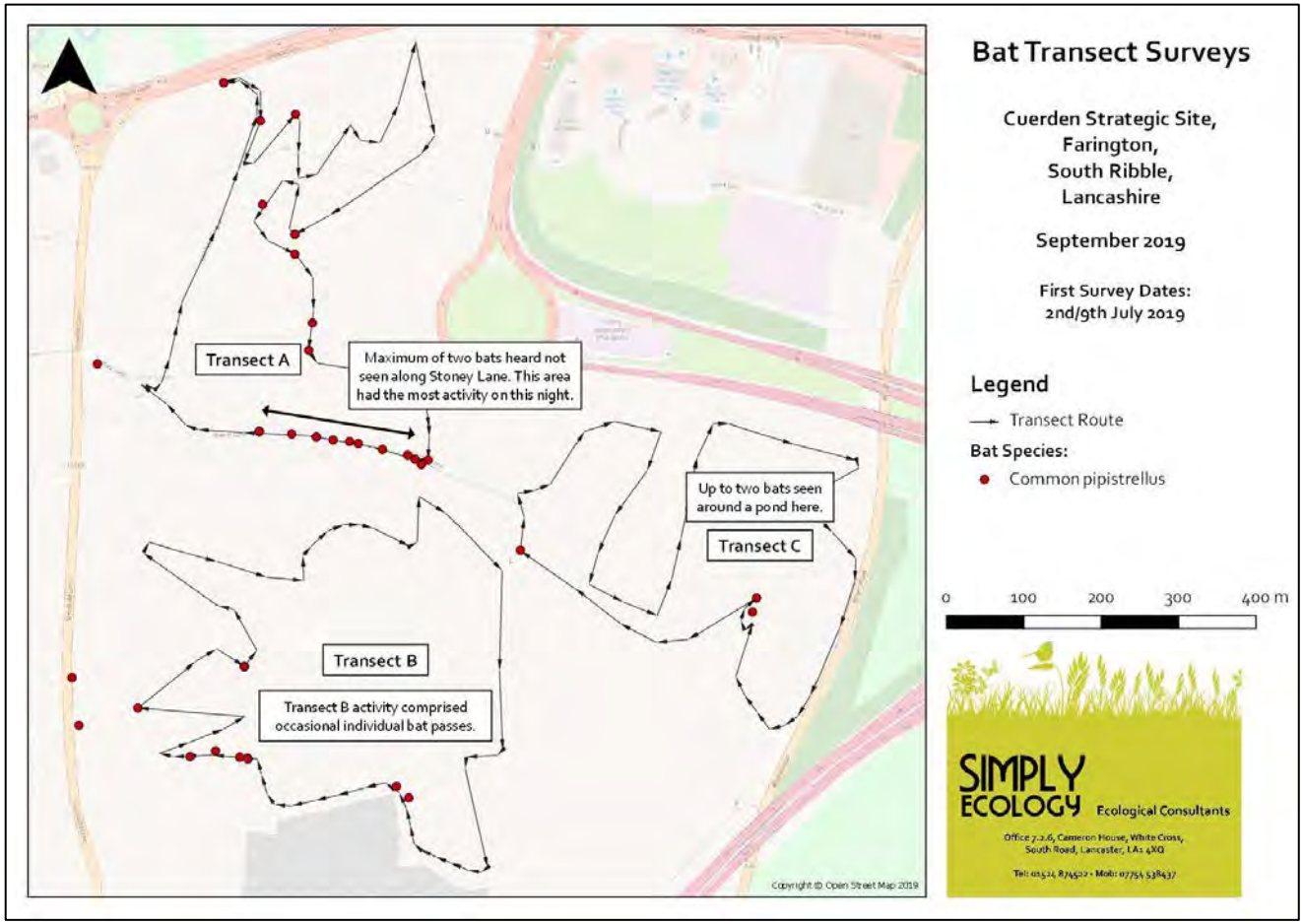
T4 (62)	Ash	See arb report	See arb report	See arb report	55243 25700	Field boundary	Knot hole	East, 12m	Neg. does not extend	Negligible	NA	NA
T3 (63)	Oak	See arb report	See arb report	See arb report	55245 24713	Field boundary	Tear out	West, 12m	Small torn out limb with cavity she wound wood grown. Tube like, extending 10-15cm. Approx 2cm wide. Rough and dry on inside. No evidence. Moderate	**Moderate**	No significant change. Cobwebs. Bird nest in base. Smooth and dry. No signs of usage.	**Moderate**
T2 (87)	Oak	See arb report	See arb report	See arb report	55191 24722	Field boundary, on corner of paddock	No features present	NA	All features of tree are superficial. No prf found	Negligible	NA	NA
T1 (81)	Oak	See arb report	See arb report	See arb report	55276 24907	Field boundary	No features present	NA	All features of tree are superficial. No prf found	Negligible	NA	NA
T10 (40)	oak	See arb report	See arb report	See arb report	55490 24613	Field Boundry	Tear out	North 2.5m	major limb tear out 18 inch cavity dry cobwebs	**Moderate**	Squirrel nest. Cobwebs. No sign of bats, no smell.	**Low**
T35 (28)	oak	See arb report	See arb report	See arb report	55607 24570	Field boundary	knot hole	3.5m east	extends back 5-10cm but not up. Low potential	Low	NA	NA
T37	oak	5m	0.1m	dead	55685 24545	woodland edge, 1m from fence	ground cavity	1m east	Additional Tree - small dead tree, ground cavity extends approx 60 up to tapering spire. not smooth inside but clear and dry. cobwebs and no bats.	**Moderate**	**Clear felled**	**NA**
T13	oak	10m	0.7m	mature	55686 24546	woodland edge, on ditch side of fence line	Trunk Cavity		2 large cavities open to the elements 1 small cavity approx 5-8cm dry cobwebs	**Moderate**	**Clear felled**	**NA**
T38	oak	10m	.6m	mature	55715 24591	woodland edge on ditch side of fence	tear out	4m west	Additional Tree - On upper side of West facing limb. wet at entrance and contains slugs, but extends about 20cm to tapering apex.	**Moderate**	**Clear felled**	**NA**

T34	oak	12m	1m	mature	55716 24619	woodland edge, up against the fence on plantation side	tear out	4m south west	4ft tear along limb but only to a max depth of4-5cm	Low	NA	NA
T39	sycamore	8m	0.1 (+0.15)	moderate	55730 24665	woodland edge, approx 1m from fence	low level tear in smaller stem	1m east	Additional Tree - extends approx 20cm up to tapering spire. slugs at present	**Moderate**	**Clear felled**	**NA**
T32 (7)	oak	8m	1m	dead	55927 24645	Field boundary	flaking bark and potential branch tear	1m-6m	Cannot be inspected, tree dead and not safe to climb. bark inspected at ground level. contained wren nest. no sign of bats, rough and dusty. Some transient potential though.	Low	NA	NA
T33 (1)	Oak	See arb report	See arb report	See arb report	55997 24606	Field boundary	cavity on limb 60 v degree NE		small cavity approx 10 inch long dry see photo no.7	Low	NA	NA
T19 (24)	Oak	14	1	mature	55983 24536	Field boundary	rotted stub	3m south east	whole limb rotted, open at both ends, no cavity - negligible	Negligible	NA	NA
							Ivy	2-12m	some thick, with overlaps but none that were inspected had potential, unlikely roost - low	Low	NA	NA
T18 (26)	Oak	14	1	mature	56021 24475	Field Boundry agj to road A49	Ivy	2-10m	The thickest parts of ivy around crown but very damp.:neg. do not extend	Negligible	NA	NA
T7(61)	Oak	See arb report	See arb report	See arb report	5535 2465	Field boundary	Branch tear	5m n	Lowest east facing limb 12 inch dry rot wood lice slugs. Moderate potential	**Moderate**	Rough inside, smels of animals.However, blue tit feather present. Slugs and woodlice present.	**Moderate**
T8(53)	Sycamore	See arb report	See arb report	See arb report	55358 24653	Field boundary	Knot hole	Between 3-5m E	Neg. do not extend	Negligible	NA	NA
							Branch tear	5m E	Neg. does not extend	Negligible	NA	NA

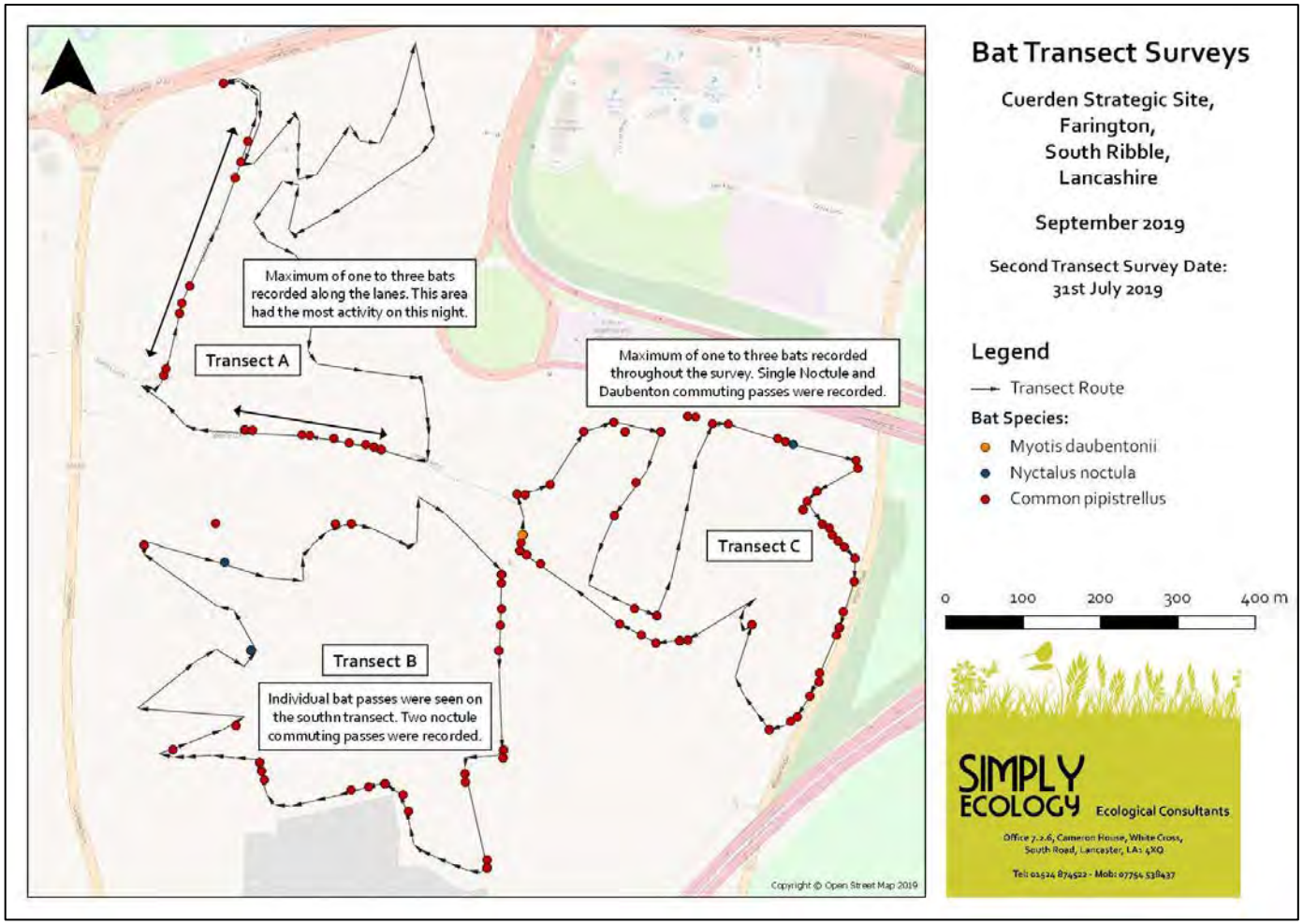
T9 (51)	Oak	See arb report	See arb report	See arb report	55377 24649	Field boundary	Dead stub	6m W	Exposed longitudinal cracks and lose bark. Light visible through all. Low	Low	NA	NA
T5 (70)	Oak	See arb report	See arb report	See arb report	5441 2474	Field boundary	Dead stub	6m E	Low potential	Low	NA	NA
T6 (71)	Ash	See arb report	See arb report	See arb report	55433 24743	Field boundary	Knot holes x3	5m S and E	Small, 2 to 3 inch deep. Low potential	Low	NA	NA
T37 (37)	Ash	See arb report	See arb report	See arb report	55555 24584	Footpath edge	Trunk cavity at union between stems	6m east	Very small, do real depth (approx 3cm) full of wood lice. All other features are superficial. Negligible	Negligible	NA	NA
T11	Sycamore	20m	1m	Mature	5556 2458	Footpath boundary	Ivy up to around 10m	All, various heights	Low potential	Low	NA	NA
T12	Sycamore	20m	1m	Mature	5556 2459	Footpath boundary	Ivy up to 10	4m N	Double thick ivy stems, raised from trunk. Low potential	Low	NA	NA
T36 (36)	Oak	3m	See arb report	See arb report	5558 2459	Footpath boundary	3 separate torn out limbs	3m	Potential in 3m cavity dry smooth possible Squirrel roost	**Moderate**	**Clear felled**	**NA**
		5m						NA	NA	Negligible		
		6m						NA	NA	Negligible		
T14	Sycamore	20m	1m	Mature	5559 2450	Footpath boundary	Ivy up to10	4m to 10m W	Negligible, small diameter immature Ivy	Negligible	NA	NA
T15	Sycamore	22m	1m	Mature	5565 2447	Field boundary adjacent to stream	Ivy upto 10m	Ivy at 6m	Low potential some larger stem ivy but little triangulation on trunk	Low	NA	NA
T16	Sycamore	22m	1m	Mature	5566 2444	Field boundary adj stream tree positioned right of gate at stream	Ivy up to 10m	Ivy knot at 5m E, canker cavity at 3m S	All three PRFs are negligible.	Negligible	NA	NA
T17	Sycamore	24m	0.9m	Mature	5578 2438	Field boundary adj to stream.	Knot hole	4m N	Old bird nest, poss wren or robin, goes down 3-4 inches. Low potential	Low	NA	NA

T29	Oak	15m	1.10m	Mature	5553 2423	Field boundary corner by gate	Trunk cavity and major limb cavity	Severe decay from basal cavity at2m to 3m upwards	Decay is advanced medium potential seperate dry cracks upwards daylight visible	**Moderate**	Too open now.	Low
								Longitudinal cracks on dead limb at 3m to 6m east	Medium potential between split, wood dry areas inside	**Moderate**	Open cavity, full of squirrel nest. Open cracks at the side	Low
T30	Oak	15m	0.75	Mature	55439 24173	Field boundary	Knot holes around dead branches (x3)	3m E	Dead limb has two 30cm deep longitudinal narrow cavities, one on underside of dead branch and on left side of dead branch where it joins wound wood callus. Moderate.	**Moderate**	Full of squirrel nest material and dead squirrel	Low
								3m	15cm cavity in dead limb protruding from spring of crown. Moderate.	**Moderate**	Decayed more so too open now. Also full of squirrel material	Low
T31	Oak	15m	0.75	Mature	5546 2414	Field boundary	Failed limb	At 4m west	Longitudinal cavity low potential wet muddy	Low	NA	NA

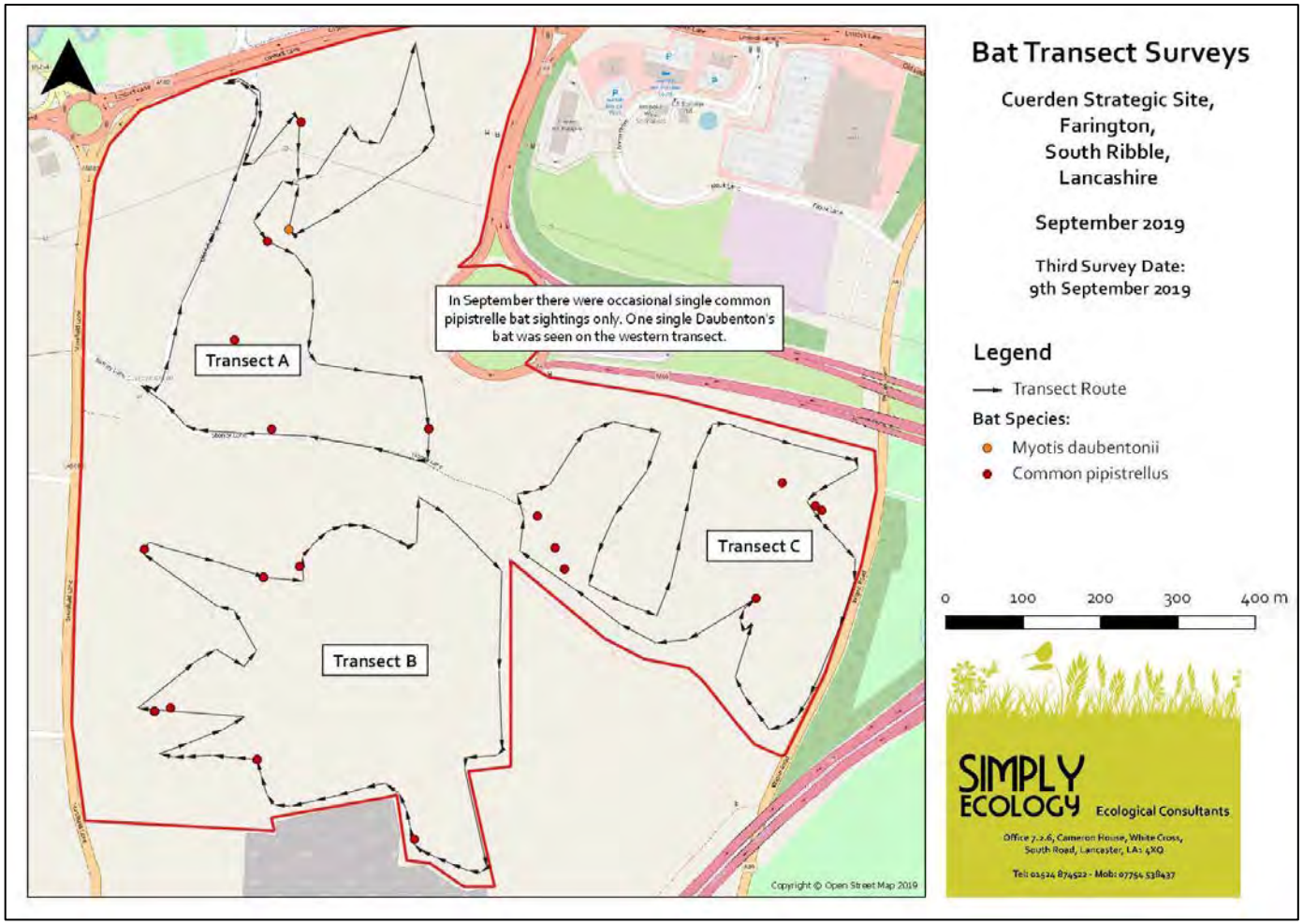
9.0 APPENDIX 2: BAT TRANSECT SURVEY RESULTS



Plan 6: First 2019 Bat Transect Survey.

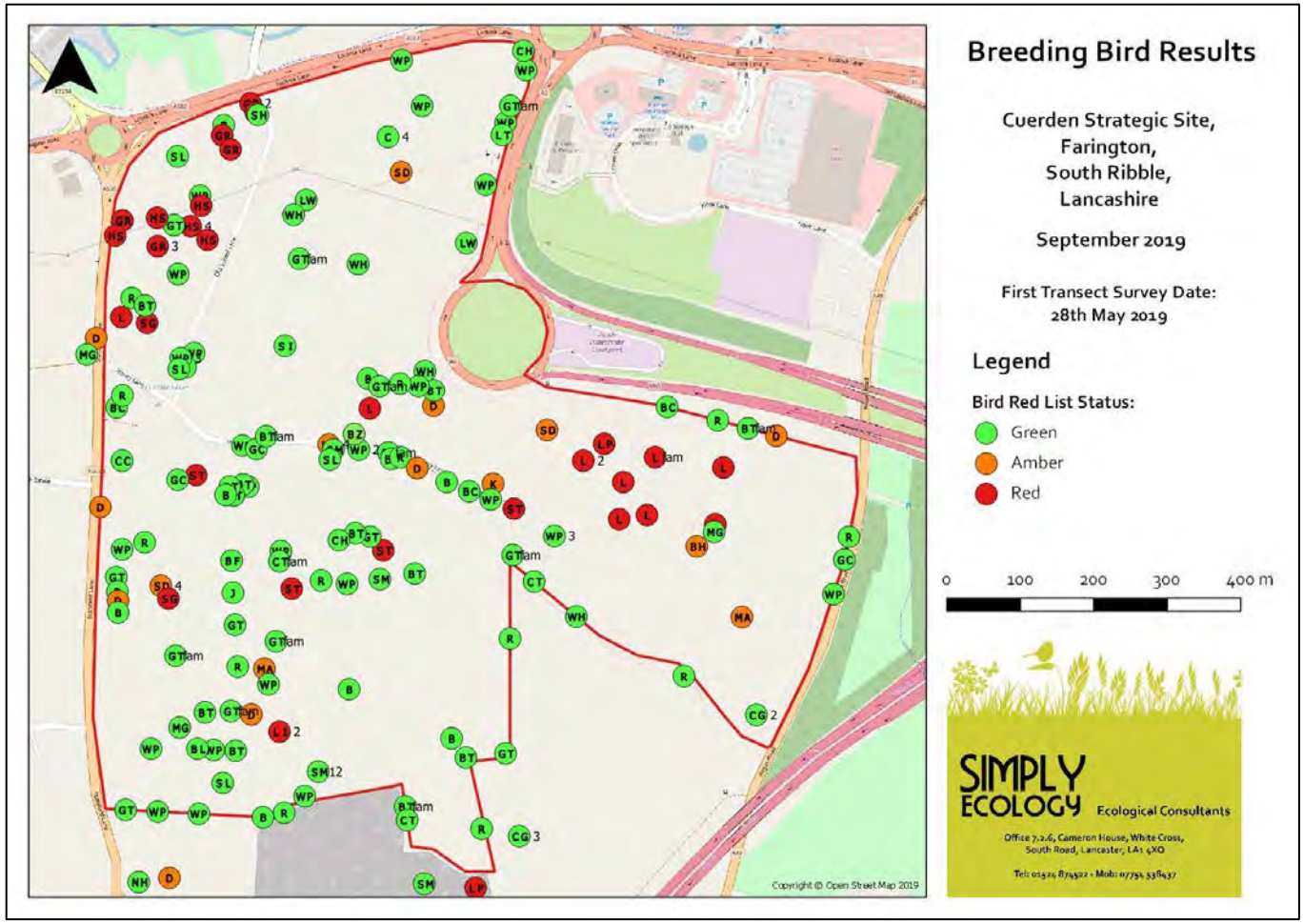


Plan 7: Second 2019 Bat Transect Survey.

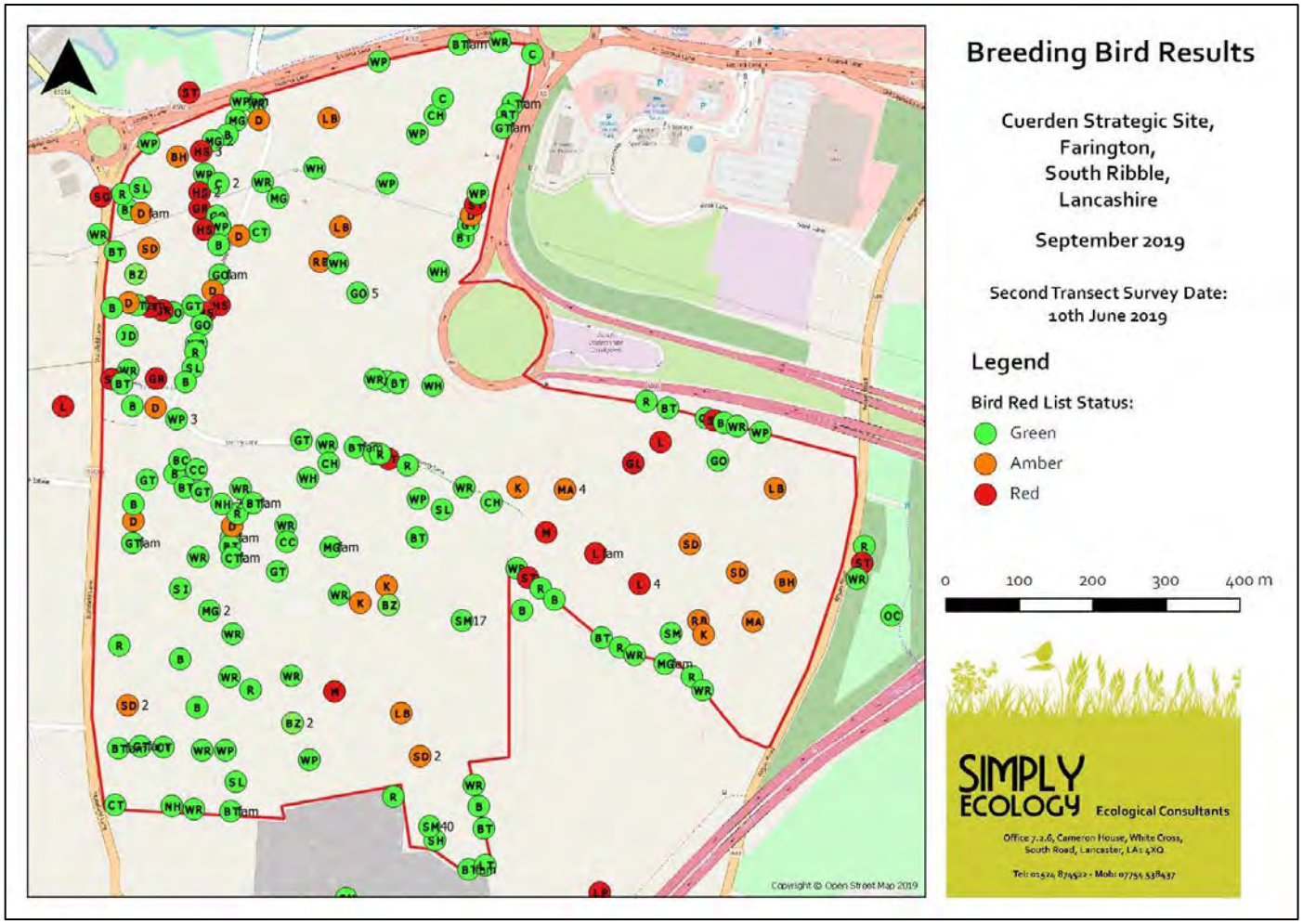


Plan 8: Third 2019 Bat Transect Survey.

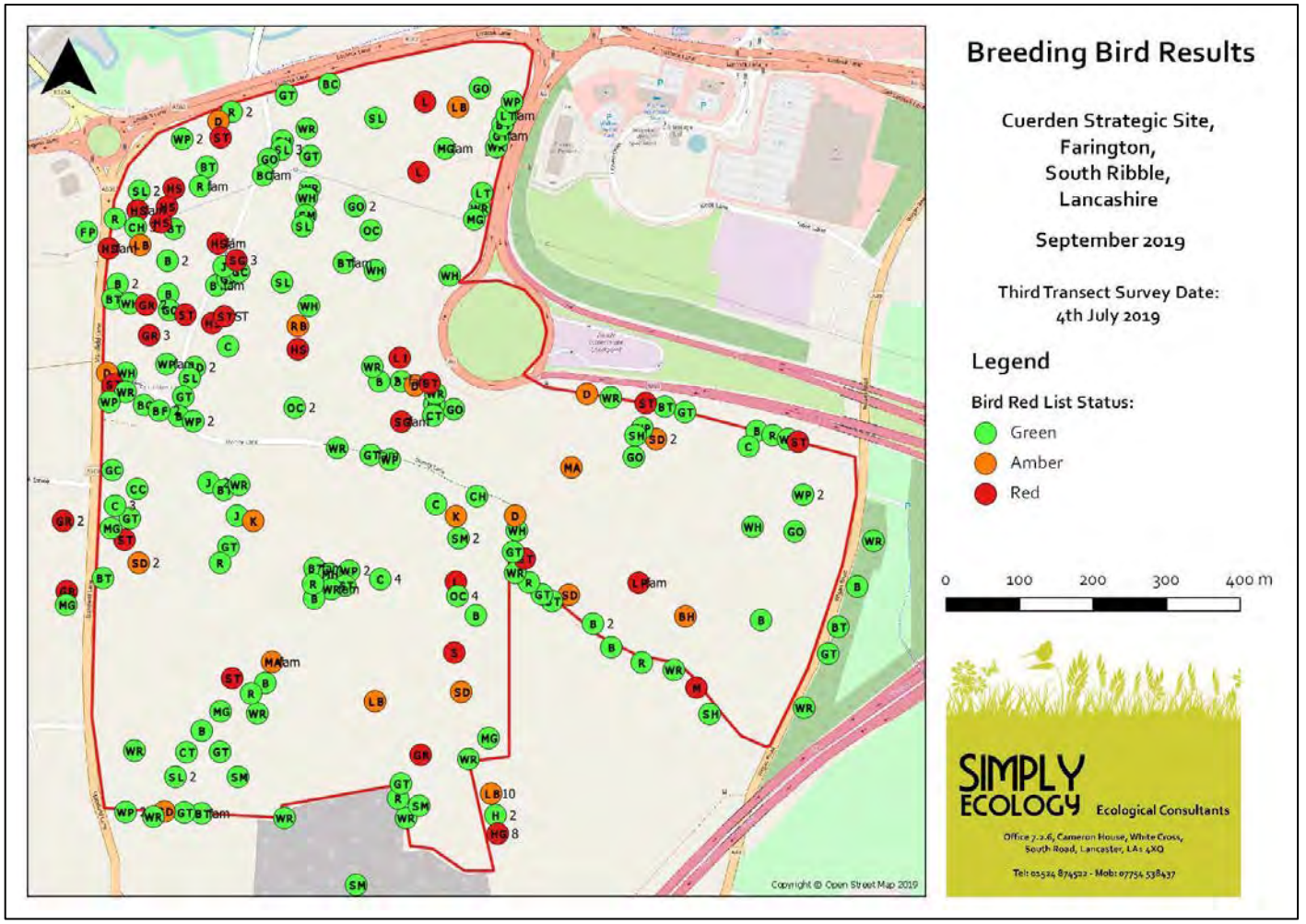
10.0 APPENDIX 3: BREEDING BIRD SURVEY RESULTS



Plan 9: First Breeding Bird Survey.



Plan 10: Second Breeding Bird Survey.



Plan 11: Third Breeding Bird Survey.