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Appendix 8.2 – Baseline Reports (Part 3 of 5) May 2021



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

						ANSD .	PROJECT:	SCALE @ A3: 7,000	CHECKED: LR	APPROVED: AH	
						T .	M3 Junction 9	FILE: Site Plan	DRAWN:	DATE:	2018
						📥 highways	TITLE:	PROJECT No:	DRAWING No:		REV:
REV DRAWI	DATE NG STATUS:	BY	DESCRIPTION	СНК	APP	england	Site Location Plan	© 1	© WSP Group plc		

FIGURE 3-1 – DORMOUSE SURVEY AREA







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

						vs p	PROJECT:	SCALE @ A3:	CHECKED:	APPROVED:	
						\\SD		7,000	LR	АН	
								FILE:	DRAWN:	DATE:	
								Dormouse Tubes	BW	January	2018
							TITLE:	PROJECT No:	DRAWING No:		REV:
REV	DATE	BY	DESCRIPTION	СНК	APP	🚄 highways	DORMOUSE TUBE LOCATIONS	70016638	3-1		А
DRAW	RAWING STATUS: FINAL				england		© WSP Group plc				

FIGURE 4-1 – DORMOUSE SURVEY RESULTS





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Source: Esrl, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, GN, and the GIS User Community

-						\\S D		SCALE @ A3: 7,000	CHECKED: LR	APPROVED: AH	ł
							M3 JUNC HON 9	FILE:	DRAWN:	DATE:	
								DM Results	BW	January	2018
							TITLE:	PROJECT No:	DRAWING No:		REV:
REV	DATE	BY	DESCRIPTION	СНК	APP	highways	DORMOUSE SURVEY RESULTS	70016638	4-1		A
DRAWI	RAWING STATUS: FINAL				england		© WSP Group plc				



Appendix A Survey results

	DORMOUSE SURVEY RESULTS											
Tube Number	TUBE LOCATION	JUNE	JULY	August	September	OCTOBER	November	DECEMBER				
1	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A				
2	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
3	Land east of the M3	-	-	1 Active Adult Dormouse	N/A	N/A	Dormouse Nest	N/A				
4	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A				
5	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
6	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
7	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
8	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
9	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
10	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A				
11	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
12	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
13	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
14	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
15	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
16	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
17	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
18	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
19	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
20	Land east of the M3	-	-	-	N/A	N/A	-	N/A				
21	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A				

Table 1 - Dormouse Survey Results

	Dormouse Survey Results										
Tube Number	TUBE LOCATION	JUNE	JULY	AUGUST	September	October	NOVEMBER	DECEMBER			
22	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
23	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
24	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
25	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
26	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			
27	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
28	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
29	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
30	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
31	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
32	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
33	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
34	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
35	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
36	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
37	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
38	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
39	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
40	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
41	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
42	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
43	Land east of the M3	-	-	-	N/A	N/A	-	N/A			

DORMOUSE SURVEY RESULTS											
Tube Number	TUBE LOCATION	JUNE	JULY	August	September	OCTOBER	NOVEMBER	DECEMBER			
44	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
45	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
46	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
47	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			
48	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			
49	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
50	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
51	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
52	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
53	Land east of the M3	-	-	1 Active Juvenile Dormouse	N/A	N/A	Dormouse Nest	N/A			
54	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
55	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			
56	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
57	Land east of the M3	Dormouse Nest	Dormouse Nest	Dormouse Nest	N/A	N/A	Dormouse Nest	N/A			
58	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			
59	Land east of the M3	Dormouse Nest	Dormouse Nest	Dormouse Nest	N/A	N/A	Dormouse Nest	N/A			
60	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			
61	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			
62	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
63	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			
64	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			

	Dormouse Survey Results										
Tube Number	TUBE LOCATION	JUNE	JULY	AUGUST	September	October	NOVEMBER	DECEMBER			
65	Land east of the M3	-	-	-	N/A	N/A	Dormouse Nest	N/A			
66	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
67	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
68	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
69	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
70	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
71	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
72	Land east of the M3	-	-	-	N/A	N/A	-	N/A			
73	M3 Junction 9 Roundabo ut	-	-	-	-	-	-	N/A			
74	M3 Junction 9 Roundabo ut	-	-	-	-	-	-	N/A			
75	M3 Junction 9 Roundabo ut	-	-	-	-	-	-	N/A			
76	M3 Junction 9 Roundabo ut	-	-	-	-	-	-	N/A			
77	Land North of the A34/A33	-	-	-	-	-	-	N/A			
78	Land North of the A34/A33	-	-	-	1 Active Adult Male Dormouse	Dormouse Nest	Dormouse Nest	N/A			
79	Land North of the A34/A33	-	-	-	-	-	Dormouse Nest	N/A			
80	Land North of the A34/A33	-	-	-	-	-	-	N/A			
81	Land North of the A34/A33	-	-	-	-	-	-	N/A			

	DORMOUSE SURVEY RESULTS										
Tube Number	TUBE LOCATION	JUNE	JULY	AUGUST	September	October	NOVEMBER	DECEMBER			
82	Land North of the A34/A33	-	-	-	-	-	-	N/A			
83	Land North of the A34/A33	-	-	-	-	-	-	N/A			
84	Land North of the A34/A33	-	-	-	Dormouse Nest	Dormouse Nest	Dormouse Nest	N/A			
85	Land North of the A34/A33	-	-	-	-	-	-	N/A			
86	Land North of the A34/A33	-	-	-	-	1 Active Adult Females with pinkies	Dormouse Nest	N/A			
87	Land North of the A34/A33	-	-	-	-	-	Dormouse Nest	N/A			
90	Land North of the A34/A33	-	-	-	-	-	-	N/A			
88	Land North of the A34/A33	-	-	-	-	-	-	N/A			
89	Land North of the A34/A33	-	-	-	-	-	-	N/A			
91	ltchen Woodland	-	-	-	-	-	-	N/A			
92	ltchen Woodland	-	-	-	-	-	-	N/A			
93	Itchen Woodland	-	-	-	-	-	-	N/A			
94	ltchen Woodland	-	-	-	-	-	Dormouse Nest	N/A			
95	Itchen Woodland	-	-	-	-	-	-	N/A			
96	ltchen Woodland	-	-	-	-	-	-	N/A			
97	Itchen Woodland	-	-	-	-	-	-	N/A			
98	Itchen Woodland	-	-	-	-	-	-	N/A			
99	ltchen Woodland	-	-	-	-	-	-	N/A			

DORMOUSE SURVEY RESULTS										
Tube Number	TUBE LOCATION	JUNE	JULY	AUGUST	September	October	NOVEMBER	DECEMBER		
100	Itchen Woodland	-	-	-	-	-	-	N/A		
101	ltchen Woodland	-	-	-	-	-	-	N/A		
102	Itchen Woodland	-	-	-	-	-	-	N/A		
103	ltchen Woodland	-	-	-	-	3 Active Dormice – 2 Adults, 1 Juvenile	Dormouse Nest	N/A		
104	ltchen Woodland	-	-	-	-	-	-	N/A		
105	ltchen Woodland	-	-	-	-	2 Active Dormice – 2 Male Juveniles	1 Torpid Adult Dormouse	N/A		
106	Itchen Woodland	-	-	-	-	Dormouse Nest	Dormouse Nest	N/A		
107	Itchen Woodland	-	-	-	-	-	-	N/A		
108	Itchen Woodland	-	-	-	-	-	-	N/A		
109	Itchen Woodland	-	-	-	-	-	-	N/A		
110	Itchen Woodland	-	-	Dormouse Nest	Dormouse Nest	Dormouse Nest	Dormouse Nest	N/A		
111	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A		
112	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A		
113	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A		
114	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A		
115	Winnall Industrial Estate	-	-	-	-	N/A	Dormouse Nest	N/A		
116	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A		
117	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A		

	Dormouse Survey Results										
Tube Number	TUBE LOCATION	JUNE	JULY	August	September	October	NOVEMBER	DECEMBER			
118	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A			
119	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A			
120	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A			
121	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A			
122	Winnall Industrial Estate	-	-	-	-	N/A	Dormouse Nest	N/A			
123	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A			
124	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A			
125	Winnall Industrial Estate	-	-	-	-	N/A	Dormouse Nest	N/A			
126	Winnall Industrial Estate	-	-	-	1 Active Juvenile Dormouse	N/A	Dormouse Nest	N/A			
127	Winnall Industrial Estate	-	-	-	-	N/A	-	N/A			
128	Pudding Lane Farm	-	-	-	-	-	-	N/A			
129	Pudding Lane Farm	-	-	-	-	-	-	N/A			
130	Pudding Lane Farm	-	-	-	-	-	-	N/A			
131	Pudding Lane Farm	-	-	-	-	-	-	N/A			
132	Pudding Lane Farm	-	-	-	-	-	-	N/A			
133	Pudding Lane Farm	-	-	-	-	-	-	N/A			
134	Pudding Lane Farm	-	-	-	-	-	-	N/A			
135	Pudding Lane Farm	-	-	-	-	-	-	N/A			

Dormouse Survey Results								
Tube Number	TUBE LOCATION	JUNE	JULY	August	September	October	NOVEMBER	DECEMBER
137	Pudding Lane Farm	-	-	-	-	-	Dormouse Nest	N/A
136	Pudding Lane Farm	-	-	-	-	-	Dormouse Nest	N/A
138	Pudding Lane Farm	-	-	-	-	-	-	N/A
139	Pudding Lane Farm	-	-	-	-	-	Dormouse Nest	N/A
140	Pudding Lane Farm	-	-	-	-	-	-	N/A
141	Pudding Lane Farm	-	-	-	-	-	Apodemus sp. nest	N/A
142	Pudding Lane Farm	-	-	-	-	-	-	N/A
143	Pudding Lane Farm	-	-	1 Active Adult female dormouse - post lactation	Dormouse Nest	Dormouse Nest	Dormouse Nest	N/A
144	Pudding Lane Farm	-	-	-	-	-	Dormouse Nest	N/A
145	Pudding Lane Farm	-	-	Brown leaves, some bark, little structure.	Dormouse Nest	Dormouse Nest	Dormouse Nest	N/A
146	Pudding Lane Farm	-	-	-	-	-	-	N/A
147	Pudding Lane Farm	-	-	-	-	-	-	N/A
148	Pudding Lane Farm	-	-	-	-	-	Slug covered nest	N/A
149	Pudding Lane Farm	-	-	-	-	-	-	N/A
150	Pudding Lane Farm	-	-	-	-	-	-	N/A
151	Pudding Lane Farm	-	-	-	-	-	-	N/A
152	Pudding Lane Farm	-	-	-	-	-	Dormouse Nest	N/A
153	Pudding Lane Farm	-	-	-	-	-	-	N/A
154	Pudding Lane Farm	-	-	-	-	-	Dormouse Nest	N/A

DORMOUSE SURVEY RESULTS								
Tube Number	TUBE LOCATION	JUNE	JULY	August	September	October	NOVEMBER	DECEMBER
155	Pudding Lane Farm	-	-	-	-	-	2 Active Adult Dormice	N/A
156	Pudding Lane Farm	-	-	-	-	-	1 Torpid Adult Dormouse	N/A
157	Pudding Lane Farm	-	-	-	-	-	-	N/A
158	Pudding Lane Farm	-	-	-	-	-	-	N/A
159	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
160	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
161	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
162	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
163	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
164	Easton Down	-	-	-	N/A	N/A	-	N/A
165	Easton Down	-	Dormouse Nest	1 Dead Eyes Open Dormouse	N/A	N/A	1 Adult <i>Apodemus</i> sp.	N/A
166	Easton Down	-	-	-	N/A	N/A	-	N/A
167	Easton Down	-	Dormouse Nest	Dormouse Nest	N/A	N/A	Dormouse Nest	N/A
168	Easton Down	-	-	-	N/A	N/A	-	N/A
169	Easton Down	-	-	-	N/A	N/A	-	N/A
170	Easton Down	-	-	-	N/A	N/A	-	N/A
171	Easton Down	-	-	-	N/A	N/A	-	N/A
172	Easton Down	-	-	-	N/A	N/A	Dormouse nest taken over by <i>Apodemus</i> sp.	N/A
173	Easton Down	-	-	-	N/A	N/A	1 Active Adult Dormouse	N/A

Dormouse Survey Results								
Tube Number	TUBE LOCATION	June	JULY	August	September	OCTOBER	NOVEMBER	DECEMBER
174	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
175	Easton Down	-	-	1 Active Adult Dormouse	N/A	N/A	Dormouse Nest	N/A
176	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
177	Easton Down	-	-	-	N/A	N/A	-	N/A
178	Easton Down	-	-	-	N/A	N/A	-	N/A
179	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
180	Easton Down	-	-	-	N/A	N/A	1 Torpid Adult Dormouse	N/A
181	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
182	Easton Down	-	-	-	N/A	N/A	-	N/A
183	Easton Down	-	-	-	N/A	N/A	-	N/A
184	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
185	Easton Down	-	1 Active Adult Dormouse	Dormouse Nest	N/A	N/A	Dormouse Nest	N/A
186	Easton Down	-	-	-	N/A	N/A	-	N/A
187	Easton Down	-	-	-	N/A	N/A	-	N/A
188	Easton Down	1 Active Female Adult Dormouse	Apodemus sp. taken over nest	Apodemus sp. nest	N/A	N/A	Dormouse Nest	N/A
189	Easton Down	-	-	-	N/A	N/A	Dormouse Nest	N/A
190	Easton Down	-	-	-	N/A	N/A	N/A	-
191	Easton Down	-	-	-	N/A	N/A	N/A	-
192	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
193	Easton Down	-	-	-	N/A	N/A	N/A	-

DORMOUSE SURVEY RESULTS									
Tube Number	TUBE LOCATION	JUNE	JULY	August	September	OCTOBER	NOVEMBER	DECEMBER	
194	Easton Down	-	-	-	N/A	N/A	N/A	-	
195	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
196	Easton Down	-	-	-	N/A	N/A	N/A	-	
197	Easton Down	-	-	-	N/A	N/A	N/A	Torpid Adult Dormouse	
198	Easton Down	-	-	-	N/A	N/A	N/A	-	
199	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
200	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
201	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
202	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
203	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
204	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
205	Easton Down	-	-	-	N/A	N/A	N/A	-	
206	Easton Down	-	-	-	N/A	N/A	N/A	-	
207	Easton Down	-	-	-	N/A	N/A	N/A	-	
208	Easton Down	-	-	-	N/A	N/A	N/A	-	
209	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
210	Easton Down	-	-	-	N/A	N/A	N/A	-	
211	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
212	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest	
213	Easton Down	-	-	-	N/A	N/A	N/A	-	
214	Easton Down	-	-	-	N/A	N/A	N/A	-	

DORMOUSE SURVEY RESULTS								
Tube Number	TUBE LOCATION	June	JULY	August	September	October	NOVEMBER	DECEMBER
215	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
216	Easton Down	-	-	-	N/A	N/A	N/A	-
217	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
218	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
219	Easton Down	-	-	-	N/A	N/A	N/A	-
220	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
221	Easton Down	-	-	-	N/A	N/A	N/A	-
222	Easton Down	-	-	-	N/A	N/A	N/A	-
223	Easton Down	-	-	-	N/A	N/A	N/A	-
224	Easton Down	-	-	-	N/A	N/A	N/A	-
225	Easton Down	-	-	-	N/A	N/A	N/A	-
226	Easton Down	-	-	-	N/A	N/A	N/A	-
227	Easton Down	Dormouse Nest	Dormouse Nest	Dormouse Nest	N/A	N/A	N/A	Dormouse Nest
228	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
229	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
230	Easton Down	-	-	-	N/A	N/A	N/A	-
231	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
232	Easton Down	-	-	-	N/A	N/A	N/A	-
233	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
234	Easton Down	-	-	-	N/A	N/A	N/A	Dormouse Nest
235	Easton Down	-	-	-	N/A	N/A	N/A	-
236	South of Tesco	-	-	-	-	-	-	N/A

DORMOUSE SURVEY RESULTS								
Tube Number	TUBE LOCATION	JUNE	JULY	AUGUST	September	October	November	DECEMBER
237	South of Tesco	-	-	-	-	-	-	N/A
238	South of Tesco	-	-	-	-	-	-	N/A
239	South of Tesco	-	-	-	-	-	-	N/A
240	South of Tesco	-	-	-	-	-	-	N/A
241	South of Tesco	-	-	-	-	-	-	N/A
242	South of Tesco	-	-	-	-	-	-	N/A
243	South of Tesco	-	-	-	-	-	-	N/A
244	South of Tesco	-	-	-	-	-	-	N/A
245	South of Tesco	-	-	-	-	-	-	N/A



Appendix B

Table 2 - Do	rmouse Evidence	
Рното Number	PHOTO DESCRIPTION	Рното
1	Dormouse nest with woven chamber	
2	Dormouse nest with woven chamber and brown leaves	
3	Dormouse nest with brown leaves	

Рното Number	PHOTO DESCRIPTION	Рното
4	Dormouse nest with bird feathers, clematis and peeled bark	
5	Dormouse nest with peeled bark	
6	Adult dormouse	Luiz Lunphie and

Рното Number	Photo Description	Рното
7	Tube 110 with peeled bark dormouse nest	
8	Tube 3 with dormouse exiting the tube.	



Appendix C

INDICATIVE SPECIES FOR COMPENSATORY PLANTING

indicative opecies List of species suitable for dofinice					
COMMON NAME	LATIN NAME				
Field maple	Acer campestre				
Sycamore	Acer pseudoplatanus				
Birch	Betula pendula				
Hornbeam	Carpinus betulus				
Sweet chestnut	Castanea sativa				
Dogwood	Cornus sanguinea				
Hazel	Corylus avellana				
Hawthorn	Crataegus monogyna				
Broom	Cytisus scoparius				
Spindle	Euonymus europaeus				
Holly	llex aquifolium				
Wild privet	Ligustrum vulgare				
Honeysuckle	Lonicera pericyclemum				
Domestic apple	Malus domestica				
Crab apple	Malus sylvestris				
Wild cherry	Prunus avium				
Bird cherry	Prunus padus				
Blackthorn	Prunus spinosa				
Pedunculate oak	Quercus robur				
Field rose	Rosa arvensis				
Dog rose	Rosa canina				
Bramble	Rubus fruticosus				
Goat willow	Salix caprea				
Grey willow	Salix cinerea				
Wayfaring tree	Viburnum lantana				

Table 3 - Indicative Species List of species suitable for dormice



APPENDIX B8-9 WATER VOLE SURVEY REPORT



M3

Junction 9 Improvement Scheme

PCF Stage 3 - Water Vole Survey Report

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ Highways England Company Limited registered in England and Wales number 09346363

M3 JUNCTION 9 IMPROVEMENT SCHEME

PCF STAGE 3 - WATER VOLE SURVEY REPORT

Highways England

Second Issue

Project no: 70016638 Date: November 2017

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EXECUTIVE SUMMARY

M3 Junction 9 has been highlighted as requiring redevelopment in order to help reduce congestion. This will be achieved by improving the flow of traffic and three options are currently being considered for implementation.

The Proposed Works will cross the River Itchen which currently passes under the A34 and A33 at multiple locations north of Junction 9. WSP was commissioned by Highways England to undertake water vole surveys to detect the presence, or confirm the likely absence, of water voles within land adjacent to the junction. A Survey Area comprising land within 250m of the proposed works area was used. The survey was completed in line with current good practice guidance (Strachan et al, 2011 and Dean et al, 2016). All wetland habitats along the lengths of ditch and river within the Survey Area were visually inspected for evidence indicating the presence of water voles (latrines, burrows, feeding remains etc). Bankside habitat within 5m of the banktop was also included in the survey. Two surveys were undertaken, one in June 2017 and one in August 2017.

Water voles were confirmed to be present within the River Itchen and its associated channels west of the A34. The river channels west of the A34 are part of a wetland habitat that includes springs, flushes and wetland meadows managed by the Hampshire and Isle of Wight Wildlife Trust. The majority of these channels exhibit some water vole activity, although the abundance of activity greatly varies. The River Itchen also exhibits limited activity signs, east of the A34 and A33, though the suitability of these habitats is limited due to the presence of broadleaved woodland and management relating to angling.

Current indications are that the Proposed Works should not directly affect water vole on the basis that soft estate within 10m of occupied watercourses should not be directly affected. This conclusion should be revisited in Project Control Framework Stage 3. Should proposals emerge that may affect habitat close to occupied watercourses, outline recommendations for mitigation are provided in this report. In addition, recommendations are made for ecological enhancement measures which could be incorporated into the design, such as including native planting in existing and new channels, the restoration of channels that are currently unsuitable for water voles and the incorporation of suitable features in new drainage systems.



1 INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

- 1.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). A large volume of traffic currently uses the interchange (approximately 6,000 vehicles per hour during the peak periods), which acts as a bottleneck on the local and strategic highway network, causing significant delays. M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.
- 1.1.2 Three options have been taken forward to Project Control Framework (PCF) Stage 2 and assessed within this report, namely:
 - → Option 14: Northbound and Southbound A34 Free Flow Design
 - → Option 16B: Incremental Delivery Northbound A34 Free Flow Link
 - → Option 16C: Incremental Delivery Southbound A34 Free Flow Design
- 1.1.3 The works are hereafter referred to as the 'Proposed Works'. Further details of the Proposed Works are presented within the PCF Stage 2 Environmental Assessment Report (EAR) (HE551511-WSP-GEN-M3J9PCF2-RP-LE-00041). The anticipated maximum extent of the works is shown on Figure 8.1, and is hereafter referred to as 'the Site.' An ecological Survey Area has been defined comprising land within 250m of the Site.

1.2 ECOLOGICAL BACKGROUND

- 1.2.1 A desk study undertaken for the M3J9 PCF Stage 1 identified 357 water vole *Arvicola amphibious* records within a 2km search area of the works extent (WSP 2016).
- 1.2.2 An extended Phase 1 habitat survey was conducted during the spring of 2017 (WSP, 2017), which confirmed the presence of habitats suitable for water vole. These include river channels of the River Itchen and associated ditches and reedbeds. The River Itchen flows through the north of the Survey Area passing under the A34 and A33. The River Itchen has a number of tributaries and multiple channels, creating a complex stream network.

1.3 BRIEF AND OBJECTIVES

- 1.3.1 Highways England commissioned WSP UK Limited to:
 - → Complete a water vole survey in accordance with good practice guidance (Strachan *et al*, 2011) to establish whether water vole are present or likely absent from the Survey Area
 - → Provide a concise technical report setting out the survey methods used, reporting the survey results, and providing outline recommendations in relation to the project and water voles (with reference to legislation and planning policy relevant to this species)
- 1.3.2 The results of this survey, and subsequent recommendations, are included within this report.



2 METHODS

2.1 OVERVIEW

2.1.1 To establish whether water vole are present or likely absent, a survey was completed in line with current good practice guidance (Strachan *et al*, 2011). This survey comprised two survey visits to search for water vole field signs within the habitats present.

2.2 WATER VOLE SURVEY

- 2.2.1 Watercourses and waterbodies identified during the extended Phase 1 habitat survey within the Survey Area were included within the water vole presence and likely absence survey, where access was possible. The locations of the waterbodies surveyed are shown on Figure 8.2.
- 2.2.2 The survey comprised two visits to each surveyed watercourse within the appropriate season for water vole survey (late April to early October), each incorporating three elements:
 - → A walked survey of the entire length of the watercourses within the survey area to conduct a thorough visual inspection of the banks and immediate vicinity for water voles or their field signs (field signs include faeces, latrines, feeding remains, burrows, 'lawns', nests, footprints and runways in vegetation)
 - → The recording of habitat variables and features relevant to water voles (for example general habitat type, shore or bank substrate, bordering land use, vegetation, disturbance level, bank profile, water depth)
 - → The recording of any field signs or evidence relating to other relevant wildlife (for example otter *Lutra lutra*, mink *Neovison vison* or brown rat *Rattus novegicus*)

2.3 DATES OF SURVEY AND PERSONNEL

2.3.1 The water vole survey was led by an experienced consultant ecologist with extensive water vole survey experience. Surveys were completed on the following dates:

DATE	START TIME	WEATHER CONDITIONS SUMMARY
28 th & 29 th June 2017	08:00	Rain in the early morning before the first survey. Some light showers during the surveys. Low wind speeds throughout the both days with cloud cover 6/8.
30 th & 31 st August 2017	09:00	Warm days, with occasional cloud cover and one short rain shower on first day. Low winds throughout both days with cloud cover 5/8.

Table 2-1 Survey Dates and Weather Conditions

2.4 EVALUATION

2.4.1 The value of the Survey Area for water vole was preliminarily evaluated with reference to good practice guidance (CIEEM, 2016). This guidance recommends that valuation of site importance is made with reference to a geographical framework e.g. a site is of local, regional or national value. To inform the assessment in this report, the extent and quality of habitat present was considered in the context of the distribution and abundance of water vole locally and nationally.


2.5 NOTES AND LIMITATIONS

- 2.5.1 Light rain fell on the evening of 27th and early morning of 28th June. It is likely that some evidence of water vole activity was lost with this rainfall. However, the rainfall was considered not heavy enough to wash away all water vole signs. Water vole signs were recorded along a number of river sections despite this limitation.
- 2.5.2 Due to high water levels and light rainfall during the surveys, water vole latrines may have been recently washed away leaving only fresh faeces present at the time of survey. Many of the faeces piles recorded during the surveys are therefore considered latrines and have subsequently been recorded as such.
- 2.5.3 The majority of watercourses within the Survey Area could be accessed sufficiently to assess the habitat present, and search for signs of water vole presence. However, in some places the depth of the River Itchen channels and density of some reed beds meant that not all parts of the channels could be safely accessed. In these cases the survey was completed from the banks. It is probable that some burrow entrances and evidence of water vole activity will not have been visible from the bankside and therefore will not have been recorded. This is not considered a significant limitation to the survey objectives as water vole signs were recorded frequently along the channels. It is concluded that the entire length of the water course is occupied by water vole for the purpose of designing mitigation.
- 2.5.4 Drainage ditches associated with the A34 were not accessible for health and safety reasons during the water vole surveys (see Figure 8.2), and were not assessed within this report. The drainage ditches are considered unlikely to support water voles due to their shallow water depth, low engineered profiles and prevalence of over-shading vegetation. The ditches, however, could provide suitable foraging habitat for water vole. This limitation is not significant because the Proposed Works should not affect these habitats. Should proposals emerge that may affect these watercourses, it is advised that a water vole survey should be undertaken of these areas.



3 RESULTS AND EVALUATION

3.1 OVERVIEW

3.1.1 Water voles and their signs were recorded within the Survey Area. Evidence was particularly prominent within the Hampshire and Isle of Wight Wildlife Trust (HIWWT) Winnall Moors Nature Reserve west of the A33/A34, whilst occasional evidence was located in the north-east of the Survey Area.

3.2 RESULTS OF WATER VOLE SURVEY

- 3.2.1 The watercourses surveyed included: channels, forming the River Itchen system; and ditches, which included those associated with the water meadow habitats west of the road, in addition to some highways drainage ditches. For the purposes of reporting, each surveyed watercourse has been assigned a letter (A-V) as shown on Figure 8.3 and described within Appendix A.
- 3.2.2 The majority of the banks of the River Itchen channels were shallow and densely vegetated, whilst the channels themselves were deep and open. Bankside vegetation most often consisted of common reed *Phragmites australis* and sedge species *Carex sp.* with intermittent grass and herb species. The majority of the bank profiles are considered sub-optimal for water vole burrows due to their low gradients. Feeding opportunities for water vole are high among the majority of the channels due to the abundance of food plants.
- 3.2.3 Many of the channel banks observe some vegetation maintenance for angling, as well as being grazed by cattle in some cases. In areas where angling or grazing was prominent water vole evidence was limited. This is likely because of lower availability of foraging resources. Management for angling was particularly prominent to the east of the A33/A34 with grazing noted west of the road.
- 3.2.4 Significantly fewer signs of water vole were observed to the east of the A33/A34. This is likely to be due to the higher cover of woodland, creating shading and a lower cover of emergent aquatic vegetation (which water vole rely upon for food). In addition, most of the banks in this area are reinforced and not conducive to burrowing, and there is a greater degree of habitat management.
- 3.2.5 With respect to the ditches within the Survey Area, in general these did not hold sufficient water to be suitable for water voles although do provide foraging opportunities.
- 3.2.6 A total of seven channels were identified as having occasional to abundant activity signs (J, K, N, P, T, U and V). Details of water vole evidence recorded are summarised in Table 3-1 below, with detailed descriptions included in Appendix B. The results are also displayed on Figure 8.3.
- 3.2.7 Evidence of otter was identified under the bridges of the A34 and A33 along ledges. Small mammal evidence was also identified along the river channels surveyed. These included sightings, droppings and feeding remains of field vole *Microtus agrestis* and shrews *Sorex sp*.



			ABUN	NDANCE OF WATER VOLE E	VIDENCE			
Water course section	Habitat Suitability	Latrines	Feeding stations	Tunnel entrances/ burrows	Paths and runs	Sightings/ sounds		
A	Moderate		No Evidence Found					
В	Moderate	-	-	Scarce	-	-		
С	Moderate			No Evidence Found				
D	Moderate			No Evidence Found				
E	Moderate			No Evidence Found				
F	Moderate			No Evidence Found				
G	Low			No Evidence Found				
Н	Moderate		No Evidence Found					
I	Low		No Evidence Found					
J	High	Scarce	Occasional	-	Occasional	-		
к	High	Occasional	Occasional	Scarce	Occasional	-		
L	Low			No Evidence Found				
М	Low			No Evidence Found				
Ν	High	Abundant	Abundant	Scarce	Abundant	Frequent/ scarce		
0	Moderate			No Evidence Found				
Р	High	Occasional	Occasional	-	Occasional	-		
Q	Low			No Evidence Found				
R	Moderate			No Evidence Found				
S	Moderate			No Evidence Found				
Т	High	Occasional	Occasional	Scarce	Abundant	-		
U	High	Occasional	Occasional	-	Occasional	-		
V	High	Abundant	Abundant	Scarce	Abundant	-		

Table 3-1 Summary of Water Vole Evidence at each section

3.3 EVALUATION OF THE SITE FOR WATER VOLE

3.3.1 Water voles are a widespread species but are of conservation concern having undergone significant population decline and local extinctions (Strachan et al, 2011). Hampshire in general and the River Itchen in particular, support strong populations, as evidenced by the desk study (WSP, 2016) which noted 367 records within a 2km radius of the Survey Area. Therefore, in the context of a strong local population, the population within the Survey Area is considered to be of importance at above the Local level.



4 IMPLICATIONS FOR DEVELOPMENT

4.1 OVERVIEW

4.1.1 Water voles are protected from killing and injury under UK legislation. In addition, planning policy affords further protection within the planning system, as described below. Dependent on the nature of detailed designs, it may be necessary to adopt appropriate avoidance or mitigation measures as part of the Proposed Works as outlined in Section 6.

4.2 LEGAL COMPLIANCE

- 4.2.1 Water vole are fully protected under The Wildlife and Countryside Act (1981) (as amended), meaning: it is an offence to kill, injure or take this species; damage or destroy places of rest or shelter; or disturb this species whilst occupying a place of rest of shelter.
- 4.2.2 The water vole is also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England, in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies (including local planning authorities) have a duty to have regard for the conservation of SPI when carrying out their functions, including determining planning applications.

4.3 PLANNING POLICY COMPLIANCE

- 4.3.1 As the project qualifies as a Nationally Significant Infrastructure Project (NSIP), it must adhere to the National Policy Statement (NPS) for National Networks (Department for Transport, 2014). This states *inter alia* that the principles and objectives of the government's 2012 Natural Environment White Paper (NEWP) and Biodiversity 2020 strategy should be adhered to. These promote moving progressively from net biodiversity loss to net gain by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. The NPS also states that the likely significant effects on the following should be clearly set out:
 - → Internationally, nationally and locally designated sites of ecological conservation importance
 - → Protected species and habitats
 - → Other species identified as being of principal importance for the conservation of biodiversity
 - → Ecosystems
- 4.3.2 At the national level, the National Planning Policy Framework (NPPF, 2012) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including water vole. tThe ODPM circular 06/2005 also provides supplementary guidance, including confirmation that 'the presence of a protected species is a material consideration when a planning authority is considering a development proposal'.
- 4.3.3 The NPPF sets out, amongst other points, how at an overview level the 'planning system should contribute to and enhance the national and local environment by:
 - → …recognising the wider benefits of ecosystem services; and
 - minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures...'



- 4.3.4 A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF, and includes the following:
 - → '- if significant harm resulting from a development cannot be avoided...adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
 - → …opportunities to incorporate biodiversity in and around developments should be encouraged.'
- 4.3.5 At a local level, Winchester City Council and the South Downs National Park have adopted the Winchester District Local Plan Part 1 (Adopted 2013). Chapter 9 is entitled 'High Quality Environment' with policy CP16 entitled Biodiversity. This states 'The Local Planning Authority will support development which maintains, protects and enhances biodiversity across the District, delivering a net gain in biodiversity, and has regard to the following:
 - → Protecting sites of international, European, and national importance, and local nature conservation sites, from inappropriate development.
 - \rightarrow Supporting habitats that are important to maintain the integrity of European sites.
 - → New development will be required to show how biodiversity can be retained, protected and enhanced through its design and implementation, for example by designing for wildlife, delivering BAP targets and enhancing Biodiversity Opportunity Areas.
 - → New development will be required to avoid adverse impacts, or if unavoidable ensure that impacts are appropriately mitigated, with compensation measures used only as a last resort.
 - → Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.
 - → Maintaining a District wide network of local wildlife sites and corridors to support the integrity of the biodiversity network, prevent fragmentation, and enable biodiversity to respond and adapt to the impacts of climate change.
 - → Supporting and contributing to the targets set out in the District's Biodiversity Action Plan (BAP) for priority habitats and species.
 - Planning proposals that have the potential to affect priority habitats and/or species or sites of geological importance will be required to take account of evidence and relevant assessments or surveys.'
- 4.3.6 Water vole is recognised as a priority species within the Hampshire Biodiversity Action Plan (BAP). Mitigation, compensation and enhancement measures are recommended in Section 6 to enable the Proposed Works to be compliant with the above legislation and planning policy.



5 RECOMMENDATIONS

5.1 OVERVIEW

5.1.1 The Proposed Works will likely require works near to the River Itchen watercourse which is occupied by water voles. However, a review of the design drawings indicates that direct impacts to watercourses are unlikely to occur, and therefore it should be possible to avoid impacts to water vole altogether. However, should proposals emerge that affect soft estate within approximately 10m of watercourses, it would be necessary to give consideration as to whether water vole could be affected.

5.2 AVOIDANCE AND MITIGATION MEASURES

DESIGN MITIGATION MEASURES

- 5.2.1 As the Proposed Works do not currently include watercourse crossing points, no specific design mitigation recommendations are made. However, should proposals emerge to affect bridge and culvert structures over watercourses that support water vole, the following recommendations are made:
 - → They should be designed to maximise permeability to water voles, with a preference for bridges rather than pipes or small culverts
 - \rightarrow The height of the structure above the water should be maximised
 - \rightarrow Where possible, an area of water course bank should also run through the structure.
- 5.2.2 In addition, recommendations for ecological enhancement measures are made within Section 5.3 below, which may be of relevance to drainage design.

CONSTRUCTION AVOIDANCE MEASURES

- 5.2.3 If possible, construction methods should be devised to ensure that soft estate within 10m of watercourses is avoided. This should include avoiding the storage of materials and operation of machinery from within this area. Present indications are that this should be possible for all design options, although this conclusion will need to be revisited as detailed proposals emerge in PCF Stage 3.
- 5.2.4 If proposals emerge that affect soft estate within 10m of watercourses, it may be necessary to implement mitigation measures outlined below.

CONSTRUCTION MITIGATION MEASURES

- 5.2.5 Where it is not possible to avoid works within 10m of a watercourse it will be necessary to design and implement a mitigation strategy to avoid an offence under the Wildlife and Countryside Act 1981 (as amended). Where effects are limited to areas of bankside habitat totalling less than 50m, it is likely to be appropriate to displace water voles from the works area (as opposed to translocation where greater extents of habitat are affected) in order to avoid the disturbance or harm of individuals water voles.
- 5.2.6 To displace animals from the works area the following will be required:



- → Displacement will need to occur in spring (i.e. between 15th February and 15th April) during warm conditions (i.e. >5°C). If spring clearance is not possible, it may be possible to agree an autumn habitat clearance programme with Natural England¹.
- → All vegetation will need to be removed from the displacement area, to include bankside, bank top (to a minimum of 3m back) and in-channel vegetation with arisings removed.
- → The area will need to be left for a minimum of five days and re-surveyed to check for the presence of water voles (such as latrines, feeding remains and pathways).
- → If water voles remain present, or there is uncertainty as to whether burrows remain occupied or not, a destructive search would need to be completed to excavate burrows (using hand tools where possible) and remove suitable habitat for water voles. The destructive search would need to be completed under an ecological watching brief.
- 5.2.7 During the construction stage, the cleared area must remain unsuitable for water voles. This could be achieved by regularly managing any vegetation regrowth and/or laying matting or other material to prevent regrowth. It is likely that matting or similar will be preferable to also function to prevent sediment run-off towards watercourses where bare substrate is exposed to rainfall.
- 5.2.8 Furthermore, in order to carry out work under a Natural England licence, it is necessary to include an element of ecological enhancement, such as measures included within Section 5.3 below.

5.3 ECOLOGICAL ENHANCEMENT MEASURES

- 5.3.1 Biodiversity gain in association with development is encouraged by planning policy including NPPF (2012) and NNNPS (2014). In accordance with this policy it is recommended the following opportunities for enhancing the Site for water vole should be considered:
 - → The planting of native wetland plants, reeds, grasses, rushes and sedges along new channels, drainage ditches and attenuation ponds; for which a list of suitable native species is included in Appendix C. If created, these features should have sections of steep bank (for burrowing) and marginal vegetation to provide fodder and cover. The new features should be incorporated into the drainage design for the Proposed Works, and seek to maintain and extend the network of drainage channels providing suitable habitat for water voles.
 - → The removal of areas of dense woody vegetation on existing watercourses, to allow increased light to reach watercourses and thereby enable an increase in in-stream and marginal wetland plants.
 - → The restoration of water channels; with deepening or alteration of bank profile where appropriate to maximise their suitability for water voles. This could be through ensuring a sufficient depth of water remains present throughout the year or providing a suitable bank profile and substrate for burrowing. The removal of reeds from choked channels (and subsequent management) should be considered to provide open water and growth opportunity for other macrophytes and emergent aquatic vegetation.
 - The implementation of long term management to enhance existing watercourses east of the A34. The suitability for water voles can be enhanced within this area through implementing opportunities discussed above, thus resulting in a gain of suitable water vole habitat.

¹ Spring displacement is favoured because water vole population density is at its lowest. During autumn, population density will be significantly higher and water voles, which are territorial animals, may be more reluctant to move to adjacent habitats. Unlike spring clearance (which can be undertaken by a registered individual operating under the class licencing system), autumn clearance would require a licence application to be made to Natural England.



6 CONCLUSION

6.1.1 The water vole survey confirmed the presence of water vole in association with the River Itchen and its channels. Current indications are that the Proposed Works should not affect water vole although this conclusion should be kept under review. Consideration should be given to including ecological enhancement measures within the Proposed Works.



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M3 Junction 9 Improvement Scheme PCF Stage 3 - Water vole Survey Report

8 FIGURES

8.1 FIGURE 8.1 – SITE LOCATION PLAN





Conta	ains Ordi	nance	e Survey data © Crown copyright a	and da	tabase	a right 2017	ource: Esri, DigitalGlobe, GeoEye, Earthstar Ge N, and the GIS User Community	ographics, CNES/Air	bus DS, USDA, US	GS, AeroGR	ID,
							PROJECT:	SCALE @ A3:	CHECKED:	APPROVED:	
						\\ S D	M3 Junction 9	7,500	LR	HS	
								FILE:	DRAWN:	DATE:	
						-		A3 Template	BW	August 2	2017
							TITLE:	PROJECT No:	DRAWING No:	-	REV:
REV	DATE	BY	DESCRIPTION	СНК	APP	🚖 highways	Figure 8.1 Site Location Plan	70016638	1		A
DRAWI	IG STATUS:		DRAWING STATUS		england			©	WSP Group plo	;	

8.2 FIGURE 8.2 WATER VOLE SURVEY AREA





Containe Ordnance Surve	v data @ Crown convright and database right 2017
Contains Ordinance Surve	y data 😊 Crown copyright and database right 2017

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

-						ANSD .	PROJECT:	SCALE @ A3: 7,000	CHECKED: LR	APPROVED:	
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8.3 FIGURE 8.3 WATER VOLE SURVEY RESULTS





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

							PROJECT:	SCALE @ A3: 7,000	CHECKED: LR	APPROVED:	
								FILE:	DRAWN:	DATE:	00.17
								WV Results	BW	Septembe	er 2017
							TITLE:	PROJECT No:	DRAWING No:		REV:
REV	DATE	BY	DESCRIPTION	СНК	APP	差 highways	Figure 8.3 Water Vole Survey Results	70016638	3		А
DRAW	NG STATUS:		FINAL			england		© \	WSP Group plc		



Appendix A

WATER BODY DESCRIPTIONS

	WATER VOLE SUITABILITY	Moderate	Moderate	Moderate	Moderate	Moderate
	DESCRIPTION	Shallow, narrow, tributary to the River Itchen. North bank nasuben grazed and poached quite heavily with the south bank entriely vegetated with trees and bushes. The channel is relatively open with some shading from nearby bushes. Emergent vegetation present along the north bank and floating vegetation is present in the east.	Main channel of the River lichen flowing through broadleaved woodland. The banks are flat along much of the channel with vertical reinforced sections. The channel is wide, deep and over shaded. Maintained angling pathways are located wither side of the channel along with scattered bridged crossings. Sedge <i>Carex</i> sp. reed and herb species along banks regularly cut back for angling.	Shallow, narrow, over shaded channel flowing into the littom. Flowing through dense wet willow <i>Salix sp.</i> and reed <i>Phragmites australis</i> . The banks are flat on either side.	Tributary to the River lichen, flowing through broadleaved woodland. Fenced on south bank with dense willow and read. Angling pathway maintained on north bank. Soft reinforcement within some of the banks. Sedge, reed and herbs along banks regularly cut back for angling.	Tributary to the River Itchen, flowing through broadleaved woodland. Angling pattway maintained on both banks. Sedge. reedorement within some of the banks. Sedge. reed and herbs along banks regularly cut back for angling. Some undercuting of the bank
	HEOW	-2m 1	10-20m	Ę	10-20m	5-20m
	DEPTH	<0.5-1 m	<0.5-2m	<0.5m	<0.5-2m	A0.5-2m
	WATER SPEED	Slow	Rapid	Slow	Rapid	Rapid
	Vertical		>		>	>
ROFILE	Steep (>45°)					
BANK P	(°34>) wollerl2	>				
	Flat (<10°)		>	>	>	>
	Short grass	Ľ	A		LL	۲
	Tall grass			о		
'ATION ²	səɓpəs /spəəy	۲	Ŀ	۲	ш	ш
VEGET	Submerged Weeds	0	Ŀ		۱L	۲
	Herbs		۲		0	
	səysng	×	0			
	Bankside trees	0	0	۲	A	۲
	BORDERING LAND USE	Permanent/ temporary grass, Grazed with bank fenced.	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	Permanent/ temporary grass. Mixed broadleaved woodland. Both banks fenced.	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.
	Bank Material	Earth	Earth/ Reinforced	Earth	Earth/ Reinforced	Earth/ Reinforced
	Навітат	Running Water	Running Water	Running Water	Running Water	Running Water
	R E	٩	۵	U	۵	ш

² The DAFOR scale has been used to estimate the frequency and cover of the different plant types as follows: Dominant (D) - >75% cover, Abundant (A) – 51-75% cover, Frequent (F) – 26-50% cover, Occasional (O) – 11-25% cover, Rare (R) – 1-10% cover.

Table A1 Water body Descriptions

	WATER VOLE SUITABILITY		Moderate	Pok	Moderate	Low	ЧġН	Н Ној	Low
DESCRIPTION		present on north bend where reinforcement has occurred.	Tributary to the River Itchen, flowing through broadleaved woodland. Anging pathway maintained on both banks north of the bridge. East bank maintained for anging sound of the bridge. Soft reinforcement within some of the banks. More naturel banks located along the channel. Compared to the similar B. D & E. High slit deposition in places with presence of water mint <i>Mentha aquatica</i> .	Short section of the Itchen following on from F flowing under the A33 & A34 roads. Two concrete bridges are present with installed otter leadges. Flow is considerably faster within this section. Earth and stone banks. with a mixture of shallow to steep banks.	Main channel of the River Itchen. Wide, deep, not very shaded. Reed and sedge prevalent along east bank. Angling pathways regularly maintained on either side. Concrete reinforcement on west bank closet to A34.	Similar to G, flowing underneath the A34 north and south bound carriageways. Heavily wooded on either bank. Gravel bars located within the channel.	Narrow, deep and slow channel. The south bank of this channel whilst then north bank is shallow. South bank is maintained for angling, north bank reed and sedge abundant. The banks get steeper as the channel flows south. Noticeable change from reed to sedge from north to south.	Continuation from section G. Deep and wide channel, bordered by woodland on the west and reedbed on the east. Shallow earth banks with dense sedge and reed. West bank is maintained for anging 50m after the bridge.	Wet drainage ditch between two grazed fields. Yorp shalow (+10cm) in depth and lined with trees and bushes. Drise out at its northern end. Reed and yellow iris <i>fits</i> <i>psuedacorus</i> located in wetter areas.
	HLOIM		5-20m	5-10m	10-20m	5-10m	2-5m	5-20m	É
	WATER DEPTH		<0.5-2m	<0.5-1m	<0.5-2m	<0.5-1m	<0.5-2m	0.5-1m	<0.5m
	WATER SPEED		Rapid	Fast	Rapid	Rapid	Slow	Rapid	Static
	Vertical			>	>				
ROFILE	(°34<) q99t2			>					
BANK P	(°34>) wollsh2		>	>		>	>	>	>
	Flat (<10°)		>		>		>		>
	Short grass		٩		Ľ		Ľ	A	
	Tall grass						Ľ	Ŀ	ш
ATION ²	segbes /sbeeЯ		0		A		A	A	o
VEGET	sbeeW begreeds		Ľ	0	Ŀ	ο	۲	L	
	Herbs		Ľ	ш	0	L	۲	۲	
	səysng					Ľ	о	۲	Ľ
	Bankside trees		0	۵	۲	۵	٣	0	L
	BORDERING LAND USE		Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	Mixed broadleaved woodland. Road bridges.	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	Mixed broadleaved woodland. Road bridges.	Permanent/ temporary grass. Grazed and cut for angling.	Permanent/ temporary grass. Mixed broadleaved woodland. Regularly mowed bankside angling paths.	Permanent/ temporary grass. Grazed by cattle and fenced on one side
	BANK MATERIAL		Earth/Silt/ Reinforced	Earth/Stones/ Canalized/ Reinforced	Earth/ Reinforced	Earth/Stones/ Canalized/ Reinforced	Earth	Earth	Earth
	HABITAT		Running Water	Running Water	Running Water	Running Water	Running Water	Running Water	Ditch
	REF		L	U	т	-	7	¥	-

	WATER VOLE SUITABILITY	Low	High	Moderate	High	Low	Moderate	Moderate	High
	DESCRIPTION	Wet flushes within marshy grassland. Very shallow channel choked with vegetation. Heavily poached by cattle.	Main channel of the River ltchen. Wide, deep and fast ltowing channel. Very large, dense reed bed to the east of the channel with will further south. West bank is maintained for angling, with a sodge and reed dominant. Gravel river bed. Banks are shallow with plenty of food sources. West bank was not accessed due to reed bed.	Narrow, fast flowing open channel lined with reed. Poaching on the north bank. The banks are relatively flat and with some shallower sections. Access limited due to breeding warblers and buntings.	Very thick reed chokes the channel in the north and opens out in the south. West bank is mown for angling, however 2m strip of herb, sedge and reed is maintained. East bank is dense with reed. Very flat banks towards the south.	Wooded pond with sluiced southern point, trickling into P. Very shaded and flat banks with some submerged vegetation. Channel extends west of the pond into the cattle grazed field. This channel is sluggish and choked with sedge and tall grasses.	Narrow, shallow channel with reed bed to the west and grazed field to east. The channel has flat banks on either side. The channel begins flowing through woodland and into section O. A dry ditch extends north of R from the A34 highways ditch.	Flush within marshy grassland flowing into section P. Dense reeds on either side of the flat banks. Completely shaded channel, which gradually deepens from west to east.	Narrow, shallow and rapid channel with some reed and sedge along northern stretch. The channel is open. Some large sedge tussocks located along the northern section flowing west to east. Southern section banks are densely covered in reed. The channel remains open and fast flowing.
	HLOIM	É	10-20m	2-5m	2-10m	1-5m	1-2m	Ê	1-2m
	MATER DEPTH	<0.5m	<0.5m - 2m	0.5-1m	<0.5-2m	<0.5-1m1	<0.5-1m	<0.5-1m	<0.5m
	WATER SPEED	Static	Rapid	Rapid	Rapid	Static/ Sluggish	Slow	Static	Rapid
	Vertical								
ROFILE	Steep (>45°)								
BANK F	(°34>) wollsd2		>	>	>		>		>
	Flat (<10°)	>		>	>	>	>	>	>
	Short grass		٩		L				
	Tall grass	A	0		ш	ш			L
IATION ²	səɓpəs /spəəy	٥	٩	۵	۵		A	۵	۲
VEGET	sbəəW bəgrəmdu2		۲	0	A	A	Ľ		۲
	sdì9H	٨	Ľ		A				L
	səysng		L				Ľ		
	Bankside trees		Ľ	۲	٣	ш	٨	۲	
	BORDERING LAND USE	Permanent/ temporary grass. Grazed by cattle.	Permanent/ temporary grass. Grazed by cattle. Angling pathways	Permanent/ temporary grass. Grazed by cattle.	Permanent/ temporary grass. Grazed by cattle. Banks maintained for angling.	Permanent/ temporary grass. Mixed broadleaved woodland. Grazed by cattle.	Permanent/ temporary grass. Mixed broadleaved woodland. Grazed by cattle. Fenced on both banks.	Permanent/ temporary grass. Reed bed.	Permanent/ temporary grass. Reed bed.
	BANK MATERIAL	Earth/ Poached	Earth/Gravel	Earth/ Poached	Earth/ Poached	Earth/ Poached	Earth/ Poached	Earth	Earth
	НАВІТАТ	Ditch	Running Water	Running Water	Running Water	Running Water/Pond	Running Water	Ditch	Running Water
	REF	Σ	z	0	٩	Ø	с	w	F

	WATER VOLE SUITABILITY	High	High	
	DESCRIPTION	Fast flowing and deep channel extending south from K. No longer wooded, but cattle grazing and angling pathways either side. Some poaching identified on west bank. The banks are shallow with 2-3m of vegetation including sedge and reed.	Narrow, slow flowing, open channel flowing through grazed fields. Heavily poached either side. Predominately reed on the bank sides, with very flat bank on east. The bank is steeper on the west, however more heavily poached.	
	HLOIM	2-5m	1-5m	
	WATER DEPTH	0.5-2m	<0.5m	
	WATER SPEED	Rapid	Sluggish	
щ	Vertical			
Profil	(°245°) (99912			
BANK	(°54≥) wollsd2	>	>	
	Flat (<10°)			
	Short grass			
N ²	Tall grass	ш	A	
зетапо	sedges /speeg	A	۵	
VEG	Submerged Weeds	4	ш.	
	sdi9H	ш.	œ.	
	səysng			
	Bankside frees	Permanent/ temporary grass. Grazed by cattle. Banks maintained for angling.	Permanent/ temporary grass. Grazed by cattle.	
	BANK MATERIAL	Earth/ Poached	Earth/ Poached	
	HABITAT	Running Water	Running Water	
	REF	Þ	>	

Table A2 Waterbody Photos

WATERBODY REFERENCE	Рното
<u> </u>	<u> </u>
В С	N/A N/A
D	
E	
F	
G	

WATERBODY REFERENCE	Рното
Н	
I	THE
J	
К	
L	N/A
M	N/A
Ν	

WATERBODY REFERENCE	Рното
Ο	
Ρ	
Q	N/A
R	
S	
T	N/A
U	

WATERBODY REFERENCE	Рното
V	N/A



Appendix B

WATER VOLE EVIDENCE

Рното						
DESCRIPTION OF EVIDENCE PRESENT	Mammal path through sedge and marginal vegetation. No droppings or slide present.	Two burrows located on the east bank approximately 7-8cm in diameter. One burrow is under and filled with water, whilst the other has some collapsing.	Burrow described above located again - further collapsing occurred since Survey 1.	No evidence found	No evidence found	Runs within the vegetation, two small feeding stations identified. Droppings present are not from water vole, likely bank vole.
SURVEY DATE	28/06/17	28/06/17	30/08/17			30/07/17
WATER COURSE	A	۵		ပ		ш

Table B1 Waterbody Photos

РНОТО					
DESCRIPTION OF EVIDENCE PRESENT	Burrow located 2m from the water's edge within the mowed pathway. It is approximately 4-5cm wide the lower limit to water vole burrows. The burrow leads straight to the water, however no entrance was located.	Otter spraints located under the bridges of the A34 & A33. Four spraints located under the A34 under the A34 under the A34 (667) these being fresher than those aforementioned.	Otter spraints identified as before, no fresh spraints on Survey 2.	No evidence found	No evidence found
SURVEY DATE	28/06/17	28/06/17	30/07/17		
WATER COURSE	L	U		т	—

Рното			
DESCRIPTION OF EVIDENCE PRESENT	Small mammal runs located through the bankside vegetation, likely to be used by water voles and other small mammals. Droppings of small mammals located within sedge, unlikely to be water vole. Water vole feeding remains located at feeding stations within the west bank. Vegetation remains include reed and Yorkshire fog cut to 10cm pieces with 45° ends.	Feeding remains identified on the east and west banks of the stream with prominent pathways intermittent.	Water vole burrow located in the east west bank of section K. Droppings and well used pathways also identified within the immediate vicinity.
SURVEY DATE	28/06/17	30/07/17	28/06/17
WATER COURSE	~		¥

Рното								
DESCRIPTION OF EVIDENCE PRESENT	W ater vole feeding stations and runs identified on the north bank of the river corner. Latrines identified within close proximity to the feeding remains. Fresh water vole droppings identified on an in stream log (K5).	No evidence found	No evidence found	A high density of water vole activity signs were identified all along the west bank of section N.	Two water voles were sighted within the reed and sedge bank.	A floating platform is located within the section, with water vole droppings identified on the platform. Water vole runs and feeding platforms are located along section N in high density.	Water vole droppings are also located amongst the feeding remains and along the pathways.	No burrows were identified on the west bank, however the east bank was not accessed due to water depth and dense reed bed. Map reference 687 is a potential otter slide. It is wide enough for otter use, however it does not exhibit other shared strategistics associated with other.
SURVEY DATE	30/07/17					29/06/17		
WATER COURSE		_	Σ			z		



Рното			
DESCRIPTION OF EVIDENCE PRESENT	No evidence found	Small mammal droppings identified.	W ater vole feeding stations identified along the west bank of the channel, with vegetation cuttings of over 10cm in length. One water vole latrine was identified with fresh droppings in close proximity to a large feeding station. W ater vole runs are present along the bank connecting feeding stations together.
SURVEY DATE		29/06/17	31/08/17
WATER COURSE	0		٩





Рното				
DESCRIPTION OF EVIDENCE PRESENT	Water vole and small mammal droppings located on the west bank of the channel. Feeding remains of water vole and small mammals present. Numerous water vole feeding stations identified along the length of section U.	Water vole pathway identified leading to a feeding station and latrine.	Feeding remains and pathways of water vole present. Feeding remains approximately 10cm in length consisting primarily of reed.	A number of water vole activity signs identified along the channel, up to the wooded section. Water vole feeding stations located along the channel connected by runways. One latrine identified in close proximity a large feeding station. One water vole burrow identified at 320.
SURVEY DATE	29/06/17	31/08/17	29/06/17	31/08/17
WATER COURSE	5			>





Appendix C

INDICATIVE SPECIES LIST FOR RIPARIAN PLANTING
Table C1	Indicative S	necies List	for Rinarian	Planting ³
	maioante e		ioi inpunun	i iuning

COMMON NAME	LATIN NAME
Reeds/Grasses	
Reed canary grass	Phalaris arundinacea
Common reed	Phragmites australis
Reed sweet grass	Glyceria maxima
Meadow grasses	Poa trivalis, P. pratensis
Cocksfoot	Dactylis glomerata
Sweet grasses	Glyceria fluitans, G. notata
False oat-grass	Arrhenatherum elatius
Tufted hair-grass	Deschampsia caespitosa
Sweet vernal-grass	Anthoxanthum odoratum
Yorkshire fog	Holcus lanatus
Creeping soft grass	H. mollis
Creeping bent	Agrostis stolonifera
Timothy	Phleum pratense
Marsh foxtail	Alopecurus geniculatus
Meadow foxtail	A. pratensis
Purple moor-grass	Molinia caerulea
Rushes	-
Hard rush	Juncus inflexus
Soft rush	J. effusus
Conglomerated rush	J. conglomeratus
Sharp-flowered rush	J. acutiflorus
Jointed rush	J. articulatus
Sedges	
Greater tussock sedge	Carex paniculata
False fox-sedge	C. otrubae Podp.
Hairy sedge	C. hirta
Bottle sedge	C. rostrata
Pendulous sedge	C. pendula
Black sedge	C. nigra
Greater pond-sedge	C. riparia
Water Plants	
Branched bur-reed	Sparganium erectum
Unbranched bur-reed	S. emersum
Common water-plantain	Alisma plantago-aquatica
Flowering rush	Butomus umbellatus
Broad-leaved pondweed	Potamogetum natans
Hornwort	Ceratophyllum demersum
Yellow flag iris	Iris pseudacorus
Bogbean	Menyanthes trifoliata
Pond lilies	Nymphoides peltata, Nuphar lutea, Nymphaea alba
Bulrush	Schoenoplectus lacustris

³ (Based on Strachan *et al,* 2011)

COMMON NAME	LATIN NAME
Water crowfoots	Ranunculus peltatus, R. aquatilis, R. penicillatus,
Watercress	Nasturtium officinale
Wetland / Riparian edge plants	
Bistort	Polygonum amphibium
Marsh marigold	Caltha palustris
Celery-leaved buttercup	Ranunculus sceleratus
Lesser spearwort	R. flammula
Greater spearwort	R. lingua
Cuckoo flower	Cardamine pratensis
Meadowsweet	Filipendula ulmaria
Water avens	Geum rivale
Purple loosestrife	Lythrum salicaria
Fools watercress	Apium nodiforum
Angelica	Angelica sylvestris
Marsh bedstraw	Galium palustre
Water forget-me-not	Myosotis scorpioides
Water mint	Mentha aquatica
Brooklime	Veronica beccabunga
Marsh valerian	Valeriana officinalis
Marsh sowthistle	Sonchus palustris
Water figwort	Scrophularia auriculata
Gypsywort	Lycopus europaeus



APPENDIX B8-10 BREEDING BIRD COMMUNITY WALKOVER SURVEY REPORT



M3

Junction 9 Improvement Scheme

Breeding Bird Community Walkover Survey Report

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ Highways England Company Limited registered in England and Wales number 09346363

M3 JUNCTION 9 IMPROVEMENT SCHEME

BREEDING BIRD COMMUNITY WALKOVER SURVEY REPORT

Highways England

Second Issue

Project no: 70016638 Date: November 2017

wsp

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QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Final for comment	P02		
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Project number	70016638	70016638	2017.11.13 11.35.30 2	
Report number	HE551511-WSP- GEN-M3J9PCF3- RP-LE-00004	HE551511-WSP- GEN-M3J9PCF3- RP-LE-00004-P02		
File reference				

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	RECORDED IN 20177

APPENDICES

A P P E N D I X A SPECIES RECORDING WITHIN SURVEY AREA



EXECUTIVE SUMMARY

M3 Junction 9 has been highlighted as requiring redevelopment in order to help reduce congestion. This will be achieved by improving the flow of traffic, and three options are currently being considered for implementation.

To gather baseline information about the importance of the land adjacent to the junction and the potential works footprint for birds, a survey was completed in June and July 2017. This comprised a habitat assessment and survey focussing on birds, and covering the proposed work area and land to 250m away (the Survey Area). Surveys covered this area using two transects.

The work has established that the Survey Area supports a breeding bird community including Red or Amber listed Species of Conservation Concern (Eaton *et al.*, 2015), and Species of Principal Importance as listed in Section 41 of the Natural Environment and Rural Communities Act 2006, as well as more common species. The species of conservation concern include at least two declining farmland Species of Principal Importance, skylark and yellowhammer, which due to the intensively farmed nature of the arable habitats, and sightings, are likely to be present in small numbers. Two Schedule 1 species, Cetti's warbler and kingfisher, and a variety of other species of conservation concern were noted along the River Itchen corridor. The Itchen is likely to support a more notable bird community than the remainder of the Survey Area.

Once the final design is identified, a further bird survey should be carried out in the breeding season, comprising (as a minimum) three visits, one each in April, May and June. Surveyors will approach habitat that could be used by breeding birds within and surrounding the works area, and land to 50m. Depending on the final design, the presence of breeding waders on Winnall Moors (a nearby nature reserve, managed by the Hampshire Wildlife Trust) may need to be established, either through appropriately timed surveys or liaison with the Wildlife Trust. Species specific surveys, such as for lesser spotted woodpecker *Dendrocopos minor*, are recommended where the Proposed Works will impact specific habitat types. Species specific surveys will be dependent on the final route selected.



1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). A large volume of traffic currently uses the interchange (approximately 6,000 vehicles per hour during the peak periods), which acts as a bottleneck on the local and strategic highway network, causing significant delays. M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.
- 1.1.2 Three options have been taken forward to Project Control Framework (PCF) Stage 2 and assessed within this report, namely:
 - → Option 14: Northbound and Southbound A34 Free Flow Design;
 - → Option 16B: Incremental Delivery Northbound A34 Free Flow Link;
 - → Option 16C: Incremental Delivery Southbound A34 Free Flow Design.
- 1.1.3 The works are hereafter referred to as the 'Proposed Works'. Further details of the Proposed Works are presented within the PCF Stage 2 EAR (HE551511-WSP-GEN-M3J9PCF2-RP-LE-00041). The anticipated maximum extent of the works is shown on **Figure 1.1**, and is hereafter referred to as 'the Site.'

1.2 ECOLOGICAL BACKGROUND

- 1.2.1 An ecological desk study was produced by WSP in 2016. A large number of bird species records were obtained occurring within grid squares within a 2km radius of the Site. These included notable and strictly protected species such as kingfisher *Alcedo atthis* and bittern *Botaurus stellaris*.
- 1.2.2 The Phase 1 habitat survey carried out by WSP in spring 2017 confirmed the presence of habitats with potential to support notable bird species and communities.

1.3 AIMS AND OBJECTIVES

- 1.3.1 The aims of this report are to:
 - → Set out the methods and results of walkover bird surveys undertaken in June and July 2017;
 - → Provide an initial appraisal, based on habitats and the species recorded, of the likely conservation value of the breeding bird assemblage present; and
 - → Identify whether further surveys would be likely to significantly strengthen the baseline for assessment.

1.4 LEGISLATIVE AND POLICY FRAMEWORK

HABITAT REGULATIONS 2010 (AS AMENDED)

1.4.1 Under the amendments to the Habitat Regulations (16th August 2012) Regulation 9A(2) & (3) state that local authorities '*must take such steps in the exercise of their functions as they consider appropriate to contribute to…the preservation, maintenance and re-establishment of a sufficient*



diversity and area of habitat for wild birds in the UK including by means of the upkeep, management and creation of such habitat...'. The legislation continues to state that economic and recreation requirements must be taken into consideration in considering which measures are appropriate.

WILDLIFE AND COUNTRYSIDE ACT 1981 (AS AMENDED)

- 1.4.2 Under the Wildlife and Countryside Act 1981 (as amended) all wild birds are protected from killing and injury, and their nests and eggs protected from taking, damage and destruction whilst in use. Therefore, recommendations to avoid contravention of this legislation are included within Section 6.
- 1.4.3 Additional protection is extended to species listed under Schedule 1 of the Act, meaning it is also an offence to disturb these species at or near the nest, or whilst they have dependent young.

NATURAL ENVIRONMENT AND RURAL COMMUNITIES (NERC) ACT 2006

1.4.4 The NERC Act 2006 reinforces the duty upon all public authorities, including planning authorities, to have regard for the conservation of biodiversity when discharging their duties. The Act refines the definition of biodiversity conservation, stating that it includes restoring or enhancing a population or habitat. Section 41 of the NERC Act requires the Secretary of State to list habitats and species of principal importance (HPIs and SPIs) for the conservation of biodiversity in England. The habitats and species listed in accordance with Section 41 largely replicate those listed on the UK Biodiversity Action Plan (BAP) which occur in England (however there are exceptions).

1.5 PLANNING POLICY

NATIONAL POLICY STATEMENT FOR NATIONAL NETWORKS

1.5.1 As the project qualifies as a Nationally Significant Infrastructure Project (NSIP), it must adhere to the National Policy Statement (NPS) for National Networks (Department for Transport 2014). This states *inter alia* that the principals and objectives of the government's *2012 Natural Environment White Paper (NEWP)* and *Biodiversity 2020 strategy* should be adhered to. These promote moving progressively from net biodiversity loss to net gain by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. The NPS also states that the likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats, on other species identified as being of principal importance for the conservation of biodiversity and that potential impacts on ecosystems should be clearly set out.

NATIONAL PLANNING POLICY FRAMEWORK

- 1.5.2 At a national context planning policy is driven by the National Planning Policy Framework (NPPF) (2012). The NPPF sets out, amongst other points, how at an overview level the *'planning system should contribute to and enhance the national and local environment by:*
 - → ...recognising the wider benefits of ecosystem services;
 - minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures...'
- 1.5.3 The NPPF states that this should be achieved through local planning development frameworks and gives recommendations for criteria based policies which recognise the hierarchy of designated sites which range from internationally important habitat, to sites of importance at a local level and ensure



that protection is 'commensurate with their status and gives appropriate weight to the their importance and the contribution that they make to wider ecological networks.'

- 1.5.4 A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF which includes the following:
 - → 'if significant harm resulting from a development cannot be avoided...adequately mitigated, or, as last resort, compensated for, then planning permission should be refused;
 - → …opportunities to incorporate biodiversity in and around developments should be encouraged;
 - → planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland...unless the need for, and benefits of, the development in that location clearly outweigh the loss...'
- 1.5.5 Although the NPPF revoked Planning Policy Statement 9 (PPS9), the ODPM circular 06/2005 originally prepared to accompany PPS9 remains current. This states that 'the presence of a protected species is a material consideration when a planning authority is considering a development proposal and also includes confirmation that 'potential effects of a development, on habitats or species listed as priorities in the UK Biodiversity Action Plan (BAP)...are capable of being a material consideration in the...making of planning decisions.'. The circular advises that local authorities should consult Natural England before granting planning permission if the proposals could adversely affect a protected species, this definition of a protected species includes birds.

LOCAL PLANNING POLICY

- 1.5.6 At a local level, Winchester City Council and the South Downs National Park have adopted the Winchester District Local Plan Part 1 (Adopted 2013). Chapter 9 is entitled 'High Quality Environment' with policy CP16 entitled *Biodiversity*. This states '*The Local Planning Authority will support development which maintains, protects and enhances biodiversity across the District, delivering a net gain in biodiversity, and has regard to the following:*
 - Protecting sites of international, European, and national importance, and local nature conservation sites, from inappropriate development. Supporting habitats that are important to maintain the integrity of European sites.
 - → New development will be required to show how biodiversity can be retained, protected and enhanced through its design and implementation, for example by designing for wildlife, delivering BAP targets and enhancing Biodiversity Opportunity Areas.
 - → New development will be required to avoid adverse impacts, or if unavoidable ensure that impacts are appropriately mitigated, with compensation measures used only as a last resort.
 - → Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.
 - → Maintaining a District wide network of local wildlife sites and corridors to support the integrity of the biodiversity network, prevent fragmentation, and enable biodiversity to respond and adapt to the impacts of climate change.
 - Supporting and contributing to the targets set out in the District's Biodiversity Action Plan (BAP) for priority habitats and species.
 - Planning proposals that have the potential to affect priority habitats and/or species or sites of geological importance will be required to take account of evidence and relevant assessments or surveys.'



2 METHODOLOGY

2.1 WALKOVER SURVEY

- 2.1.1 The survey involved walking two transects selected to sample habitats within the 'Survey Area', defined to cover the maximum extent of works and land 250m around it (see **Figures 2.1 and 2.1**).
- 2.1.2 The survey followed a method based on the British Trust for Ornithology's (BTO's) Common Bird Census (CBC), as summarised by Bibby et al. (2000). Transects were walked at a slow and steady pace, and frequent stops were made to look and listen for singing and calling birds, particularly where the transects passed close to woodland (in order to allow time to record and pick out all species audible).
- 2.1.3 The activity of all birds detected was mapped using standard British Trust for Ornithology (BTO) annotation (two-letter species codes and activity symbols). In addition, notes were made on the habitats present. The combination of species recorded and an assessment of habitat type and quality have been used in this report to infer the likely composition of the breeding bird community.

2.2 DATES AND PERSONNEL

2.2.1 Two visits were carried out, both starting shortly after dawn, one on 6 June 2017 and the other on 3 July 2017. The weather conditions during the survey visits are detailed in **Table 2.1**.

 Table 2.1
 Survey dates and weather conditions

DATE	START TIME	WEATHER CONDITIONS SUMMARY
6 June 2017	6:00	Rain initially followed by progressive clearing of cloud cover. North-westerly light wind during much of the survey to 6/8.
3 July 2017	5:45	Dry throughout survey. No wind. Cloud cover 7/8.

2.2.2 The surveys were completed by an experienced field ornithologist able to identify all breeding bird species likely to be encountered both visually and aurally. The surveyor has undertaken breeding bird surveys across much of southern Britain, and is familiar with all regularly used survey techniques and standard BTO coding. He has over 12 years of consultancy experience and has undertaken breeding bird survey work to inform the planning applications for large residential developments, wind farms and infrastructure projects.

2.3 NOTES AND LIMITATIONS

2.3.1 The rain that affected the June survey visit may have supressed territorial behaviour, particularly territorial song. However, as the work commissioned involved initial characterisation of the breeding bird community based on both species and habitat appraisal, this is not a significant constraint.



3 RESULTS AND INTERPRETATION

3.1 HABITATS

- 3.1.1 The Survey Area supports a range of broad habitat types and these can be seen on **Figure 2.1**. Notable locations are also shown on this figure which can be cross-referenced with the text below. Habitats and discrete areas within the context of the Survey Area include:
 - Intensively managed arable. This is the dominant habitat in the east of the Survey Area. A variety of autumn sown cereals (see Note 1 on Figure 2.1), peas (Note 2) and potatoes (Note 3) were present at the time of the surveys.
 - → Hedgerows. Those bordering or close to the M3 are generally heavily managed and narrow. The hedgerows on Easton Lane (Note 4) are more structurally diverse and have dimensions of approximately 2 m height by 2 m width. The ground flora in this location has a range of grasses and herbs.
 - → Recently established grassland and woodland belt. This runs east to west (see Note 5), is approximately 35 m wide and 500 m in length (and extends outside the survey area). The sward is tussocky and grass-dominated.
 - Mixed woodland. Present in the northern part of the Survey Area (see Note 6), and of plantation origin, with both native deciduous trees and non-native spruces and a varied edge featuring berry-bearing shrubs.
 - → The River Itchen corridor between the A34 and the M3. A mosaic of habitats including seminatural broad-leaved woodland and flood plain meadows (see Note 7) bordered by two (grazed) improved grassland fields (see Note 8) that are separated by poor quality plantation woodland.
 - → The River Itchen corridor west of the A34. Reed bed adjacent to the river (Note 9 on Figure 2), periodically flooded meadows under low intensity grazing (Note 10 on Figure 2) and hay meadows (Note 11 on Figure 2) within the Winnal Moors nature reserve. The nature reserve is managed by the Hampshire Wildlife Trust. A system of reed-fringed drains is present on adjacent land. These habitats have supported a breeding bird community including lapwing Vanellus vanellus redshank Tringa totanus and snipe Gallinago gallinago, for which the nature reserve is noted as being (in part) managed.
 - → The A34/M3 Junction and verges. A mosaic of scrub, woodland and grassland. Much of the woodland is of plantation woodland (Note 12). Scrubby edge habitats are bordered by grassland which supports varied flora including seed-bearing weeds.
 - → Hard standing. Industrial and commercial units and roads dominate the south-eastern part of the Survey Area.

3.2 SPECIES RECORDED

- 3.2.1 Two species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) were noted within the Survey Area during the surveys: kingfisher *Alcedo atthis* and Cetti's warbler *Cettia cetti.* These species are afforded protection against disturbance when breeding (in addition to the general protection afforded by the Act to all wild birds from persecution, and the reckless and deliberate destruction of active nests).
- 3.2.2 A number of species which feature on the Red or Amber lists of Conservation Concern (Eaton *et al.* 2015) and SPI for the Conservation of Biodiversity in England (with regard to the provisions of the NERC Act 2006) were also recorded. These are predominantly species that have undergone



declines or range contractions due to factors including agricultural intensification and changes in land use. **Table 3-1** lists these species and their conservation status.

Species	SCIENTIFIC NAME	BIRDS OF CONSERVATION CONCERN RED OR AMBER LIST	SPI
Bullfinch	Pyrrhula pyrrhula	А	Y
Dunnock	Prunella modularis	А	Y
Grey wagtail	Motacilla cinerea	R	
Herring gull	Larus argentatus	R	Y
Kingfisher	Alcedo atthis	А	
Linnet	Linaria cannabina	R	Y
Mallard	Anas platyrhynchos	А	
Mistle thrush	Turdus viscivorus	R	
Reed bunting	Emberiza schoeniclus	Α	Y
Song thrush	Turdus philomelos	R	Y
Skylark	Alauda arvensis	R	Y
Swift	Apus apus	А	
Yellowhammer	Emberiza citrinella	R	Y

Table 3.1	Species of	Conservation	Concern and	SPIs	recorded in	2017
		OUTION		01.13		

3.2.3 A number of species which are not listed as Red or Amber or SPIs were also recorded. A full list is included in **Appendix A**.

INTERPRETATION

- 3.2.4 The records of kingfisher and Cetti's warbler were both from the River Itchen corridor west of the A34 (Note 9 on **Figure 2.1**). Habitats in this area are suitable for breeding Cetti's warbler, as they include reed bed and seasonally inundated scrub. It is unclear from the survey work whether kingfishers are likely to breed close to where the bird was recorded, or if the individual was commuting along the River Itchen. Both species are 'moderately common residents' in the county (Hampshire Ornithological Society, 2011). Other species noted in this area included a family party of grey wagtails, song thrush and reed bunting, all of which are of conservation concern or SPIs, and which could potentially breed in areas of habitat close to where they were recorded. Mallard were also noted on the Itchen.
- 3.2.5 The understorey structure and presence of deadwood in the woodland plots in the northern part of the Survey Area (see Note 6) may be of local importance to the bird community associated with the Itchen corridor.
- 3.2.6 The remaining SPIs and species of conservation concern were mainly associated with farmland habitats. These included yellowhammer, linnet and skylark.
 - → Yellowhammer was noted in small numbers, particularly around the hedgerows on Easton Lane (Note 4 on Figure 2.1), around the recently planted plantation woodland and rough grassland strip (Note 5) and along hedgerows at Long Walk immediately to the east of the Survey Area.
 - → Small numbers of skylark were recorded in the arable field in the south-eastern corner of the Survey Area (Note 1 on **Figure 2.1**) and to the north of Easton Lane (Note 2 on **Figure 2.1**).
 - → Linnet and bullfinch were both noted during one of the two visits and were seen on the hedgerow adjoining Easton Lane.
- 3.2.7 It is likely, based on the records of skylark and yellowhammer (which included singing birds in the case of the former and repeat sightings in the same discrete area in the case of the latter), that both species breed within the Survey Area. Both species are typically double or triple-brooded, and therefore likely to be in breeding habitat at the time of the work.



- 3.2.8 Dunnock was recorded in a variety of habitats across the Survey Area, including scrub in proximity to the River Itchen and around built development in the south-eastern part of the Survey Area. Song thrush was also noted in several locations within the Survey Area.
- 3.2.9 Herring gulls and a swift were seen in flight over the Survey Area. There was no indication of breeding of either species within it.
- 3.2.10 A range of common species with wide-ranging habitat preferences were noted during the work. These included blackbird *Turdus merula*, wren *Troglodytes troglodytes*, and robin *Erithacus europaeus*.
- 3.2.11 Overall, the work established the bird community is comprised of a mixture of common and widespread species, some of which are of conservation concern. The exceptions to this are the River Itchen corridor, which appears to support a varied bird community, and the hedgerow along Easton Lane, which appears to be the most important feature in the context of the arable farmland that dominates the Survey Area.
- 3.2.12 There are limitations to what can be concluded at this stage. The likely breeding status of some species of conservation concern (such as linnet and bullfinch) remains unclear. For other species, such as skylark and yellowhammer, only broad estimates of the number of territories present can be made. Spring survey work would provide greater certainty with regard to the current status of breeding waders in the Winnal Moors area and for some species of conservation concern which could potentially occur locally (including lesser spotted woodpecker *Dryobates minor*). Species specific surveys are recommended in cases where the Proposed Works will impact such habitats. These surveys will be dependent on the final route selected.



4 CONCLUSIONS AND RECOMMENDATIONS

- 4.1.1 The survey work completed in June and July 2017 has involved representative sampling of the Survey Area using two transects.
- 4.1.2 This work has established that the Survey Area supports a breeding bird community that is likely to include at least two declining farmland SPIs, skylark and yellowhammer. Due to the intensively farmed nature of the arable habitats, and the limited number of registrations of these species, it is likely that only small populations are present within the Survey Area. However, further (spring) surveys would be necessary to confirm this.
- 4.1.3 Two Schedule 1 species, Cetti's warbler and kingfisher, and a variety of other species of conservation concern were noted along the River Itchen corridor. The Itchen is likely to support a more notable bird community than the remainder of the Survey Area, and consideration will need to be given to the completion of additional surveys if there is a likelihood of impacts on this community. In particular, the continued presence of breeding waders on Winnal Moors could be established through appropriately timed surveys or liaison with Hampshire Wildlife Trust.
- 4.1.4 When the preferred route option is selected it is recommended that a more detailed survey be undertaken of the areas identified to be impacted upon by the final scheme. To do this, three visits in April, May and June will be undertaken, during which the surveyors will cover all suitable habitats within the final survey area to within 50m. Species specific surveys, such as for lesser spotted woodpecker *Dendrocopos minor*, are recommended dependent on the final route selected.



5 REFERENCES

5.1 **PROJECT REFERENCES**

- → WSP (2016) M3 Junction 9 Improvement PCF Stage 1. Ecological Desk Study
- → WSP (2017) M3 Junction 9 Improvement PCF Stage 2. Phase 1 Habitat Survey

5.2 TECHNICAL REFERENCES

- → Bibby C.J, Burgess N.D, Hill D.A, & Mustoe S.H. (2000). Bird Census Techniques. Second Edition. Elsevier Ltd.
- → Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D., & Gregory, R.D. (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108: 708-746.
- → Hampshire Ornithological Society (2011). Hampshire Bird Report 2010.



FIGURES

FIGURE 1.1 SITE LOCATION PLAN





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							PROJECT:	SCALE @ A3:	CHECKED:	APPROVED:	
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							M3 Junction 9	FILE:	DRAWN:	DATE:	
								A3 Template	BW	August	2017
							TITLE:	PROJECT No:	DRAWING No:	1	REV:
REV	DATE	BY	DESCRIPTION	СНК	APP	🚖 highways	Site Location Plan	70015218	1.	1	
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FIGURE 2.1 BREEDING BIRD SURVEY RESULTS





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Appendix A

SPECIES RECORDING WITHIN SURVEY AREA

SPI	ECIES	WCA 1981	NERC Act 20066	BoCC		
Common Name	Latin Name	Schedule 1	Section 41	Red List	Amber List	UKBPA
Blackbird	Turdus merula					
Blackcap	Sylvia atricapilla					
Bullfinch	Pyrrhula pyrrhula		Y		Y	
Carrion crow	Corvus corone					
Chaffinch	Fringilla coelebs					
Chiffchaff	Phylloscopus collybita					
Common buzzard	Buteo buteo					
Dunnock	Prunella modularis		Y		Y	
Greenfinch	Carduelis chloris					
Grey wagtail	Motacilla cinerea			Y		
Goldcrest	Regulus regulus					
Goldfinch	Carduelis carduelis					
Herring gull	Larus argentatus		Y	Y		
Kingfisher	Alcedo atthis	Y			Y	
Linnet	Linaria cannabina		Y	Y		
Magpie	Pica pica					
Mallard	Anas platyrhynchos				Y	
Mistle thrush	Turdus viscivorus			Y		
Pheasant	Phasianus colchicus					
Reed bunting	Emberiza schoeniclus		Y		Y	
Robin	Erithacus europaeus					
Song thrush	Turdus philomelos		Y	Y		
Skylark	Alauda arvensis		Y	Y		
Swift	Apus apus				Y	
Yellowhammer	Emberiza citrinella		Y	Y		
Whitethroat	Sylvia communis					
Woodpigeon	Columba palumbus					
Wren	Troglodytes troglodytes					



APPENDIX B8-11 REPTILE SURVEY REPORT



M3

Junction 9 Improvement Scheme

Reptile Survey Report

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ Highways England Company Limited registered in England and Wales number 09346363

M3 JUNCTION 9 IMPROVEMENT SCHEME REPTILE SURVEY REPORT

Highways England

Second Issue

Project no: 70016638 Date: November 2017

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QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Final for comment	P02		
Date	October 2017	December 2017		
Prepared by	B Williams R Pope	B Williams R Pope		
Signature		Digitally signed by Pope, Rosie DN: cn=Pope, Rosie, OW: cn=Pope, Rosie, OW: cn=Pope, Rosie, OW: Collaring (Westbrock Milis), email=Rosie.Pope@wsp.com Date: 2017.12.06 09:31:162	·	
Checked by	L Roberts	L Roberts		
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Project number	70016638	70016638	ate: 2017.12.07 12:08:22 Z	
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File reference	HE551511-WSP-GEN- M3J9PCF3-RP-LE- 00009	HE551511-WSP- GEN-M3J9PCF3- RP-LE-00009		

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EXECUTIVE SUMMARY

M3 Junction 9 has been highlighted as requiring redevelopment in order to help reduce congestion. This will be achieved by improving the flow of traffic, and three options are currently being considered for implementation (the 'Proposed Works').

In order to assess the potential ecological constraints and impacts of the Proposed Works, a suite of ecological surveys are being undertaken. A 'Survey Area' was defined that encompassed the three options' maximum extent of works ('the Site') plus a 250m buffer. Following a desk based assessment undertaken in 2016 which identified local records of reptiles, an extended Phase 1 habitat survey was completed in 2017 which confirmed the presence of suitable reptile habitat within the Survey Area. Reptile surveys were carried out in line with industry guidance, dividing the Survey Area into seven parcels, between May and September 2017.

Two species of reptiles were identified within the Survey Area; slow worm and common lizard in varying populations, including an 'exceptional' population of slow worm in one Parcel (M3 Northbound), and a 'good' population of common lizard in two others (East of M3 and Easton Down). One Parcel, the Winnall Roundabout, was shown to be devoid of reptiles. Overall the reptile populations within the Survey Area are considered to be of Local level importance.

Slow worm and common lizard receive partial protection under Schedule 5 of The Wildlife and Countryside Act (1981). All species of reptile are also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies, including local planning authorities have a duty to have regard for Species of Principal Importance (SPI) when carrying out their functions, including determining planning applications. Reptiles, as protected species, must also be considered in development under national and local planning policy.

It is recommended that avoidance of reptile habitat should be considered during the design process, and it is likely that mitigation and enhancement measures will be required. As the preferred route option has not been selected and detailed design has not progressed, this report provides outline recommendations for mitigation. These are dependent on the level of impact, with on-site translocation required in the instance of significant habitat loss and/or isolation of a population. It also provides recommendations regarding enhancement for inclusion within design proposals, for ongoing management, and measures to ecologically 'future proof' the Proposed Works.



1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). A large volume of traffic currently uses the interchange (approximately 6,000 vehicles per hour during the peak periods), which acts as a bottleneck on the local and strategic highway network, causing significant delays. M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.
- 1.1.2 Three options have been taken forward to Project Control Framework (PCF) Stage 2 and assessed within the Environmental Assessment Report (EAR), namely:
 - → Option 14: Northbound and Southbound Free Flow Design
 - → Option 16B: Incremental Delivery Northbound A34 Free Flow Link
 - → Option 16C: Incremental Delivery Southbound A34 Free Flow Design.
- 1.1.3 Further details of the Proposed Works are presented within the PCF Stage 2 EAR (HE551511-WSP-GEN-M3J9PCF2-RP-LE-00041). The anticipated maximum extent of the works for all options is shown on Figure 1-1, and is hereafter referred to as 'the Site.'
- 1.1.4 For the purposes of ecological assessment, in order to consider indirect effects on adjacent/nearby receptors, a Survey Area of 250m around the Site was defined.

1.2 ECOLOGICAL BACKGROUND

- 1.2.1 An ecological desk study was carried out with respect to the Proposed Works by WSP in 2016 to gain an ecological background of the surrounding area using a 2km search radius. The desk study found that there are records of two species of reptiles within a 2km radius of Junction 9 of the M3, slow worm *Anguis fragilis* and common lizard *Zootoca vivipara*, located 899m and 835m away respectively. A Phase 1 habitat survey completed in spring 2017 identified suitable habitats for common reptile species across the Survey Area (WSP, 2017).
- 1.2.2 The Survey Area, which is traversed by several roads, includes a range of habitats. East of the M3, the landscape is dominated by arable land, with associated hedgerows and parcels of broadleaved woodland. The central area between the three major roads (A34/A33 & M3) also contains a variety of habitats including grazed semi-improved pastures and several semi-natural and plantation broadleaved woodlands. The majority of woodland is located within the highways boundary. The River Itchen passes through the north and west of the Survey Area flowing in a south-westerly direction and is characterised by a number of interconnected channels with associated wetland and flood meadow grasslands.

1.3 BRIEF AND OBJECTIVES

- 1.3.1 Highways England commissioned WSP UK Ltd to complete a reptile survey in accordance with good practice guidance Design Manual for Roads and Bridges (DMRB) (1997), Froglife (1999) and Gent and Gibson (1998) to:
 - → Establish whether reptiles were present or likely absent from the Survey Area
 - \rightarrow Determine, if present, which species are present and the distribution of these species



- → If present, evaluate the value of the Survey Area for reptiles and make recommendations as to how proposals should account for reptiles in relation to legislation, planning and biodiversity policy.
- 1.3.2 The results of this survey, and subsequent recommendations, are included within this report.



2 METHODOLOGY

2.1 OVERVIEW

2.1.1 Due to the large size of the Survey Area, and the presence of several effective barriers to movement for reptiles (the M3, the River Itchen), the Survey Area was split into seven 'Parcels' for the purposes of the reptile survey:

- → Easton Down Farm
- → Arable East of M3
- → M3 Northbound Verge
- → M3 Roundabout
- → M3 Southbound Verge
- → Pudding Lane Farm
- → Winnall Moors Hampshire and Isle of Wight Wildlife Trust (HIWWT).
- 2.1.2 The seven parcels and respective results are shown at Figure 2-1 and 2-2.
- 2.1.3 The reptile survey to determine presence/likely absence of reptile species from the Survey Area comprised two main elements; the checking of artificial refugia and visual observation of habitats and natural refugia present. This survey comprised seven survey visits of each Parcel between 26 June 2017 and 26 September 2017.
- 2.1.4 The reptile survey in each Parcel to determine presence/likely absence was completed in line with guidance within the Herpetofauna Workers' Manual (1998) and the methodology within Froglife's Reptile Survey Advice Sheet 10 (1999), as well as the DMRB, Volume 10, Section 4, Part 7 Nature Conservation Advice in Relation to Reptiles and Roads (2005).

2.2 REPTILE PRESENCE/LIKELY ABSENCE SURVEY

- 2.2.1 The survey comprised seven survey visits of each Parcel, each incorporating two elements:
 - → Survey of artificial refugia
 - → Visual observation of habitats and natural refugia present.
- 2.2.2 A total of 320 refugia¹ were installed within suitable habitat for reptiles, divided between each Parcel, on the 30 and 31 May 2017. These were allowed to bed down for 28 days prior to the beginning of the survey visits.



¹ Artificial refugia are used to assist with the detection of reptiles within suitable habitat. The materials warm up and retain heat, and therefore are attractive to basking reptiles. The settling in period allows favourable conditions i.e. suitable humidity and temperature gradient to develop and for reptiles present within the habitat to become aware of the refugia.
- 2.2.3 A mixture of materials sized approximately 0.5m x 0.5m or 0.5m x 1m were used as artificial refugia. These included bitumen felt, corrugated metal and corrugated bitumen (with the exception of areas adjacent to the roads, see below). Refugia were sited in suitable basking spots, close to cover, within habitat parcels identified to provide suitable conditions for reptiles during an initial site walkover.
- 2.2.4 Within the Parcel sections which flanked roads, all refugia comprised bitumen felt sized approximately 0.5m x 0.5m or 0.5m x 1m which were pegged to the ground at one corner in order to prevent them blowing into the oncoming traffic. Rigid sheets of bitumen or metal were not used as these are more likely to become airborne, should wind-speed / direction permit and would then pose a potential safety risk to road users.
- 2.2.5 Suitable reptile habitat totalled approximately 14.2 hectares over all parcels (see Figure 2-1); by using 320 refugia the density exceeded the minimum density as recommended by good practice guidance (Froglife, 1999) in all Parcels. This guidance states the number of refugia used 'will depend on many factors, such as likelihood of disturbance, size of site and what the survey is attempting to achieve' and recommends a minimum of 5-10 refugia per hectare for 'general survey purposes'. Details on the refugia density in each Parcel is shown in Table 2-1 below.

PARCEL	AREA OF SUITABLE REPTILE HABITAT ² , HECTARES	NO. OF REFUGIA	REFUGIA DENSITY / HECTARE	DESCRIPTION OF HABITATS
Easton Down Farm	1.9	31	16	Areas of grassland that occur in mosaic with scrub to the east of the A34/A33; an area of coarse unmanaged grassland on Easton Down in a fenced off area; and areas of taller grassland in the southern periphery of the pasture.
Arable East of M3	4.7	140	30	Area of land under intense management for crops, with some suitable grassland at the field margins.
M3 Northbound Verge	0.5	30	60	Road verge including cuttings/embankments vegetated with coarse semi-improved calcareous grassland in mosaic with scattered scrub.
M3 Roundabout	0.5	32	31	Comprising coarse semi-improved grassland present on Winnall Roundabout (located above the M3 carriageway) in addition to areas of grassland on the verge of the M3 beneath the roundabout. These habitats are isolated from surrounding habitats by roads.

Table 2-1 Reptile Survey Parcels

2 Estimated approximate total area, see Section 2.5 for further details



PARCEL	AREA OF SUITABLE REPTILE HABITAT ² , HECTARES	NO. OF REFUGIA	REFUGIA DENSITY / HECTARE	DESCRIPTION OF HABITATS
M3 Southbound Verge	0.9	26	29	Road verge including cuttings/embankments vegetated with coarse semi-improved calcareous grassland in mosaic with scattered scrub.
Pudding Lane Farm	2.9	35	12	A range of habitats present including an arable field with a grassy margin to the west, marshy grassland with associated ditches and water courses in the central areas and areas of pasture with less managed areas to the margins in the west.
Winnall Moors HIWWT	2.3	26	11	An area of marshy grassland with a dense network of wet ditches.

2.2.6 Although the Froglife guidance forms the current, recognised, good survey practice, it should be noted that it is not specifically designed for use in demonstrating absence of reptiles from a development site, rather the focus is on identifying key reptile sites and increasing recording of reptiles. In contrast, the DMRB recommends a refugia density of '*no fewer than 10 per hectare, with greater concentrations around key habitat features....in some areas it will be appropriate to deploy an equivalent density of up to 50 artificial refuges per hectare'.* The DMRB also advises one refugium every 10m ought to be used for survey of linear habitat on existing road networks. A compromise between the contrasting guidelines has been sought, with professional interpretation applied to tailor the survey design to the habitats present within the Survey Area. Sufficient refugia were deployed to determine presence or likely absence from the various parcels of suitable habitat within the Survey Area, with a greater density of refugia than recommended within Froglife guidance used in order to increase confidence in results, should likely absence be concluded, and to ensure compliance with the densities described within the DMRB. The location of each refugium was recorded and is shown on Figure 2-1.

2.2.7 Reptiles are ectothermic animals, deriving their body heat from the external environment. Therefore, the timing of the survey visits was dictated by weather conditions. All surveys were completed within the appropriate season (March to October) and within the appropriate ambient air temperature range (10-18°C). As far as possible, surveys were undertaken on sunny days with low cloud cover and little wind to maximise the probability of recording reptiles, should they be present; where ambient air temperatures were towards the upper end of the temperature range, days of higher cloud cover were targeted.



2.3 DATES OF SURVEY AND PERSONNEL

- 2.3.1 The reptile survey was designed and overseen by a senior ecologist who is an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) with over six years' experience. Survey visits were also undertaken by an experienced consultant ecologist with three years' experience of ecological survey, including extensive reptile survey experience.
- 2.3.2 Surveys of each Parcel were completed on the dates shown in Table 2-2 below.

	Survey Dates L	y raicei					
SURVEY NO.	M3 SOUTH VERGE	M3 NORTH VERGE	M3 R'BOUT	ARABLE EAST OF M3	EASTON DOWN FARM	PUDDING LANE FARM	WINNALL MOORS HIWWT
1	26/06/17	26/06/17	26/06/17	30/06/17	30/06/17	30/06/17	29/06/17
2	05/07/17	05/07/17	05/07/17	06/07/17	05/07/17	05/07/17	06/06/17
3	19/07/17	19/07/17	19/07/17	20/07/17	19/07/17	19/07/17	24/07/17
4	23/08/17	23/08/17	23/08/17	29/08/17	23/08/17	23/08/17	31/08/17
5	06/09/17	06/09/17	06/09/17	07/09/17	06/09/17	06/09/17	07/09/17
6	14/09/17	14/09/17	14/09/17	15/09/17	14/09/17	14/09/17	15/09/17
7	22/09/17	22/09/17	22/09/17	26/09/17	22/09/17	28/09/17	28/09/17

Table 2-2: Survey Dates by Parcel



2.4 EVALUATION

- 2.4.1 The value of the Site for reptiles was evaluated using the CIEEM Guidelines for Ecological Impact Assessment (CIEEM, 2016). This guidance recommends that valuation of site importance is made with reference to a geographical framework, e.g. a site is of local, regional, national value. To inform the assessment in this report the number of species recorded and peak counts of adults were considered in the context of the distribution and abundance of each species locally and nationally, the quality of habitat present and the abundance of such species on other sites.
- 2.4.2 Froglife guidance (1999) was used to inform the population size class estimates. However, due to certain limitations of the guidance, which does not include consideration of variables such as site size, whether both visual observation and refugia survey contribute to peak counts and individual reptile species ecology, professional judgement has been applied to avoid misinterpretation of data.

2.5 NOTES AND LIMITATIONS

- 2.5.1 The DMRB guidelines suggest that surveys should be confined to the months of April mid/late May and mid/late August – mid/late September. As shown in Table 1, three surveys of each Parcel were undertaken in June/July, outside of these dates. However, given that surveys were undertaken across a wide spread of dates and generally in optimal weather conditions, this is not considered to be a significant limitation.
- 2.5.2 Ten of the 49 survey visits, (20%) were undertaken wholly or partially in conditions exceeding the recommended temperature limit (>18°C). This was largely due to access difficulties, including Traffic Management restrictions and requirements to pre-arrange visits to the Winnall Moors HIWWT nature reserve. This may have reduced the chance of finding reptiles in these surveys and this limitation is taken into account when assessing the results. In particular, although no reptiles were recorded within the Winnall Moors HIWWT Parcel, it is not possible to conclude absence. Nevertheless this is not significant at a project level as this Parcel is likely to remain unaffected by the Proposed Works.
- 2.5.3 Survey effort was focused on those areas of reptile suitable habitat located within or close to the Site (*i.e.* those areas which may be directly affected by the Proposed Works). Beyond these areas it was not practical to survey all habitat within the Survey Area with the potential to support reptiles. Instead, a sampling approach was used to focus on those areas with potential to support significant reptile populations and that were well connected to the Site.
- 2.5.4 The verge of the A34 northbound carriageway contains suitable habitat within the Site. However, these areas were not subject to survey as it is not possible to access these verges without closing a lane of the road, which was not possible in daylight hours. Reptile surveys cannot be undertaken at night as the animals would be less likely to use the refugia which they utilise for warming. As such it is advised that the verge in this area should be assumed to support a reptile population as a precaution, and detailed mitigation proposals should take account of this limitation.
- 2.5.5 No snakes were recorded in any of the surveys. Despite this, and despite a lack of records in the local area, due to the low population densities that widespread snake species (grass snake *Natrix natrix* and adder *Vipera berus*) are generally found at, it is possible that these species could occur within the Survey Area. Mitigation recommendations account for this possibility.



2.5.6 Where surveys were carried out in areas of pasture or meadow (*i.e.* Easton Down Farm, Winnall Moors HIWWT and Pudding Lane Farm), only the margins were surveyed, providing areas of taller vegetation were present. The suitability of these habitats for supporting reptiles will vary dependent upon management. For example, prior to cutting, central areas of meadows will provide refuge and foraging opportunities for reptiles. However, it was not considered to be practical to survey these as management such as cutting and grazing would pose a hazard to animals utilising these areas, could harm cattle and would be inconvenient to land owners. Given the ephemeral nature of taller vegetation in these areas, this is not considered to be a significant limitation. However, it should be noted that reptiles could occur in these areas and that cessation of management could lead to increased habitat availability.



3 RESULTS AND EVALUATIONS

3.1 OVERVIEW

- 3.1.1 A total of two species of reptile were recorded during the presence/likely absence surveys; slow worm and common lizard. Reptiles were found to be absent in the M3 Roundabout Parcel.
- 3.1.2 As detailed in the limitations section, absence of reptiles could not be concluded for Winnall Moors HIWWT Parcel, and nor could the absence of snakes from the Survey Area be concluded.

3.2 RESULTS OF REPTILE SURVEY

- 3.2.1 No reptiles or evidence of reptiles was recorded within the M3 Roundabout Parcel and as such they can be considered absent from this area due to its isolation. The M3 Roundabout is isolated by several lanes of road on all sides, and is unlikely to be colonised by reptiles in the future.
- 3.2.2 No reptiles were recorded within the Winnall Moors HIWWT Parcel. However, due to the limitation inflicted by the temperature during some surveys (see Notes and Limitations section), as well as the presence of reptiles in adjacent parcels, it is concluded that reptiles may occasionally be present within the Wildlife Trust land, albeit at low numbers.
- 3.2.3 Slow worm was recorded within all five other parcels, with a peak count of 29 adults recorded in the M3 Northbound Verge Parcel, constituting an 'Exceptional' population based on the Froglife guidance (1999) (>20 adults at peak count). 'Good' populations (5-20 adults at peak count) of slow worm were recorded in the M3 Southbound Verge, Arable East of M3 and Easton Down Farm Parcels, whilst a 'Low' population (<5 adults at peak count) was recorded within the Pudding Lane Farm Parcel.
- 3.2.4 Common Lizard was recorded in three parcels; a 'Good' population in the Arable East of M3 Parcel, and 'Low' populations in the M3 North and Easton Down Farm Parcels, based on the Froglife guidance (1999) (5-20 adults at peak count).
- 3.2.5 As shown at Figure 2-2, reptiles were distributed throughout the Survey Area, with the exception of the Winnall Moors HIWWT and the M3 Roundabout Parcels. They were recorded to the east and west of the M3 and the A34, as well as in between.
- 3.2.6 The results of the reptile presence/likely absence surveys are summarised in Table 3-1 below, and presented on Figure 2-2, with raw data included in Appendix A.
- 3.2.7 Weather conditions during surveys ranged between 10°C and 22°C in temperature, with cloud cover of between 0 and 8 oktas (unit for cloud cover ranging from 0 and 8); full details are also included in Appendix A.



	M3 SO VERGE	UTH E	M3 NO VERGE	RTH E	M3 R'B	OUT	EAST (OF M3	EASTO DOWN	DN I FM	PUDDI LANE I	NG FM	WINNA MOOR HIWW	ALL T
SURVEY VISIT	Common Lizard	Slow Worm	Common Lizard	Slow Worm	Common Lizard	Slow Worm	Common Lizard	Slow Worm	Common Lizard	Slow Worm	Common Lizard	Slow Worm	Common Lizard	Slow Worm
1	0	1	0	0	0	0	7	9	0	1	0	2	0	0
2	0	0	0	3	0	0	5	2	0	0	0	0	0	0
3	0	0	0	5	0	0	3	3	0	2	0	1	0	0
4	0	9	1	29	0	0	0	9	0	18	0	0	0	0
5	0	4	0	19	0	0	7	8	3	14	0	1	0	0
6	0	0	3	11	0	0	1	1	0	7	0	0	0	0
7	0	0	0	12	0	0	11	3	1	4	0	1	0	0
Peak Adult Count	0	9	3	29	0	0	11	9	3	18	0	2	0	0
Pop. Size Class ³	-	G	L	E	-	-	G	G	L	G	-	L	-	-

Table 3-1: Summary of Survey Results

³ L = Low, G = Good, E = Exceptional (Froglife, 1999)



3.3 EVALUATION OF THE SITE FOR REPTILES

- 3.3.1 Taking into account the factors recommended by the CIEEM EcIA Guidelines (2016), an assessment of the importance of the Survey Area for reptiles has been made. This has considered the legislative and policy framework applicable to the Survey Area (see Legislative and Policy Framework section below), the habitat status of the Survey Area and the results of the survey in context with the surrounding landscape.
- 3.3.2 Slow worm and common lizard are partially protected under the Wildlife and Countryside Act 1981 (as amended), from killing and injury.
- 3.3.3 Two 'good' populations of lizard and an 'exceptional' population of slow worm were recorded utilising the Survey Area, and it is likely that these species also breed therein. Slow worm and common lizard are the most abundant UK reptile species, and are not Hampshire Biodiversity Action Plan species.
- 3.3.4 Overall therefore, the combined populations of reptiles utilising the Survey Area are considered to be of importance at a local scale.



4 IMPLICATIONS FOR DEVELOPMENT

4.1 LEGISLATIVE AND POLICY FRAMEWORK

LEGISLATION

- 4.1.1 Native, widespread reptile species (common or viviparous lizard, adder, grass snake and slow worm) are partially protected under Schedule 5 of The Wildlife and Countryside Act (1981), under part of Section 9(1) and all of Section 9(5). As such it is an offence to:
 - \rightarrow 'Intentionally or recklessly kill or injure' an individual of these species; or
 - → Sell, offer or expose for sale, or [have in] possession or transport for the purpose of sale, any live or dead [individual] or any part of, or anything derived from' an individual of these species.
- 4.1.2 All species of reptile are also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies, including local planning authorities have a duty to have regard for SPI when carrying out their functions, including determining planning applications.

RELEVANT PLANNING POLICY

- 4.1.3 As the project qualifies as a Nationally Significant Infrastructure Project (NSIP), it must adhere to the National Policy Statement (NPS) for National Networks (Department for Transport 2014). This states *inter alia* that the principals and objectives of the government's *2012 Natural Environment White Paper (NEWP)* and *Biodiversity 2020 strategy* should be adhered to. These promote moving progressively from net biodiversity loss to net gain by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. The NPS also states that the likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats, on other species identified as being of principal importance for the conservation of biodiversity and that potential impacts on ecosystems should be clearly set out.
- 4.1.4 At the national level the National Planning Policy Framework (NPPF) (2012) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including reptile species. The Office of the Deputy Prime Minister circular 06/2005 also provides supplementary guidance, including confirmation that 'the presence of a protected species is a material consideration when a planning authority is considering a development proposal'.
- 4.1.5 The NPPF sets out, amongst other points, how at an overview level the 'planning system should contribute to and enhance the national and local environment by:
 - → ...recognising the wider benefits of ecosystem services; and
 - minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures...'
- 4.1.6 A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF, and includes the following:



- → '- if significant harm resulting from a development cannot be avoided...adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- → …opportunities to incorporate biodiversity in and around developments should be encouraged;
- → planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland...unless the need for, and benefits of, the development in that location clearly outweigh the loss...'
- 4.1.7 At a local level, Winchester City Council and the South Downs National Park have adopted the Winchester District Local Plan Part 1 (Adopted 2013). Chapter 9 is entitled 'High Quality Environment' with policy CP16 entitled *Biodiversity*. This states '*The Local Planning Authority will support development which maintains, protects and enhances biodiversity across the District, delivering a net gain in biodiversity, and has regard to the following:*
 - → Protecting sites of international, European, and national importance, and local nature conservation sites, from inappropriate development.
 - \rightarrow Supporting habitats that are important to maintain the integrity of European sites.
 - New development will be required to show how biodiversity can be retained, protected and enhanced through its design and implementation, for example by designing for wildlife, delivering BAP targets and enhancing Biodiversity Opportunity Areas.
 - → New development will be required to avoid adverse impacts, or if unavoidable ensure that impacts are appropriately mitigated, with compensation measures used only as a last resort.
 - → Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.
 - Maintaining a District wide network of local wildlife sites and corridors to support the integrity of the biodiversity network, prevent fragmentation, and enable biodiversity to respond and adapt to the impacts of climate change.
 - Supporting and contributing to the targets set out in the District's Biodiversity Action Plan (BAP) for priority habitats and species.
 - Planning proposals that have the potential to affect priority habitats and/or species or sites of geological importance will be required to take account of evidence and relevant assessments or surveys.
- 4.1.8 The Biodiversity Action Plan for Hampshire (2000) lists only two reptiles as Priority Species for the county, namely smooth snake and sand lizard.



5 RECOMMENDATIONS

5.1 AVOIDANCE AND MITIGATION MEASURES

- 5.1.1 In the first instance it is recommended that, where possible, habitat known to support reptiles is retained within the Proposed Works designs. Although the habitat of widespread reptile species is not directly protected by law, habitat removal or alteration has potential to cause death or injury to individual reptiles which should be avoided to ensure legal compliance (see Section 4).
- 5.1.2 Three route options are being considered for the M3 J9 improvements, and as the project is still at the Route Selection stage, the precise amount of habitat which will be lost is unknown.
- 5.1.3 Where it is not possible to avoid effects upon reptiles, it will be necessary to provide mitigation measures to avoid killing and/or injury of individual animals, and avoid detrimental effects upon the local populations.
- 5.1.4 Precise mitigation methods will depend on the final design, and should reflect the anticipated impacts. Some examples are provide in Table 5-1. The precise mitigation strategy for reptiles should be finalised prior to works commencing, and it may be appropriate to consult with stakeholders such as the local planning authority. Any removal of reptile habitat should be accompanied by the provision of replacement habitat to ensure that reptile populations can persist in the long-term. Further details are provided within Section 5.2.

IMPACT IN PARCEL	SUGGESTED MITIGATION
Significant habitat loss and/or likely isolation of reptile population	Translocation & Destructive Search
Low levels of habitat loss in most populated Parcel	Destructive Search
Low levels of habitat loss in least populated Parcels	Habitat Manipulation

5.1.5 Details on the steps involved in the mitigation methods recommended, should they be required, are provided below.

TRANSLOCATION

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- → Identification of a suitable receptor habitat: This should be of equivalent or greater size and habitat quality to the area of suitable reptile habitat to be lost, and not contain an existing reptile population; or alternatively sufficient enhancements should be possible to ensure additional individuals can be supported within the habitat area available. It is likely that all Parcels will contain sufficient area of retained, suitable habitat to allow any translocated individuals to be retained on-site.
- → The receptor areas should be enhanced to form suitable reptile habitat, through seeding as grassland and planting of hedgerow or patches of scrub to provide shelter. Permanent artificial refugia such as log piles should also be created within the receptor site to provide shelter for translocated reptiles and suitable habitat for hibernation.
- Trapping and translocation of reptiles from areas to be affected by the Proposed Works once receptor habitat has been prepared. This must be completed in advance of works and during the season in which reptiles are active, but should be completed before there is a risk of individuals being less active or entering hibernation if weather conditions are cooler (i.e. March to September). The perimeter of the works area adjacent to suitable habitat should be



fenced with reptile exclusion fencing⁴, and all suitable reptile habitat where reptiles have been recorded should be 'trapped out'. The trapping should comprise deployment of a high density of artificial refugia (i.e. 50 per hectare) which are then checked daily by a surveyor trained to capture any reptiles present and translocate them to the designated receptor habitat. It is likely exclusion would take a minimum of 60 suitable⁵ days (HGBI, 1998).

→ Completion of the translocation and maintenance of the exclusion area: Once five suitable days have passed in which no reptiles have been captured during suitable weather conditions, the translocation can be considered complete, after which a destructive search should be undertaken prior to works.

DESTRUCTIVE SEARCH

5.1.6 These methods should only be used during the reptile active season when it is considered there is low potential for reptiles to be encountered (i.e. following trapping and translocation of reptiles or where very minimal areas of suitable habitat are due to be affected).

Tool Box Talk

- 5.1.7 The ecologist will give a tool box talk to the vegetation clearance contractors; this will include:
 - → A brief introduction to the widespread reptile species which potentially may be discovered on the Site
 - \rightarrow Working methods to be employed, and permitted equipment types (e.g. hand tools).

Vegetation Clearance

- 5.1.8 Vegetation clearance must be completed using hand tools (these can include mechanised hand tools such as brush cutters or chainsaws). Clearance must move towards retained habitat on or adjacent to the Site (where not all habitat is due to be removed and connecting habitat is available). The steps listed below must be completed:
 - → Hand search by ecologist for reptiles within vegetation to be cleared
 - \rightarrow Clearance of vegetation to 200mm above ground level using hand tools
 - → Re-inspection of vegetation by ecologist
 - → Clearance to ground level (or as close as is practicable)
 - → Any active reptiles found must be captured by the suitably qualified ecologist and placed into a soft cloth bag before being moved to the receptor site or adjacent suitable habitat lying outside the working area. To reduce the chances of predation, any captured animals must be placed under suitable natural or artificial refugia.

⁵ Days on which weather conditions are suitable for surveying reptiles, between 10 and 18°C, with sunny spells.



⁴ Also referred to as 'temporary amphibian fencing' (TAF) which serves the same purpose for amphibian translocations.

Soil Stripping

5.1.9 Once the vegetation has been reduced to ground level (or as close as is practicable) land within the Proposed Works area should be soil-stripped under an ecological watching brief. Some reptiles, particularly slow-worm, burrow down into the topsoil and risk being killed or injured. Soil stripping should entail use of a 360 degree tracked excavator (7 tonne or similar) using a small toothed bucket to carefully scrape back the remaining vegetation and 150mm of topsoil. The topsoil and any debris must be spread on to the ground to allow the ecologist to search for any remaining reptiles, in the unlikely event that animals are present.

HABITAT MANIPULATION

- 5.1.10 In instances where very small impacts are anticipated, or there is a low risk of encountering reptiles, habitat manipulation without ecological supervision may be sufficient. This involves directional clearance of suitable habitat in a two-stage strim as per the destructive search, from the 'inside' footprint of the works towards areas of suitable habitat.
- 5.1.11 If no suitable habitat is present adjacent, it should be created in line with the enhancement measures detailed below.
- 5.1.12 If a reptile is encountered during any habitat manipulation, works should immediately cease and an ecologist be contacted for advice.

5.2 ECOLOGICAL ENHANCEMENT MEASURES

- 5.2.1 The NPPF, The Winchester District Local Plan Policy CP16 and the DMRB all require or recommend ecological enhancement measures to be designed into new development schemes. Therefore, it is recommended that enhancement measures are incorporated into the proposals which seek to achieve net gain in habitat available to reptiles on-site, and enhance habitat connectivity within the landscape.
- 5.2.2 The detailed enhancement programme must be based on the final design proposals. However it is advised that the following measures should be considered for inclusion within the Proposed Works.
 - → Allowing the development of broad hedgerow margins adjacent to retained hedgerows, with some scrub cover extending out into the grassland, creating interface habitat which is of particular value to reptiles.
 - → Development of a low intensity, 'reptile friendly' cutting regime along road verges, retained and created hedgerows and other interface scrub habitats, allowing long grass to provide cover for reptile species during summer months.
 - → Ensuring created habitats within the Proposed Works are connected to high quality habitat areas outside the Site such as the woodland and scrub mosaic to the north, thus allowing for the potential colonisation by reptiles in the future of these areas, and enhancing habitat connectivity in the local area.
 - → Installation of log piles or rock piles to serve as refugia, and installation of larger such structures to act as hibernacula.
 - → The provision of one / more 'egg laying heaps' for grass snakes. These are primarily piles of rotting vegetation in which grass snakes lay their eggs (usually in the early summer) and which provide protection from predation, as well as a constant temperature in which the eggs can develop. Additional vegetative material should be added each year to ensure the long term maintenance of high quality habitat. Although grass snake were not recorded within the Survey Area, the presence of suitable habitat (standing/running water, marshy grassland, marginal vegetation) may encourage them to colonise in future. Thus, including enhancements for grass snake can serve to 'future proof' the Proposed Works.



→ It is recommended that this is set out in a habitat management plan, which includes a commitment to monitoring the reptile population present.



6 CONCLUSION

- 6.1.1 WSP has undertaken a presence/likely absence survey for reptile over seven Parcels within the Survey Area, all of which contain a variety of habitats suitable for active and/or hibernating reptiles.
- 6.1.2 Common lizard and slow worm are considered to be present in six of the seven Parcels, with the exclusion of the M3 Roundabout section which is isolated by roads. The density of reptiles varied across the Survey Area between low and exceptional peak counts as defined by Froglife (1999). The highest numbers found were in the M3 North, East of M3 and Easton Down Parcels.
- 6.1.3 Slow worm and common lizard receive legislative protection from killing and injury under the Wildlife and Countryside Act 1981 (as amended); they are also afforded population level protection under national and local policy.
- 6.1.4 As such mitigation and enhancement measures have been recommended to minimise the risk of killing/injuring reptiles. Translocation, destructive search and/or habitat manipulation should be considered based on the level of impact arising from the final scheme design. Further, enhancements have been recommended to maintain a favourable population status and 'future-proof' the Site for future population increases.



REFERENCES

7.1 PROJECT REFERENCES

- → WSP (2016) M3 Junction 9 Improvement PCF Stage 1. Ecological Desk Study
- → WSP (2017) M3 Junction 9 Improvement PCF Stage 2. Phase 1 Habitat Survey

7.2 TECHNICAL REFERENCES

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- → UK Biodiversity Action Plan priority Species List. Available at: http://jncc.defra.gov.uk/page-5717. [Accessed 24/10/17].



FIGURES

FIGURE 1-1 SITE LOCATION PLAN





Conta	ains Ordi	nance	Survey data © Crown copyright	and dat	tabase	a right 2017	ource: Esri, DigitalGlobe, GeoEye, Earthstar G N, and the GIS User Community	eographics, CNES/Air	bus DS, USDA, US	GS, AeroGR	ID,
							PROJECT:	SCALE @ A3:	CHECKED:	APPROVED:	
						NSD	M2 Junction 0	7,500	LR	HS	
								FILE:	DRAWN:	DATE:	
						-		A3 Template	BW	August 2	2017
						-	TITLE:	PROJECT No:	DRAWING No:		REV:
REV	DATE	BY	DESCRIPTION	снк	APP	🚖 highways	Site Location Plan	70016638	1		А
DRAWIN	IG STATUS:	-	DRAWING STATUS	-		england		©	WSP Group plo	;	-

FIGURE 2-1 REPTILE SURVEY AREA





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

							PROJECT:	SCALE @ A3:	CHECKED:	APPROVED:
							M3 Junction 9	9,900	LR	AH
								FILE:	DRAWN:	DATE:
								A3 Template	BW	November 2017
							TITLE:	PROJECT No:	DRAWING No:	REV:
REV	DATE	BY	DESCRIPTION	СНК	APP	🚬 highways	Reptile Survey Area	70016638	2-1	А
DRAWI	NG STATUS:		FINAL			england		©ν	WSP Group plc	

FIGURE 2-2 REPTILE SURVEY RESULTS





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

							PROJECT:	SCALE @ A3:	CHECKED:	APPROVED:	
						NSD	M3 Junction 9	9,930	LR	AH	
								FILE:	DRAWN:	DATE:	
						•		Reptile Results	BW	October 2017	7
							TITLE:	PROJECT No:	DRAWING No:	REV:	
REV	DATE	BY	DESCRIPTION	СНК	APP	🚬 highways	Reptile Survey Results	70016638	2-2	А	٩.
DRAW	NG STATUS:		DRAWING STATUS			england		© I	WSP Group plc		



Appendix A

RAW SURVEY DATA

Date:	05/07/2017	Description of w	eather prior to survey				Sunny and v	varm			
	Time	Air temperature ^o	C (in shade)	Cloud cov	/er (oktas)	Vir	nd speed (Beau	fort Scale)		Rain (0-4)	
Start:	09:20	18		•	-		٢			0	
End:	11:00	21			-		+			0	
Notes (Inc. des survey/photo numb surve	sription of weather during ers/whether all refugia on site yed/limitations):				rodellod boxed	- 	(dhron)				
Shorthand:		F = fe	(SW=slow wor male. M = male. AU = .	m, GS=grass snah Adult - sex uncon	ieaveu rieriebou ke, CL=common firmed. SA = su	lizard, A=adde b-adult, J = iuve	r) r) enile/hatchling				
Refuaia number or	Result (Where species is record	ed enter number of indiving	duals under appropriat quired by project aims,	e sex and age clas (thereby minimising	s - record sex an disturbance an	d age of reptile v d avoiding biasir	where possible to g results).)	o observe this wi	thout handling	g, unless spe	cifically
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								_			
											T
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Rain: 0=none, 1=drizz	ile, 2=light, 3=moderate, 4=heavy.	Cloud: 0-8 oktas. Beau	ifort Scale: 0=calm, 1=	light air (smoke drif	fts in wind), 2=lig	ht breeze (leave	s rustle, wind fe	It on face), 3=gei	ntle breeze (li	ght flags exte	nded,
small twigs in constan	t motion); 4=moderate wind (dust	leaves and loose paper	raised, small branches	s move), 5=fresh wi	nd (small trees s	way), 6=strong v	vind (large bran	ches move, whist	ling in phone	lines, difficult	t to use
umbrellas), 7-12=inap	propriate conditions for reptile sur	vev.									

Da	te:	-	9/07/2017		Dest	cription of	weather pi	ior to surve	ey:			F	hundersto	ms overniç	ght and ear	ly morning			
		Time			Air t	emperature	, ⁰C (in sha	de)	-	Cloud cove	ər (oktas)		Wine	l speed (Be	eaufort Sca	le)		Rain (0-4)	
Start:		00:00				17				8				-				0-1	
End:		10:45				15	~			8				1				0	
Notes (Inc nu	description imbers/whe survey	of weather c ther all refuç ed/limitation	during surv jia on site ⊧s):	ey/photo							Overc	ast and hu	mid						
Short	and:						: female, M	(SW=slow) = male, AU	worm, GS=g = Adult - se	arass snake sx unconfir	e, CL=comr med, SA =	mon lizard, sub-adult,	A=adder) J = juvenil	e/hatchling					
Refuaian	umber or	Result (W	here species	s is recorde	d enter num	ber of indivi	duals under pro	appropriate)ject aims, (t	sex and age hereby minin	e class - reco nising disturt	ord sex and bance and a	age of repti avoiding bias	le where pos sing results).	ssible to obs)	serve this wit	hout handlir	ng, unless sl	pecifically re	quired by
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Rain: 0=non	e, 1=drizzle, 2	2=light, 3=mo	derate, 4=he	avy. Clouc	1: 0-8 oktas.	Beaufort :	Scale: 0=ca	Ilm, 1=light a	ir (smoke dri	fts in wind),	2=light bree.	ize (leaves r	ustle, wind fe	elt on face),	3=gentle bre	eeze (light fla	lags extende	ed, small twig	Is in
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Date:	23/08/2017	Descri	ption of wea	ther prior to s	urvey:				Humid	warm				
	Time	Air tem	perature ⁰ C	(in shade)		Cloud cover (c	oktas)	×	ind speed (B	eaufort Scal	le)	Rai	n (0-4)	
Start:	10:40		18			7			0	_			0	
End:	12:00		19			7			0	_			0	
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				(SW=slo	w worm, GS=	egrass snake, C	L=common l	izard, A=add	er)					
Shorthand:			F = fem a	ale, M = male,	AU = Adult -	sex unconfirme	ed, SA = sub	adult, J = ju	/enile/hatchl	ing				
Refugia number or	Result (Where species is record	ded enter numb	er of individu requ	als under appl ired by project	opriate sex a aims, (thereb	nd age class - re y minimising dis	cord sex and turbance and	age of reptile avoiding bias	where possit ing results).)	ole to observe	e this without h	andling, u	unless spec	cifically
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End:	13:30				-	8			-					-			0	
Notes (Inc. de survey/photo num surv	scription of weatl bers/whether all I eyed/limitations):	her duri refugia	ing on site						Warm &		e start duc		5 M 3					
Shorthand:			1				(SW=slow	worm, GS=	=grass snah	(e, CL=con	mon lizar	d, A=adde						
	Result (Where s	species	is recorded	d enter nur	T =	female, N.	l = male, A	U = Adult -	nd age class	firmed, SA	= sub-adt	ult, J = juve of rentile v	here possit	he to obser	ve this witho	out handlir	s selunes s	necifically
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small twigs in consts umbrellas), 7-12=ina	ant motion); 4=mot ppropriate conditic	derate w	vind (dust, reptile survi	leaves anc 'ey.	a loose pa	oer raised,	small bran	ches move)	, 5=fresh wi	nd (small tr	ees sway),	6=strong w	/ind (large t	oranches m	ove, whistlir	ig in phone	e lines, diffic	ult to use

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End:	11:30			12				2				0				0	
Notes (Inc. des survey/photo numb surve	cription of weather sers/whether all refu syed/limitations):	during gia on site															
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umbrellas), 7-12=ina	opropriate conditions	for reptile sur-	vey.														

Date:	22/09/2	:017	ð	scription of	weather pri	or to surve	ż									
	Time		Air	* temp eratu r	e [°] C (in sha	de)	⁰	oud cover (c	oktas)		Wind speed	I (Beaufort \$	Scale)		Rain (0-4)	
Start:	10:30			÷.	_			0				0			0	
End:	12:30			÷	10			٢				0			0	
Notes (Inc. des survey/photo numi surve	scription of weath bers/whether all re syed/limitations):	er during ıfugia on si	ite													
Shorthand:					(S (S	W=slow wo male, AU =	rm, GS=gra Adult - sex	ass snake, C c unconfirme	L=commol d, SA = st	n lizard, A= Ib-adult, J	adder) = juvenile/hat	chling				
Refugia number or	Result (Where sp	tecies is rec	corded enter r	number of ind	ividuals und equired by	er appropria project aims	tte sex and a , (thereby m	age class - re iinimising dis	cord sex al turbance al	nd age of re nd avoiding	ptile where pc biasing result	ssible to obs s).)	serve this with	nout handlir	ıg, unless sp	pecifically
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small twigs in consta	nt motion); 4=mode	trate wind (dust, leaves a	ind loose pap	er raised, sr	nall branche	s move), 5=	fresh wind (s	mall trees	sway), 6=sti	ong wind (larg	le branches	move, whistli	ng in phone	e lines, diffic	ult to use
umbrellas), 7-12=ina,	opropriate condition	ns for reptile	e survey.													

Date:		26/06/2017		Dest	cription of	weather pri	or to surve	iy:				Sunny warm	, low cloud	cover			
		ime		Air tu	emp er atu re	^o C (in sha	de)	o	loud cover (o	oktas)		Wind speed	(Beaufort S	ŝcale)		Rain (0-4)	
Start:	1	0:10			16				2				1			0	
End:	÷-	1:50			15	~			2				1			0	
Notes (Inc. (survey/photo nu su	description o ımbers/wheth ırveyed/limita	ศ์ weather dเ าer all refugi ttions):	uring la on site														
						Late s	tart due to	TM - warm	due to late st	tart. Dead b	arn owl on a	south bound	i near mat 6	i. Mat 21 mis	ssing		
Shorthand:					F = f	emale, M =	male, AU =	arm, <u>eo=gr</u> = Adult - se	ass snake, u x unconfirme	uter recommon	nzara, A=a p-adult, J = _	uaer) juvenile/hato	chling				
Refuaia number	Result (\	Where specie	s is recorde	enter nui	mber of ind.	ividuals und equired by	er appropria project aims	ate sex and s, (thereby r	age class - re ninimising dist	cord sex and turbance and	d age of rept d avoiding bi	ile where pos asing results	ssible to obs().)	erve this with	out handlin	ıg, unless sp	ecifically
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small twigs in con	istant motion);	4=moderate	wind (dust,	, leaves and	d loose pap	er raised, sr	nall branche	es move), 5=	=fresh wind (s	mall trees sv	vay), 6=stroi	ng wind (larg	e branches r	move, whistli	ng in phone	e lines, difficu	ult to use
umbrellas), /-12=	inappropriate	conditions to	r reptile sur	vey.													

Date:	05/07/2017	Description of v	veather prior to sur	vey:			Su	nny and warı	u			
	Time	Air temperature	^o C (in shade)	ö	oud cover (oktas)		Wind sp(eed (Beaufor	t Scale)		Rain (0-4)	
Start:	09:20	18			٢			+			0	
End:	11:00	21			-			-			0	
Notes (Inc. des survey/photo numt surve	scription of weather during bers/whether all refugia on sitr syed/limitations):	۵					100 J CC 30 44	-				
Shorthand:			(SW=slow)	worm, GS=gra:	broad leaved ne ss snake, CL=col	mmon lizard	A=adder)					
		F=f	emale, M = male, Al	U = Adult - sex	unconfirmed, S/	A = sub-adul	t, J = juvenile/l	hatchling				
Refugia number or	Result (Where species is reco	orded enter number of indi ru	viduals under approped	oriate sex and a ms, (thereby mi	ige class - record : nimising disturbar	sex and age (nce and avoid	of reptile where ing biasing res.	possible to ol ults).)	bserve this wit	hout handlin	ig, unless spi	ecifically
visual observation	SW			GS			С			A		
location	F M AU	SA J	L	AU SA	r	Σ	AU =	-	Σ	ш	AU J	
20 (N)	- 0						+					
(N) 12	N	•										T
8 (N)		-										
							+					
							+					
Rain: 0=none, 1=driz	zle, 2=light, 3=moderate, 4=hea	avy. Cloud: 0-8 oktas. Bea	ufort Scale: 0=calm,	, 1=light air (sm	oke drifts in wind)), 2=light bree	ze (leaves rust	e, wind felt or	n face), 3=gen	itle breeze (li	ight flags ext	ended,
small twigs in constan	nt motion); 4=moderate wind (dt	ust, leaves and loose pape	er raised, small branc	ches move), 5=f	resh wind (small t	trees sway), 6	=strong wind (I	arge branche	s move, whistl	ing in phone	e lines, difficu	It to use
umbrellas), 7-12=inaț	opropriate conditions for reptile	survey.										

Date		19/07/2017	Description of weath	er prior to survey:		Thunde	storms overnig	jht and early mori	ning		
		Time	Air temperature ^o C (ir	shade)	Cloud cover (okta	s)	Wind speed (Be	eaufort Scale)		Rain (0-4)	
Start:		00:60	17		8		-			0-1	
End:		10:45	18		8		-			0	
Notes (Inc. dƙ nun	sscription hbers/whe survey	of weather during survey/photo sther all refugia on site yed/limitations):			õ	vercast and humid					
Shorth	:put		E - fema	(SW=slow worm	, GS=grass snake, CL=c	ommon lizard, A=add	er) enile/hatchling				
		Result (Where species is records	enter number of individuals u	nder appropriate sex a	nd age class - record sex	and age of reptile when	e possible to obs	erve this without ha	andling, unless s	specifically requ	uired by
visual obse	rvation	MS		5	6 S	6	CL			A	
locatio	r.	F M AU	SA J M	F AU	SA J	<u>ц</u>		Σ	ш	r n	
21 (N	(-									
5m south of	* 27 (N)	2	1								
27 (N	()	-	+			_					
41 (r.		-									
			_								
		_									
		_									
				_							
						_					
						_					
			_								
		_									
Rain: 0=none,	1=drizzle,	2=light, 3=moderate, 4=heavy. Clou	d: 0-8 oktas. Beaufort Scale:	0=calm, 1=light air (sm	oke drifts in wind), 2=light l	oreeze (leaves rustle, w	ind felt on face),	3=gentle breeze (li	ght flags extend	led, small twigs	. ⊑
constant motio	n); 4=mod€	erate wind (dust, leaves and loose pa	ther raised, small branches mo	/e), 5=fresh wind (smal	I trees sway), 6=strong wir	nd (large branches mov	e, whistling in pho	me lines, difficult to	use umbrellas),	, 7-12=inappro	priate
conditions for I	reptile surv.	ley.									

Date:	23/08/2017	Description of v	veather prior to survey	×			lumid warm				
	Time	Air temperature	⁰ C (in shade)	Cloud cover	(oktas)	Wind spt	ed (Beaufort St	cale)	Ra	in (0-4)	
Start:	10:40	18		7			0			0	
End:	12:00	19		7			0			0	
Notes (Inc. desc survey/photo numb survey	ription of weather during ars/whether all refugia on site /ed/limitations):			Ľ	tte set out due to) IPV issues					
Shorthand:		F=fe	(SW=slow wo ∋male. M = male. AU =	rm, GS=grass snake, Adult - sex unconfirr	CL=common liz: ned. SA = sub-ac	ard, A=adder) Jult. J = juvenile/F	latchling				
Refuaia number or	Result (Where species is record	ed enter number of indiv	/iduals under appropria equired by project aims,	te sex and age class - (thereby minimising d	record sex and ac isturbance and av	ge of reptile where voiding biasing rest	possible to obse ults).)	srve this without	t handling,	unless speci	ifically
visual observation	E M AI		Ē	GS SA	2			<u> </u>	A		
5 (N)	2 	5	-	5	<u> </u>	2			2	,	
20 (N)	- 1	€.									
21 (N) 24 (N)	5 1 Tood	4									
24 (N) 26 (N)	1										
26-27 (N)		1									
27 (N)	2 3										
29 (N)	1										
32 (N)	2	2									
33 (N)		-									T
34 (N)	-	-									
(N) 65	1 0	0									
(N) 14		7									
										1	
										1	
Rain. O-none 1-drizz	le 2-licht 3-moderate 4-heavy	Cloud: 0-8 oktas Bea	infort Scale: 0-calm 1-	-liaht air (emoke drifte	in wind) 2-liaht h	Iteaver (leaver rist)	e wind felt on fa	re) 3-rentle h	raaza (lidh	t flags avtand	had
small twigs in constant	t motion); 4=moderate wind (dust	, leaves and loose pape	ir raised, small branche	s move), 5=fresh wind	(small trees sway), 6=strong wind (k	arge branches m	nove, whistling in	in phone lin	ies, difficult t	to use
umbrellas), 7-12=inap,	propriate conditions for reptile sur	vey.									

Date:	06/09/2017		Description	1 of weather	prior to surv	vey:				Warm &	Sunny				
	Time		Air tempers	nture ⁰ C (in sl	nade)	-	Cloud cover (ok	ttas)	Wir	d speed (B	eaufort Sca	le)	œ	tain (0-4)	
Start:	11:15			16			4			-				0	
End:	13:30			18			7			-				0	
Notes (Inc. d survey/photo nui sui	lescription of weather durin mbers/whether all refugia o rveyed/limitations):	n site					Warm & Sunny	ate start o	lite to accide	10 M3					
					(SW=slow	vorm, GS=g	Irass snake, CL-		ard, A=adde	r)					
Shorthand:				F = female, N	I = male, AU	l = Adult - s	ex unconfirmed	l, SA = sub-a	dult, J = juv	snile/hatchl	ing				
Refugia number o	Result (Where species is or	s recorded (enter number o.	f individuals u required t	nder approp vy project ain	riate sex anc ns, (thereby	d age class - reα minimising distu	ord sex and a rbance and a	ige of reptile v voiding biasir	where possit ng results).)	ole to observ	<i>i</i> e this withou	ut handling	j, unless spe	ecifically
visual observatio	u u	SW				GS	þ			۲.	F		٩		
location	F M AU	SA	n	Μ	ц	AU §	SA J	M	ц	AU	ſ	M F		VU J	
1 (N)	-														
21 (N)	5														
27 (N)	en l														
29 (N)	1														
31 (N)	1														
33 (N)	-			1	-										
34 (N)	e		+					_							
35 (N)	2		1												
39 (N)				1											
								_							
		┥						+							
		T										T			T
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		\vdash													
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		+										T			T
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					ſ										
		+										T	Ī		T
Pain. 0-none 1-d	rizzla 2-linht 3-moderate 4	1-heavy CI	10.10-8 oktas	Boaufort Sc.	men-O-ole	1-licht air (6	smoke drifts in w	ind) 2-licht h	inteal) areard	s ructla wind	4 falt on face	a) 3-rantla	hraaza (lic	the sheet the	papua
small twice in cons	stant motion): 4=moderate win	nd (dust. le:	aves and loose	paper raised.	small branc	hes movel.	5=fresh wind (sm	nall trees swav	z). 6≡strong w	vind (large b	ranches mo	-ve. whistling	a in phone	lines. difficu	It to use
umbrellas), 7-12=ir	nappropriate conditions for rep	ptile survey	l.												

Date:	14/09/2017	Description of weather prior to	survey:	Ÿ	ain overnight, chill			
	Time	Air temperature ^o C (in shade)	Cloud cover (oktas)	Wind	speed (Beaufort Sc	cale)	Rain (0-4)	
Start:	09:30	12	2		0		0	
End:	11:30	12	2		0		0	
Notes (Inc. des survey/photo numb surve	cription of weather during ers/whether all refugia on site yed/limitations):							
Shorthand:		(SW=slc F = female. M = male	ow worm, GS=grass snake, CL=cor ∴ All = Adult - sex unconfirmed. SA	nmon lizard, A=adder) = sub-adult_J = iuveni	le/hatchling			
Refucia number or	Result (Where species is record	ted enter number of individuals under appreciation tender apprecia	propriate sex and age class - record s propriate sex and age class - record s # aims. (thereby minimising disturban	ex and age of reptile whe	ere possible to obser esults).)	rve this without har	ndling, unless sp	ecifically
visual observation	SW		GS	° C			A	
location	F M AU	SA J M F	AU SA J	M F A	<u>-</u>	Ш	AU J	
20 (N)	-							
27 (N) 20 (N)		•						
32 (N)	- m	-						
34 (N)	o	-						
35 (N)	1							
41 (N)					1			
5 (N)					1 1			
Rain: 0=none, 1=driz:	zle, 2=light, 3=moderate, 4=heavy	/ Cloud: 0-8 oktas. Beaufort Scale: 0=ci	alm, 1=light air (smoke drifts in wind)	2=light breeze (leaves ru	ustle, wind felt on fa	ice), 3=gentle breez	ze (light flags ext	ended,
small twigs in constar umbrellas), 7-12=inap	<pre>nt motion); 4=moderate wind (dus propriate conditions for reptile su</pre>	t, leaves and loose paper raised, small br irvey.	rancnes move), b=tresn wind (small t	ees sway), o=strong win	a (large brancnes m	iove, wnistling in pr	none lines, difficu	It to use

Date:	22/09/2017	Description of weather	prior to survey:									
	Time	Air temperature ⁰ C (in s	shade)	Cloud cover (oktas)		Wind speed (B	eaufort Scale)		Rain (0-4)			
Start:	10:30	11		0		0			0			
End:	12:30	15		1		0			0			
Notes (Inc. des survey/photo numb surve	cription of weather during ers/whether all refugia on site yed/limitations):											
Shorthand:		F = female. h	(SW=slow worm, G M = male. AU = Adult	S=grass snake, CL=co	mmon lizard, A A = sub-adult, J	=adder) = iuvenile/hatchl	ina					
Refincts number or	Result (Where species is record	ded enter number of individuals u required	under appropriate sex bv proiect aims. (there	(and age class - record ebv minimising disturba	sex and age of n	ptile where possit biasing results).)	ole to observe th	nis without hand	lling, unless sp	ecifically		
visual observation	SW		est project tank	52 55 B	5	CL CL			A			
location	F M AU	SA J M	F AU	SA J	M	AU	۲ N	Ц	AU J			
20 (N)	1											
21 (N)	- 0											
27 (N) 32 (N)	2 5											
33 (N)	-	-										
35 (N)	-											
			_									
Rain: 0=none, 1=drizz	le, 2=light, 3=moderate, 4=heav	y. Cloud: 0-8 oktas. Beaufort St	cale: 0=calm, 1=light	air (smoke drifts in wind)), 2=light breeze	(leaves rustle, win	d felt on face),	3=gentle breeze	(light flags ext	ended,		
umbrellas), 7-12=inap	propriate conditions for reptile su	at, icaves and roose paper raised JIVey.			ucco oway), uno					10 000		
Date:	26/06/2017	Description of	weather prior to su	Irvey:			sunny w	arm, low clo	ud cover			
---	---	---------------------------	--	-------------------------------------	--	--------------------------------	-------------------------------------	-------------------------	----------------	----------------	------------------	-------------
	Time	Air temperature	⁰ C (in shade)		Cloud cover (okta:	s)	Wind sp	eed (Beaufo	rt Scale)		Rain (0-4)	
Start:	10:10	16			2			1			0	
End:	11:50	18			2			1			0	
Notes (Inc. des survey/photo numl surve	cription of weather during sers/whether all refugia on sit syed/limitations):	9										
			Late start due	to TM - warn	n due to late start.	Dead barn o	vl on south b	ound near m	at 6. Mat 21 n	nissing		
Shorthand:		E = F	(SW=SIOW emale, M = male, A	<u>vorm, GS=g</u> VU = Adult - s	<pre>prass snake, CL=c ex unconfirmed, 5</pre>	ommon lizaro SA = sub-adu	I, A=adder) It, J = juvenile	hatchling				
Refucia number or	Result (Where species is reco	orded enter number of ind	ividuals under appro equired by project a	priate sex and ims, (thereby	d age class - record minimising disturb	d sex and age ance and avoi	of reptile where ding biasing re	possible to sults).)	observe this w	vithout handl	ing, unless s	oecifically
visual observation	SW			GS			, ۲.				A	
location	F M AU	SA J	M	AU	SA J	×	F AU	٦	M	ш	AU ,	_
4 (S)	-											
									_			
									_			
									+			
												T
									+			
Rain: 0=none, 1=driz	zle, 2=light, 3=moderate, 4=hea	aw. Cloud: 0-8 oktas. Be:	aufort Scale: 0=calm	n, 1=light air (smoke drifts in wind	d), 2=light bre	eze (leaves rus	tle, wind felt	on face), 3=ge	entle breeze	(light flags ex	ttended,
small twigs in consta	nt motion); 4=moderate wind (d	ust, leaves and loose pap	er raised, small bran	iches move),	5=fresh wind (small	I trees sway),	6=strong wind	large branch	es move, whis	stling in phor	he lines, diffic	ult to use
umbrellas), 7-12=ina _l	ppropriate conditions for reptile	survey.										_

Date:	05/07/2017		Description of	weather pri-	or to surve	×				Sunny an	d warm				
	Time	A	ir temperature	i ^o C (in shac	le)	CIO	ud cover (okta:	s)	Winc	d speed (Be	aufort Sca	le)	E.	Rain (0-4)	
Start:	09:20		18	~			1			1				0	
End:	11:00		2.				1			1				0	
Notes (Inc. des survey/photo numi surve	scription of weather dur bers/whether all refugia syed/limitations):	ing on site					3road leaved h	elleborine n	orth of 33 (north)					
Shorthand:				(S)	M=slow wo	rm, GS=gras	ss snake, CL=c	ommon liza	d, A=adder)						
				female, M =	male, AU =	Adult - sex	unconfirmed, 5	SA = sub-ad	ult, J = juvei	nile/hatchli	Ju	3			:
Refugia number or	Result (Where species	is recorded enter	number of ind	ividuals und required by p	er approprie vroject aims.	tte sex and aç , (thereby mir	je class - recorc imising disturb:	d sex and agt ance and avc	e of reptile wi	here possib 3 results).)	le to observ	re this withou	ut handling	j, unless spi	ecifically
visual observation		SW				GS			U				A		
location	F	U SA	٦	M	Ā	U SA	r	¥	ш	AU	-	<u>ц</u>	A	n N	
					+	+						+	T		
				Ť							T		Ť		
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				Ť	╎	+				Ť	T	$\left \right $	Ť		
				Ť							T		Ť		
				Ť							T		Ť		
Rain. 0-none 1-driz	zla 2-licht 3-moderate	4-heavy Cloud	0-8 oktas Re:	aufort Scale	- 0-calm 1-	-linht air (smr	ske drifts in wind	4) 2-linht hre	אפעניקטן) פעפי	rustle wind	felt on face	a) 3=nentle	hreeze (lio	tht flace ext	pubed
small twigs in consta	nt motion); 4=moderate w	ind (dust, leaves	and loose pap	er raised, sn	all branche	s move), 5=fr	esh wind (small	trees sway),	6=strong wi	nd (large br	anches mo	ve, whistling	in phone i	lines, difficu	It to use
umbrellas), 7-12=ina _i	ppropriate conditions for I	eptile survey.													

Date:	19/07/2017	Desc	ription of w∈	ather prior	to survey:	_		Th.	understorms	overnight	and early mc	orning			
	Time	Air tei	mperature ⁰ C	(in shade		Cloud	cover (oktas)		Windsp	need (Beau	fort Scale)		Ra	in (0-4)	
Start:	00:60		17				8			٢				0-1	
End:	10:45		18				8			1				0	
Notes (Inc. descriptio numbers/w surv	on of weather during survey/phol hether all refugia on site veyed/limitations):	2					OVer	rcast and hum	Ę						
Shorthand:			E=fe	(S) male: M = r	V=slow wor nale. AU = A	m, GS=grass s. dult - sex unco	nake, CL=con	mmon lizard, A = sub-adult .J	\=adder) = iuvenile/hz	atchlind					
Refucia number or	Result (Where species is reco	orded enter numb	ier of individua	als under ap	propriate sex st aims, (there	and age class -	record sex an isturbance and	id age of reptile	where possib gresults).)	le to observ	e this without I	handling, ur	nless spec	cifically requ	ired by
visual observation	SW					SS			5		-		۷		
location	F M AU	L AS	Σ	Ŀ	AU	SA	- -	μ	AU	- -	Σ	ш	AL	<u>г</u>	
				+	+										
									+	+		+			
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			╉		╉	+			+	╉					
				+	+	+			+	+	+				
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					+					╉					
Rain: 0=none. 1=drizz.	le. 2=licht. 3=moderate. 4=hea.w. CI	oud: 0-8 oktas. I	Beaufort Sca	lle: 0=calm.	1=liaht air (s	moke drifts in wi	nd). 2=liaht bre-	eze (leaves rus	stle. wind felt o	n face). 3=	Jentle breeze	(liaht flaas e	extended	small twids	.9
constant motion); 4=mc	oderate wind (dust, leaves and loose	paper raised, sn	nall branches	move), 5=fr	esh wind (sm	all trees sway),	6=strong wind ((large branches	s move, whistlir	ng in phone	lines, difficult	to use umb	orellas), 7-'	12=inapprop	oriate
conditions for reptile su	urvey.						I								

Date:	23/08/2017	Desc	sription of v	reather prio	r to survey:					Humid \	varm				
	Time	Air te	smperature	C (in shade	(i	Clou	d cover (oktas)		Winc	I speed (Be	aufort Scale	(a	ß	ain (0-4)	
Start:	10:40		18				7			0				0	
End:	12:00		19				7			0				0	
Notes (Inc. desc survey/photo numb survej	rription of weather during ars/whether all refugia on sit /ed/limitations):	e					Late set o	out due to I	PV issues						
Shorthand.				NS)	'=slow worr	n, GS=grass	snake, CL=co	mmon lizan	d, A=adder)						
			F=fc	male, M = r	nale, AU = A	Adult - sex u	nconfirmed, S.	A = sub-adu	ilt, J = juver	vile/hatchlir	<u>b</u>				
Refugia number or	Result (Where species is reco	orded enter nui	mber of indiv re	iduals under quired by pr	r appropriat∈ oject aims, (e sex and age thereby mini	e class - record mising disturba	sex and age nce and avoi	of reptile which of the other of the other of the other othe	nere possibl results).)	e to observe	this without	: handling,	unless spe	cifically
visual observation	SW					GS			CL				A		
location	F M AU	SA	2	<u>u</u>	AU	SA	7	۲	4	N J	Σ	L	AI	r ſ	
4 (south)								Ţ		T			T		
ωσ			÷												
10	2 1		-												
11	-												l		
17	-														
18	1		1												
16															
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Rain: 0=none. 1=drizz	le. 2=light. 3=moderate. 4=hee	aw. Cloud: 0-6	3 oktas. Beau	ifort Scale:	0=calm. 1=li	iaht air (smol	<pre><c drifts="" in="" pre="" wind)<=""></c></pre>). 2=liaht bre	eze (leaves	rustle. wind	felt on face	. 3=aentle b	oreeze (liat	nt flags exte	and ed.
small twigs in constan	t motion); 4=moderate wind (d	ust, leaves and	I loose pape	r raised, smá	all branches	move), 5=fre	sh wind (small	trees sway),	6=strong win	iarge br	anches mov	e, whistling i	in phone lii	nes, difficul	t to use
umbrellas), 7-12=inap	propriate conditions for reptile	survey.													٦

Date:	06/09/2017		Description of	veather prid	or to surve	×				Warm &	Sunny				
	Time	A	\ir temperature	^o C (in shad	(e)	ö	oud cover (okt	tas)	Wit	nd speed (B	eaufort Scal	e)	R	tain (0-4)	
Start:	11:15		16				4			1				0	
End:	13:30		18				7			1				0	
Notes (Inc. d survey/photo nur sur	sscription of weather duri nbers/whether all refugia veyed/limitations):	ing on site				5	e Cunto	t to to	and	M 20					
Shorthand.				IS)	V=slow wo	rm, GS=gra	varm & Jumy iss snake, CL=	common liz	ard, A=adde	r)					
			F = 1	emale, M =	male, AU =	Adult - sex	<pre>c unconfirmed,</pre>	, SA = sub-a	dult, J = juv	enile/hatchl	ing				
Refugia number c	Result (Where species	is recorded enter	r number of indi r	viduals und: equired by p	er appropris roject aims,	tte sex and ∉ , (thereby m	age class - reco inimising distur	ord sex and a bance and a	ge of reptile	where possit ng results).)	ole to observe	e this withou	ıt handling	l, unless spi	ecifically
visual observatio	- -	SW				GS				5			A		
location	M M	U SA	-	5	A	U SA	-	₽	ш	AU	2 7	<u> </u>	4	n N	
10 (S) 18 (S)					\uparrow	+									
(2) 21	-														
						\vdash									
					╎			+							
					1			+							
Rain: 0=none, 1=d1	izzle, 2=light, 3=moderate,	4=heavy. Cloud.	1: 0-8 oktas. Bea	ufort Scale.	: 0=calm, 1=	=light air (srr	oke drifts in wi	nd), 2=light b	reeze (leave	s rustle, win	d felt on face	e), 3=gentle	breeze (lig	tht flags ext	ended,
small twigs in consi	ant motion); 4=moderate w	rind (dust, leaves	and loose pape	er raised, srr	all branche	s move), 5≕	fresh wind (sm	all trees sway	i), 6=strong v	vind (large b	ranches mov	æ, whistling	in phone l	lines, difficu	It to use
umbrellas), 7-12=in	appropriate conditions for I	eptile survey.													

Date:	14/09/20	17	Desi	cription of 1	veather pri	or to surve	y:				Ra	in overniç	jht, chill				
	Time		Airt	emp er atu re	°C (in shat	de)	Ċ	oud cover (c	oktas)		Wind s	peed (Bea	aufort Scale	(6		Rain (0-4)	
Start:	09:30			12				2				0				0	
End:	11:30			12				2				0				0	
Notes (Inc. des survey/photo numi surve	scription of weather bers/whether all refu syed/limitations):	during Jgia on site															
Shorthand:				F =	(S emale, M =	W=slow wo male, AU =	orm, GS=gra	ass snake, C	L=commo ed, SA = s	on lizard, /	A=adder) J = juvenile	.s/hatchlin	5				
Refugia number or	Result (Where spe	cies is recorde	ed enter nu	mber of indi	viduals und	er approprik project aims	ite sex and a , (thereby m	age class - re inimising dist	ecord sex a	and age of and avoidin	reptile when ig biasing re	re possible ssults).)	to observe	this withou	it handling	g, unless sp	pecifically
visual observation		SW			Ì		GS				, ว		╞		A		
location	M L	AU	SA	ſ	N	A .	U SA	-	Σ	ш	AU		Σ	ш	1	, ۱	
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							$\left \right $						$\left[\right]$				
Pain. O-none 1-driz	zla 2-linht 3-moder	rate 1-heavy	Cloud: 0-5	3 obtac Bas	ufort Scale	- O-calm	-licht air /em	Joka drifte in	I-c (puint	inht hraaz	in soveol) e	t puind t	falt on face)	3-dentle	hraaza (lic	ve anel the	tandad
small twigs in consta	nt motion); 4=moders	ate wind (dust	, leaves and	loose pape	er raised, sn	nall branche	s move), 5=1	fresh wind (s	small trees	sway), 6≕	strong wind	(large bra		, Jugaine e, whistling	in phone	lines, diffic	ult to use
umbrellas), 7-12=ina,	opropriate conditions	for reptile sur	rvey.														

Date:	22/09/2	:017	De	scription of	weather pri	or to surve	y:										
	Time		Air	· temperature	o [°] C (in sha	de)	ö	loud cover ((oktas)		Wind s	peed (Bea	ufort Scale)	_	8	ain (0-4)	
Start:	10:30			÷	_			0				0				0	
End:	12:30			1	2			٢				0				0	
Notes (Inc. des survey/photo numi surve	scription of weath bers/whether all re syed/limitations):	er during ıfugia on si	ite														
Shorthand:					(S emale, M =	W=slow wo male, AU =	ntm, GS=gr	ass snake, (x unconfirm	CL=comme hed, SA = s	on lizard, sub-adult,	A=adder) J = juvenile	/hatchlin					
Refugia number or	Result (Where sp	tecies is rec	corded enter n	umber of ind	ividuals und equired by	er appropris oroject aims	tte sex and a (thereby m	age class - re ainimising dis	ecord sex a	and age of and avoidii	reptile wher ng biasing re	e possible sults).)	to observe t	his without	handling	, unless sp	ecifically
visual observation		SW					GS				ರ -				٩		
location	∑	AU	SA	ſ	N N	A	n s≀	۲ ا	Σ	ш	AU		Σ	ш	A	n U	
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Rain. 0-none 1-driz	zle 2-licht 3-mod	lerate 4-he	Cloud.)-R oktas Ba	urfort Scale	- 0-calm 1.	-licht air (cn	noke drifts in	-c (puim	linht hreez	e (leaves rus	the wind	felt on face)	3-nentle h	rreeze (lin	ht flans ext	papua
small twigs in consta	nt motion); 4=mode	trate wind (dust, leaves a	nd loose pap	er raised, sr	nall branche	s move), 5=	fresh wind (:	small trees	sway), 6=	strong wind	(large bra	nches move,	whistling i	n phone I	ines, difficu	ilt to use
umbrellas), 7-12=ina,	opropriate conditior	ns for reptile	e survey.														

Dato:	2006/2012	Docorint	a noticoutien in	vior to curro	_			- thornard	ano pajurom	and here			
רמוכי.	1020000				·		2			1) allu wal,		:	
	l ime	Air temp	erature ⁻ C (in st	lade)	Cloud	cover (oktas)		Wind spee	d (Beautort S	cale)	-	Kaın (0-4)	
Start:	08:20		14			4			٢			0	
End:	10:20		16			4			-			0	
Notes (Inc. des survey/photo numb surve	cription of weather during ers/whether all refugia on site yed/limitations):												
Shorthand:			F = female,	(SW=slow w M = male, AU	orm, GS=grass s = Adult - sex unc	nake, CL=com confirmed, SA	mon lizard, A: = sub-adult, J	=adder) = juvenile/hato	hling				
Refucia number or	Result (Where species is record	Jed enter number of	[:] individuals unde	ar appropriate s roject aims, (th	ex and age class - ereby minimising d	record sex and listurbance and	age of reptile v avoiding biasir	where possible to ig results).)	o observe this v	without handlir	ng, unless sp	becifically req	quired by
visual observation	SW				GS			С			A		
location	F M AU	SA J	Σ	F	U SA	-	L W	AU	م	×	F A	r ₽0	
6	m												
11	£												
13		-											
19		-											
21	-												
06		-											
89	4												
29	1												
49								1					
57								1					
10m south of 60									1				
66									1				
67							1						
74									1				
112	+												
114		-											
132							-						
138	-												
Dain: 0-none 1-drizzl	e 3-licht 3-moderate 1-heavy	Cloud: 0-8 obtac E	teaufort Scale. /	n-calm 1-liabi	air /emoka driffe ir	n wind) 2-liaht	hreeze (leaves	nietle wind falt	on face) 3-de	ntla hraaza (liv	aht flage avte	llema bebue	twide in
constant motion): 4=mc	e, z-ligin, 3-liboerate, +-libavy. Iderate wind (dust: leaves and loo	se paper raised, sm	all branches mov	v=caint, t=iigti ∕e). 5≡fresh wir	id (small trees swa	ir wird), z=iigirt V). 6=strona wir	biecze (leaves Id (large brancl	nes move. whist	un ace), J-ye lina in phone li	ines, difficult to	gint nays exte D use umbrell	anueu, aman las). 7-	III chimi
12=inappropriate condi	tions for reptile survey.)						

Date.	20	100/20/2		Dec	rintion of	weather n							20	ht+				
2410.	- L	07100		Air 4	amperatur.	a ^o r (in ch				or (oktae)		Win	l eneed /B	aguitort Sc	(010		()-1) uie 0	
Ctart.	07.1			Z			anel							caulor oc	aic)			
Start. Fnd:	10.0	Ģ			-	0 6												
Notes (Inc. de survey/photo numl surve	scription of w bers/whether syed/limitatio	/eather d all refuç ns):	luring jia on site							- M	-						, ,	
Shorthand:					F =	(<u>(</u> emale, M	<u>sW=slow v</u> = male, Al	/orm, GS=ç J = Adult - s	grass snak	e, CL=com irmed, SA	mon lizar = sub-adu	<u>y.</u> d, A=adde lt, J = juve) nile/hatch	ling				
Refucia number or	Result (Wr	nere speci	ies is recorc	ded enter nu	umber of in	dividuals ur required by	nder approp / project air	oriate sex ar ns, (thereby	nd age class minimising	: - record se disturbanc	ex and age e and avoii	of reptile w ding biasin	here possit g results).)	ole to obser	ve this withc	out handling	g, unless s	pecifically
visual observation			SW					GS				U U				A A		
10Cation	<u><</u>	۷ 	AU	SA		Σ	L	AU	SA		×	L	AU	,	Σ		AU	,
86		-																
74												1						
62													1					
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Rain: 0=none, 1=dri. small twigs in consta	zzle, 2=light, (int motion); 4=	3=modera ⊧moderat∈	ate, 4=heav e wind (dust	y. Cloud: 0. t, leaves and	-8 oktas. B i 1 loose pap	eautort Sc er raised, ε	ale: 0=caln small branc	ו, 1=light aiו hes move),	r (smoke dri 5=fresh win	fts in wind), d (small tre	, 2=light bre es sway), 6	∋eze (leav∈ i=strong wi	s rustle, wi nd (large b	nd felt on fa ranches mo	ce), 3=gentl ve, whistling	le breeze (l g in phone	ight flags e lines, diffici	extended, ult to use
umbrellas), 7-12=ina	ppropriate cor	nditions fc	or reptile su	rvey.								,						

Date:	20/07/2017	Description of weather prior to	o survey:	Rain early morning	
	Time	Air temperature ⁰ C (in shade)	Cloud cover (oktas)	Wind speed (Beaufort Scal	le) Rain (0-4)
Start:	08:10	15	8	4	0
End:	10:10	14	8	£	-
Notes (Inc. desc survey/photo numbe survey	ription of weather during srs/whether all refugia on site ed/limitations):		Cloudy and ds	mo but not unsultable.	
Shorthand:		(SW=s F = female, M = ma	low worm, GS=grass snake, CL=com le, AU = Adult - sex unconfirmed, SA	mon lizard, A=adder) = sub-adult, J = juvenile/hatchling	
Refucia number or	Result (Where species is recor	ded enter number of individuals under a required by proje	appropriate sex and age class - record se ect aims, (thereby minimising disturbanc	 and age of reptile where possible to observe e and avoiding biasing results).) 	e this without handling, unless specifically
visual observation	SW		CS		۷-
location 6	A AU	SA J M F	AU SA J	M F AU J	- E
13	-				
19	-				
53				-	
58				-	
57		1-			
76				1	
130	1	1			
Rain: 0=none, 1=drizz	ile, 2=light, 3=moderate, 4=heav	V. Cloud: 0-8 oktas. Beaufort Scale: 0)=calm, 1=light air (smoke drifts in wind)	2=light breeze (leaves rustle, wind felt on face	e), 3=gentle breeze (light flags extended,
small twigs in constant	: motion); 4=moderate wind (dus	t, leaves and loose paper raised, small l	branches move), 5=fresh wind (small tre	es sway), 6=strong wind (large branches move	e, whistling in phone lines, difficult to use
umbrellas), 7-12=inap	oropriate conditions for reptile su	Irvey.			

Dato.		100/00/00	-		orintion of	a rotton	rior to curr					200	ht cool	action and an a	ning			
רמופי.		12100127						ey.		1-1-1-1-1			<u></u>		6			
		me		AIL	emperatur	e c(in sn	aae)		<u>, ioua cove</u>	r (oktas)			, speed (D		ale)	-	Kain (0-4)	
Start:	80	00							ומ								0 0	
End:	10	:30			-	6			7				-				0	
Notes (Inc. de survey/photo num surv	scription of bers/wheth eyed/limitat	[:] weather er all refu tions):	during gia on site					ä	eak at 09:3	0 to meet	Ross Sinc	leton for	safetv tour					
Shorthand:					E E	(S emale, M	sW=slow w = male, AU	orm, GS=g = Adult - s	rass snake ex unconfii	, CL=com rmed, SA :	mon lizard = sub-adul	l, A=adder t, J = juve) nile/hatchl	ing				
Refugia number or	Result (V	Vhere spe	cies is recor	rded enter nu	umber of in	dividuals ur required by	ider approp	riate sex and is, (thereby	d age class minimising	 record se disturbance 	x and age o	of reptile w ling biasing	nere possib g results).)	le to observ	/e this witho	ut handling	j, unless sp	oecifically
visual observation			SW.					GS				0				<u>م</u>		
acation 31	- -	Σ	AU	SA	~	Σ	Ł	AU	P A	2	-		AU	-	×			
39			1															
26				1														
18	1																	
6	2																	
8	-		-															
9	-																	
Rain: 0=none, 1=dri	zzle, 2=light	, 3=moder	ate, 4=heav	vy. Cloud: 0	-8 oktas. B	saufort Sc	ale: 0=calm	, 1=light air	(smoke drift	ts in wind),	2=light bre	eze (leave	s rustle, wir	nd felt on fa	ce), 3=gentl	e breeze (li	ight flags e:	xtended,
small twigs in constants	ant motion); -	4=modera	te wind (du:	st, leaves an	d loose pap	er raised, s	mall branch	les move), 5	j=fresh wind	l (small tree	es sway), 6	=strong wi	nd (large br	anches mo	ve, whistling	in phone I	ines, difficu	ult to use
	appropriate c			ui vey.														

Doto.		- 100/00/20		200	o noitaina		10 40 min						Cuman 2	llide vedasi				
Date:	i	1 1 100/201		nes				vey.					ouriny, si					
		ue .		AIL	emperatur	e c(in sn	aue)			r (oktas)		Ň	a) naads r		ale)		Kain (0-4)	
	50	.40				0	1		0								D I	
End:	11:	:40			-	5			80								0	
Notes (Inc. de survey/photo num surv	scription of bers/wheth eyed/limitat	weather d er all refuç ions):	luring jia on site						Sunda	clear war	m toward	s end of s	ILVev					
Shorthand:					F =1	(S emale, M	<u>SW=slow w</u> = male, AU	orm, GS=g I = Adult - s	Jrass snake ex unconfi	, CL=com rmed, SA =	mon lizard	l, A=adde t, J = juve	r) nile/hatch	ling				
Refuaia number or	Result (//	Vhere spec	ties is record	ded enter nu	umber of in	dividuals ur required by	ider approp	rriate sex an ns, (thereby	d age class minimising	- record se disturbance	x and age e and avoid	of reptile w ting biasin	here possil g results).)	ole to obser	ve this witho	out handling	g, unless s	pecifically
visual observation			SW.					GS				С С		-		<		
49	-	×	AU	AS	-	Σ	L	AU	PA AC	2	-	-	AU	,	5		AU	-
52														-				
57														1				
80											1	1	1	1				
WP138											-							
WP137														1				
110		1																
132												1						
88	~																	
87		1																
23		-																
19	TOAD																	
18	-																	
5	-																	
4		1																
92	-			-	1													
Rain: 0=none, 1=dri	zzle, 2=light,	. 3=modera	ate, 4=heav	y. Cloud: 0-	-8 oktas. Be	saufort Sc.	ale: 0=calm	ı, 1=light air	(smoke drif	ts in wind),	2=light br€	eze (leave	s rustle, wi	nd felt on fa	ice), 3=gent	le breeze (l	light flags ∈	extended,
small twigs in consta	ant motion); 4	4=moderat(e wind (dus	tt, leaves anı	d loose pap	ver raised, s	small brancl	nes move), (5=fresh winc	d (small tree	es sway), 6	=strong wi	nd (large b	ranches mc	ve, whistling	g in phone	lines, diffic	ult to use
umbrellas), 7-12=Iné	appropnate c	onditions fo	or reptile su	Irvey.														

Date:	_	15/09/201	7	Desc	srintion of	weather n	rior to surv	. No.					Colds	VIIII				
	Ē	me		Air te	smperature	e ^o C (in shi	ade)		Cloud cove	er (oktas)		Wind	speed (B	eaufort Sca	ale)		Rain (0-4)	
Start:	60	1:20			1	0			-				0				0	
End:	11	:20			1:	2			1				0				0	
Notes (Inc. dé survey/photo nun surv	sscription of bers/wheth /eyed/limitat	f weather (er all refu tions):	during gia on site					Chill	in the mor	nina. sunn	v. Warme	r towards	end of sur	Vev				
Shorthand:					F = f	(S emale, M	<u>W=slow w</u> = male, AU	orm, GS=g = Adult - s	rass snake ex unconfi	e, CL=com rmed, SA	mon lizard	l, A=adder t, J = juve) nile/hatchl	ing				
Refuaia number o	Result (V	Where spec	cies is record	led enter nu	umber of inc	lividuals ur required by	der approp project aim	riate sex and is, (thereby	d age class minimising	 record se disturbance 	x and age e and avoid	of reptile w ling biasinç	nere possib I results).)	le to observ	/e this witho	ut handling	j, unless sp	oecifically
visual observation			SW.		.			GS				Ū				∀ -		
57	-	Σ	AU	SA		×	L	AU	P AS	<	5			-	•			
50														1				
23																		
					T													
					T													
Rain: 0=none, 1=dı	rizzle, 2=light	; 3=moder	ate, 4=heavy	/. Cloud: 0-	8 oktas. Be	aufort Sca	ale: 0=calm	, 1=light air	(smoke drif	ts in wind),	2=light br€	eze (leave	s rustle, wir	nd felt on fa	ce), 3=gentl	e breeze (li	ight flags e	xtended,
small twigs in const umbrellas), 7-12=in.	ant motion); appropriate c	4=moderat	e wind (dust or reptile sur	t, leaves anc rvev.	d loose pap	er raised, s	mall branch	les move), {	5=fresh wind	d (small tree	es sway), 6	=strong wi	nd (large br	anches mo	ve, whistling	l in phone l	lines, difficu	ult to use

Date:	26/05	9/2017		Dest	cription of	weather i	prior to sur	rvev:				Mistv.	warm. So	me rain ov	reniaht			
	Time			Air te	emperatul	re ^o C (in sl	hade)		Cloud cov	ver (oktas)		Wir) peeed (Beaufort St	cale)		Rain (0-4)	
Start:	10:30					15				2				0			0	
End:	12:30					15				2				0			0	
Notes (Inc. des survey/photo numb surve	cription of wea ers/whether all yed/limitations	ather du 1 refugi: \$):	uring a on site															
Shorthand:					Ľ	(female, M	SW=slow = male, A	worm, GS: U = Adult -	=grass snal · sex uncon	ke, CL=con Ifirmed, SA	nmon lizal = sub-adı	rd, A=add 	er) enile/hatc	hling				
Refuaia number or	Result (Where	e specie	s is record	ed enter nu	umber of ir	ndividuals u required b	Inder appro	priate sex <i>ɛ</i> ims, (thereb	and age clas	ss - record s g disturbanc	ex and age se and avo	e of reptile siding biasit	where poss ng results).	sible to obse	srve this with	nout handlir	ng, unless s	specifically
visual observation			SW					GS					<u>۲</u>			-	4	
25	∑ ⊥		AU	SA	-	×	-	AU	SA	-	Σ	r.	PA	,	Σ	L	AU	~
4		٢																
83	1																	
50														ť	~			
49														2				
52														-				
58												-		-				
57														1	_			
56 (5m S)														-				
61														-				
68														-				
72											-							
76														-				
WP 139														-				
WP 136	-																	
		╡	Ī															
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		T																
		T		T														
Rain: 0=none, 1=driz	zle, 2=light, 3=n	noderate	e, 4=heavy	Cloud: 0.	-8 oktas. B	eaufort So	:ale: 0=cali	m, 1=light a	air (smoke d	rifts in wind)), 2=light bi	reeze (leav	es rustle, v	vind felt on f	face), 3=gen	ntle breeze	(light flags	extended,
small twigs in constar	nt motion); 4=mc	oderate	wind (dust,	, leaves an	d loose pa	per raised,	small bran	ches move)), 5=fresh wi	ind (small tre	ees sway),	6=strong v	vind (large	branches m	nove, whistlir	ng in phon∈	e lines, diffic	cult to use
umbreiias), r-i∠=iiia	propriate conun	TIOUS IOI	r repuie sur	vey.														

Date:	30/06/2017	Description of wea	ther prior to surv	ey:							
	Time	Air temperature ⁰ C	(in shade)	Cloud cove	r (oktas)	Wir	nd speed (Beaut	ort Scale)	œ	tain (0-4)	
Start:	10:50	16		5			-			0	
End:	11:20	17		5			-			0	
Notes (Inc. desc survey/photo numbe survey	ription of weather during srs/whether all refugia on si ed/limitations):	e									
Shorthand:		F = fema	(SW=slow w ile, M = male, AU	orm, GS=grass snake = Adult - sex unconfi	e, CL=common li rmed, SA = sub-	izard, A=adde adult, J = juv	enile/hatchling				
Refugia number or	Result (Where species is rec	orded enter number of individ requ	uals under approp ired by project aim	iate sex and age class is, (thereby minimising	- record sex and disturbance and	age of reptile v avoiding biasii	where possible to	observe this with	nout handling	, unless spe	ecifically
visual observation	SW			GS	:				A		
location ⊿	M AU	SA J M	LL	AU SA J	Σ	ш	AU J	M	4		
10	-										
.č 26		-									
Rain: 0=none, 1=drizz	:le, 2=light, 3=moderate, 4=he : motion): 4=moderate wind (d	avy. Cloud: 0-8 oktas. Beauf ust leaves and loose namer ra	ort Scale: 0=calm ised_small_branct	, 1=light air (smoke drif es move) 5=fresh win	ts in wind), 2=ligh I (small trees swa	nt breeze (leav w) 6≕strong w	es rustle, wind fe vind /large hrang	ilt on face), 3=ger hes move whistli	ntle breeze (liç	ght flags ex ines difficul	tended, t to use
umbrellas), 7-12=inapp	propriate conditions for reptile	survey.					2	f	-		

Date:	5	05/07/201	7	Desc	sription of	weather p	rior to surv	/ey:										
	Tin	ne		Air te	mperatur	e ^o C (in sh	ade)		Cloud cove	er (oktas)		Wine	speed (Bea	ufort Scal	e)	R	ain (0-4)	
Start:	08:	15			~	9			-				-				0	
End:	11:	00			1	8			-				-				0	
Notes (Inc. des survey/photo numb surve	cription of ers/whethe yed/limitati	weather (er all refu ions):	during gia on site						1.3.4.5 &	14 cut up ;	and crush	ed bv aras	s cutting					
Shorthand:					F = 1	(<u>(</u> female, M	<u>sW=slow w</u> = male, AL	rorm, GS=g J = Adult - s	grass snake sex unconfi	e, CL=com irmed, SA :	mon lizarc = sub-adul	l, A=adder t, J = juve) nile/hatchlir	jā				
Refugia number or	Result (W	/here spec	xies is record	ed enter nu	Imber of in	dividuals ur required by	rder approp	rriate sex an ns, (thereby	id age class minimising	 record se disturbance 	x and age e and avoic	of reptile w ting biasing	nere possible I results).)	to observe	this withou	ut handling	, unless sp	ecifically
visual observation			SW					GS	-			Ū				A		
location	Ŀ	Σ	AU	SA	ر	M	Ŀ	AU	SA J	_	1		4U J	Σ	ш	A	ר ח	1
10	1 x Dead				T													
					T													
					T													
																	l	
Rain: 0=none 1=driz	zle 2=liaht	3=moders	ate 4=heavv	Cloud: 0-	8 oktas Br	saufort Sc.	ale: 0=calm	1=lichtair	. (smoke drif	fts in wind)	2=liaht hre	eze (leave	s rustle wind	felt on face	a) 3=dentle	e hreeze (lic	ht flans ex	ktended
small twigs in constar	it motion); 4	l=moderat	e wind (dust,	, leaves and	l loose pap	ier raised, s	small branch	nes move),	5=fresh winc	d (small tree	es sway), 6	=strong wi	nd (large brai	Tches move	e, whistling	in phone li	nes, difficu	lt to use
umbrellas), 7-12=inaț	propriate co	onditions f	or reptile sur	vey.														

Date:	19,	/02/2017	2	Desc	ription of	weather p	rior to surv	vey:			Heavy r	ain and th	under night	before and	d early mo	rning		
	Time	a		Air te	mperatur	e ^o C (in sh	ade)		Cloud cove	er (oktas)		Wine	d speed (Be	aufort Sca	le)	В	tain (0-4)	
Start:	12:00	0			-	2			8				1				0-1	
End:	14:3(0			1	8			8				-				0	
Notes (Inc. des survey/photo numb surve	cription of w ers/whether yed/limitatio	eather d all refug ns):	luring jia on site						ing DM sur	Some	rain but s	uitable co	nditions sti	=				
Shorthand:					F = 1	(<u>s</u> emale, M	<u>SW=slow v</u> = male, AL	/orm, GS=	grass snak	e, CL=com irmed, SA	mon lizar	d, <u>A=adde</u> lt, J = juve	r) nile/hatchliu	. Du				
Refuaia number or	Result (Wh	ere speci	ies is recorde	ed enter nu	mber of in	dividuals ur required by	ider approp / project ain	nriate sex an ns, (thereby	nd age class	s - record se I disturbance	x and age e and avoid	of reptile w ding biasin	there possible g results).)	e to observe	e this withou	ut handling	l, unless sp	pecifically
visual observation			SW SW					GS								A .		
27	ž	_	A	AC		Ξ		AU	AC	_	<u>۲</u>			2	_		2	
25	-																	
1	-																	
				T	Ī								T					
				T	T													
				T						T								
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					Ţ							T						
					ſ							T					Ì	
				T														
Rain: 0=none. 1=driz	zle. 2=liaht. 3-	=modera	tte. 4=heaw.	. Cloud: 0-6	3 oktas. Be	aufort Sc.	ale: 0=calm	ι. 1=liαht air	r (smoke dri	fts in wind).	2=liaht bre	seze (leave	s rustle, wind	d felt on fac	e). 3=gentle	e breeze (li	aht flags ex	xtended.
small twigs in constar	it motion); 4=r	moderate	e wind (dust,	leaves and	l loose pap	er raised, s	small branct	hes move),	5=fresh win	d (small tree	es sway), £	ì=strong wi	nd (large bra	anches mov	e, whistling	i in phone li	ines, difficu	ult to use
umbrellas), 7-12=inaț	opropriate con	iditions fc	or reptile sur	vey.														

Date:	23/08/20	17	Desc	ription of v	reather pri	or to surve	sy:				cloudy w	arm humi	d. Sunny p	atches			
	Time		Air tei	mperature	⁰ C (in sha	de)	0	loud cover	(oktas)		Wind	speed (Be	aufort Sca	le)		Rain (0-4)	
Start:	13:30			19				9				1				0	
End:	14;30	_		19				9				1				0	
Notes (Inc. descr survey/photo number survey	ription of weather rs/whether all ref ed/limitations):	r during ugia on site															
Shorthand:				F = fe	(SV male, M =	V=slow wo male, AU	orm, GS=gi = Adult - se	ass snake, e	CL=comm ned, SA =	ion lizard, sub-adult,	<u>A=adder)</u> J = juver	ile/hatchli	bu				
Refugia number or	Result (Where sp	ecies is record	led enter nur	mber of indi	viduals und equired by p	ler appropri project aims	late sex anc s, (thereby r	l age class - ninimising di	record sex isturbance	and age of and avoidi	[:] reptile wh ng biasing	lere possibl results).)	le to observ	e this witho	ut handling	g, unless s	pecifically
visual observation		SW.					es				5				A -		
		1 AU	SA V	_	-	4		r V	Σ	<u> </u>		,	_	_		DA	,
2	2	2															
9			1														
5		1	1	1													
4	-		-	-													
З	-																
-	-																
11		2															
13		-															
17													ε				
20	-																
19			-														
21		-											-				
5m south 21													-				
25	-																
28	2																
						Ì											
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		_															
				Ť													
Dain. 0-none 1-drizzl	a 2-liaht 3-mode	Tate 1-heave		2 obtae Bas	Infort Scal	- 0-colm	1-liaht air i	emoke drifte	c (hoind) o	-licht broc		nietle win	d falt on fac	a) 3-aont	o hroozo (inht flage e	tondad
small twids in constant	motion): 4=moder	ate wind (dust.	. leaves and	loose pape	r raised. sm	e. u-callin, nall branche	es move). 5	efresh wind (small trees	"III III UIEE s swav). 6=	strong win	d (large bra	anches mov	e, whistling	in phone	lines. diffic	ult to use
umbrellas), 7-12=inapp	ropriate conditions	for reptile sur	rvey.								,						

Dato.		100/00/20	-	č	to notion of	a rotton	rior to cur						Marm P	Cunnur				
רמוב.		107/20/00						.ey.							1			
į	= ;	. ue		Ā	remperatu	e c(in sr	aue)		<u>uoua covel</u>	r (oktas)			, speed (De		(all		Tain (0-4)	
Start:	11	00:0				8			o o								0	
End:	#	3:00			-	8			9				-				0	
Notes (Inc. c survey/photo nu sur	lescription of mbers/wheth rveyed/limita	f weather ier all refu tions):	during Igia on sit	Ð						Warm &	sunnv inte	ervals						
Shorthand:					Ľ	(; female, M	<u>sW=slow w</u> = male, AU	orm, GS=g I = Adult - s	rass snake ex unconfir	, CL=comr rmed, SA =	non lizard = sub-adult	, A=adder t, J = juve) hile/hatchi	ing				
Refucia number	Result (\	Where spe	cies is reco	orded enter r	number of in	dividuals un required by	nder approp / project ain	riate sex and ns, (thereby	d age class - minimising (record sex disturbance 	x and age c e and avoid	of reptile w ing biasing	nere possib I results).)	le to observ	e this witho	ut handling	g, unless sl	pecifically
visual observation	L L		SW					GS	-			0				A		
	<u> </u>	Σ	AU	A	-	Σ	L	AU	PA Ac	2	_				5		D	,
25											Ì							
2											-	1	-					
18				1														
11	-		7															
14		_																
1	. 1	0	1															
3					-													
4				,-	-													
7	17	0	2															
				+														
								Ì			Ì							
				+														
Rain: 0=none, 1=(drizzle, 2=ligh	t, 3=moder	rate, 4=hes	avy. Cloud: (0-8 oktas. B	eaufort Sc	ale: 0=calm	1, 1=light air	(smoke drift	ts in wind),	2=light bre	eze (leave	s rustle, win	id felt on fac	ce), 3=gentl	le breeze (l	ight flags e	extended,
umbrellas), 7-12=ii	nappropriate (20nditions	for reptile s	ust, reaves a. survev.	lin inuse pa	hel lalseu, s		ies lilove), S			so sway), u=	=suong wi	in (iaige bi	alicites III0	ve, willstillig		IIIIes, uIIIIc	air to use

Date.		14/09/201	2	Ď	scription of	weather n	rior to surv						Rain over	niaht				
2010.	F	me		Air	temperatur	P C (in sh	ade)		Cloud cove	r (oktas)		Wind	sheed (Bes	urfort Scal	(a)		Sain (0-4)	
Start:	1	1:30				2 0	(2000		4									
End:	13					1 6			4								0	
Notes (Inc. de survey/photo num surv	scription of bers/wheth eyed/limita	f weather her all refu tions):	during Igia on sit	<u>v</u>							-							
Shorthand:					L L	((female, M	SW=slow w = male, AL	/orm, GS=g J = Adult - s	rass snake ex unconfi	e, CL=com rmed, SA :	mon lizard, = sub-adult	A=adder) , J = juver	ile/hatchlir	6				
Refugia number o	Result (\	Where spe	cies is rec	orded enter r	number of in	dividuals ur required by	rder approp / project ain	riate sex an ns, (thereby	d age class minimising	 record se disturbance 	x and age o e and avoidi	f reptile wh ng biasing	ere possible results).)	to observe	e this withou	ut handling	j, unless sp	pecifically
visual observation			SW					GS				-C				₹		
location 8	<u>u</u>	Σ	AU	SA	-	Σ	ш	AU	SA	_	<u> </u>			Σ	<u>u</u>		AU A	
2					-													
5	-																	
1	-	1																
10	-	_																
14			-															
19														-				
21	Juv. Toad		-															
25		0	-															
Rain: 0=none, 1=dr small twids in const	izzle, 2=lighi ant motion):	it, 3=modei 4=moderat	rate, 4=he. te wind (du	avy. Cloud: 1 Jst. leaves al	0-8 oktas. B	eaufort Sc	ale: 0=calm small brancl	 1=light air hes move). 	(smoke drif 5=fresh wind	ts in wind), d (small tree	2=light bree ss swav). 6=	sze (leaves strong win	rustle, wind d (large brai	felt on face	e), 3=gentle e. whistling	e breeze (li in phone l	ight flags e lines. difficu	xtended, ult to use
umbrellas), 7-12=in	appropriate (conditions 1	for reptile :	survey.	-)) -			-		

Date:		22/09/201	7	Dest	crintion of	weather n	rior to surv											
2410.	Ë	me	_	Air te	emperature	e ^o C (in sh	ade)		Cloud cove	er (oktas)		Wind	speed (Be	eaufort Sca	ale)		Sain (0-4)	
Start:	13	1:00			Ĩ	5			~				0				0	
End:	14	00:			1	2			-				0				0	
Notes (Inc. dé survey/photo nur surv	sscription of ibers/wheth 'eyed/limita	f weather (ler all refu tions):	during gia on site															
Shorthand:					F = f	(S emale, M	sW=slow w = male, AU	orm, GS=c	rass snake ex unconfi	e, CL=com irmed, SA	mon lizard = sub-adul	l, A=adder t, J = juve) nile/hatchl	ing				
Refuaia number o	r Result (V	Where spec	cies is record	ded enter nu	umber of inc	dividuals ur required by	ider approp / project ain	riate sex an ns, (thereby	d age class minimising	 record se disturbance 	x and age (e and avoic	of reptile w ling biasinç	nere possib I results).)	le to observ	ve this witho	ut handling	g, unless sp	oecifically
visual observation			SW					GS								<u>م</u>		
		Z	AU	SA		×	L	AU	PA PA	_	-		, D	_	2		DA	
- 2					-													
8	-																	
19													1					
20														1				
22	2																	
Rain: 0=none, 1=di	izzle, 2=light	t, 3=moder	ate, 4=heav	y. Cloud: 0-	-8 oktas. Bt	saufort Sci	ale: 0=calm	i, 1=light air	(smoke drif	fts in wind),	2=light bre	eze (leave	s rustle, wir	nd felt on fac	ce), 3=gentl	e breeze (li	ight flags e	xtended,
umbrellas), 7-12=in.	ant mouony, appropriate c	2000 Sonditions	or reptile su	r, leaves all. Tvey.	u iuuse par	el Ialseu, :		ies illove), sei			as sway), u	=>ri nig wi	iu (iaiye u	ancies ino	ve, willstillig		III les, all loc	ash of the

Date:	30/06/2017	Description of weather prior t	o survey:		
	Time	Air temperature ⁰ C (in shade)	Cloud cover (oktas)	Wind speed (Beaufort Scale)	Rain (0-4)
Start:	08:50	14	7	0	0
End:	10:20	16	5	-	0
Notes (Inc. desc survey/photo numbe survey	ription of weather during srs/whether all refugia on site red/limitations):	Slight wi	nd at end of survey. Numbers 193. 203.	209 missing/hot found. Number 207 under falle	in tree
Shorthand:		SW=s F = female, M = ma	low worm, GS=grass snake, CL=comm le, AU = Adult - sex unconfirmed, SA =	ıon lizard, A=adder) sub-adult, J = juvenile/hatchling	
Refuaia number or	Result (Where species is recorded	ed enter number of individuals under a required by proj	appropriate sex and age class - record sex ect aims, (thereby minimising disturbance	and age of reptile where possible to observe this wi and avoiding biasing results).)	thout handling, unless specifically
visual observation	SW		GS GS		× -
190 190	A AU	SA J M F	AU SA J M	F AU J	P AU
181	Common Toad	×1			
212	1				
210	Common Toad	x1			
small twigs in constant	ire, z=iigiit, 3=irioderate, 4=ireavy. : motion); 4=moderate wind (dust,	. CIOUUT: 0-0 OKLAS. DEBUIOL SCALE: U leaves and loose paper raised, small	branches move), 5=fresh wind (small trees	issignt presse (reaves rushe, wind reit on race), and s sway), 6=strong wind (large branches move, whist	anne preze (iigni riags extended, ling in phone lines, difficult to use
umbrellas), /-12=inapp	propriate conditions for reptile surv	vey.			

Date:	05/07/2017	Description of weather prior to s	survey:		
	Time	Air temperature ^o C (in shade)	Cloud cover (oktas)	Wind speed (Beaufort Scale)	Rain (0-4)
Start:	07:10	15	0	-	0
End:	08:00	17	-	1	0
Notes (Inc. desc survey/photo numbe survey	:ription of weather during ars/whether all refugia on site /ed/limitations):		267 and 25	51 missing	
Shorthand:		(SW=slow F = female. M = male.	w worm, GS=grass snake, CL=common li AU = Adult - sex unconfirmed. SA = sub-s	izard, A=adder) adult. J = iuvenile/hatchling	
Refucia number or	Result (Where species is recorde	sd enter number of individuals under appi required by project	ropriate sex and age class - record sex and a aims, (thereby minimising disturbance and a	age of reptile where possible to observe this with avoiding biasing results).)	out handling, unless specifically
visual observation	SW		GS	CL	A.
location	F M AU \$	SA J M F	AU SA J M	F AU J M	F AU J
183	Juv. Smooth Ne	ewt			
				+++ //	
Rain: U=none, 1=0122 small twigs in constant	te, z=lignt, 3=moderate, 4=neavy. t motion); 4=moderate wind (dust,	. CIOUG: 0-8 OKIAS. BEAUTOR SCALE: U=CI leaves and loose paper raised, small bra	aim, 1=iignt air (smoke drins in wind), ∠=iign inches move), 5=fresh wind (small trees swa)	it preeze (leaves rusite, wind reit on race), 3=gen sy), 6=strong wind (large branches move, whistilr	the preeze (light flags extended, g in phone lines, difficult to use
umbrellas), 7-12=inapį	propriate conditions for reptile surv	vey.			

Date:	19,	/07/2017		Des(cription of	weather p	prior to sur	vey:			Thunder	and heav	y rain nigh	it before ar	id early mo	orning		
	Time			Air te	emperatur	e ^o C (in sh	iade)		Cloud cov	er (oktas)		Winc	l speed (Be	eaufort Sca	le)		Rain (0-4)	
Start:	07:15	10			-	9			2				1				0	
End:	08:10				-	9			2				-				0	
Notes (Inc. desc survey/photo numb surve)	sription of we srs/whether red/limitation	eather d all refug ns):	uring ia on site															
Shorthand:					Ľ	(; female, M	<u>SW=slow v</u> = male, AL	vorm, GS= J = Adult - :	grass snak sex unconf	e, CL=com ïrmed, SA	mon lizarc = sub-adul	<mark>1, A=adder</mark> t, J = juve) nile/hatchl	ing				
Refuaia number or	Result (Whe	ere speci	es is record	led enter nu	umber of in	dividuals un required b	nder approg y project air	oriate sex ar ns, (thereb)	nd age clast / minimising	s - record se disturbanc	e and age	of reptile w	here possib 1 results).)	le to observ	e this witho	ut handling	j, unless sp	pecifically
visual observation			SW					GS				Ū				<		
212	T <u>-</u>		AU	SA	-	Σ	L	AU	SA	_	- -		AU	_	-			
											T							
										T								
										T								
										T			T					
		T									T							
Rain: 0=none, 1=drizz	rle, 2=light, 3	=modera	te, 4=heavy	/. Cloud: 0-	-8 oktas. B	eaufort Sc	ale: 0=caln	n, 1=light ai	r (smoke dr	ifts in wind),	2=light bre	eze (leave	s rustle, wir	id felt on fac	se), 3=gentl	e breeze (li	ight flags e	xtended,
small twigs in constan umbrellas), 7-12=inap	t motion); 4=i propriate con	ditions fo	e wind (dust <u>vr reptile sur</u>	, leaves and vey.	d loose par	der raised,	small branc	nes move),	5=Tresn WIF	id (smail tre	es sway), c	=strong wi	na (large pr	ancnes mo	/e, wnistling	l in prone	ines, amcu	asu ot til

Date:	23/08/2017	Description of weather prior to s	urvey:	Rain overnight wet on grour	pu
	Time	Air temperature ⁰ C (in shade)	Cloud cover (oktas)	Wind speed (Beaufort Scale	e) Rain (0-4)
Start:	07:50	17	8	0	0
End:	08:45	18	8	0	0
Notes (Inc. desc survey/photo numbc survey	ription of weather during ers/whether all refugia on site /ed/limitations):		Cow grazing and cu	tinn of mass in larme fields	
Shorthand:		(SW=slow F = female, M = male,	v worm, GS=grass snake, CL=com AU = Adult - sex unconfirmed, SA :	non lizard, A=adder) sub-adult, J = juvenile/hatchling	
Refuaia number or	Result (Where species is record	ed enter number of individuals under app required by project	ropriate sex and age class - record se aims, (thereby minimising disturbance	<pre>c and age of reptile where possible to observe and avoiding biasing results).)</pre>	this without handling, unless specifically
visual observation	SW	:	GS		- - -
location	F M AU	SA J M F	AU SA J	AU J	F AU
017					
Rain: 0=none, 1=drizz	zle, 2=light, 3=moderate, 4=heavy	. Cloud: 0-8 oktas. Beaufort Scale: 0=c	alm, 1=light air (smoke drifts in wind),	2=light breeze (leaves rustle, wind felt on face), 3=gentle breeze (light flags extended,
small twigs in constan umbrellas), 7-12=inap	t motion); 4=moderate wind (dust, propriate conditions for reptile sur	leaves and loose paper raised, small bra vey.	inches move), 5=fresh wind (small tree	s sway), 6=strong wind (large branches move	e, whistling in phone lines, difficult to use
	-	- /			

Date.	_	06/00/201	-	Deer	crintion of	weather n	rior to surv						Warm mc	rning				
2010.	Ē	me		Air te	emperature	a ^o C (in sh	ade)		cove	r (oktas)		Wind	sneed (Be	aufort Scal	(e)		tain (0-4)	
Start:	30	3:30			7				4				- -				0	
End:	10):30			=	5			4				~				0	
Notes (Inc. survey/photo nu su	description of imbers/wheth rveyed/limita	f weather (ier all refu tions):	during gia on site															
Shorthand:					F = f	(S emale, M =	W=slow w = male, AU	orm, GS=gi = Adult - se	rass snake ex unconfi	, CL=com rmed, SA =	mon lizard	<u>A=adder)</u> , J = juver	ile/hatchli	6				
Refugia number	Result (\	Where spec	sies is record	ded enter nu	umber of inc	lividuals un required by	der appropi , project aim	riate sex and is, (thereby I	d age class minimising	 record se; disturbance 	x and age o e and avoid	f reptile wh ng biasing	ere possible results).)	e to observe	this withou	ut handling	l, unless sp	pecifically
visual observati	uo		SW					GS				CL				A-		
212	<u> </u>	Σ	AU	SA	,	Σ	ц.	AU S	SA J	2				≥	<u>u</u>		0	_
Rain. 0-none 1-	drizzla 2-licht	+ 3-moders	ate 4-heav		-8 oktas Re	aufort Sca	ne- 0-calm	1-licht air	/smoke drift	ts in wind)	2-licht hree		nistle wind	l falt on face	a) 3-nentle	a hraaza (li	oht flans e	vtended
small twigs in con	stant motion);	4=moderat	e wind (dus	t, leaves and	d loose pap	er raised, s	mall branch	, i-ligin all les move), 5	j=fresh winc	ts in wind), I (small tre∈	z –⊪gint bite es sway), 6=	strong win	d (large bra	nches move	e, whistling	in phone I	gint nags e. ines, diffict	ult to use
umbrellas), 7-12=	inappropriate (conditions f	or reptile su	Irvey.														

Date.		14/09/20	17	Dae	crintion of	weather n	ior to surv	. //0				Rain	overnicht	slicht chill				
2010-		Time		Air f	emberature	o ⁰ C (in sh			oud cover	(oktas)		Wind	sneed (Beal	ifort Scale)		ä	in (0-4)	
Start:		08:00			1				9				-				0	
End:		00:60			7				7				0				0	
Notes (In survey/photo	c. description numbers/whe surveyed/limi	of weather ther all refu tations):	during ugia on site						ŭ	old in the s	shade - wi	nd chill						
Shorthan					F = f	(S) emale, M =	W=slow we male, AU	orm, GS=gra = Adult - se	ass snake, x unconfirn	CL=comm ned, SA =	non lizard, sub-adult	A=adder	ile/hatchling					
Refugia numk	Result	(Where spe	cies is record	ded enter nu	umber of inc	lividuals un required by	der appropr project aim	iate sex and s, (thereby m	age class - ninimising di	record sex isturbance	and age o	f reptile wh ng biasing	ere possible t results).)	to observe th	nis without	: handling,	unless spe	ecifically
visual observ	ation		SW					GS				CL		_		A		
location	Ŀ	×	AU	SA	ſ	Σ	<u>ч</u>	NU SI	ר ע	Σ	ш		n N	Σ	ш	AI	л Г	
			+												1			
			+															
Rain: 0=none, small twigs in c	1=drizzle, 2=lic onstant motion	jht, 3=mode); 4=modera	rate, 4=heav ite wind (dus	y. Cloud: 0. t, leaves an	-8 oktas. Be d loose pap	eufort Sca er raised, si	l le: 0=calm, nall branch	1=light air (; es move), 5=	smoke drifts =fresh wind (in wind), 2 (small trees	2=light bre∈ s sway), 6=	sze (leaves strong wir	rustle, wind 1 d (large brane	felt on face), ches move,	3=gentle h whistling ir	breeze (lig n phone lir	ht flags ex ies, difficul	tended, It to use
umbrellas), 7-1	2=inappropriat	e conditions	for reptile su	rvey.														

Dato.		28/00/2012	-	Dec	vrintion of	mosther n	rior to sur						Dain ove	arniaht				
-000-	Ē	107100170		Air 40	an point of	To of the ch	101 10 201		Cloud cove	(obtoo)		Min	d enond /	confort Sc.	1010		(1-1) ning	
Ctart.		.46					ane						a sheed In	Caulou oc	aicj			
Start. End:		30				7 t			2									
EIIU.		00:			-	t			7								0	
Notes (Inc. de survey/photo num surv	scription of bers/wheth eyed/limitat	weather c er all refuç ions):	during gia on site					Mat	ts thrown a	ver the fer	tce in the	field conts	ainina shee	Qa				
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163	1 toad				
101					
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159	1 x Commor	n Toad									
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										_	
Dain: 0-cono 1-driz-	alo 2_liabt 2_modorato 4_bo		Scale: 0	alm 1_liabt oir /amaka	drifte in wind)	oli orocoo llo		d falt an face)	2_conto broo		outondod
small twigs in constan	t motion); 4=moderate wind (dt	avy. Ciouu: U-o Uklas. De ust, leaves and loose pap	er raised, small bra	ann, r=ngm an (smore) anches move), 5=fresh	wind (small trees	=ligrit breeze (le sway), 6=strong	aves rustle, with y wind (large bra	u reit on race), anches move, '	o=genue pree whistling in ph	ze (lign liags one lines, diff	icult to use
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Date:	31/08/2017	Description of weather prior to	survey:		
	Time	Air temperature ^o C (in shade)	Cloud cover (oktas)	Wind speed (Beaufort Scale)	Rain (0-4)
Start:	16	16	3	0	0
End:	20	20	2	0	0
Notes (Inc. desc survey/photo numbe survey	ription of weather during srs/whether all refugia on site ed/limitations):		Some licht rain intermitten	 Conducted during WV survey 	
Shorthand:		(SW=slo F = female. M = male	ow worm, GS=grass snake, CL=comm a. AU = Adult - sex unconfirmed. SA = :	c. conducted doring vv survey on lizard, A=adder) sub-adult. J = iuvenile/hatchling	
Refucia number or	Result (Where species is recorde	sd enter number of individuals under ap required by projec	propriate sex and age class - record sex propriate, (thereby minimising disturbance)	and age of reptile where possible to observe this wit and avoiding biasing results).)	hout handling, unless specifically
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167	Toad x 2				
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twigs in constant moti 7-12=inappropriate co	on); 4=modera nditions for re	ate wind (c ptile surve	tust, leaves y.	and loose	paper raise	d, small bra	inches move	e), 5=fresh winc	d (small trees :	sway), 6=st	rong wind (I	arge branch	es move, whi	stling in phor	ne lines, diffi	cult to use	umbrellas),

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small twigs in c	onstant motion);	4=moderat	e wind (dusi	t, leaves and	d loose pap	er raised, s.	mall branch	ies move), 5	i=fresh wind	l (small tre∈	es sway), 6	=strong wi	nd (large brar	iches move	e, whistling	in phone li	nes, difficu	ilt to use
umbrellas), 7-1.	2=inappropriate	conditions fu	or reptile su.	rvey.														



APPENDIX B8-12 GREAT CRESTED NEWT SURVEY REPORT


M3

Junction 9 Improvement Scheme

Great Crested Newt Survey Report

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ Highways England Company Limited registered in England and Wales number 09346363

M3 JUNCTION 9 IMPROVEMENT SCHEME

GREAT CRESTED NEWT SURVEY REPORT

Highways England

Second Issue

Project no: 70016638 Date: November 2017

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QUALITY MANAGEMENT

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EXECUTIVE SUMMARY

M3 Junction 9 has been highlighted as requiring redevelopment in order to help reduce congestion. This will be achieved by improving the flow of traffic, and three options are currently being considered for implementation.

An ecological desk study was carried out with respect to the Proposed Works by WSP in 2016. This found that there are no records of great crested newt *Triturus cristatus* within a 2km radius of Junction 9 of the M3, but that several waterbodies occur within a 500m radius of the Proposed Works area.

In order to gather further information regarding the presence or likely absence of great crested newts from the Survey Area, Habitat Suitability Index and environmental DNA sampling were undertaken within a 500m Survey Area around the Proposed Works.

A total of ten waterbodies were subject to Habitat Suitability Index survey including a fishery, attenuation ponds, ditches and other watercourses associated with the River Itchen, which traverses the Survey Area. Concurrent with the Habitat Suitability Index survey, water samples were collected in line with standard methods (Biggs *at al.*, 2014) from eight of the waterbodies for laboratory testing for great crested newt environmental DNA. All of the samples tested negative for great crested newt environmental DNA.

Based on the results of these surveys and the absence of records from the local area, great crested newt is considered to be likely absent from the Survey Area.

Common toad *Bufo bufo* and common frog *Rana temporaria* were incidentally recorded in the northeastern part of the Survey Area. Common toad is considered to be of some conservation importance, reflected by its status as a Species of Principal Importance for the conservation of biodiversity.

Recommendations are made within the report for avoidance, mitigation and enhancement with respect to common amphibians. The following outline some of the key recommendations:

- → Avoid existing waterbodies where possible to retain amphibian habitat and prevent accidental harm.
- \rightarrow Improvements to existing waterbodies to enhance their quality as amphibian habitat.
- → Creation of new waterbodies within the Survey Area to benefit not only amphibian but invertebrate and aquatic flora species.
- → Creation or enhancement of suitable terrestrial habitat as part of the wider landscaping scheme.
- → Creation of winter hibernacula or permanent refugia within terrestrial habitat surrounding waterbodies to raise the carrying capacity of the terrestrial habitat.



1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). A large volume of traffic currently uses the interchange (approximately 6,000 vehicles per hour during the peak periods), which acts as a bottleneck on the local and strategic highway network, causing significant delays. M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.
- 1.1.2 Three options have been taken forward to Project Control Framework (PCF) Stage 2 and assessed within the Environmental Assessment Report (EAR), namely:
 - → Option 14: Northbound and Southbound Free Flow Design;
 - → Option 16B: Incremental Delivery Northbound A34 Free Flow Link;
 - → Option 16C: Incremental Delivery Southbound A34 Free Flow Design.

The works are hereafter referred to as the 'Proposed Works'. Further details of the Proposed Works are presented within the PCF Stage 2 EAR (HE551511-WSP-GEN-M3J9PCF2-RP-LE-00041). The anticipated maximum extent of the works for all options is shown on **Figure 1.1**, and is hereafter referred to as 'the Site.'



1.2 ECOLOGICAL BACKGROUND

- 1.2.1 An ecological desk study was carried out with respect to the Proposed Works by WSP in 2016 to gain an ecological background of the surrounding area using a 2km search radius. The desk study found that there are no records of great crested newt *Triturus cristatus* within a 2km radius of Junction 9 of the M3. Several waterbodies occur within a 500m radius of the Proposed Works area, the recommended search area for conducting great crested newt surveys (Natural England 2015).
- 1.2.2 A broad suite of baseline ecological surveys have been undertaken by WSP during 2017, including a Phase 1 habitat survey of a Survey Area comprising a 250m radius around the Proposed Works area.
- 1.2.3 The Survey Area, which is traversed by several roads, includes a range of habitats. East of the M3, the landscape is dominated by arable land, with associated hedgerows and parcels of broadleaved woodland. The central area between the three major roads (A34/A33 & M3) also contains a variety of habitats including grazed semi-improved pastures and several semi-natural and plantation broadleaved woodlands. The majority of woodland is located within the highways boundary. The River Itchen passes through the north and west of the Survey Area flowing in a south-westerly direction and is characterised by a number of interconnected channels with associated wetland and flood meadow grasslands.
- 1.2.4 The River Itchen forms a complex network of channels through land managed by the Hampshire and Isle of Wight Wildlife Trust (HIWWT). Many of the channels are deep and fast flowing. However, static and sluggish ditches are also present where they are formed by natural springs and flushes. A number of channels have sluiced control gates, creating wet ditches adjacent to grazed grassland. Trout fisheries are located within the Survey Area, with many of the rivers and tributaries providing angling opportunities.
- 1.2.5 Based upon review of aerial imagery, *Ordnance Survey* mapping, and on observations made during the Phase 1 habitat survey, a total of 12 waterbodies were identified for further assessment for the presence or absence of great crested newts *Triturus cristatus*.

1.3 BRIEF AND OBJECTIVES

- 1.3.1 Highways England commissioned WSP to:
 - → Complete a Habitat Suitability Index (HSI) assessment of waterbodies within 500m of the Proposed Works extent to assess their suitability as aquatic habitat for great crested newts and determine if further survey was required;
 - → Complete environmental DNA (eDNA) sampling of up to eight waterbodies identified as having suitable habitat for great crested newts; and
 - → Where present, evaluate the value of the Survey Area for great crested newts and make recommendations as to how proposals should account for great crested newts in relation to relevant legislation and planning policy.
- 1.3.2 The results of this survey, and subsequent recommendations, are included within this report.

1.4 LEGISLATIVE AND POLICY FRAMEWORK

GREAT CRESTED NEWTS

1.4.1 Great crested newts are afforded a high level of protection under the Conservation of Habitats and Species Regulations 2010 (as amended) (the 'Habitat Regulations'). The legislation means that it is an offence to:



- → deliberately capture, injure or kill a wild great crested newt;
- → deliberately disturb wild great crested newts; 'disturbance of animals includes in particular any disturbance which is likely:
 - (a) to impair their ability ---
 - (i) to survive, to breed or reproduce, or to rear or nurture their young; or
 - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or

(b) to affect significantly the local distribution or abundance of the species to which they belong.'

- \rightarrow damage or destroy a breeding site or resting place used by this species.
- 1.4.2 Protection is also afforded under the Wildlife and Countryside Act 1981 (as amended) with respect to disturbance of animals when using places of shelter and obstruction of access to places of shelter.
- 1.4.3 The great crested newt is also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies (including local planning authorities) have a duty to have regard for the conservation of SPI when carrying out their functions, including determining planning applications.

OTHER AMPHIBIANS

- 1.4.4 Whilst the smooth *Lissotriton vulgaris* and palmate newt *Lissotriton helveticus* are protected from sale and trade, these species are not afforded the high level of protection given to the great crested newt.
- 1.4.5 The common toad is also listed as a SPI in accordance with Section 41 of the NERC Act 2006. Therefore, as for great crested newts, public bodies, including local planning authorities, have a duty to have regard for the conservation of this species when carrying out their functions.

RELEVANT PLANNING POLICY

- 1.4.6 As the project qualifies as a Nationally Significant Infrastructure Project (NSIP), it must adhere to the National Policy Statement (NPS) for National Networks (Department for Transport 2014). This states *inter alia* that the principals and objectives of the government's *2012 Natural Environment White Paper (NEWP)* and *Biodiversity 2020 strategy* should be adhered to. These promote moving progressively from net biodiversity loss to net gain by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. The NPS also states that the likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats, on other species identified as being of principal importance for the conservation of biodiversity and that potential impacts on ecosystems should be clearly set out.
- 1.4.7 At the national level the National Planning Policy Framework (NPPF) (2012) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including great crested newts. The Office of the Deputy Prime Minister circular 06/2005 also provides supplementary guidance, including confirmation that 'the presence of a protected species is a material consideration when a planning authority is considering a development proposal'.
- 1.4.8 The NPPF sets out, amongst other points, how at an overview level the 'planning system should contribute to and enhance the national and local environment by:
 - → ...recognising the wider benefits of ecosystem services; and



- minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures...'
- 1.4.9 A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF, and includes the following:
 - → '- if significant harm resulting from a development cannot be avoided...adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
 - → -...opportunities to incorporate biodiversity in and around developments should be encouraged;
 - → planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland...unless the need for, and benefits of, the development in that location clearly outweigh the loss...'
- 1.4.10 At a local level, Winchester City Council and the South Downs National Park have adopted the Winchester District Local Plan Part 1 (Adopted 2013). Chapter 9 is entitled 'High Quality Environment' with policy CP16 entitled *Biodiversity*. This states '*The Local Planning Authority will support development which maintains, protects and enhances biodiversity across the District, delivering a net gain in biodiversity, and has regard to the following:*
 - → protecting sites of international, European, and national importance, and local nature conservation sites, from inappropriate development. supporting habitats that are important to maintain the integrity of European sites.
 - → new development will be required to show how biodiversity can be retained, protected and enhanced through its design and implementation, for example by designing for wildlife, delivering BAP targets and enhancing Biodiversity Opportunity Areas.
 - → new development will be required to avoid adverse impacts, or if unavoidable ensure that impacts are appropriately mitigated, with compensation measures used only as a last resort.
 - → Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.
 - → maintaining a District wide network of local wildlife sites and corridors to support the integrity of the biodiversity network, prevent fragmentation, and enable biodiversity to respond and adapt to the impacts of climate change.
 - supporting and contributing to the targets set out in the District's Biodiversity Action Plan (BAP) for priority habitats and species.
 - Planning proposals that have the potential to affect priority habitats and/or species or sites of geological importance will be required to take account of evidence and relevant assessments or surveys.
- 1.4.11 The great crested newt is recognised as a priority species within the Hampshire Biodiversity Action Plan (BAP).



2 METHODOLOGY

2.1 HABITAT SUITABILITY INDEX ASSESSMENT

- 2.1.1 Waterbodies within the 500m radius of the Proposed Works area were assessed for their suitability to support great crested newts using the standard Habitat Suitability Index (HSI) assessment method (ARG UK, 2010, based on Oldham *et al.* (2000)). A total of 12 waterbodies were identified based upon review of aerial imagery and Ordnance Survey mapping and from observations made during the Phase 1 habitat survey (see **Figure 1.1**). It should be noted that access was not achieved to two of the waterbodies and that some ephemerally wet ditches and areas of flood meadow within the River Itchen flood meadows were excluded (see Section 3.4).
- 2.1.2 Waterbodies were assessed and scored on ten key variables which are known to influence breeding populations of great crested newts, in accordance with standard methods (ARG UK, 2010). These variables are:
 - → Geographic location;
 - → Waterbody area;
 - → Waterbody permanence;
 - → Water quality;
 - → Waterbody shading;
 - → Impact of waterfowl;
 - → Fish stocks;
 - → Number of waterbodies within 1km;
 - → Terrestrial habitat around the waterbody; and
 - \rightarrow Macrophyte cover of the waterbody.
- 2.1.3 Scores for each of the above variables were used to calculate an overall HSI value for each waterbody. This was then cross referenced with the guidelines (ARG, 2010) to assign the pond to one of five categories, poor, below average, average, good or excellent.

2.2 ENVIRONMENTAL DNA SAMPLING

- 2.2.1 Sampling of eDNA was undertaken concurrently with the HSI survey. Professional judgement gained from previous experience and knowledge of great crested newt ecology, was exercised in selecting waterbodies appropriate for sampling with samples collected from all but two of the waterbodies (see Section 3.4).
- 2.2.2 The surveys were undertaken following survey techniques described in Biggs et al. (2014):
 - → A single visit to each target waterbody was made between mid-April and June, during the newt breeding season.
 - → Twenty sub-samples of water were taken from each waterbody using sterile sampling equipment provided by the laboratory (*Fera Science Ltd*).
 - → The locations of the 20 sub-samples were spaced as evenly as possible around the waterbody margin, and where possible targeted areas of vegetation which could be used as egg laying substrate and open water areas which newts could use for displaying.



- → The sub-samples were mixed and pipetted into six sample tubes containing an alcohol and pH buff solution.
- → The samples were sent to *Fera* for laboratory testing using real time PCR to amplify part of the cytochrome 1 gene found in mitochondrial DNA.
- → The water samples from each waterbody were assigned a positive or negative result as well as a score between 0 and 12 representing the number of positive replicates from a series of 12.
- 2.2.3 A positive eDNA result concludes that GCN DNA was present in the water sample, whilst a negative result concludes that the presence of great crested newts is considered unlikely within that waterbody. Negative eDNA results cannot conclusively say that a great crested newts are not present within the waterbody, rather that DNA from the species was not detected.

2.3 DATES OF SURVEY AND PERSONNEL

2.3.1 The HSI and eDNA surveys were undertaken on 6th June 2017 by experienced ecologists who surveyors have undergone training on the use of the eDNA technique to survey for great crested newts provided by Jeremy Biggs from the Freshwater Habitats Trust, who devised the official survey protocol.

2.4 NOTES AND LIMITATIONS

- 2.4.1 Access permission was not gained to two of the waterbodies (Waterbodies 2 and 12). Waterbody 2 could not be directly observed from adjacent land holdings and is located approximately 410m from the Proposed Works area. Waterbody 12 was observed from adjacent landholding and comprises a fishing lake, a land use that makes it extremely unlikely that it would be used by great crested newts. It is located approximately 350m from the Proposed Works area. In the unlikely event that great crested newts did utilise these habitats, given their separating distance they would be unlikely to be significantly affected by the Proposed Works¹.
- 2.4.2 Access to the entire perimeter of the Waterbodies 1 and 4 was not possible due to dense vegetation or steep slopes. Where access was not possible, observations and samples were taken from safe and suitable locations. Given the comparatively small size of these waterbodies, this is unlikely to have significantly affected the findings of the eDNA analysis as representative samples were obtained.
- 2.4.3 The flood meadow habitats in the north west of the Survey Area contain a network of ditches that are generally dominated by dense emergent vegetation including common reed *Phragmites australis*. These are understood to be at least partially spring fed and generally only ephemerally contain standing water. Overall they represent low suitability great crested newt habitat, lacking the open water habitat this species typically requires for courtship display. A representative sample of these ditches was assessed, comprising those ditches that contained the most water. The majority of this area forms part of Winnal Moors, a nature reserve managed by the HIWWT.

¹ Research (Cresswell & Whitworth, 2004) indicates that great crested newts are unlikely to occur in significant numbers as distances greater than 100m from breeding ponds



- 2.4.4 Within the flood meadow area, Waterbodies 7, 9 and 11 comprises ditches and Waterbodies 8 and 10 comprise pools that have some hydrological connectivity to a main channel of the River Itchen. At the time of survey no discernible flow was observed from these waterbodies, which all tested negative for great crested newt eDNA. However, it is likely that on occasion (such as following heavy rainfall), water would flow from these waterbodies into the River Itchen, with the associated risk that great crested newt eDNA present could be flushed away. Overall, this limitation is not considered to have affected the overall conclusion of this report that great crested newts are likely to be absent from the Survey Area for the following reasons: all other waterbodies tested negative; no records of great crested newts are found within a 2km radius; these waterbodies occur within a longstanding Wildlife Trust reserve that is actively managed and where it is reasonable to assume great crested newts would be recorded if present; and significant barriers to amphibian movement isolate these waterbodies, namely main channels of the River Itchen and the A34/A33 roads. This conclusion is also explored in Section 4.4.
- 2.4.5 Waterbody 10 was not assessed using eDNA sampling. This limitation is not considered to have affected the conclusion of this survey as it scored poor in the HSI survey and waterbodies in proximity provided negative results for GCN eDNA. It is therefore considered unlikely that GCN would be present.
- 2.4.6 Waterbodies 5 and 6 represent linear attenuation waterbodies located in an area of habitat that is isolated by several major barriers to amphibian movement including the River Itchen to the north and major roads to the east and west (see **Figure 1.1**). As Waterbody 6 contained only a small amount of water, a decision was made to sample only Waterbody 5, which contained a greater volume of water.



3 RESULTS AND EVALUATIONS

3.1 HABITAT SUITABILITY ASSESSMENT (HSI)

3.1.1 The HSI scores (**Table 3.1**) indicate that four waterbodies are considered good, two average, one below average and three poor quality habitat (see **Figure 3.1**). In general, waterbodies with average or good HSI scores are more likely to support great crested newts than those with below average or poor scores. Whilst HSI gives an indication of habitat quality, the assessment is not sufficiently precise to allow the conclusion that any particular waterbodies with a good score will support newts, or that any waterbodies with a poor score will not do so.

Table 3.1: Summary of HSI Results

WATERBODY REF.	GRID REFERENCE	PROXIMITY TO WORKS	HSI SCORE	HSI CATEGORY
1	SU 490317	130m west	0.78	Good
2	SU 486320	440m north west	N/A	No access
3	SU 487320	425m north west	0.31	Poor
4	SU 491320	130m north	0.46	Poor
5	SU 492316	10m east	0.72	Good
6	SU493317	40m west	0.59	Below Average
7	SU492314	90m west	0.63	Average
8	SU492315	10m west	0.73	Good
9	SU490312	190m west	0.70	Average
10	SU490307	420m west	0.50	Poor
11	SU490310	410m west	0.73	Good
12	SU491305	370m west	N/A	No access

3.2 ENVIRONMENTAL DNA

3.2.1 Eight waterbodies were subject to eDNA sampling (see **Figure 3.2**). Waterbodies 6 and 10 were not sampled using eDNA methods, see Section 2.4 for details. The results of the laboratory analysis identified that none of the waterbodies included in the analysis contained great crested newt DNA. No DNA was detected within the water samples as shown in Table 3.2 and the Fera results in Appendix C. No inhibition or degradation was identified in any of the samples.

Table 3.2: eDNA Sampling Results

WATERBODY REF.	FERA REFERENCE	GCN DETECTION	GCN SCORE	INHIBITION	DEGRADATION
1	S17-006354	Negative	0	No	No
3	S17-006353	Negative	0	No	No
4	S17-006347	Negative	0	No	No
5	S17-006348	Negative	0	No	No
7	S17-006349	Negative	0	No	No
8	S17-006351	Negative	0	No	No
9	S17-006352	Negative	0	No	No
11	S17-006350	Negative	0	No	No



3.3 INCIDENTAL RECORDS

3.3.1 Common toad *Bufo bufo* and common frog *Rana temporaria* were incidentally recorded on numerous occasions in association with the flood meadow habitats in the northwest of the Survey Area.

3.4 EVALUATION

3.4.1 The results of the eDNA sampling indicate great crested newts are likely absent from the Survey Area. This conclusion is supported by the absence of records of great crested newt from at least a 2km radius of the Proposed Works area. This may be related to the prevalence of chalk bedrock in the surrounding area, resulting in a relative scarcity of surface water. The 2003 Hampshire Biodiversity Action Plan stated that known breeding populations of great crested newt in Hampshire were concentrated on the south coast and eastern border, with populations also thought to be strong in the north of the county. Conversely, areas of chalk bedrock in Hampshire occur within the central and western extents. Overall it is concluded that there is sufficient evidence to conclude that great crested newts are likely to be absent from the Survey Area.



4 RECOMMENDATIONS

4.1.1 The survey results indicate that great crested newt are likely absent from the Survey Area, therefore there are no known legal or planning constraints in relation to this species. However, the relevant legislation and planning policy listed in Section 2.4 sets out protection of the common amphibian species that are likely present within the Survey Area and planning policy states that all development should consider opportunities for biodiversity enhancements. Our recommendations below are aimed at delivering this.

4.2 AVOIDANCE AND MITIGATION MEASURES

GREAT CRESTED NEWT & OTHER AMPHIBIANS

- 4.2.1 As no great crested newt DNA was detected within waterbodies within the Survey Area great crested newts are considered likely absent at the time of survey. Considering this, the majority of waterbodies surveyed were of average or good quality and therefore would provide suitable habitat to amphibians in general.
- 4.2.2 In the first instance, habitat considered suitable for great crested newt and other common amphibians should be avoided. Designs should avoid direct and indirect effects on waterbodies and drainage ditches including: destruction or degradation; siltation; and pollution. Drainage during the construction and operational phases should be designed to avoid pollution events when in close proximity to waterbodies.
- 4.2.3 Where habitat loss cannot be avoided, this habitat should be compensated for. It is considered unlikely that the large waterbodies will be impacted by the Proposed Works. However, drainage ditches associated with the A34 and A33 are likely to be affected. New drainage ditches and swales should be designed to provide suitable habitat for common amphibians, which should include marginal planting, bank profiling, provision of refugia and hibernacula and the creation of suitable terrestrial habitat.
- 4.2.4 The Proposed Works will result in the terrestrial habitats being affected which could support common amphibians. The following precautionary habitat clearance methods are recommended to be implemented to minimise the likelihood of common amphibians being incidentally harmed during site clearance works:
 - → Habitat clearance should be timed to avoid the sensitive hibernation season (indicatively October-February inclusive, but weather dependent). If this is not possible caution should be taken to ensure that potential hibernacula are not disturbed until hibernation ends. Hibernacula could include mammal burrows or objects under which amphibians could be hibernating including logs or amongst the roots of trees and shrubs. All hibernacula should be dismantled outside the hibernation period under ecological supervision.
 - → Where tall herbaceous vegetation (including that occurring on the edge of scrub and woodland areas) is cleared outside of the period in which amphibians are likely to be hibernating, it should be undertaken in two stages over at least two consecutive days in order to progressively render habitat unsuitable for amphibians. An initial cut should be made to approximately 150mm. The second cut should reduce vegetation as close as possible down to ground level. Vegetation clearance should proceed in a directional manner in or to displace animals which may be present into areas of retained habitat. The habitat should then be maintained in an unsuitable condition for reptiles, such as by regular cutting of vegetation or by removal of topsoil.



4.3 ECOLOGICAL ENHANCEMENT MEASURES

- 4.3.1 National and local planning policy requires ecological enhancement measures to be designed into new development schemes. It is recommended that enhancement measures are incorporated into the proposals which seek to achieve net gain in habitat available to amphibians on site, and ensure habitat connectivity with adjacent land.
- 4.3.2 The following measures are recommended:
 - → Improvements to existing waterbodies could be made to enhance their quality as amphibian habitat. Ponds identified as having poor to average quality in the HSI could be enhanced through marginal and submerged planting, reformation of steep banks to improve amphibian access and creation of suitable terrestrial habitat.
 - → Creation of new waterbodies within the Survey Area to benefit not only amphibian but invertebrate and aquatic flora species. Attenuation ponds, swales and drainage ditches should be designed into the Proposed Works to create new habitat for these taxa. These new waterbodies should be located within a sufficiently large catchment or have sufficient swales running along slope contours and ditches created in order to direct enough water into the pond. To benefit amphibians new ponds should be designed to include varying depths, gentle slopes, native aquatic marginal and emergent planting and terrestrial refugia.
 - Creation or enhancement of suitable terrestrial habitat as part of the wider landscaping scheme, to include retention or creation of hedgerows, woodland and grassland subject to low management.
 - → Creation of winter hibernacula or permanent refugia within terrestrial habitat surrounding waterbodies to encourage amphibians to remain closer to the ponds, reducing the need for movement across roads and other habitats where they are at risk.



5 CONCLUSION

5.1.1 Ten waterbodies within a 500m radius of the Proposed Works were subject to HSI survey, eight of which were subject to eDNA analysis. None of the waterbodies tested positive for great crested newts, and based on this evidence and a lack of records from the surrounding area, this species is considered to be likely absent from the Survey Area. The waterbodies do provide suitable habitat for common amphibians with common toad and frog incidentally recorded. Accordingly, recommendations are made for avoidance and mitigation measures to minimise potential impacts to common amphibians (with receive no specific legal protection). In addition, recommendations are made for ecological enhancement measures which if incorporated into the Proposed Works should benefit local amphibian populations.



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PROJECT REFERENCES

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M3 Junction 9 Improvement Scheme Great Crested Newt Survey Report

FIGURES

FIGURE 1.1 SITE LOCATION PLAN





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M3 Junction 9 Improvement Scheme Great Crested Newt Survey Report

FIGURE 3.1 HSI RESULTS





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M3 Junction 9 Improvement Scheme Great Crested Newt Survey Report

FIGURE 3.2 EDNA RESULTS





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Appendix A

Table A.1 : Waterbody descriptions

Water body Photograph Ref.

1

2

3

5

Description / Comment

Waterbody created by cutting off River Itchen. The resultant pool is isolated from the River Itchen and no discernible flow was observed. Extensive emergent vegetation and pond weed present. Welldeveloped margins and clear water. Frog tadpoles visible. Access to entire waterbody perimeter was not possible due to dense vegetation.

	du
-	No
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	W Fu

Not Accessed

Large trout fishery. Incidental waterfowl included swans, mallards and coots. Sluice gate at either end fed by the River Itchen. Good water quality with emergent vegetation including water mint, pond weed, sedges and iris. Amenity grassland surrounding the lake for fishery purposes.

Waterbody surface covered in duckweed. Fully shaded pond surrounded by broadleaved woodland. Signs indicate deep water, however shallow at time of survey. Likely dries at some points of the year. Possible attenuation pond although no outlet seen. No emergent vegetation. Limitations to access on one side of the pond.

Linear attenuation feature approximately 175m in length running along the A34 north bound. Some emergent vegetation present. Duck weed covers the majority of the waterbody. Fairly steep banked either side.



Water body Ref.	Photograph	Description / Comment
9		Waterbody comprising a ditch of approximately 45m in length that is connected to the River Itchen by a sluice gate at the eastern end. The ditch displayed no flow, and is spring fed.The ditch is approximately 30cm deep. Reed dominates the ditch margin with occasional sedge.
10		Waterbody comprising a shaded pool within a wet woodland that is connected to ditches and ultimately the main channel of the River Itchen. Duckweed was present in areas.
11		Waterbody comprising a ditch lined with willow approximately 40m in length, connected to the main channel of the River Itchen. Duckweed cover was high where the ditch met a headwall. Sedge and reed are prominent along the margins. The ditch is approximately 30cm deep and is surrounded by marshy grassland. Access to the north bank was not possible due to dense vegetation.
12	-	Fishing lake, not accessed.



Appendix B

HSI CALCULATIONS

Table B.1 : HSI Calculations

Pond Ref.	S1: Geographic location	S2: Waterbody area	S3: Waterbody permanence	S4: Water quality	S5: % Shade (1m from bank	S6: Impact of waterfowl	S7: Fish stocks	S8: Number of waterbodies <1km	S9: Terrestrial habitat	S10: Macrophyte cover (%cover)	HSI SCORE	HSI CATEGORY
1	1	0.92	0.9	1	1	0.67	0.67	0.65	1	0.35	0.781	Good
2	Not accessed											
3	1	0.6	0.9	1	1	0.01	0.01	0.65	0.67	0.3	0.31	Poor
4	1	0.2	0.5	0.67	0.2	1	1	0.1	1	0.3	0.46	Poor
5	1	0.95	0.5	0.67	0.8	1	1	0.45	1	0.35	0.72	Good
6	1	0.6	0.5	0.67	0.2	1	1	0.45	1	0.3	0.59	Below Average
7	1	0.4	0.5	1	0.2	1	0.67	0.65	0.67	0.9	0.63	Average
8	1	0.7	1	1	0.4	0.67	0.33	0.65	1	0.8	0.71	Good
9	1	0.6	1	1	0.2	0.67	0.67	0.65	0.67	0.9	0.68	Average
10	1	0.85	1	1	0.4	0.67	0.01	0.65	1	0.6	0.50	Poor
11	1	0.98	0.9	1	0.4	0.67	0.67	0.65	0.67	0.6	0.73	Good
12							Not acc	cessed				



Appendix C

LABORATORY RESULTS

DNA Analysis Report - Commercial in Confidence



Customer:	WSP UK Limited
Address:	Mountbatten House, Basing View
	Basingstoke
	Hampshire
	RG21 4HJ
Contact:	Bradley Williams
el:	
Report date:	21-Jun-2017
Drder Number:	GCN17-0560
Samples:	Pond Water
Analysis requested:	Detection of Great Crested Newt eDNA from pond water.

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

Method:

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

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

The results are defined as follows:

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

page 1 of 2

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DNA Analysis Report - Commercial in Confidence



CustomerReference	Fera Reference	GCN Detection	GCN Score	Inhibition	Degradation
-	S17-006347	Negative	0	No	No
-	S17-006348	Negative	0	No	No
-	S17-006349	Negative	0	No	No
-	S17-006350	Negative	0	No	No
	S17-006351	Negative	0	No	No
-	S17-006352	Negative	0	No	No
-	S17-006353	Negative	0	No	No
-	S17-006354	Negative	0	No	No

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

This test procedure was developed using research funded by the Department of Environment, Food and Rural Affairs, and was performed under the conditions of licensing arrangements with Applied Biosystems and patent rights owned by F. Hoffman-La Roche Ltd.

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APPENDIX B8-13 TERRESTRIAL ENTOMOLOGICAL WALKOVER SURVEY REPORT


M3

Junction 9 Improvement Scheme

Terrestrial Entomological Walkover Survey Report

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ Highways England Company Limited registered in England and Wales number 09346363

M3 JUNCTION 9 IMPROVEMENT SCHEME

TERRESTRIAL ENTOMOLOGICAL WALKOVER SURVEY REPORT

Highways England

Second Issue

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EXECUTIVE SUMMARY

M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion by improving the flow of traffic. Three options for this scheme are currently being investigated.

In order to carry out an evaluation of the potential conservation value of the Survey Area for invertebrate assemblages, an appraisal of the Survey Area (defined as the area to be affected by works and an additional 100 m buffer) was visited by an entomologist. The likely key habitats and features present in the Survey Area were assessed based on the diversity of the structure of the vegetation present and floristic diversity. Much of the Survey Area includes habitats unsuitable to support important invertebrate assemblages. This walkover did, however, identify several areas which are of high potential for important invertebrate assemblages including: two wet meadows to the west of the A34; two areas of dry grassland associated with woodland; and scrub margins and the verges of a lane (Easton Lane).

To obtain a more robust baseline of information and to be able to carry out an appropriate assessment of the likely impacts of the scheme, further surveys have been recommended for high potential areas likely to be impacted by the Proposed Works, with reference to best practice guidance (Drake *et al* 2007), where available.



1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.
- 1.1.2 The works are hereafter referred to as 'the Proposed Works'. Further details of the Proposed Works are presented within the PCF Stage 2 Environmental Study Report (ESR). The anticipated maximum extent of the works is shown on Figure 1, and is hereafter referred to as 'the Site'.

1.2 ECOLOGICAL BACKGROUND

- 1.2.1 An ecological desk study was undertaken with respect to the Proposed Works by WSP in 2016. 167 notable invertebrate species records were obtained from within a 2km radius of the Site, the vast majority of which were of butterflies and moths (Lepidoptera). Three records were obtained from grid squares that overlap with the Site: small heath butterfly *Coenonympha pamphilus*, silver wash fritillary butterfly *Argynnis paphia* and stag beetle *Lucanus cervus*.
- 1.2.2 A Phase 1 habitat survey was carried out by WSP during 2017, which confirmed the presence of habitats of potential value to notable invertebrate species and communities within the Site

1.3 AIMS AND OBJECTIVES

- 1.3.1 The aims of this report are to:
 - → Set out the methods and findings of an entomological walkover of the Survey Area (defined as all habitats within 100m of the Site).
 - → Provide an evaluation of the potential conservation value of the Survey Area for invertebrate assemblages, including an appraisal of key habitats/features likely to be of greatest invertebrate value.
 - → If appropriate, identify the need for further targeted surveys with reference to best practice guidance, where available.



2 METHODOLOGY

2.1 WALKOVER SURVEY

- 2.1.1 The walkover Survey Area comprised the footprint of all works and land within a 100m radius of this, where access was available, hereafter referred to as the 'Survey Area'. Habitats within the Survey Area were categorised as 'low' or 'high' potential for important invertebrate assemblages, dependent on the presence of features which might be of particular value for invertebrates, or which might limit invertebrate assemblages and are therefore recommended for further targeted invertebrate surveys should they be either directly or indirectly affected by the development proposals. Owing to the lack of any defined or set methodology for invertebrate habitat quality assessment, the survey relied on the professional judgement of the surveyors and their experience of working on similar projects.
- 2.1.2 The categories given to the different habitat parcels are intended to represent the relative interest of the different areas within the Survey Area, rather than to indicate their quality on a National or Regional scale. However, the categories are to some extent habitat-specific (grassland is graded relative to other grassland, not to ancient woodland) and useful categorisation cannot be made without some consideration to the wider context.

DATES AND PERSONNEL

2.1.3 The walkover survey was completed on the 25 June 2017 by Dr Jim Fairclough MCIEEM of BSG Ecology, with assistance from John Baker MCIEEM also of BSG Ecology. Jim is a Principal Ecologist with extensive experience in carrying out invertebrate surveys, has completed a PhD looking at invertebrate communities associated with dung in 2004, and provides training on invertebrate survey techniques and identification.

LIMITATIONS

2.1.4 No areas of habitats immediately adjacent to the A34 or M3 carriageways were accessed during this survey. However, based on the findings of the Phase 1 habitat survey (for which roadside access was obtained), sufficient baseline information is available to make robust conclusions regarding the value of those habitats to invertebrates. Other than this, no limitations to the above survey were encountered.



3 RESULTS AND DISCUSSION

3.1 GENERAL

3.1.1 Across the Survey Area there are a range of different habitats and features of potential importance to invertebrates. Below, the habitats and areas present within the Survey Area are categorised into 'low' and 'high' potential for important invertebrate assemblages. Target Notes (TNs) and areas of high potential for invertebrates are shown on Figure 2.

3.2 HIGH POTENTIAL FOR IMPORTANT INVERTEBRATE ASSEMBLAGES

- 3.2.1 The Winnal Moors water meadows associated with the River Itchen are present in the northwestern part of the Survey Area. These are designated as part of the River Itchen Site of Special Scientific Interest (SSSI) with the main channels of the river designated as a Special Area of Conservation (SAC). The land within the Survey Area comprises water meadows which are periodically inundated. At the time of the survey, these were dry, though water was present in the drains which demarcate their margins.
- 3.2.2 The sward in the meadow in Area 1 (see Figure 2) is tall (up to 80cm) with occasional areas of trampled ground as a result of it being grazed by a small number of cattle which had recently been moved to the meadow as part of the management of the site. This has created a more diverse sward structure. The vegetation recorded included: reed canary grass *Phalaris arundinacea* (the dominant grass species), yellow iris *Iris pseudacorus*, lesser pond sedge *Carex acutiformis*, hard rush *Juncus inflexus*, broad-leaved dock *Rumex obtusifolius*, curled dock *Rumex crispus*, woody nightshade *Solanum dulcamara*, common comfrey *Symphytum officinale*, common ragwort *Senecio jacobaea*, common nettle *Urtica dioica*, marsh thistle *Cirsium palustre*, red fescue *Festuca rubra*, amphibious bistort *Persicaria amphibia*, water mint *Mentha aquatica*, wild angelica *Angelica sylvestris*, marsh-bedstraw *Galium palustre* and tussock sedge *Carex paniculata*.
- 3.2.3 This meadow was bordered by woodland dominated by willow on the northern side and scattered willows (mainly goat willow *Salix caprea*) and alder *Alnus glutinosa* (TN1) were also present. On the north-eastern side of this meadow is a bank which slopes down from the verge of the A34. This supported a diverse sward structure with species such as hemp-agrimony *Eupatorium cannabinum*, common reed *Phragmites australis* and common nettle. Area 2 (see Figure 2) is of a similar composition and structure but no grazing was noted. The drain on the southern and western edge of Area 1 (TN2 and 3) supports a range of species of a similar composition to the meadow itself but grazing was excluded from the banks of the drain. The area between Area 1 and 2 supports a mix of wet meadow as described for Areas 1 and 2 and woodland.
- 3.2.4 A hay meadow is also present immediately to the south of Area 1 (TN4). This had recently been cut at the time of the survey, but it may support a wider diversity of herbs and graminoids (grasses and grass like species) than was immediately apparent. This should also, therefore, be included in the habitats of high potential as a precautionary measure. However, should further surveys be needed for Area 1, the need for surveys in this area (the hay meadow) will be determined based on the floristic diversity and structure of the sward present.
- 3.2.5 Overall, the habitats of the water meadows are likely to be of importance to invertebrates owing to: the varied structural diversity (grassland, scrub and trees); species diversity of herbs; relatively sheltered aspect afforded by trees and wooded belts; and seasonally inundated ground, which can support a range of specialist invertebrates (notably beetles and flies; Coleoptera and Diptera respectively).



- 3.2.6 The habitats enclosed by the roundabout of Junction 9 include some dense plantation woodland habitats with a dense scrub layer. The species include ash *Fraxinus excelsior*, hawthorn *Crataegus monogyna* and dogwood *Cornus sanguinea*. Although these offer limited diversity in terms of species composition, the structural diversity and shelter they provide heightens the interest to invertebrates of the adjacent open areas, especially at the ecotone between the woodland and open areas. These open areas adjacent to the road verges support grassland which, in places, is herb-rich. This includes Areas 3 and 4 (see Figure 2).
- Area 3 includes an underpass on its western side and the banks created to accommodate this 3.2.7 provide a range of aspects. The vegetation structure is fairly diverse and ranges from a long sward (50cm) down to much shorter swards, which either arise from drier conditions or management (mowing). The grasses recorded include false oat-grass Arrhenatherum elatius. This species made up about 40% of the sward. However, a number of other species were also present either as part of the taller sward or forming lower swards. These included: goldenrod Solidago virgaurea, early goldenrod Solidago gigantea, perforate St. John's-wort Hypericum perforatum, agrimony Agrimonia eupatoria, varrow Achillea millefolium, goat's-beard Tragopogon pratensis, wild teasel Dipsacus fullonum, red clover Trifolium pratense, musk-mallow Malva moschata, welted thistle Carduus crispus, hogweed Hareclum sphondylium, bristly oxtongue Helminthotheca echioides, upright hedge parsley Torilis japonica, hemp-agrimony Eupatorium cannabinum, tufted vetch Vicia cracca, wild carrot Daucus carota, wild marjoram Origanum vulgare, wild basil Cinopodium vulgare, fairy flax Linum catharticum, oxeye daisy Leucanthemum vulgare, common bird's-foot-trefoil Lotus corniculatus and toadflax Linaria vulgare. Such a diversity of plants, with species (including the aforementioned shrubs) that flower through much of the growing season is likely to support a varied invertebrate fauna, either feeding off the foliage (phytophagous species) or visiting the flowers to collect nectar or pollen. The southern aspects of some of these areas, the shorter sward height and the sheltered position (in some places) will benefit warmth-loving (thermophillous) species, such as solitary bees and wasps (Hymenoptera: Aculeata).
- 3.2.8 Area 4 (see Figure 2) was less diverse in terms of structure, being dominated by a short sward with some patches of bare ground. Several anthills were noted as developing in this area. The species list was similar to that of Area 3 with further species including: bladder campion *Silene vulgaris*, white clover *Trifolium repens*, common centaury *Centarium erythraea*, hedge bedstraw *Galium mollugo*, common knapweed *Centaurea nigra*, evening primrose *Oenothera biennis*, goat's-rue *Galega officinalis*, common fleabane *Pulicaria dysenterica* and ploughman's-spikenard *Inula conyzae*.
- 3.2.9 To the east of the Junction (shown as Area 5 on Figure 2), Easton Lane runs south-west to northeast and is lined on both sides with mature hedgerows. These support species such as blackthorn *Prunus spinosa*, hawthorn, dog rose *Rosa canina agg*. and bramble *Rubus fructicosus* agg.. The blackthorn was suckering into the verges in places. These verges also support grassy margins, with false oat-grass as well a number of herb species, including common nettle, common knapweed, agrimony, hogweed, hedge bedstraw, black horehound *Ballota nigra*, field scabious *Knautia arvensis*, mugwort *Artemisia vulgaris* and wild onion *Allium vineale*. The structure, shelter and nectar and pollen sources afforded by the hedgerows along this lane makes it a linear sun trap that will benefit (amongst other groups) thermophilous (warmth-loving) species, spiders (Araneae), grasshoppers and crickets (Orthoptear), and butterflies and moths (Lepidoptera).

3.3 LOW POTENTIAL FOR IMPORTANT INVERTEBRATE ASSEMBLAGES

3.3.1 Certain areas within the River Itchen SSSI and Winnal Moors reserve were assessed as having low potential to support significant invertebrate assemblages. This included the drier meadows in the northern part of the Survey area (TN 5). For example, the area between the Itchen and the A34 (TN 6) is dominated by common reed with a fairly uniform structure.



- 3.3.2 Two large meadows (TN7) are present in the central part of the Survey Area, immediately to the north of the junction. These were grazed by cattle and managed relatively intensively, though the sward did show some diversity in terms of herb species the structure offered is very limited.
- 3.3.3 An area of grassland (TN8), with recently planted woodland, is present to the south of Easton Lane in the Survey Area. This appears to be recently unmanaged, and as such the structure of the sward is relatively uniform. The herb species recorded were limited, but included ploughman's spikenard, colt's-foot *Tussilago farfara*, teasel, mugwort, common fleabane and wild carrot. Therefore this habitat has been categorised as being of low potential although it may develop into a more diverse area in time.
- 3.3.4 The majority of the remainder of the Survey Area comprises intensively managed arable farmland with narrow field margins. This agricultural landscape offers very limited sheltering and foraging opportunities for invertebrates and is therefore regarded as low potential for invertebrates. Other habitats include the infrastructure associated with a supermarket (parking areas and the store itself) and industrial areas.



4 RECOMMENDATIONS

- 4.1.1 The information gathered has allowed habitats to be categorised as either low or high potential. All areas assessed as being of low potential will not need further targeted surveys.
- 4.1.2 It is recommended that those categorised as having high potential should be subject to further surveys if they are to be impacted directly or indirectly by the development proposal, with the exact methods tailored to suit the likely species composition of the assemblage. The recommendations presented in the Table 4-1 below are in line with current best practice guidance (Drake *et al.*, 2007).

Area	Навітат	Метнор	TIMING	SURVEY FOCUS
1 & 2 (and adjacent hay meadow - TN4)	Wet meadow and hay meadow	Sweep netting / beating	Minimum of two surveys covering spring and summer	Pitfall traps will be deployed on up to two occasions in late spring and summer for a period of 10 – 14 days on each occasion. The surveys will focus on Coleoptera, Hemiptera and Orthoptera (grasshoppers & crickets)
3	Grassland and scrub/ woodland edge	Minimum of two surveys covering spring and summer	Minimum of two surveys covering spring and summer	Pitfall traps will be deployed on up to two occasions in late spring and summer for a period of 10 – 14 days on each occasion. The surveys will focus on Coleoptera, Hemiptera and aculeate Hymenoptera (bees, ants and wasps)
4	Grassland and scrub/ woodland edge	Sweep netting / beating Pitfall traps Pan traps	Minimum of two surveys covering spring and summer	Pitfall traps will be deployed on up to two occasions in late spring and summer for a period of 10 – 14 days on each occasion. The surveys will focus on Coleoptera, Hemiptera and aculeate Hymenoptera.
5	Hedgerow and lane verges	Sweep netting / beating Pitfall traps Pan traps	Minimum of two surveys covering spring and summer	Pitfall traps will be deployed on up to two occasions in late spring and summer for a period of 10 – 14 days on each occasion.

Table 4-1 Further surveys (if required)



Area	Навітат	Метнор	TIMING	SURVEY FOCUS
				The surveys will
				focus on Coleoptera,
				Hemiptera,
				Orthoptera and
				aculeate
				Hymenoptera.



5 CONCLUSIONS

- 5.1.1 Whilst the majority of the Survey Area comprises intensively managed arable farmland largely unsuitable for notable invertebrate assemblages, there are several parts of the Survey Area that have the potential to support species and assemblages of conservation importance. These areas comprise wet meadow and grassland associated with scrub, woodland and hedgerows.
- 5.1.2 Areas 1 and 2 currently lie outside the proposed working footprint, and therefore further surveys, are not likely to be necessary unless the development proposals change. However, the northeastern margin of Area 1 supports habitats associated with existing drainage ditches which are likely to be of high potential for invertebrates. Therefore should impacts to the banks of the A34 be impacted upon, further surveys will be required.
- 5.1.3 The further surveys recommended for Areas 3, 4 and 5 (where these areas are affected by the Proposed Works) and will inform the likely impacts of the scheme on the invertebrate assemblages present. These are likely to require at least two visits to covering both spring (typically early April to mid-June) and summer (typically late June to early September).



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→ Drake, C. M., Lott, D. A., Alexander, K. N. A. & Webb, J. (2007) Natural England Research Report NERR005: Surveying terrestrial and freshwater Invertebrates for conservation evaluation. Natural England.





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