

South Wales Trunk Road Agent

Managing and Improving
Motorways and Trunk Roads
through South Wales



Asiant Cefnffyrdd De Cymru

Rheoli a Gwella'r Traffyrdd
a'r Cefnffyrdd yn Ne
Cymru

M4 Junction 33-34 Westbound Widening Ecology Factual Report



Yn gweithio ar ran
Llywodraeth Cymru
Working on behalf of the
Welsh Government

- Local (Vale of Glamorgan) and National Biodiversity Action Plans.

Badger

Badger (*Meles meles*) surveys were undertaken within a 250m buffer of the proposed works from 18th-21st March 2014. Surveys were undertaken with reference to the Design Manual for Roads and Bridges (DMRB, 2001) Volume 10. In the absence of general badger survey guidance this methodology was considered the most appropriate. Surveys involved searching for field signs including:

- Badger setts;
- Badger paths;
- Latrines;
- Badger hair;
- Prints; and,
- Evidence of foraging.

Bats

Bat surveys were undertaken in accordance with the Design Manual for Roads and Bridges (DMRB, 2001) and Bat Survey: Good Practice Guidelines (Hundt 2012) in order to determine the presence and status of bats in the motorway highway boundary habitats.

Static Anabats

Anabat SD2 units were placed at eight locations identified in Figure 4a and in Table 1 below. Five of the Anabat units were placed close to culvert entrances where the survey objective was to identify whether culverts were being used for bats commuting under the M4 and A4232. Three Anabat units were placed in habitats considered to be of value to bats close to the M4, where the survey objective was to determine levels of bat activity. All eight Anabats were left out for a minimum of three consecutive nights in May, June, August and October 2014.

Table 1: Details of Static Anabat Locations

Location / Anabat Name	Marker Post	Description of Location
Culvert 1	251/1	At entrance to 900mm diameter culvert under A4232 which lies on woodland edge.
Culvert 2	251/2	Anabat unit was placed next to a 600mm culvert 5m down the M4 embankment.
Woodland Edge	251/6	The Anabat was placed along the edge of an area of woodland.
Culvert 3	252/0	The Anabat was placed at the entrance to a 2m diameter culvert that carries the watercourse Nant Henstaff under the M4. See Photograph 2 in Appendix D.
Culvert 4	252/4	The Anabat was placed on the wing wall of a large box culvert that carries the watercourse Nant Coslech under the M4.
Rush Field (Marshy Grassland)	252/9	The Anabat was placed at the edge of an extensive area of marshy grassland.
Culvert 5	252/9	The Anabat was placed in front of a 900mm culvert carrying a small watercourse under the M4
Wet Woodland	253/3	The Anabat was placed in an area of unmanaged wet woodland.

Walked transects

Walked transects were designed so that they covered the survey area in three sections, western, central and eastern. These were each walked once in three consecutive dusk surveys in May and July 2014 and once in three consecutive dawn surveys in September 2014. The details of these surveys are presented in Table 2.

Table 2: Details of Walked Transects

Month	Transect	Date	Sunset/ sunrise	Start time	Temp (Celsius)	Weather
May (dusk)	West	20/05/2014	21:06	20:35	15 to 13	10% cloud, no wind, fine
	Central	21/05/2014	21:07	20:38	17 to 18	30% cloud no wind fine
	East	22/05/2014	21:08	20:40	12 to 13	90% cloud, no wind, occasional light showers
July (dusk)	West	15/07/2014	21:24	20:55	19 to 15	5% cloud, fine, no wind
	Central	16/07/2014	21:23	20:50	18 to 20	100% cloud, occasional light drizzle, light breeze
	East	17/07/2014	21:22	20:50	21 to 23	50% cloud, very humid, warm, mainly fine but a thunderstorm at end of survey - survey ended 90 mins after sunset.
Sept (dawn)	West	08/09/2014	06:35	05:00	11	5% cloud, cool, no wind
	Central	09/09/2014	06:37	04:50	10	5% cloud, cool, no wind
	East	10/09/2014	06:39	04:45	9	Clear sky, cool, no wind

The transects had up to ten listening posts at locations with habitat features considered to be of likely value to bats. Surveyors stood at the listening posts for periods of ten minutes, and then walked at a constant pace between listening points. Transect routes were walked in reverse direction on alternating visits in order to vary the time after sunset that surveyors reached each listening post. An Anabat SD2 bat detector recorded bat ultrasound continuously, and a Batbox Griffin time expansion detector was also activated manually to sample bat calls.

Driven Transects

Driven transects were undertaken in June, August and October 2014. June and October were dusk surveys and, August was a dawn survey. The transect route is illustrated with results in Figure 4b.

The survey methodology consisted of driving slowly (approximately 5 mph) along the M4 hard shoulder between J33 and J34 and along the A4232 hard shoulder, south to the first roundabout. An Anabat unit was deployed on the vehicle in order to pick up the ultrasound calls of any bats within range. The details of the driven transect surveys are set out in Table 3.

Table 3: Details of Driven Transect Surveys

Month	Date	Sunset/ sunrise	Start time	Temp (Celsius)	Weather
June	23/06/2014	21:06	20:35	15 to 13	10% cloud, no wind, fine
August	22/08/2014	04:16	06:06	13	no cloud, fine but heavy rain before start of survey, no wind
October	10/10/2014	07:10	05:21	9	10% cloud, fine, no wind

Target Note	Description
19	Four mature oak trees with low bat potential
20	Semi-natural broad-leaved woodland. Dog's mercury noted. Wet areas (alder and willow dominant) noted towards Renshaw. Himalayan balsam present in these areas. Pond 3 located within this habitat, see Photograph 9 in Appendix D.
21	South facing motorway embankment with plantation/self-seeded woodland leading to semi-natural broad leaved woodland at base (wet in parts). Ground flora is representative of well-established woodland throughout with good diversity of species.
22	Large mature oak tree with fallen, cracked limbs. Some bat roost potential – falls within Scheme development footprint.
23	Broad-leaved woodland with a range of canopy species and a bramble understorey. Large, mature trees present along old walls/ditches and small areas of recently planted species. Becomes marshy grassland towards the highway boundary with rush species and scattered willow trees. See Photograph 10 in Appendix D
24	Small roadside brick cabin. No evidence of roosting bats identified. Highly unlikely to provide bat roosting opportunities.
25	Groes Faen over-bridge. Some bat roost potential in the expansion joints of the bridge structure itself.
26	Culvert with running water – silted.
27	Himalayan balsam growing around culvert.
28	Tall ruderal with scattered scrub Nettle was the abundant species with bramble occasional but locally abundant.
29	Semi-mature broad-leaved woodland along old railway line Canopy species included sycamore, hazel, ash and hawthorn. Ivy, hart's-tongue fern and male fern were common in the understorey.
30	Two small areas of semi-natural mixed woodland.
31	Coniferous plantation.

Badgers

A number of signs of badger activity were recorded in woodland adjacent to J34. This included a dead badger located near to the carriageway to the west of the scheme, three separate badger setts, badger hairs and a claw identified in woodland adjacent to J34. Mammal runs and a badger hair were also found underneath a fence adjacent to woodland associated with J33 and the A4232.

The results of the badger survey are shown in Appendix F and included in Figure 3.

Bats

Habitat Assessment

The habitat quality for bats in the survey area was found to be very good, containing a diverse range of habitats of value to many bat species for foraging, roosting and commuting.

The survey area contained a number of watercourses and ponds which were considered of value to foraging bats, providing them with water to rehydrate and also attracting flying insects.

The survey area contained areas of woodland of varying species composition, and structure, scrub, scattered veteran trees and hedgerows providing a wide diversity of insect prey of value to hunting bats. Many trees were noted to contain features such as splits, rot holes and

woodpecker holes providing many suitable roost sites for bats (one of which was identified in the Scheme footprint (TN 22)). Woodlands in the western third of the survey area were wet woodland, dominated by willow and alder. These were considered to be of particular value for bat foraging.

The survey area contained extensive semi improved and marshy grasslands providing high value foraging habitat for bats. Many of these were noted as being managed as sheep, horse and cattle pasture and therefore providing suitable habitat for dung beetles, an important prey for larger bat species such as noctule and serotine, both of which were recorded during surveys.

The survey area contained a number of farms and associated agricultural buildings, and also residential properties providing many opportunities for bats to roost. The Groes faen overbridge was considered to offer suitable features in which bats might roost (however this structure was not inspected closely due to access restrictions).

The survey area was found to provide good connectivity for bats in the form of woodland edges, hedgerows, watercourses and other linear features. A disused railway line vegetated by scrub and woodland was noted on the western side of the A4232 road south of M4 J33 and running parallel with it for several hundred metres.

The M4 and A4232 roads were considered likely to act as significant habitat barriers to bats, restricting free movement of bat populations across the landscape. However, the presence of a number of culverts carrying watercourses beneath the M4 and A4232, which are navigable by bats, were considered likely to mitigate this effect.

The Groes Faen over bridge and a number of signalling gantry supports are also located within the existing highway boundary. These were considered to offer some potential habitat connectivity by acting as linear features which may assist bats to navigate over the carriageways avoiding collisions with traffic. (Access constraints meant that none of the survey methodologies employed could test this, and so no evidence was found in surveys which would support or discount this conjecture.)

Static Anabat results

Bats were recorded at all eight static Anabat locations. Data is presented in Appendix E, and summarised in Figure 4a.

Results were dominated by large numbers of common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and unidentified *Myotis* species, however low numbers of lesser horseshoe bats (*Rhinolophus hipposideros*) were also recorded at culvert #1, culvert #2, culvert #3 and culvert #5. Small numbers of Noctule (*Nyctalus noctula*) Brown long eared bat (*Plecotus auritus*) and Serotine (*Eptesicus serotinus*) were also recorded.

Driven Transect results

The results of the driven transects are presented in Figure 4b. Overall numbers of bats recorded using this methodology was low in comparison to the static anabats and walked transects methodologies. Species recorded were low numbers of common pipistrelle, soprano pipistrelle and unidentified *Myotis* species. Records of pipistrelle species were clustered around the access road to the industrial site south of J34 and the service station north of J33, both of which are well lit with street lighting.

A lesser horseshoe bat was recorded outside the survey area on the A4232.

Walked Transect results

The results of the walked transects are presented in Appendix E and Figures 4c, 4d and 4e. Bat activity was moderate/high on all dusk surveys in the western, central and eastern transects in May and July, when weather conditions were favourable. Bat activity was low during all dawn surveys in September when ambient temperatures were low.

Species recorded were common pipistrelle, soprano pipistrelle, unidentified *Myotis* species, brown long eared bat, Noctule and Serotine, lesser horseshoe and possible barbastelle (*Barbastella barbastellus*).

Of particular note a bat was recorded on the May Eastern walked transect whose call characteristics were consistent with barbastelle. Two brief calls were recorded both of which, although consistent with barbastelle, also have some characteristics of a brown long eared bat, though atypical for this species. It is considered that the call characteristics are intermediate between the two species (pers. comm. Dr Sandie Sowler). Therefore this data is presented on Figure 4c as “possible barbastelle”. The bat was recorded close to the disused railway line which lies parallel to the eastern boundary of the A4232 south of J33.

Small numbers of lesser horseshoe bat were recorded from the central and eastern transects. Of particular note is the record of lesser horseshoe flying south along the watercourse leading from culvert #4.

Incidental observation

An incidental record of a dead lesser horseshoe bat was found on the M4 embankment above culvert #4 during the Phase 1 survey. The position and condition of the corpse were consistent with it being killed in a road traffic collision. Low numbers of lesser horseshoe bats were recorded in the static and walked transects. A lesser horseshoe was recorded at culvert #4 during the walked transect in May.

Birds

The highway verge comprises dense plantation woodland and scrub. The remainder of the study area is dominated by a farmed (mostly sheep and cattle grazed) agricultural landscape consisting of improved grassland, neutral semi-improved and marshy grassland typically bounded by fences and/or hedgerows. Habitats of greatest importance to breeding birds within the overall study area include broad-leaved semi-natural woodland, marshy grassland, scrub and riparian borders along minor watercourses.

Sixteen bird species of conservation importance were recorded during the bird surveys. Table 7 lists these species. The location where each bird was recorded is shown in Figure 5. Of these species of conservation importance, the most common species recorded was song thrush (*Turdus philomelos*) while the least common species recorded was house martin (*Delichon urbicum*). Barn owl feathers were also found in woodland during Phase 1 survey (Photograph 8, Appendix D) and owl pellets were found in a barn approximately 600m to the south of Junction 33 (Photograph 7, Appendix D).

Appendix E: Bat Survey Data

Static Anabat Results

No bats were recorded at culvert 2 or culvert 4 in May.
No bats were recorded at culvert 4 in October

The following tables contain the number of bat registrations for individual species or species groups at each static Anabat location.

Static Anabat data for Culvert #1 May 2014

Date	Common Pipistrelle	Soprano Pipistrelle	Lesser Horseshoe Bat	Myotis	Noctule	Grand Total
08/05/2014	13	1		3	2	19
09/05/2014	25	14		7	12	58
10/05/2014				2		2
11/05/2014	127	111		6	2	246
12/05/2014	51	20	1	4	1	77
13/05/2014		1				1
Grand Total	216	147	1	22	17	403

Static Anabat data for Culvert #1 June 2014

Date	Common pipistrelle	Soprano Pipistrelle	Myotis Species	Noctule	Serotine	Grand Total
23/06/2014	5	14	75			94
24/06/2014	32	13	136	1	2	184
25/06/2014	2	10	140			152
26/06/2014	1	29	13			43
Grand Total	40	66	364	1	2	473

Static Anabat data for Culvert #1 October 2014

Date	Common pipistrelle	Soprano Pipistrelle	Brown Long Eared	Lesser Horseshoe	Myotis species	Pipistrelle species	Grand Total
01/10/2014	3	9	0	2	6	0	20
02/10/2014	8	8	1	2	10	0	29
03/10/2014	8	42	0	0	2	38	90
Grand Total	19	59	1	4	18	38	139

Static Anabat data for Culvert #2 June 2014

Date	Common pipistrelle	Soprano Pipistrelle	Lesser Horseshoe	Myotis Species	Serotine	Grand Total
23/06/2014	10	1		1		12
24/06/2014	1	4	3		1	9
25/06/2014	2	3		1		6
26/06/2014		1	6			7
Grand Total	13	9	9	2	1	34

Static Anabat data for Culvert #2 August 2014

Date	Common pipistrelle	Lesser Horseshoe	Myotis Species	Grand Total
18/08/2014	1	1		2
19/08/2014	4		1	5
Grand Total	5	1	1	7

Static Anabat data for Culvert #2 October 2014

Date	Common pipistrelle	Soprano Pipistrelle	Brown Long Eared	Lesser Horseshoe	Myotis species	Noctule	Pipistrelle species	Serotine	Grand Total
01/10/2014	11	6	2	1	28	1	1	1	51
02/10/2014	5	19	2		13				39
03/10/2014	4	11					1		16
Grand Total	20	36	4	1	41	1	2	1	106

Static Anabat data for Culvert #3 May 2014

Date	Myotis species	Grand Total
08/05/2014	18	18
09/05/2014	50	50
10/05/2014	4	4
Grand Total	72	72

Static Anabat data for Culvert #3 June 2014

Date	Common pipistrelle	Soprano Pipistrelle	Myotis species	Noctule	Grand Total
23/06/2014	3	1	23	1	28
24/06/2014			118		118
25/06/2014			41		41
26/06/2014			44		44
Grand Total	3	1	226	1	231

Static Anabat data for Culvert #3 October 2014

Date	Common pipistrelle	Soprano Pipistrelle	Lesser Horseshoe	Myotis species	Pipistrelle social	Pipistrelle species	Grand Total
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calls						
01/10/2014			1	26		27
02/10/2014		1	7	15	2	26
03/10/2014	1	1	1	3		6
Grand Total	1	2	9	44	2	59

Static Anabat data for Culvert #4 May 2014

Date	Myotis	Noctule	Grand Total
08/05/2014	10	1	11
09/05/2014	11		11
10/05/2014	4		4
11/05/2014	8		8
12/05/2014	6		6
13/05/2014	3		3
Grand Total	42	1	43

Static Anabat data Culvert #5 May 2014

Date	Common pipistrelle	Soprano Pipistrelle	Lesser Horseshoe	Myotis Species	Noctule	Grand Total
08/05/2014	4	14		25	2	45
09/05/2014	27	14	1	272	3	317
10/05/2014		1		11		12
11/05/2014	28	70		172	11	281
12/05/2014	24	46		149	6	225
13/05/2014				6		6
Grand Total	83	145	1	635	22	886

Static Anabat data Culvert #5 June 2014

Date	Common pipistrelle	Soprano Pipistrelle	Myotis Species	Grand Total
23/06/2014	2		19	21
24/06/2014	1	3	13	17
25/06/2014	1		21	22
26/06/2014			1	1
Grand Total	4	3	54	61

Static Anabat data Culvert #5 October 2104

Date	Common pipistrelle	Soprano Pipistrelle	Myotis species	Noctule	Pipistrelle species	Grand Total
01/10/2014	3	1	3		1	8
02/10/2014		2	4		1	7

03/10/2014		1		1		2
Grand Total	3	4	7	1	2	17

Static Anabat data Rush Field May 2014

Date	Common pipistrelle	Soprano Pipistrelle	Myotis species	Noctule	Serotine	Grand Total
08/05/2014	13	7	1	4	1	26
09/05/2014	147	42	1	3		193
10/05/2014	1		1			2
11/05/2014	54	31	1	1		87
12/05/2014	65	19		1		85
Grand Total	280	99	4	9	1	393

Static Anabat data Rush Field June 2014

Date	Common pipistrelle	Soprano Pipistrelle	Brown Long Eared	Myotis Species	Noctule	Serotine	Grand Total
23/06/2014	17	23	2	6			48
24/06/2014	24	31	3	9	1	1	69
25/06/2014	13	25	5	19	1		63
26/06/2014	17	13	3	3			36
Grand Total	71	92	13	37	2	1	216

Static Anabat data Rush Field October 2014

Date	Common pipistrelle	Soprano Pipistrelle	Brown Long Eared	Myotis species	Noctule	Grand Total
01/10/2014	3	4	1	2	1	11
02/10/2014	2	1				3
03/10/2014	2	3				5
Grand Total	7	8	1	2	1	19

Static Anabat data Wet woodland May 2014

Date	Common pipistrelle	Soprano Pipistrelle	Myotis species	Grand Total
08/05/2014			1	1
09/05/2014		2	12	14
11/05/2014	1	3	10	14
12/05/2014	2	2	11	15
Grand Total	3	7	34	44

Static Anabat data Wet woodland June 2014

Date	Common pipistrelle	Soprano Pipistrelle	Myotis species	Grand Total
23/06/2014		3	1	4
24/06/2014		1	5	6
25/06/2014		1	2	3

26/06/2014	1		3	4
Grand Total	1	5	11	17

Static Anabat data Wet Woodland October 2014

Date	Myotis species
01/10/2014	2
02/10/2014	
03/10/2014	3
Grand Total	5

Static Anabat data Woodland Edge May 2014

Date	Common pipistrelle	Soprano Pipistrelle	Myotis species	Noctule	Grand Total
08/05/2014	1417	514	22	12	1965
09/05/2014	435	80	8	2	525
10/05/2014	322	124	52	6	504
11/05/2014	229	51	4		284
12/05/2014	101	30	1		132
13/05/2014	3	3			6
Grand Total	2507	802	87	20	3416

Static Anabat data Woodland Edge June 2014

Date	Common pipistrelle	Soprano Pipistrelle	Myotis Species	Noctule	Grand Total
23/06/2014	115	17	4		136
24/06/2014	46	44	1	2	93
25/06/2014					
26/06/2014					
Grand Total	161	61	5	2	229

Static Anabat data Woodland Edge October 2014

Date	Common pipistrelle	Soprano Pipistrelle	Brown Long Eared	Myotis species	Noctule	Pipistrelle social call	Pipistrelle species	Grand Total
01/10/2014	373	35	2	15	1	2	2	430
02/10/2014	150	33	1	23				207
03/10/2014	476	16		17		3	8	520
Grand Total	999	84	3	55	1	5	10	1157

Walked Transect Results

The following tables contain the number of bat registrations for individual species or species groups per walked transect for each species recorded. Location information for this data is represented on Figures 4c, 4d and 4e.

Walked Transect data for May Western Transect

Date	Common pipistrelle	Soprano Pipistrelle	Noctule	Grand Total
20/05/2014	54	22	9	85

Walked Transect data for May Central Transect

Date	Common pipistrelle	Soprano Pipistrelle	Lesser Horseshoe	Myotis	Serotine	Grand Total
21/05/2014	23	17	2	4	2	48

Walked Transect data for May Eastern Transect

Date	Common pipistrelle	Soprano Pipistrelle	Lesser Horseshoe	Serotine	Brown Long Eared	Myotis Species	Possible Barbastelle	Grand Total
22/05/2014	33	13	1	3	1	5	2	58

Walked Transect data for July Western Transect

Date	Common pipistrelle	Soprano Pipistrelle	Myotis Species	Noctule	Pipistrelle species	Grand Total
15/07/2014	37	6	3	8	1	55

Walked Transect data for July Central Transect

Date	Common pipistrelle	Soprano Pipistrelle	Myotis Species	Noctule	Grand Total
16/07/2014	21	76	3	8	108

Walked Transect data for July Western Transect

Date	Common pipistrelle	Soprano Pipistrelle	Myotis	Pipistrelle species	Serotine	Lesser Horseshoe	Grand Total
17/07/2014	116	137	13	7	2	2	277

Walked Transect data for September Western, Central and Eastern Transects

Transect	Date	Common pipistrelle	Soprano Pipistrelle	Noctule	Grand Total
Western Transect	08/09/2014	16	1		17
Central Transect	09/09/2014	2	1		3
Eastern Transect	10/09/2014			1	1
Grand Total		18	2	1	21